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KNAUER Columns Overview

- How do you find the suitable column?

A wide range of different **KNAUER columns** and materials can be offered at a very attractive price.

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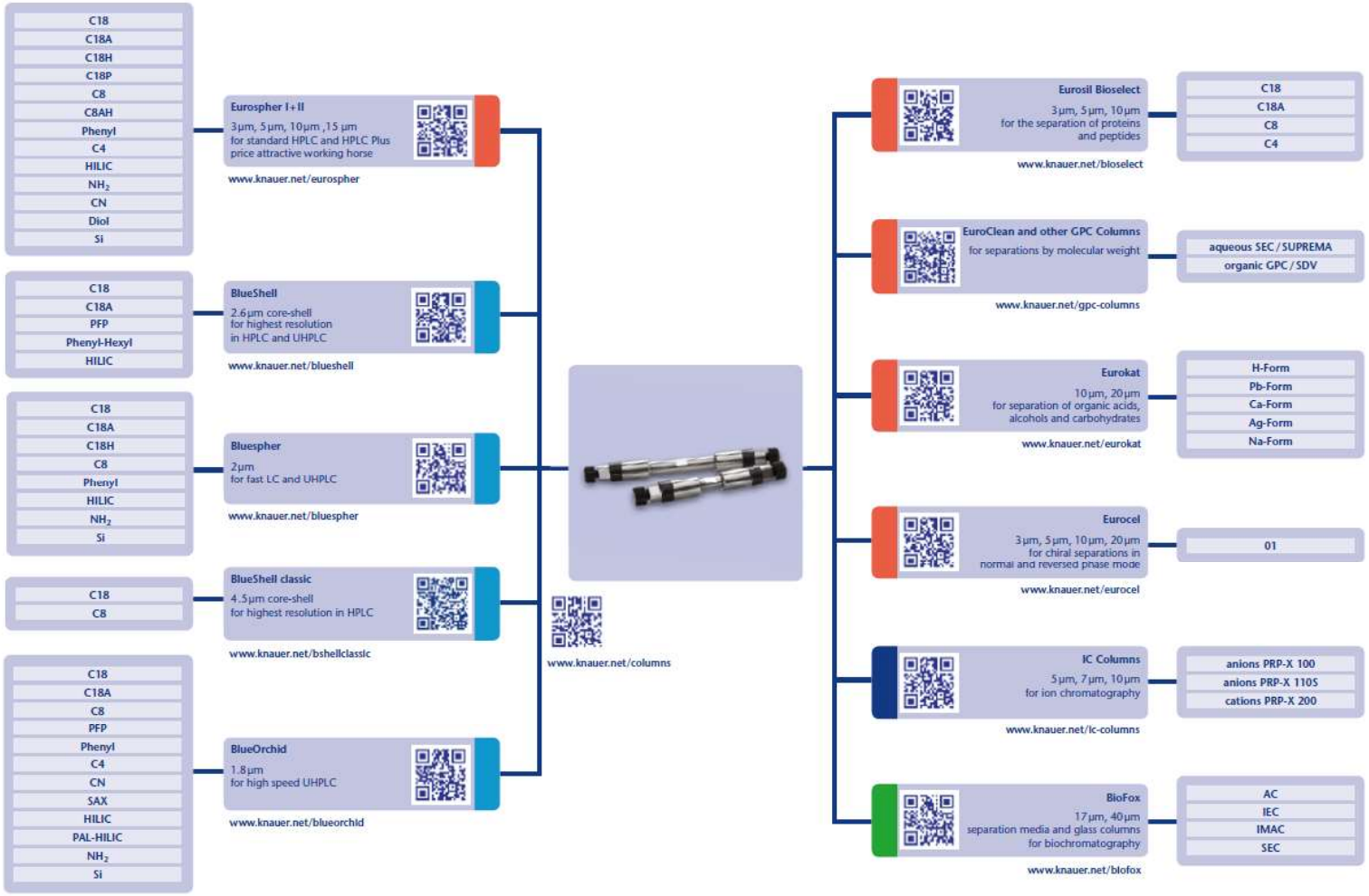
KNAUER Columns Overview



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KNAUER Columns

- Features → Benefits

- intelligent column hardware → easy filter replacement
- integrated precolumn → no loss of separation power
- column RF-Tag → column identity and history via software
- application service → column and method recommendation

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KNAUER Columns

USP

KNAUER columns are available for up- and downscale with similar selectivity.

Bluespher®	Eurospher® family			
UHPLC	HPLC	HPLC/MPLC preparative LC		
	analytical		semi-prep.	preparative

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Silica gel

BlueShell (core shell)

- for lowest backpressure with highest performance

Modifications: C18 | C18 A | HILIC | PFP | Phenyl -Hexyl

Physical properties:

Silica gel:	ultra pure, > 99.99%
Particle size:	2.6 µm
Particle shape:	spherical
Pore size:	80 Å
Specific surface:	130 m^2/g

Modification	USP Code	%Carbon	pH range
C18	L1	10% (50% endcapping)	1 – 11
C18A	L1	12% (50% hydrophilic endc.)	2 – 9
HILIC	L3		2 – 8
PFP	L43	5% (no endcapping)	2 – 8
Phenyl-Hexyl	L11	5% (no endcapping)	2 – 8

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Silica gel

BlueShell classic (core shell)

- highest performance far beyond 3 up to 5 µm fully porous particles

< 10% more resolution than 3 µm
< 25% more resolution than 5 µm

Modifications: C18 C8

Physical properties:

Silica gel:	ultra pure, > 99.99%
Particle size:	4.5 µm
Particle shape:	spherical
Pore size:	80 Å
Specific surface:	130 m^2/g

Modification	**USP Code**	**%Carbon**	**pH range**
C18	L1	7% (50% endcapping)	1 – 11
C8	L7	4% (50% endcapping)	2 – 9

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Silica gel

Bluespher

► for high speed LC and UHPLC

Modifications: (8 Types) C18; C18A; C18H, C8; Phenyl; HILIC; NEW NH_2; Si

Physical properties:

Silica gel:	ultra pure, > 99.99%
Particle size:	2µm
Particle shape:	spherical
Pore size:	100 Å
Specific surface:	320 ± 20 m^2/g
Pore volume:	0.8 ml/g

Modification	**USP Code**	**%Carbon**	**pH range**
C18	L1	16% (50% endcapping)	2 – 8
C18A	L1	10% (50% hydrophilic endc.)	2 – 8
C18H	L1	17% (99% endcapping)	1 – 12
C8	L7	10% (50% endcapping)	2 – 8
NH_2	L8	4%	2 – 8
HILIC	L8	7% (zwitterionic modification)	2 – 8
Si	L3	-	2 – 8

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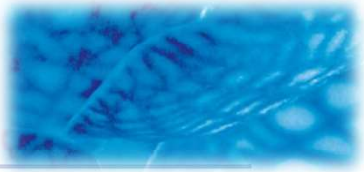
Silica gel

BlueOrchid



► for highest resolution in UHPLC

Modifications: (12 Types) C18; C18A; C8; PFP; C4; Phenyl; SAX; NH_2; HILIC; PAL-HILIC; CN; Si

Physical properties:

Silica gel:	ultra pure, > 99.99%
Particle size:	1.8 µm
Particle shape:	spherical
Pore size:	180 Å

Modification	USP Code	%Carbon	pH range
C18	L1	10% (50% endcapping)	2 – 8
C18A	L1	12% (50% hydrophilic endc.)	2 – 8
C8	L7	8% (50% endcapping)	2 – 8
PFP	L43	8%	2 – 8
C4	L26	5%	2 – 8
Phenyl	L11	8%	2 – 8
CN	L10	4%	2 – 8
SAX	L14	2.5%	2 – 8
HILIC		6%	2 – 8
PAL-HILIC		6%	2 – 8
NH_2	L8	4%	2 – 8
Si	L3	-	2 – 8

Silica gel

Eurospher II

- high flexibility with a wide range of modifications

Modifications: (13 Types) C18; C18A; C18H, C18P; C8; C8AH; C4; Phenyl; NH_2; HILIC, NEW CN; Diol; Si

Physical properties:

Silica gel:	ultra pure, > 99.99%
Particle size:	3µm; 5µm; 10µm, 15µm (upon request 20-45 µm)
Particle shape:	spherical
Pore size:	100 Å
Specific surface:	320 ± 20 m^2/g
Pore volume:	0.8 ml/g

Modification	USP Code	%Carbon	pH range
C18	L1	16% (50% endcapping)	2 – 8
C18A	L1	10% (50% hydrophilic endc.)	2 – 8
C18H	L1	17% (99% endcapping)	1 – 12
C18P	L1	20% (99% endcapping)	2 - 8
C8	L7	10% (50% endcapping)	2 – 8
C8AH	L7	8% (99% endcapping)	2 - 12
C4	L26	7% (50% endcapping)	2 – 8
NH_2	L8	4%	2 – 8
CN	L10	7%	2 – 8
Diol	L20	5%	2 – 8
HILIC	L8	7% (zwitterionic modification)	2 – 8

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Silica gel

Eurospher

► price attractive working horse

Modifications: (7 Types) C18; C8; C4; NH_2; CN; Diol; Si

Physical properties:

Silica gel:	2nd generation
Particle size:	3µm; 5µm; 10µm, 15µm (upon request 20-45 µm)
Particle shape:	spherical
Pore size:	100 Å
Specific surface:	350 m^2/g
Pore volume:	0.9 ml/g

Modification	USP Code	%Carbon	pH range
C18	L1	16% (50% endcapping)	2 – 8
C8	L7	10% (50% endcapping)	2 – 8
C4	L26	7% (50% endcapping)	2 – 8
NH_2	L8	4%	2 – 8
CN	L10	7%	2 – 8
Diol	L20	5%	2 – 8
Si	L3	-	2 – 8

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Silica gel

Eurosil Bioselect 300

ideal for large bio molecules

Modifications: C18; C18A; C8; C4

Physical properties:

Silica gel:	ultra pure, > 99.99%
Particle size:	3µm; 5µm; 10µm, 15µm
Particle shape:	spherical
Pore size:	300 Å
Specific surface:	90 m^2/g
Pore volume:	0.8 ml/g

Modification	USP Code	%Carbon	pH range
C18	L1	7.5% (50% endcapping)	2 – 8
C18A	L1	7% (50% endcapping)	2 – 8
C8	L7	4% (50% endcapping)	2 – 8
C4	L26	2% (50% endcapping)	2 – 8

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Silica gel

Eurocel*

- for chiral separations in normal and reversed phase mode

Modifications: coated silica gel with derivatized cellulose

Eurocel 01:	3,5-dimethylphenylcarbamate
Eurocel 02:	benzoate
Eurocel 03:	4-methylbenzoate
Eurocel 04	phenylcarbamate

Physical properties:

Silica gel:	ultra pure, > 99.99%
Particle size:	3µm; 5µm; 10µm, 20µm
Particle shape:	spherical
Pore size:	1000 Å

Modification	**USP Code**	**%Carbon**	**pH range**	**similar phases**
Eurocel 01	L40	-	2 – 8	Chiralcel OD, CelluCoat

*other chiral phases upon request

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Silica gel

Eurosil Pure

- for protein size exclusion (MW 10.000-1.000.000Da)*

Modifications:	Diol	
Physical properties:	Silica gel:	ultra pure, > 99.99%
	Particle size:	3µm; 5µm; 10µm
	Particle shape:	spherical
	Pore size:	100 Å; 200 Å; 300 Å
	Specific surface:	320 ± 20 m^2/g based on 100 Å
	Pore volume:	0.8 ml/g

Modification	**USP Code**	**%Carbon**	**pH range**	**MW range**
Eurosil Pure 100 Diol	L20	3.3%	2 – 8	5.000 – 100.000 Da
Eurosil Pure 200 Diol	L20	1.4%	2 – 8	10.000 – 500.000 Da
Eurosil Pure 300 Diol	L20	1 %	2 – 8	50.000 – 1.000.000 Da

*recommended column dimension: 300 x 8 mm ID

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Polymer gel

Eurokat

- for separation of carbohydrates, organic acids and alcohols without organic solvents*

Modifications:	H-Form (separation of organic acids, carbohydrates and alcohls Pb-Form (analysis of mono- and disaccharides) Ca-Form (analysis of mono- and disaccharides) Ag-Form (analysis of oligosaccharides)	
Physical properties:	Polymer gel:	sulfonated polystyrene divinylbenzene
	Cross linkage:	8% (H-Form) / 6% (Pb-; Ca- and Ag-Form)
	Particle size:	10 µm, 20 µm
	Pressure limit:	100 bar

*recommended column dimension: 300 x 8 mm ID

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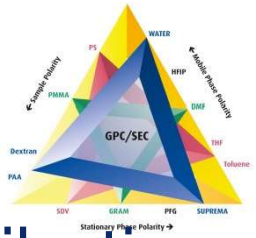
Polymer gel

GPC columns



- for determination of molecular weight distribution in organic and aqueous mode

SUPREMA:	aqueous mode: water (with salt/buffers, MeOH, ACN)	
Physical properties:	Polymer gel:	polyhydroxymethacrylate copolymer network
	Particle size:	5µm
	Pore size:	30Å, 100Å, 1000Å, 3000Å,
	Pressure limit:	50 - 80 bar
	pH range:	1.5 – 13
	MW range:	100 to 3.000.000 Da
SDV:	organic mode: THF, Toluene, Trichlormethane, Dichlormethane	
Physical properties:	Polymer gel:	modified polystyrene divinylbenzene copolymer
	Particle size:	5µm
	Pore size:	50Å, 100Å, 500Å, 1000Å, 10.000Å, 100.000Å
	Pressure limit:	45 - 150 bar, influenced by porosity
	pH range:	1.5 – 13
	MW range:	100 to 3.000.000 Da

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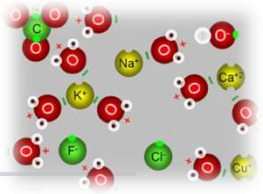
Polymer gel

Columns for Ion chromatography



- for separation of anions and cations

PRP-X 100:	inorganic and organic anions (10 – 500 ppm)
PRP-X 110S:	inorganic and organic anions (20 ppb – 20 ppm), supressed mode
PRP-X 200:	mono- and divalent cations (20 ppb – 200 ppm)

Physical properties:	Polymer gel:	modified polystyrene divinylbenzene copolymer (with Trimethylammonium Exchanger for anions; with Sulfonate Exchanger for cations)
	Particle size:	5µm, 7µm, 10µm
	Pore size:	100Å
	Pressure limit:	45 - 150 bar, influenced by porosity
	pH range:	0 – 14
	Eluents:	up to 100% organic solvent possible

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Polymer gel

EuroClean column material

- for clean-up of environmental and food samples

Material complies with guideline in EPA method 3640A, DFG 519, EN 1528, EN 12393

dry powder ready for swelling and gravity packing into glass columns*

*recommended column dimensions

Physical properties:	Polymer gel:	modified polystyrene divinylbenzene copolymer with low level of crosslinking; microporous
	Particle size:	40 – 55 µm
	Pressure limit:	low pressure application
	pH range:	0 – 14
	Eluents:	organic solvents (Dichlormethane preferred)

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Agarose gel

BioFox separation media

- for native separation of biomolecules

Modifications:	SEC: separation range 150 – 10.000 kDa IEC (Q, DEAE, S) with ionic capacity 0.18-0.26 mmol/ml Affinity material (ACT, IMAC): for protein ligands contanining amino-, hydroxy- and thiol groups IMAC (IDA, TREN): high and low metal ion capacity (10-20 µeqv [Cu^{2+}/ml]; 40-60 µeqv [Cu^{2+}/ml])	
Physical properties:	Agarose gel:	cross-linked 4.6-9.8 % agarose
	Particle sizes:	17 ± 1 µm; 40 ± 10 µm
	Particle shape:	spherical
	pressure limit:	40 bar

pre-packed columns and BULK-material

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Column Hardware

Vertex Plus analytical column hardware

Column dimensions:

- 5 mm (pre column)
- 30 mm length
- 50 mm length
- 100 mm length
- 125 mm length
- 150 mm length
- 250 mm length
- 300 mm length

ID 2mm, 3mm, 4mm, 4.6 mm,

ID 8 mm*, 16 mm* (semi preparative)

Vertex Plus AX preparative column hardware

Column dimensions:

- 30 mm (pre column)
- 150 mm length
- 250 mm length

ID 20mm, 30mm, 50mm

with axial compression

* not every length available

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Column Hardware

Bioline Glass columns

Column dimensions:

30 cm length
60 cm length
100 cm length

ID 10mm, 20mm, 30mm, 50mm and 100 mm

with axial adjustment

Properties:

- high tech borosilicate glass up to 100 bar
- axial compression
- quick release lever
- thermostatting jacket 4 – 60 °C
- central column cooling integrated into rack

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Column Ordering System

What's behind the column order numbers?

Order number examples:

250 x 4 mm column (without precolumn) Eurospher 100-5 C18	25	D	E	18	1	ES	J
150 x 4.6 mm (integrated precolumn) with Eurospher II 100-3 C18A	15	V	E	18	4	E2	G
300 x 8 mm with Eurokat H	30	G	X	34	0	EK	N
10 g Eurospher II 100-5 C18P	00	B	E	18	2	ES	J

KNAUER Column Ordering System

Position	1 2	3	4	5 6	7	8 9	10
	Column length	Inner diameter	Pore size	Particle shape and modification	Special characteristics	Brand name of packing material	Particle size

Column length		Inner diameter		Pore size		Particle shape and modification	spherical	irregular	Special characteristics		Brand name of packing material		Particle size	
				Å										
5 mm	P5*	1 mm	A	30	A	not modified	00	50	none	0	BioFox [3]	BF	1.8 µm	E
30 mm	03	2 mm	B	50	B	C1	01	51	endcapped	1	BlueShell [2]	SH	2 µm	F
50 mm	05	3 mm	C	60	C	C2	02	52	polymerbonding	2	Bluespher [1]	BS	2.6 µm	A
85 mm	08	4(4.1) mm	D	80	D	C3	03	53	acid stable h-philic endc.	3	BlueOrchid [1]	BO	3 µm	G
100 mm	10	4.6 mm	E	100	E	C4	04	54	h-philic endc.	4	Eurosil Bioselect [1]	EB	3.5 µm	H
125 mm	12	8(7.5) mm	G	120	F	Phenyl (P, C_6H_5)	05	55	h-phob. endc.	5	Eurosil Pure [1]	EP	4 µm	I
150 mm	15	10 mm	H	150	G	PFP	05 (7)		acid stable	6	Eurocel [1]	EC	5 µm	J
200 mm	20	AX 10 mm	T	180	I	C6	06	56	base stable	7	Eurokat [4]	EK	7 µm	L
250 mm	25	16 mm	I	200	H	C8	08	58	extended selectivity	8	Eurospher [1]	ES	8 µm	M
300 mm	30	AX 20 mm	P	300	K	chiral	10	60	no endcapping	9	Eurospher II [1]	E2	10 µm	N
500 mm	50	AX 30 mm	Q	500	L	HILIC	12	64	polar embedded phase	A	Hamilton [4]	HM	12 µm	O
600 mm	60	AX 50 mm	R	750	S	PAL-HILIC	13	65	TREN high	B	LiChrosorb [1]	LB	13 µm	P
1000 mm	1x	AX 100 mm	S	1000	M	cation exchanger	14	68	TREN low	C	LiChrospher [1]	LS	15 µm	Q
				4000	O	anion exchanger	15	69	IDA high	D	Nucleosil [1]	NS	16 µm	R
*Replacement for integrated precolumn		With integrated precolumn		10000	P	Phenyl-Hexyl	16	70	IDA low	E	Hydroxylapatit	PH	17 µm	W
				100000	Q	C18 (ODS, RP18)	18	80	Ni-charged	F	ProntoSIL [1]	PS	20 µm	S
				1000000	R	NH_2	19	81	S	G	ProntoSIL Hypersorb [1]	PY	30 µm	T
		2 mm	Y	not defined	X	CN^-	20	83	Q	H	ProntoSIL Spheribond [1]	SB	40 µm	Z
		3 mm	X	mixed	Z	C30	30	91	DEAE	I	PSS SDV [4]	SD	50 µm	U
		4 mm	W			NO_2	31		excl. limit 150 kDa	J	PSS Suprema [4]	SU	60 µm	V
		4.6 mm	V			$N(Me)_2$	33		excl. limit 1200 kDa	K	Sphere-Image [1]	SI	25-40 µm	X
Packing material		Weight/Volume				Diol	41		excl. limit 10000 kDa	L	Zorbax [1]	ZX	40-63 µm	Y
	00	1 g	A			H	34		ACT/excl. lim 1200 kDa	M				
		10 g	B			Pb	35		ACT/excl. lim 10000 kDa	N				
		100 g	C			Ca	36							
		1000 g	D			Ag	38							
						Polysaccharide CSP								
		5 ml	G			IMAC	39							
		10 ml	H			AC	40							
		25 ml	I			SEC	46							
		50 ml	J			GPC	47							
		100 ml	K			Enviro PAH	42							
		150 ml	L			Enviro Pesticides	43							
		200 ml	M			Enviro Phenol	44							
		250 ml	N			Enviro PTL	45							
		300 ml	O			DNPH	49							
		500 ml	P											
		1000 ml	Q											
		5000 ml	R											

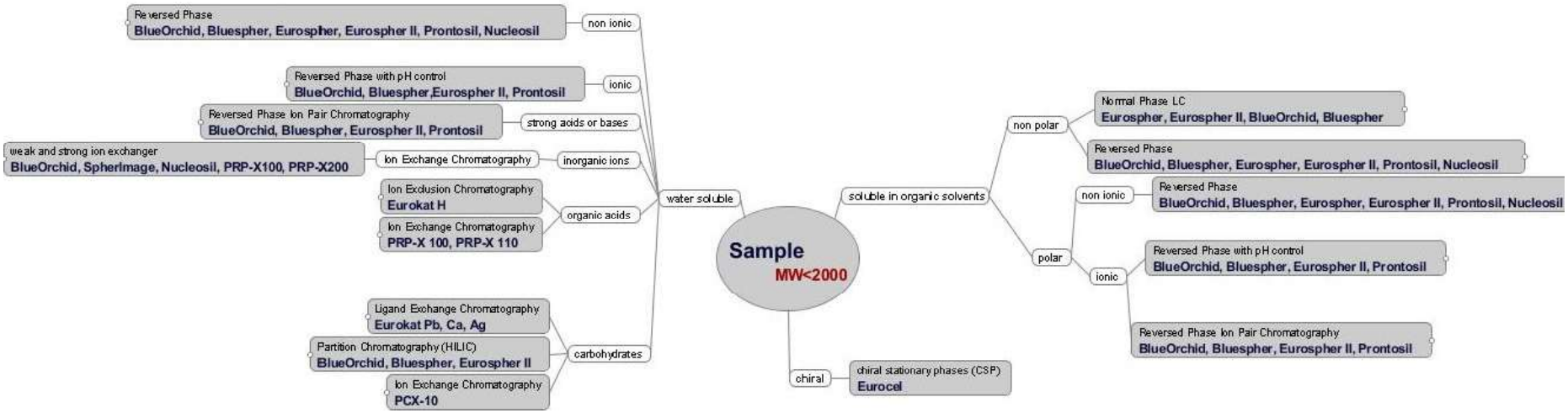
[1] Silica
[2] Core-shell
[3] Agarose polymer
[4] Polymer

The KNAUER order numbers consist of 10 positions (digits) Positions 1 to 3 describe the dimensions of the column hardwar (or when ordering bulk material, the amount of sorbent). Position 4 through 10 describe the properties of the packing material. Not that not every combination implied by this ordering system will resul in a valid column. Check availability on http://www.knauer.net/column

Need support? +49 30 809727-111 or support@knauer.ne

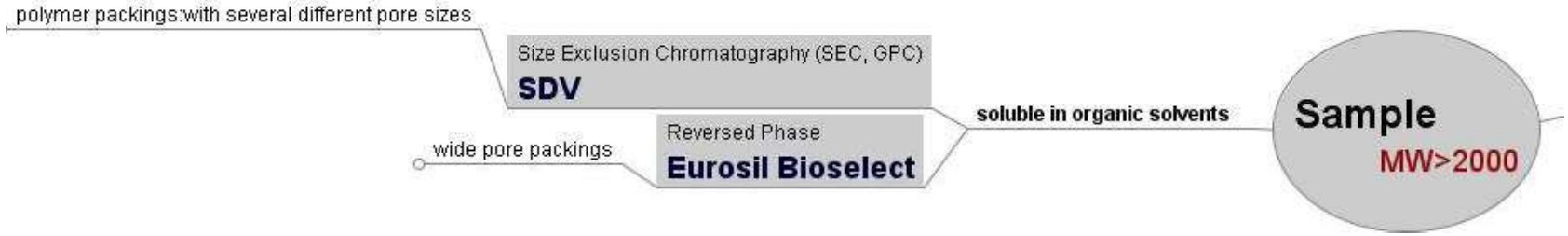
Column Selection Guide I

- Target molecules < 2000 Da



Column Selection Guide II

- Target molecules > 2000 Da



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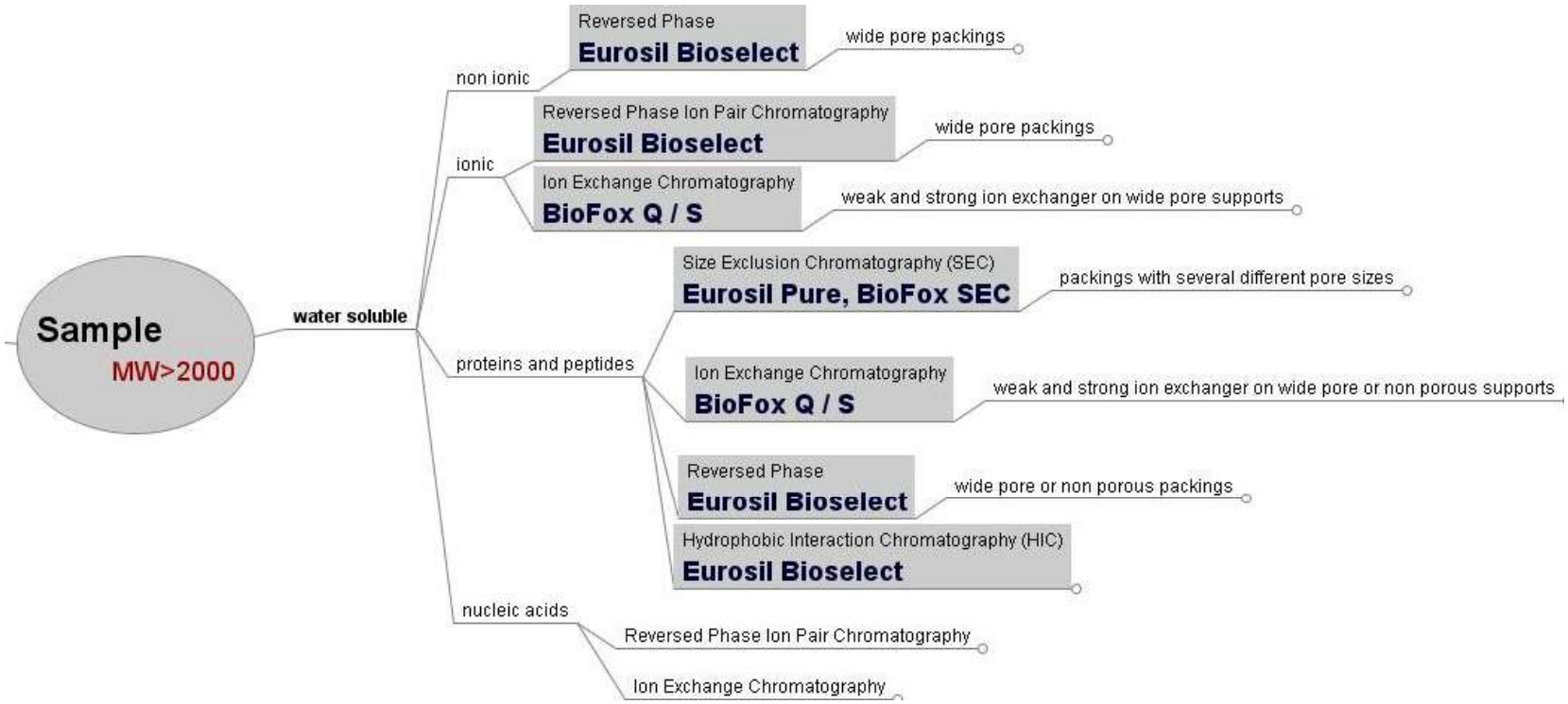
Column Selection Guide II

- Target molecules > 2000 Da



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Who is your HPLC column expert?

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