

Basics of preparative HPLC

In principal for preparative HPLC the same rules apply than for analytic HPLC. However both differ significantly in their aim. The aim of analytic HPLC is a preferably complete separation of the single components of a mixture with subsequent peak identification. In contrast the goal of preparative HPLC is isolation of the desired product in defined purity, maximum amount while having a cost effective method of operating.

Demand of a preparative separation

- Throughput
- Purity
- Yield

Upscaling table for current MN column dimensions



ID x Length [mm]	4 x 250	8 x 250	10 x 250	16 x 250	21 x 250	32 x 250	40 x 250	50 x 250	80 x 250
Linear scale-up factor	1	4	6.25	16	27.6	64	100	156.3	400
Typical amount of sample* [mg]	0.02–2	0.08–8	0.13–13	0.3–35	0.6–60	1.3–130	2–210	3–350	10–850
Typical flow rate [mL/min]	0.5–1.5	2–6	3–9	8–24	14–40	32–96	50–150	80–250	200–600

* based on RP material; the herein stated maximum amounts of sample are dependent on the separation problem and the sample. In some cases half the maximum amount of sample can already lead to a drastic overload of the column, in other cases the maximum amount of sample still leads to an acceptable separation.

NUCLEODUR[®] bulk packings

- Fully spherical high purity silica
- Pore size 110 Å; pore volume 0.9 mL/g; surface (BET) 340 m²/g; density 0.47 g/mL; pressure stable up to 600 bar
- Bigger particles for preparative application

Ordering information

Phase	Endcapped	Carbon content	Particle size	Pack of 100 g	Pack of 1000 g
NUCLEODUR[®] C₁₈ HTec premium octadecyl phase (see page 178)					
NUCLEODUR [®] C ₁₈ HTec, 7 µm	yes	18 % C	7 µm	713831.0100	713831.1
NUCLEODUR [®] C ₁₈ HTec, 10 µm	yes	18 % C	10 µm	713832.0100	713832.1
NUCLEODUR[®] C₁₈ ec standard octadecyl phase (see page 181)					
NUCLEODUR [®] 100-10 C ₁₈ ec	yes	17.5 % C	10 µm	713611.0100	713611.1
NUCLEODUR [®] 100-12 C ₁₈ ec	yes	17.5 % C	12 µm	713618.0100	713618.1
NUCLEODUR [®] 100-16 C ₁₈ ec	yes	17.5 % C	16 µm	713621.0100	713621.1
NUCLEODUR [®] 100-20 C ₁₈ ec	yes	17.5 % C	20 µm	713601.0100	713601.1
NUCLEODUR [®] 100-30 C ₁₈ ec	yes	17.5 % C	30 µm	713631.0100	713631.1
NUCLEODUR [®] 100-50 C ₁₈ ec	yes	17.5 % C	50 µm	713550.0100	713550.1
Unmodifiziertes NUCLEODUR[®] SiOH silica (see page 190)					
NUCLEODUR [®] 100-10			10 µm	713610.0100	713610.1
NUCLEODUR [®] 100-12			12 µm	713615.0100	713615.1
NUCLEODUR [®] 100-16			16 µm	713620.0100	713620.1
NUCLEODUR [®] 100-20			20 µm	713600.0100	713600.1
NUCLEODUR [®] 100-30			30 µm	713630.0100	713630.1
NUCLEODUR [®] 100-50			50 µm	713551.0100	713551.1



POLYGOSIL® bulk packings

- Irregular silica for analytical applications
- pH stability 2–8

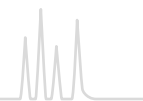
Physical properties of unmodified POLYGOSIL® materials

Phase	Pore size	Pore volume	Surface (BET)	Density	Pressure stability
POLYGOSIL® 60	60 Å	0.75 mL/g	350 m ² /g	0.45 g/mL	600 bar
POLYGOSIL® 100	100 Å	1 mL/g	280 m ² /g	0.35 g/mL	400 bar
POLYGOSIL® 300	300 Å	0.8 mL/g	100 m ² /g	0.45 g/mL	400 bar
POLYGOSIL® 1000	1000 Å	0.8 mL/g	25 m ² /g	0.45 g/mL	300 bar

Modification of POLYGOSIL® follows the same processes as for NUCLEOSIL® silica.

Ordering information

Phase	Endcapped	Carbon content	Pore size	Particle size	Pack of 10 g	Pack of 100 g
Octadecyl phases –(CH₂)₁₇–CH₃						
POLYGOSIL® 60-5 C ₁₈	yes	12 % C	60 Å	5 µm	711330.10	711330.100
POLYGOSIL® 60-7 C ₁₈	yes	12 % C	60 Å	7 µm	711340.10	711340.100
POLYGOSIL® 60-10 C ₁₈	yes	12 % C	60 Å	10 µm	711350.10	711350.100
POLYGOSIL® 100-5 C ₁₈	yes	14 % C	100 Å	5 µm	711560.10	711560.100
POLYGOSIL® 100-7 C ₁₈	yes	14 % C	100 Å	7 µm	711570.10	711570.100
POLYGOSIL® 100-10 C ₁₈	yes	14 % C	100 Å	10 µm	711580.10	711580.100
POLYGOSIL® 300-7 C ₁₈	yes	4 % C	300 Å	7 µm	711710.10	711710.100
POLYGOSIL® 1000-7 C ₁₈	yes	~ 1 % C	1000 Å	7 µm	711992.10	711992.100
Octyl phases –(CH₂)₇–CH₃						
POLYGOSIL® 60-5 C ₈	no	7 % C	60 Å	5 µm	711300.10	711300.100
POLYGOSIL® 60-7 C ₈	no	7 % C	60 Å	7 µm	711310.10	711310.100
POLYGOSIL® 60-10 C ₈	no	7 % C	60 Å	10 µm	711320.10	711320.100
Butyl phases –(CH₂)₃–CH₃						
POLYGOSIL® 300-7 C ₄	yes	~ 1 % C	300 Å	7 µm	711680.10	711680.100
POLYGOSIL® 1000-7 C ₄	yes	< 1 % C	1000 Å	7 µm	711991.10	711991.100
Cyano phases (nitrile) –(CH₂)₃–CN						
POLYGOSIL® 60-5 CN		~ 5 % C	60 Å	5 µm	711380.10	711380.100
POLYGOSIL® 60-10 CN		~ 5 % C	60 Å	10 µm	711390.10	711390.100
Amino phases –(CH₂)₃–NH₂						
POLYGOSIL® 60-5 NH ₂		~ 3 % C	60 Å	5 µm	711360.10	711360.100
POLYGOSIL® 60-10 NH ₂		~ 3 % C	60 Å	10 µm	711370.10	711370.100
Dimethylamino phases –(CH₂)₃–N(CH₃)₂						
POLYGOSIL® 60-5 N(CH ₃) ₂		~ 3.5 % C	60 Å	5 µm	711420.10	711420.100
POLYGOSIL® 60-10 N(CH ₃) ₂		~ 3.5 % C	60 Å	10 µm	711430.10	711430.100
Unmodified silica SiOH						
POLYGOSIL® 60-5			60 Å	5 µm	711010.10	711010.100
POLYGOSIL® 60-7			60 Å	7 µm	711280.10	711280.100
POLYGOSIL® 60-10			60 Å	10 µm	711020.10	711020.100
POLYGOSIL® 100-5			100 Å	5 µm	711510.10	711510.100
POLYGOSIL® 100-7			100 Å	7 µm	711520.10	711520.100
POLYGOSIL® 100-10			100 Å	10 µm	711530.10	711530.100
POLYGOSIL® 300-7			300 Å	7 µm	711600.10	711600.100
POLYGOSIL® 1000-7			1000 Å	7 µm	711890.10	711890.100



POLYGOPREP bulk packings

- Irregular silica for preparative applications
- pH stability 2–8

Physical properties of unmodified POLYGOPREP materials

Phase	Pore size	Pore volume	Surface (BET)	Density	Pressure stability
POLYGOPREP 60	60 Å	0.75 mL/g	350 m ² /g	0.45 g/mL	600 bar
POLYGOPREP 100	100 Å	1 mL/g	280 m ² /g	0.35 g/mL	400 bar
POLYGOPREP 300	300 Å	0.8 mL/g	100 m ² /g	0.45 g/mL	400 bar
POLYGOPREP 1000	1000 Å	0.8 mL/g	35 m ² /g	0.45 g/mL	300 bar

Modification of POLYGOPREP follows the same processes as for NUCLEOSIL® silica.

Ordering information

Phase	Endcapped	Carbon content	Pore size	Particle size	Pack of 100 g	Pack of 1 kg
Octadecyl phases –(CH₂)₁₇–CH₃						
POLYGOPREP 60-12 C ₁₈	no*	12% C	60 Å	10–15 µm	711009.100	711009.1000
POLYGOPREP 60-20 C ₁₈	no*	12% C	60 Å	15–25 µm	711031.100	711031.1000
POLYGOPREP 60-30 C ₁₈	no*	12% C	60 Å	25–40 µm	711480.100	711480.1000
POLYGOPREP 60-50 C ₁₈	no*	12% C	60 Å	40–63 µm	711500.100	711500.1000
POLYGOPREP 60-80 C ₁₈	no*	12% C	60 Å	63–100 µm	711011.100	711011.1000
POLYGOPREP 60-130 C ₁₈	no*	12% C	60 Å	63–200 µm	711590.100	711590.1000
POLYGOPREP 100-12 C ₁₈	no*	14% C	100 Å	10–15 µm	711018.100	711018.1000
POLYGOPREP 100-20 C ₁₈	no*	14% C	100 Å	15–25 µm	711019.100	711019.1000
POLYGOPREP 100-30 C ₁₈	no*	14% C	100 Å	25–40 µm	711032.100	711032.1000
POLYGOPREP 100-50 C ₁₈	no*	14% C	100 Å	40–63 µm	711021.100	711021.1000
POLYGOPREP 300-12 C ₁₈	yes	4% C	300 Å	10–15 µm	711024.100	711024.1000
POLYGOPREP 300-20 C ₁₈	yes	4% C	300 Å	15–25 µm	711025.100	711025.1000
POLYGOPREP 300-30 C ₁₈	yes	4% C	300 Å	25–40 µm	711720.100	711720.1000
POLYGOPREP 300-50 C ₁₈	yes	4% C	300 Å	40–63 µm	711730.100	711730.1000
POLYGOPREP 1000-30 C ₁₈	yes	~ 1% C	1000 Å	25–40 µm	711028.100	711028.1000
POLYGOPREP 1000-50 C ₁₈	yes	~ 1% C	1000 Å	40–63 µm	711029.100	711029.1000

Octyl phases –(CH₂)₇–CH₃

POLYGOPREP 60-12 C ₈	no*	7% C	60 Å	10–15 µm	711007.100	711007.1000
POLYGOPREP 60-20 C ₈	no*	7% C	60 Å	15–25 µm	711008.100	711008.1000
POLYGOPREP 60-30 C ₈	no*	7% C	60 Å	25–40 µm	711470.100	711470.1000
POLYGOPREP 60-50 C ₈	no*	7% C	60 Å	40–63 µm	711490.100	711490.1000

* On request, these POLYGOPREP RP phases can be endcapped at surcharge.

Butyl phases –(CH₂)₃–CH₃

POLYGOPREP 300-12 C ₄	yes	~ 1% C	300 Å	10–15 µm	711022.100	711022.1000
POLYGOPREP 300-20 C ₄	yes	~ 1% C	300 Å	15–25 µm	711023.100	711023.1000
POLYGOPREP 300-30 C ₄	yes	~ 1% C	300 Å	25–40 µm	711690.100	711690.1000
POLYGOPREP 300-50 C ₄	yes	~ 1% C	300 Å	40–63 µm	711700.100	711700.1000
POLYGOPREP 1000-30 C ₄	yes	< 1% C	1000 Å	25–40 µm	711026.100	711026.1000
POLYGOPREP 1000-50 C ₄	yes	< 1% C	1000 Å	40–63 µm	711027.100	711027.1000

Cyano phases (nitrile) –(CH₂)₃–CN

POLYGOPREP 60-12 CN		~ 4.5% C	60 Å	10–15 µm	711015.100	711015.1000
POLYGOPREP 60-20 CN		~ 4.5% C	60 Å	15–25 µm	711016.100	711016.1000
POLYGOPREP 60-30 CN		~ 4.5% C	60 Å	25–40 µm	711017.100	711017.1000

Amino phases –(CH₂)₃–NH₂

POLYGOPREP 60-12 NH ₂		~ 3% C	60 Å	10–15 µm	711012.100	711012.1000
POLYGOPREP 60-20 NH ₂		~ 3% C	60 Å	15–25 µm	711013.100	711013.1000
POLYGOPREP 60-30 NH ₂		~ 3% C	60 Å	25–40 µm	711014.100	711014.1000



POLYGOPREP irregular silica for HPLC



Ordering information

Phase	Pore size	Particle size	Pack of 100 g	Pack of 1 kg	Pack of 5 kg
Unmodified POLYGOPREP silica SiOH					
POLYGOPREP 60-12	60 Å	10–15 µm		711001.1000	711001.5000
POLYGOPREP 60-20	60 Å	15–25 µm		711240.1000	711240.5000
POLYGOPREP 60-30	60 Å	25–40 µm		711250.1000	711250.5000
POLYGOPREP 60-50	60 Å	40–63 µm		711260.1000	711260.5000
POLYGOPREP 60-80	60 Å	63–100 µm		711270.1000	711270.5000
POLYGOPREP 60-130	60 Å	63–200 µm		711037.1000	711037.5000
POLYGOPREP 100-12	100 Å	10–15 µm		711002.1000	711002.5000
POLYGOPREP 100-20	100 Å	15–25 µm		711003.1000	711003.5000
POLYGOPREP 100-30	100 Å	25–40 µm		711540.1000	711540.5000
POLYGOPREP 100-50	100 Å	40–63 µm		711550.1000	711550.5000
POLYGOPREP 100-80	100 Å	63–100 µm		711033.1000	711033.5000
POLYGOPREP 100-130	100 Å	63–200 µm		711034.1000	711034.5000
POLYGOPREP 300-12	300 Å	10–15 µm	711004.100	711004.1000	
POLYGOPREP 300-20	300 Å	15–25 µm	711610.100	711610.1000	
POLYGOPREP 300-30	300 Å	25–40 µm	711620.100	711620.1000	
POLYGOPREP 300-50	300 Å	40–63 µm	711630.100	711630.1000	
POLYGOPREP 1000-12	1000 Å	10–15 µm	711035.100	711035.1000	
POLYGOPREP 1000-20	1000 Å	15–25 µm	711036.100	711036.1000	
POLYGOPREP 1000-30	1000 Å	25–40 µm	711005.100	711005.1000	
POLYGOPREP 1000-50	1000 Å	40–63 µm	711006.100	711006.1000	



Silica adsorbents for low pressure column chromatography



- Silica 60; pore size ~ 60 Å; pore volume ~ 0.75 mL/g; spec. surface BET ~ 500 m²/g highly porous, amorphous silicic acid in the form of hard, opalescent particles, prepared by precipitation of water glass with sulfuric acid
- For higher demands on the performance of column packings we recommend our high-purity irregular POLYGOPREP silicas (see before).
- Silica FIA for the fluorescence indicator adsorption procedure for the determination of hydrocarbon groups in the testing of liquid fuels in accordance with DIN 51791 and ASTM D 1319-58T
- The FIA method determines saturated hydrocarbons, olefins and aromatic hydrocarbons of a sample chromatographically by adsorption and desorption in a column filled with FIA silica, in the presence of a fluorescent dye mixture.

Ordering information

Description	Particle size	1 kg	5 kg	25 kg
Silica 60, 0.015–0.04 mm	–	815650.1	815650.5	815650.25
Silica 60, 0.025–0.04 mm	–	815300.1	815300.5	815300.25
Silica 60, 0.04–0.063 mm	230–400 mesh	815380.1	815380.5	815380.25
Silica 60 M, 0.04–0.063 mm	230–400 mesh	815381.1	815381.5	815381.25
Silica 60, 0.05–0.1 mm	130–270 mesh	815390.1	815390.5	815390.25
Silica 60, 0.05–0.2 mm	70–270 mesh	815320.1	815320.5	815320.25
Silica 60, 0.063–0.2 mm	70–230 mesh	815330.1	815330.5	815330.25
Silica 60, < 0.063 mm	+230 mesh	815400.1	815400.5	815400.25
Silica 60, < 0.08 mm	+190 mesh	815310.1	815310.5	815310.25
Silica 60, 0.1–0.2 mm	70–130 mesh	815340.1	815340.5	815340.25
Silica 60, 0.2–0.5 mm	35–70 mesh	815350.1	815350.5	815350.25
Silica 60, 0.5–1.0 mm	18–35 mesh	815360.1	815360.5	815360.25
Silica FIA fine	0.071–0.16 mm	815410.1		
Silica FIA coarse	0.071–0.63 mm	815430.1		

Aluminum oxide

- Aluminum oxides produced by dehydration of different aluminum hydroxides, e.g., hydrargillite between 400 and 500 °C.
- Activity grade I, particle size 50–200 µm, specific surface (BET) ~ 130 m²/g

Ordering information

Description	pH	1 kg	5 kg	25 kg
Aluminum oxide 90 basic	pH 9.5 ± 0.3	815010.1	815010.5	815010.25
Aluminum oxide 90 neutral	pH 7 ± 0.5	815020.1	815020.5	815020.25
Aluminum oxide 90 acidic	pH 4 ± 0.3	815030.1	815030.5	815030.25



Kieselguhr

- Naturally occurring amorphous silicic acids of fossil origin, also known as diatomaceous earth or diatomite purified for chromatographic applications
- Compared to silica, kieselguhr has a small surface of low activity → application in partition chromatography; impregnated with various substances (paraffin, silicone oil, undecane) it can be used for reversed phase chromatography
- The following grades of kieselguhr are manufactured by Johns-Manville. They are narrowly classified with homogeneous particle size distributions and high purity.
- For columns packed with kieselguhr please see CHROMABOND® XTR for liquid-liquid extraction, page 63.

Ordering information

Description	Rel. purification factor	Rel. flow rate	1 kg	5 kg
Filter-Cel®	100	100	815510.1	815510.5
Hyflo® Super-Cel®	58	534	815530.1	815530.5
Celite® 503	42	910	815540.1	815540.5
Celite® 535	35	1269	815550.1	815550.5
Celite® 545	32	1830	815560.1	815560.5

Florisil®

- Hard granular magnesia silica gel:
MgO 15.5 ± 0.5 % · SiO₂ 84.0 ± 0.5 % · Na₂SO₄ ≤ 1.0 %;
60/100 mesh
- Recommended application
Sample preparation (see chapter “Solid phase extraction”, page 16)
- Clean-up of pesticide residues, separation of chlorinated pesticides, extraction of steroids, sex hormones, antibiotics, lipids etc.

Ordering information

Description	Particle size	1 kg	5 kg
Florisil standard 60/100 mesh	0.15/0.25 mm	815710.1	815710.5



Polyamide

- Polyamide 6 = ϵ -polycaprolactam
- The separation mechanism mainly based on hydrogen bonds
- Recommended application
Separation of phenolic compounds (e.g., isolation of natural products) carboxylic acids, aromatic nitro compounds
- For SPE columns packed with polyamide see CHROMABOND® PA page 44.

Ordering information

Description	Particle size	1 kg	5 kg
Polyamide SC 6, < 0.07 mm	< 0.07 mm	815610.1	815610.5
Polyamide SC 6, 0.05–0.16 mm	0.05–0.16 mm	815620.1	815620.5
Polyamide SC 6, 0.10–0.30 mm	0.10–0.30 mm	815600.1	815600.5

Unmodified cellulose

- Cellulose MN 100:
native fibrous cellulose, standard grade average degree of polymerization 620–680, fiber length (85 %) 20–100 μm , specific surface acc. to Blaine ~ 6500 cm^2/g ; residue on ignition at 850 °C < 10000 ppm, < 20 ppm Fe, < 5 ppm Cu, < 7 ppm P, CH_2Cl_2 extract < 0.20 %
- Cellulose MN 2100:
native fibrous cellulose, purified grade (washed with different eluents) average degree of polymerization 620–680, fiber length (85 %) 20–75 μm , specific surface acc. to Blaine ~ 5500 cm^2/g residue on ignition at 850 °C < 1000 ppm, < 2 ppm Fe, < 1 ppm Cu, < 2 ppm P, CH_2Cl_2 extract < 0.15 %
- Grade MN 2100ff is a defatted cellulose MN 2100 with a CH_2Cl_2 extract < 0.02 %

Ordering information

Description	1 kg	5 kg	25 kg
Cellulose MN 100	815050.1	815050.5	815050.25
Cellulose MN 2100	815060.1	815060.5	815060.25
Cellulose MN 2100ff (Cellulose MN 2100 defatted)	815070.1		