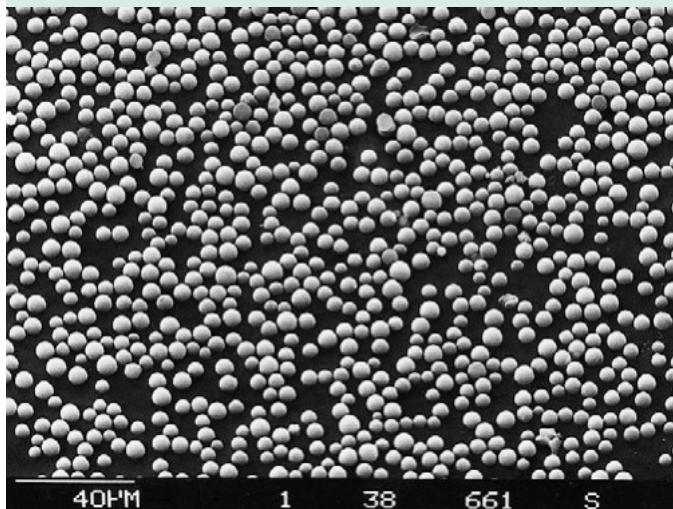




## NUCLEOSIL®



### Key feature

- NUCLEOSIL® is a family of totally porous spherical silicas. They feature a very pure and uniform SiO<sub>2</sub> structure and have gained wide acceptance as routine chromatographic packings for very different fields of modern chromatography.
- One of the first spherical silicas used in HPLC
- Developed in the early seventies, it became a world-renowned HPLC packing
- Absolutely reliable choice for routine analyses
- Largest variety of modified HPLC silicas available
- pH stability 2–8 (for NUCLEOSIL® 100-5 C<sub>18</sub> AB 1–9)
- Due to its particle sizes NUCLEOSIL® finds application in analytical as well as in preparative columns.

### Benefits of NUCLEOSIL® silica

- High efficiency due to narrow particle size distribution
- High separation performance due to optimized binding techniques
- High chemical and mechanical stability
- High load capacity and recovery rates
- High reproducibility from lot to lot

### Physical properties

NUCLEOSIL® is manufactured with different pore diameters (50, 100, 120, 300, 500, 1000 and 4000 Å) and particle sizes from 3 μm (only NUCLEOSIL® 50, 100 and 120) to 10 μm with very narrow fractionation. All narrow-pore NUCLEOSIL® packings are stable up to 500 bar (7 250 psi), the wide-pore NUCLEOSIL® silicas are stable up to 300 or 400 bar (4 200 or 5 600 psi).

### Physical properties of unmodified NUCLEOSIL® materials

Phase	Pore size	Pore volume	Surface (BET)	Density	Pressure stability*
NUCLEOSIL® 50	50 Å	0.8 mL/g	420 m <sup>2</sup> /g	0.45 g/mL	500 bar
NUCLEOSIL® 100	100 Å	1 mL/g	350 m <sup>2</sup> /g	0.36 g/mL	500 bar
NUCLEOSIL® 120	120 Å	0.65 mL/g	200 m <sup>2</sup> /g	0.55 g/mL	500 bar
NUCLEOSIL® 300	300 Å	0.8 mL/g	100 m <sup>2</sup> /g	0.45 g/mL	400 bar
NUCLEOSIL® 500	500 Å	0.8 mL/g	35 m <sup>2</sup> /g	0.45 g/mL	400 bar
NUCLEOSIL® 1000	1000 Å	0.8 mL/g	25 m <sup>2</sup> /g	0.45 g/mL	300 bar
NUCLEOSIL® 4000	4000 Å	0.7 mL/g	10 m <sup>2</sup> /g	0.48 g/mL	300 bar

\* Maximum packing pressure of NUCLEOSIL® bulk packings

### NUCLEOSIL® modifications

- NUCLEOSIL® packings are available as unmodified silica or with numerous chemically bonded phases: RP phases like C<sub>18</sub> AB, C<sub>18</sub> HD, C<sub>18</sub> Nautilus, C<sub>18</sub>, C<sub>18</sub> ec, Protect I, C<sub>8</sub> HD, C<sub>8</sub> ec, C<sub>8</sub>, C<sub>4</sub>, C<sub>2</sub> and C<sub>6</sub>H<sub>5</sub> separate mainly by hydrophobic interactions (van der Waals forces). The less polar the sample molecules, the more they are retained – the more polar the sample, the weaker are the hydrophobic interactions and consequently the retention times are shorter.
- Phases with chemically bonded polar groups such as CN, NH<sub>2</sub>, N(CH<sub>3</sub>)<sub>2</sub>, OH show selective separation properties. Due to the availability of different functional groups it is possible

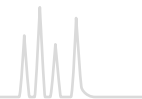
to vary the chemical characteristics of the surface and consequently the adsorption characteristics of the stationary phase.

- Silica-based ion exchangers (NUCLEOSIL® SA and SB) are stable from pH 2 to 8 and do not swell. Compared to resin-based ion exchangers they offer the advantage of constant permeability, even when the ionic strength and/or pH of the eluent are changed. The separation can be influenced by
  - the type of buffer
  - the ionic strength and
  - the pH value.


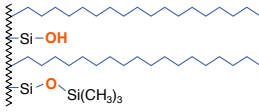

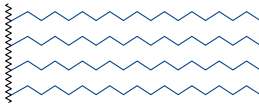

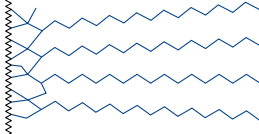

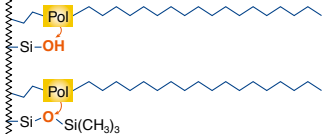

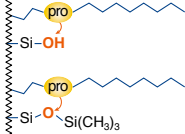

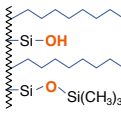

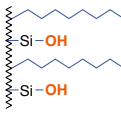

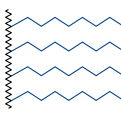

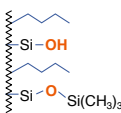
A tabular overview of NUCLEOSIL® phases can be found on page 212.



# NUCLEOSIL<sup>®</sup> phase overview



## Overview of NUCLEOSIL<sup>®</sup> HPLC phases


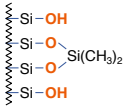

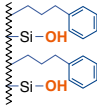

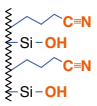

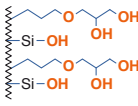

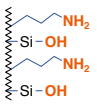

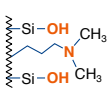

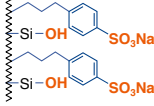

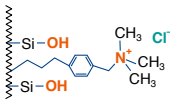

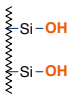
Phase	Specification	Page	Stability	Interactions	Structure
NUCLEOSIL <sup>®</sup> RP-Phasen					
 C <sub>18</sub>	octadecyl phase, medium density modification, endcapping 15% C · USP L1	214	pH 2–8	hydrophobic (van der Waals) interactions slight residual silanol interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 C <sub>18</sub> HD	octadecyl phase, high density monomeric modification, endcapping 20% C · USP L1	214	pH 2–8	hydrophobic (van der Waals) interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 C <sub>18</sub> AB	octadecyl phase, special crosslinked modification, endcapping 25% C · USP L1	214	pH 1–9	steric and hydrophobic interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 C <sub>18</sub> Nautilus	octadecyl phase, embedded polar group, endcapping 16% C · USP L60	214	pH 2–8 up to 100% H <sub>2</sub> O	hydrophobic and polar interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 Protect I	special RP phase, protective polar group, monomeric modification, endcapping 11% C	216	pH 2–8 up to 100% H <sub>2</sub> O	hydrophobic and polar interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 C <sub>8</sub> ec	octyl phase, medium density modification, endcapping 9% C · USP L7	217	pH 2–8	hydrophobic (van der Waals) interactions slight residual silanol interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 C <sub>8</sub>	octyl phase, no endcapping 8.5% C · USP L7	217	pH 2–8	hydrophobic (van der Waals) interactions interactions noticeable residual silanol interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 C <sub>8</sub> HD	octyl phase, high density modification, endcapping 13% C · USP L7	218	pH 2–8	hydrophobic (van der Waals) interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 C <sub>4</sub>	butyl phase, medium density modification, endcapping ~ 2% C · USP L26	219	pH 2–8	hydrophobic (van der Waals) interactions residual silanol interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 

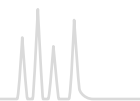


# NUCLEOSIL<sup>®</sup> phase overview



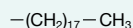
## Overview of NUCLEOSIL<sup>®</sup> HPLC phases

Phase	Specification	Page	Stability	Interactions	Structure
 C <sub>2</sub>	dimethyl phase 3.5% C · USP L16	219	pH 2–8	hydrophobic (van der Waals) interactions noticeable residual silanol interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 C <sub>6</sub> H <sub>5</sub>	phenyl phase, no endcapping 8% C · USP L11	220	pH 2–8	π-π interactions and hydrophobic interactions noticeable residual silanol interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
Polar NUCLEOSIL <sup>®</sup> phases and NUCLEOSIL <sup>®</sup> ion exchangers					
 CN / CN-RP	cyano (nitrile) phase USP L10	222	pH 2–8	π-π, polar and hydrophobic interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 OH (Diol)	diol · USP L20	220	pH 2–8	polar interactions (hydrogen bonds)	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 NH <sub>2</sub> / NH <sub>2</sub> -RP	amino · USP L8	221	pH 2–8	polar and hydrophobic interactions, weak ion exchange interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 N(CH <sub>3</sub> ) <sub>2</sub>	dimethylamino	221	pH 2–8	polar and hydrophobic interactions, weak ion exchange interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 SA	sulfonic acid, strongly acid cation exchanger (SCX) USP L9	223	pH 2–8	strong ion exchange interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 SB	quaternary ammonium, strongly basic anion exchanger (SAX) USP L14	223	pH 2–8	strong ion exchange interactions	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 
 SiOH	unmodified spherical silica USP L3	224	pH 2–8	polar	NUCLEOSIL <sup>®</sup> (Si-O <sub>2</sub> ) <sub>n</sub> 



## NUCLEOSIL<sup>®</sup> octadecyl phases (C<sub>18</sub>)

### NUCLEOSIL<sup>®</sup> standard octadecyl phases · USP L1

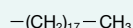


#### Technical data

- Nonpolar phases
- pH stability at 20 °C: 2–8
- carbon content depending on pore size (see table)

- Corresponding NUCLEODUR<sup>®</sup> phases see C<sub>18</sub> ec page 181

### NUCLEOSIL<sup>®</sup> C<sub>18</sub> HD · USP L1

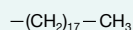


#### Technical data

- Nonpolar hydrophobic high density phases; monomeric modification
- pH stability 2–9

- Carbon content 20 %
- Corresponding NUCLEODUR<sup>®</sup> phases see C<sub>18</sub> Gravity page 158

### NUCLEOSIL<sup>®</sup> C<sub>18</sub> AB · USP L1

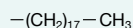


#### Technical data

- Crosslinked hydrophobic phase; polymeric modification; inert towards acidic and basic substances with high affinity for silica
- pH stability 1–9

- Carbon content 25 %; distinct steric selectivity
- Corresponding NUCLEODUR<sup>®</sup> phases see C<sub>18</sub> Isis page 164

### NUCLEOSIL<sup>®</sup> C<sub>18</sub> Nautilus · USP L60



#### Technical data

- Stable in 100 % aqueous eluents
- Carbon content 16 %
- Interesting polar selectivity features; very good base deactivation

- Corresponding NUCLEODUR<sup>®</sup> phases see C<sub>18</sub> PolarTec page 168

All NUCLEOSIL<sup>®</sup> octadecyl phases are endcapped.

Custom-packed columns with different column dimensions are available on request.

## Ordering information

Eluent in column acetonitrile – water

ID	Length →					EC guard columns*
	100 mm	125 mm	150 mm	250 mm		
<b>NUCLEOSIL<sup>®</sup> 50-5 C<sub>18</sub> ec</b> particle size 5 μm, pore size 50 Å, endcapped, 14.5 % C						
Analytical EC columns						
4.6 mm				720098.46		721473.30
<b>NUCLEOSIL<sup>®</sup> 100-3 C<sub>18</sub></b> particle size 3 μm, pore size 100 Å, endcapped, 15 % C						
Analytical EC columns						
4 mm		720150.40		720133.40		721022.30
4.6 mm	720841.46	720150.46	720949.46	720133.46		721022.30
<b>NUCLEOSIL<sup>®</sup> 100-5 C<sub>18</sub></b> particle size 5 μm, pore size 100 Å, endcapped, 15 % C						
Analytical EC columns						
2 mm		720002.20		720014.20		721074.20
3 mm		720002.30		720014.30		721074.30
4 mm	720141.40	720002.40	720120.40	720014.40		721074.30
4.6 mm	720141.46	720002.46	720120.46	720014.46		721074.30



## Ordering information

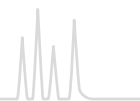
Eluent in column acetonitrile – water

ID	Length →					EC guard columns*
	100 mm	125 mm	150 mm	250 mm		
<b>NUCLEOSIL® 100-7 C<sub>18</sub></b> particle size 7 µm, pore size 100 Å, endcapped, 15 % C						
Analytical EC columns						
	4 mm				720018.40	
	4.6 mm	720951.46		720110.46	720018.46	
<b>NUCLEOSIL® 100-10 C<sub>18</sub></b> particle size 10 µm, pore size 100 Å, endcapped, 15 % C						
Analytical EC columns						
	4 mm				720023.40	
	4.6 mm	720701.46		720140.46	720023.46	
<b>NUCLEOSIL® 120-3 C<sub>18</sub></b> particle size 3 µm, pore size 120 Å, endcapped, 11 % C						
Analytical EC columns						
	4 mm	720149.40	720040.40		720055.40	721075.30
	4.6 mm	720149.46	720040.46	720740.46	720055.46	721075.30
<b>NUCLEOSIL® 120-5 C<sub>18</sub></b> particle size 5 µm, pore size 120 Å, endcapped, 11 % C						
Analytical EC columns						
	4 mm		720051.40		720041.40	721070.30
	4.6 mm		720051.46	720730.46	720041.46	721070.30
<b>NUCLEOSIL® 120-7 C<sub>18</sub></b> particle size 7 µm, pore size 120 Å, endcapped, 11 % C						
Analytical EC columns						
	4 mm				720042.40	
	4.6 mm					
<b>NUCLEOSIL® 120-10 C<sub>18</sub></b> particle size 10 µm, pore size 120 Å, endcapped, 11 % C						
Analytical EC columns						
	4 mm				720043.40	
	4.6 mm				720043.46	
<b>NUCLEOSIL® 100-3 C<sub>18</sub> HD</b> particle size 3 µm, pore size 100 Å, 20 % C						
Analytical EC columns						
	4 mm		720191.40			721196.30
	4.6 mm		720191.46	720193.46		721196.30
<b>NUCLEOSIL® 100-5 C<sub>18</sub> HD</b> particle size 5 µm, pore size 100 Å, 20 % C						
Analytical EC columns						
	4 mm		720296.40		720280.40	721072.30
	4.6 mm		720296.46	720294.46	720280.46	721072.30
<b>NUCLEOSIL® 100-5 C<sub>18</sub> AB</b> particle size 5 µm, pore size 100 Å, 25 % C						
Analytical EC columns						
	4 mm		720935.40		720936.40	721073.30
	4.6 mm		720935.46	720305.46	720936.46	721073.30
<b>NUCLEOSIL® 100-3 C<sub>18</sub> Nautilus</b> particle size 3 µm, pore size 100 Å, 16 % C						
Analytical EC columns						
	4 mm		720472.40			721649.30
	4.6 mm		720472.46	720471.46		721649.30
<b>NUCLEOSIL® 100-5 C<sub>18</sub> Nautilus</b> particle size 5 µm, pore size 100 Å, 16 % C						
Analytical EC columns						
	4 mm		720430.40		720431.40	721133.30
	4.6 mm		720430.46	720432.46	720431.46	721133.30

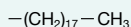
## Guard column system

Guard columns for EC columns with ID		2 mm	3 mm	4 mm	4.6 mm	Guard column holder
* Column Protection System (pack of)	EC	4/2 (3)	4/3 (3)	4/3 (3)	4/3 (3)	718966

EC columns in packs of 1, guard columns in packs of 3. For details of our column systems see page 250.



## NUCLEOSIL<sup>®</sup> octadecyl phases (C<sub>18</sub>) wide pore octadecyl phases · USP L1



### Technical data

• Many biologically interesting molecules can not be separated using conventional narrow pore silicas with pore sizes of about 100 Å. This is why MACHEREY-NAGEL offers a complete line of wide pore packings with pore sizes of 300, 500, 1000 and 4000 Å.




• These materials can also be used for size exclusion chromatography (SEC).

All NUCLEOSIL<sup>®</sup> octadecyl phases are endcapped.

Custom-packed columns with different column dimensions are available on request.

### Ordering information

Eluent in column acetonitrile – water

ID	Length →			EC guard columns*
	125 mm	150 mm	250 mm	
<b>NUCLEOSIL<sup>®</sup> 300-5 C<sub>18</sub></b> particle size 5 µm, pore size 300 Å, endcapped, 6.5 % C				
Analytical EC columns				
	4 mm		720065.40	721085.30
	4.6 mm		720065.46	721085.30
<b>NUCLEOSIL<sup>®</sup> 500-7 C<sub>18</sub></b> particle size 7 µm, pore size 500 Å, endcapped, 2 % C				
Analytical EC columns				
	4.6 mm		720074.46	
<b>NUCLEOSIL<sup>®</sup> 1000-7 C<sub>18</sub></b> particle size 7 µm, pore size 1000 Å, endcapped, ~ 1 % C				
Analytical EC columns				
	4.6 mm		720077.46	

EC columns in packs of 1, guard columns in packs of 3.

VarioPrep preparative HPLC columns with NUCLEOSIL<sup>®</sup> packing material on request.


## NUCLEOSIL<sup>®</sup> 100 Protect I special RP phase with protective polar group

### Technical data

- RP phase with pronounced hydrophilic properties
- Endcapped
- Monomeric coating
- Carbon content 11 %

### Ordering information

Eluent in column acetonitrile – water

ID	Length →				EC guard columns*
	125 mm	150 mm	250 mm	250 mm	
<b>NUCLEOSIL<sup>®</sup> 100-5 Protect I</b> particle size 5 µm, pore size 100 Å					
Analytical EC columns					
	4 mm	720175.40		720170.40	721157.30
	4.6 mm	720175.46	720174.46	720170.46	721157.30

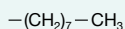
### Guard column system

Guard columns for EC columns with ID	2 mm	3 mm	4 mm	4.6 mm	Guard column holder
* Column Protection System (pack of)	EC 4/2 (3)	4/3 (3)	4/3 (3)	4/3 (3)	718966

EC columns in packs of 1, guard columns in packs of 3. For details of our column systems see page 250.



## NUCLEOSIL® octyl phases (C<sub>8</sub>) NUCLEOSIL® standard octyl phases · USP L7



### 🔧 Technical data


- Nonpolar phases for RP and ion-pairing chromatography
- Endcapped and non-endcapped modifications available; pH stability at 20 °C: 2–8
- Carbon content depending on pore size (see table)

### ✓ Recommended application

- Separation of moderately to highly polar (water-soluble) compounds: steroids, nucleosides, cyclodextrins, pharmacological plant constituents
- Corresponding NUCLEODUR® phases see C<sub>8</sub> ec page 183

### Ordering information

Eluent in column acetonitrile – water

ID	Length →			
	125 mm	150 mm	250 mm	EC guard columns*
<b>NUCLEOSIL® 100-5 C<sub>8</sub> ec</b> particle size 5 µm, pore size 100 Å, endcapped, 9 % C				
Analytical EC columns				
 4.6 mm			720165.46	721096.30
<b>NUCLEOSIL® 100-5 C<sub>8</sub></b> particle size 5 µm, pore size 100 Å, not endcapped, 8.5 % C				
Analytical EC columns				
 4 mm	720001.40		720013.40	721194.30
 4.6 mm	720001.46	720990.46	720013.46	721194.30
<b>NUCLEOSIL® 100-7 C<sub>8</sub></b> particle size 7 µm, pore size 100 Å, not endcapped, 8.5 % C				
Analytical EC columns				
 4.6 mm			720017.46	
<b>NUCLEOSIL® 100-10 C<sub>8</sub></b> particle size 10 µm, pore size 100 Å, not endcapped, 8.5 % C				
Analytical EC columns				
 4 mm			720022.40	
 4.6 mm			720022.46	
<b>NUCLEOSIL® 120-3 C<sub>8</sub></b> particle size 3 µm, pore size 120 Å, not endcapped, 6.5 % C				
Analytical EC columns				
 4 mm	720071.40			721093.30
 4.6 mm	720071.46	720214.46		721093.30
<b>NUCLEOSIL® 120-5 C<sub>8</sub></b> particle size 5 µm, pore size 120 Å, not endcapped, 6.5 % C				
Analytical EC columns				
 4 mm	720050.40		720052.40	721095.30
 4.6 mm	720050.46	720735.46	720052.46	721095.30
<b>NUCLEOSIL® 300-5 C<sub>8</sub></b> particle size 5 µm, pore size 300 Å, not endcapped, ~ 3 % C				
Analytical EC columns				
 4.6 mm			720062.46	721061.30

EC columns in packs of 1, guard columns in packs of 3.

Custom-packed columns with different column dimensions are available on request.

### Guard column system

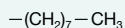
Guard columns for EC columns with ID	2 mm	3 mm	4 mm	4.6 mm	Guard column holder
* Column Protection System (pack of)	EC 4/2 (3)	4/3 (3)	4/3 (3)	4/3 (3)	718966

EC columns in packs of 1, guard columns in packs of 3. For details of our column systems see page 250.





## NUCLEOSIL<sup>®</sup> octyl phases (C<sub>8</sub>) NUCLEOSIL<sup>®</sup> C<sub>8</sub> HD · USP L7



### Technical data

- Nonpolar high density phases; monomeric modification; endcapped; carbon content 13 %
- Corresponding NUCLEODUR<sup>®</sup> phases see C<sub>8</sub> Gravity page 158

### Recommended application

- Separation of moderate to strong polar (water soluble) analytes like steroids, cyclodextrines, pharmaceutical plant ingredients

### Ordering information

Eluent in column acetonitrile – water

ID	Length → 125 mm	150 mm	250 mm	EC guard columns*
----	--------------------	--------	--------	-------------------

NUCLEOSIL<sup>®</sup> 100-5 C<sub>8</sub> HD particle size 5 μm, pore size 100 Å

Analytical EC columns

	4 mm		720196.40	721071.30
	4.6 mm	720194.46	720196.46	721071.30

EC columns in packs of 1, guard columns in packs of 3.

Custom-packed columns with different column dimensions are available on request.

### Guard column system

Guard columns for EC columns with ID		2 mm	3 mm	4 mm	4.6 mm	Guard column holder
* Column Protection System (pack of)	EC	4/2 (3)	4/3 (3)	4/3 (3)	4/3 (3)	718966

EC columns in packs of 1, guard columns in packs of 3. For details of our column systems see page 250.

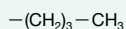


Beside analytical HPLC columns we also produce VarioPrep columns (see page 252) for preparative applications.





## NUCLEOSIL<sup>®</sup> butyl phases (C<sub>4</sub>) · USP L26



### Technical data

- Endcapped phases for RP and ion-pairing chromatography
- pH stability at 20 °C: 2–8; carbon content ~ 2 %
- Retention times are shorter than on C<sub>8</sub> and C<sub>18</sub> phases

### Recommended application

- For separation of macromolecules and hydrophobic substances
- For butyl phases for biochemical separations please refer to page 241

### Ordering information

Eluent in column acetonitrile – water

ID	Length → 250 mm	EC guard columns*
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#### NUCLEOSIL<sup>®</sup> 120-5 C<sub>4</sub> particle size 5 μm, pore size 120 Å

Analytical EC columns



4.6 mm

720096.46

721083.30

#### NUCLEOSIL<sup>®</sup> 300-5 C<sub>4</sub> particle size 5 μm, pore size 300 Å

Analytical EC columns



4 mm

720059.40

721916.30

4.6 mm

720059.46

721916.30

EC columns in packs of 1, guard columns in packs of 3.

### Guard column system

Guard columns for EC columns with ID	2 mm	3 mm	4 mm	4.6 mm	Guard column holder
* Column Protection System (pack of)	EC 4/2 (3)	4/3 (3)	4/3 (3)	4/3 (3)	718966

## NUCLEOSIL<sup>®</sup> dimethyl phase (C<sub>2</sub>) · USP L16



### Technical data

- Non-endcapped phase for RP and ion-pairing chromatography
- pH stability at 20 °C: 2–8; carbon content 3.5 %

- Retention times are much shorter than for the other RP phases

### Ordering information

Eluent in column acetonitrile – water

ID	Length → 250 mm	EC guard columns*
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#### NUCLEOSIL<sup>®</sup> 100-7 C<sub>2</sub> particle size 7 μm, pore size 100 Å

Analytical EC columns

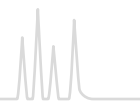


4.6 mm

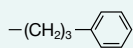
720089.46

721030.30

EC columns in packs of 1, guard columns in packs of 3. For details of our column systems see page 250.



## NUCLEOSIL<sup>®</sup> phenyl phases (C<sub>6</sub>H<sub>5</sub>) · USP L11



### Technical data




- Relatively nonpolar, non-encapped phases for RP and ion pairing chromatography
- Polarity similar to C<sub>8</sub>, but with different selectivity for PAHs, polar aromatics, fatty acids etc.
- pH stability at 20 °C: 2–8; carbon content 8 %

### Recommended application

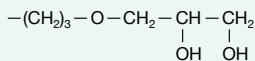
- Separation of moderately polar compounds

### Ordering information

Eluent in column acetonitrile – water

ID	Length → 250 mm	EC guard columns*
<b>NUCLEOSIL<sup>®</sup> 100-5 C<sub>6</sub>H<sub>5</sub></b> particle size 5 μm, pore size 100 Å, not encapped		
Analytical EC columns		
 4.6 mm	720956.46	721137.30
<b>NUCLEOSIL<sup>®</sup> 100-7 C<sub>6</sub>H<sub>5</sub></b> particle size 7 μm, pore size 100 Å, not encapped		
Analytical EC columns		
 4 mm	720019.40	
 4.6 mm	720019.46	

## NUCLEOSIL<sup>®</sup> diol phases · USP L20




### Technical data

- Dihydroxypropyl modified silica for RP and NP chromatography
- Less polar than unmodified silica, very easily wettable with water

- pH stability at 20 °C: 2-8; carbon content 5 %

### Ordering information

Eluent in column is *n*-heptane. When using an eluent which is not miscible with *n*-heptane (e.g., water), it is necessary to rinse the column with THF first.

ID	Length → 250 mm	EC guard columns*
<b>NUCLEOSIL<sup>®</sup> 100-5 OH (Diol)</b> particle size 5 μm, pore size 100 Å		
Analytical EC columns		
 4.6 mm	720143.46	721142.30

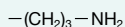
### Guard column system

Guard columns for EC columns with ID	2 mm	3 mm	4 mm	4.6 mm	Guard column holder
* Column Protection System (pack of)	EC 4/2 (3)	4/3 (3)	4/3 (3)	4/3 (3)	718966

EC columns in packs of 1, guard columns in packs of 3. For details of our column systems see page 250.



## NUCLEOSIL<sup>®</sup> amino phases · USP L8



### Technical data

- Aminopropyl modified polar silica phase; pH stability at 20 °C: 2–8; carbon content 3.5 %
- Corresponding NUCLEODUR<sup>®</sup> phases see page 188




### Recommended application

#### Multi-mode chromatography

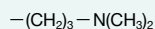
- NP chromatography with hexane, dichloromethane or 2-propanol as mobile phase for polar compounds such as substituted anilines, esters, chlorinated pesticides
- RP chromatography of polar compounds like carbohydrates in aqueous-organic eluent systems
- Anion exchange chromatography of anions and organic acids using common buffers (e.g., acetate or phosphate) in conjunction with organic modifiers (e.g., acetonitrile)

### Ordering information

Eluent in column is *n*-heptane (except for NH<sub>2</sub> RP). When using an eluent which is not miscible with *n*-heptane (e.g., water), it is necessary to rinse the column with THF first.

ID	Length → 250 mm	EC guard columns*
<b>NUCLEOSIL<sup>®</sup> 100-5 NH<sub>2</sub></b> particle size 5 μm, pore size 100 Å; eluent in column <i>n</i> -heptane		
Analytical EC columns		
 4.6 mm	720095.46	721020.30
<b>NUCLEOSIL<sup>®</sup> 100-5 NH<sub>2</sub>-RP</b> particle size 5 μm, pore size 100 Å; eluent in column acetonitrile – water (80:20)		
Analytical EC columns		
 4.6 mm	720095.46RP	721155.30
<b>NUCLEOSIL<sup>®</sup> 100-10 NH<sub>2</sub></b> particle size 10 μm, pore size 100 Å; eluent in column <i>n</i> -heptane		
Analytical EC columns		
 4.6 mm	720025.46	

## NUCLEOSIL<sup>®</sup> dimethylamino phase



### Technical data


- Weakly basic anion exchanger, pH stability at 20 °C: 2–8; carbon content 4 %

### Recommended application

- Separation of many anions; can also be used in a similar way as the NH<sub>2</sub> phase

### Ordering information

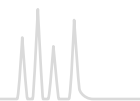
Eluent in column is *n*-heptane. When using an eluent which is not miscible with *n*-heptane (e.g., water), it is necessary to rinse the column with THF first.

ID	Length → 250 mm	EC guard columns*
<b>NUCLEOSIL<sup>®</sup> 100-5 N(CH<sub>3</sub>)<sub>2</sub></b> particle size 5 μm, pore size 100 Å		
Analytical EC columns		
 4.6 mm	720994.46	721158.30

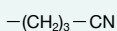
### Guard column system

Guard columns for EC columns with ID	2 mm	3 mm	4 mm	4.6 mm	Guard column holder
* Column Protection System (pack of)	EC 4/2 (3)	4/3 (3)	4/3 (3)	4/3 (3)	718966

EC columns in packs of 1, guard columns in packs of 3. For details of our column systems see page 250.



## NUCLEOSIL<sup>®</sup> cyano phases · USP L10



### Technical data

- Polar to midpolar cyano (nitrile) modified silica
- pH stability at 20 °C: 2–8; carbon content 5 % for 100 Å pores, ~ 3 % for 120 Å pores
- Corresponding NUCLEODUR<sup>®</sup> phases see page 186









### Recommended application

#### Reversed phase and normal phase chromatography

- Normal phase: with low-polarity solvents for many compounds, which can also be separated on unmodified silica, however, due to the rapid equilibration much more suitable for gradient separations
- Reversed phase: with different selectivity than C<sub>18</sub>, C<sub>8</sub> or phenyl modified packings

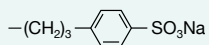
### Ordering information

Eluent in column (except for NUCLEOSIL<sup>®</sup> 100-5 CN-RP) is *n*-heptane. When using an eluent which is not miscible with *n*-heptane (e.g., water), it is necessary to rinse the column with THF first.

ID	Length → 250 mm	EC guard columns*
<b>NUCLEOSIL<sup>®</sup> 100-5 CN</b> particle size 5 µm, pore size 100 Å; eluent in column <i>n</i> -heptane		
Analytical EC columns		
 4 mm	720090.40	721078.30
 4.6 mm	720090.46	721078.30
<b>NUCLEOSIL<sup>®</sup> 100-5 CN-RP</b> particle size 5 µm, pore size 100 Å; eluent in column acetonitrile – water		
Analytical EC columns		
 4 mm	720205.40	721039.30
 4.6 mm	720205.46	721039.30
<b>NUCLEOSIL<sup>®</sup> 100-10 CN</b> particle size 10 µm, pore size 100 Å; eluent in column <i>n</i> -heptane		
Analytical EC columns		
 4 mm	720024.40	
 4.6 mm	720024.46	
<b>NUCLEOSIL<sup>®</sup> 120-7 CN</b> particle size 7 µm, pore size 120 Å; eluent in column <i>n</i> -heptane		
Analytical EC columns		
 4 mm	720057.40	
 4.6 mm	720057.46	



## NUCLEOSIL® SA phases · USP L9





### Technical data

• Strongly acidic cation exchanger (SCX) with benzenesulfonic acid modification

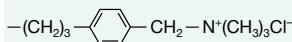
• Capacity ~ 1 meq/g; pH stability at 20 °C: 2–8; carbon content 6.5 %

### Ordering information

Eluent in column 0.15 mol/L (NH<sub>4</sub>)<sub>2</sub>HPO<sub>4</sub>, pH 5

ID	Length →				
	125 mm	150 mm	250 mm	EC guard columns*	
<b>NUCLEOSIL® 100-5 SA</b> particle size 5 µm, pore size 100 Å					
Analytical EC columns					
	4 mm			720097.40	721024.30
	4.6 mm	720709.46	720182.46	720097.46	721024.30
<b>NUCLEOSIL® 100-10 SA</b> particle size 10 µm, pore size 100 Å					
Analytical EC columns					
	4.6 mm			720028.46	

## NUCLEOSIL® SB phases · USP L14





### Technical data

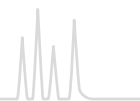
• Strongly basic anion exchanger (SAX) with quaternary ammonium modification

• Capacity ~ 1 meq/g; pH stability at 20 °C: 2–8; carbon content 10 %

### Ordering information

Eluent in column 0.15 mol/L (NH<sub>4</sub>)<sub>2</sub>HPO<sub>4</sub>, pH 5

ID	Length →				
	125 mm	150 mm	250 mm	EC guard columns*	
<b>NUCLEOSIL® 100-5 SB</b> particle size 5 µm, pore size 100 Å					
Analytical EC columns					
	4 mm			720996.40	721025.30
	4.6 mm	720989.46	720183.46	720996.46	721025.30
<b>NUCLEOSIL® 100-10 SB</b> particle size 10 µm, pore size 100 Å					
Analytical EC columns					
	4.6 mm			720029.46	



## NUCLEOSIL<sup>®</sup> SiOH unmodified silica · USP L3

### Technical data

- Spherical silica, pH stability 2–8
- For physical properties of unmodified NUCLEOSIL<sup>®</sup> materials please see page 211.
- Maximum working pressure for the EC columns listed below is 400 bar.

### Ordering information

Eluent in column is *n*-heptane. When using an eluent which is not miscible with *n*-heptane (e.g., water), it is necessary to rinse the column with THF first.

ID	Length → 250 mm	EC guard columns*
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#### NUCLEOSIL<sup>®</sup> 50-5 particle size 5 μm, pore size 50 Å

Analytical EC columns

4.6 mm	720093.46	721167.30
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#### NUCLEOSIL<sup>®</sup> 100-5 particle size 5 μm, pore size 100 Å

Analytical EC columns

4.6 mm	720099.46	721518.30
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### Guard column system

Guard columns for EC columns with ID	2 mm	3 mm	4 mm	4.6 mm	Guard column holder
* Column Protection System (pack of)	EC 4/2 (3)	4/3 (3)	4/3 (3)	4/3 (3)	718966

EC columns in packs of 1, guard columns in packs of 3. For details of our column systems see page 250.