SVEA®

SWEDISH EXCELLENCE IN NANOPORUS SILICA
SVEA® HPLC Columns

NANOLOGICA

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ABOUT SVEA® COLUMNS

Nanologica offers best-in-class (U)HPLC analytical columns that provide excellent chromatographic performance with sharp peak shapes and robust performance under extreme pH conditions (<1 and > 10 respectively).

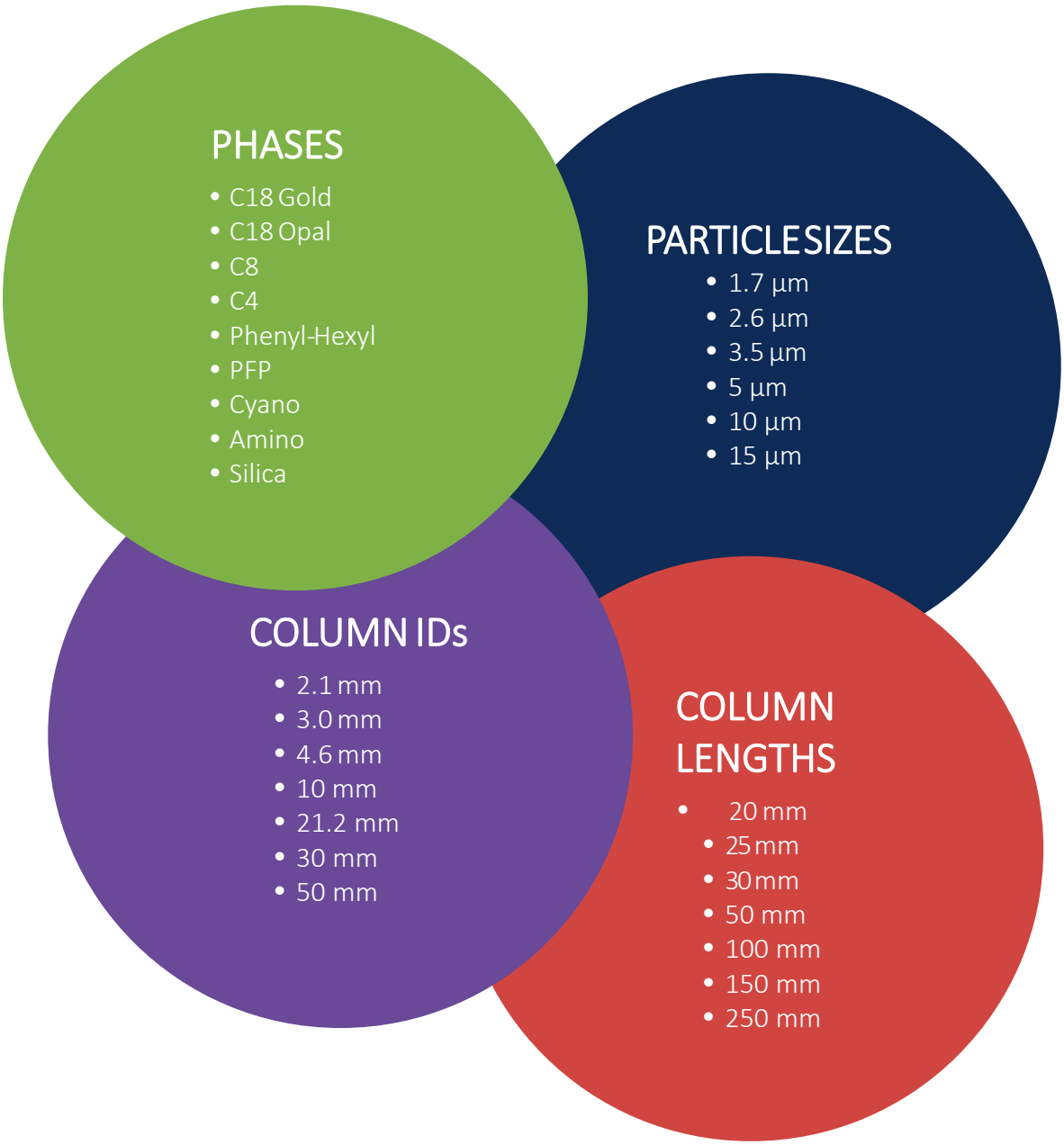
The unique surface chemistry and controlled particle properties of Nanologica's proprietary silica, result in low back pressures and high plate numbers. With an exceptionally strong silica backbone, SVEA® columns offer long life cycles.

SVEA® columns gives excellent selectivity across a wide range of chemistry needs.

We take pride in the quality, design and performance of our products. They embody our core value: Swedish Excellence in Nanoporous Silica.


3.0

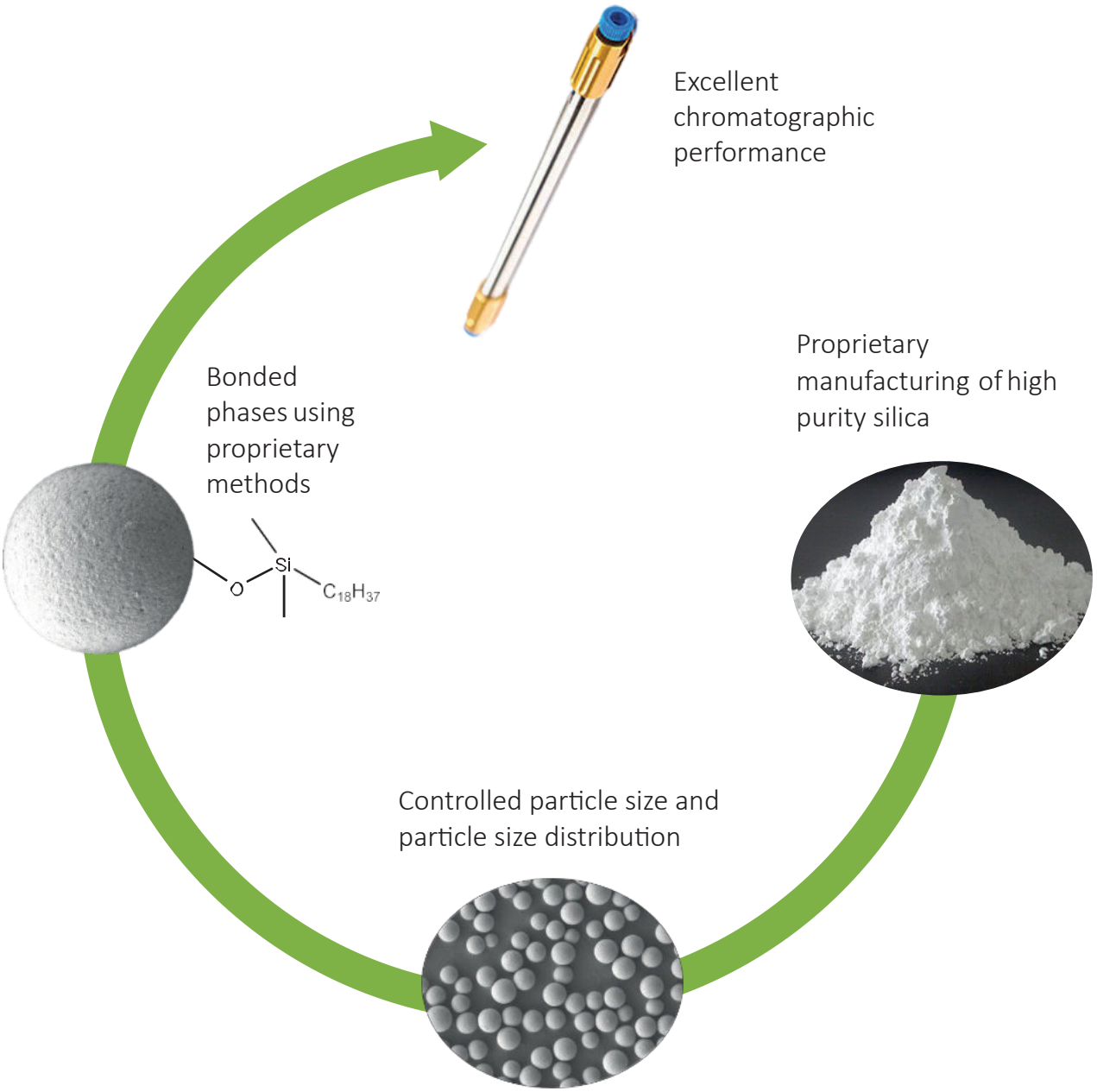
Nanologica offers best-in-class (U)HPLC with a broad portfolio of bonded phases.



Content

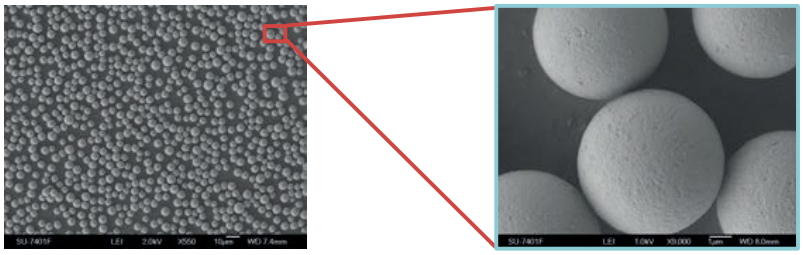
FROM SILICA TO COLUMNS

Nanologica has been producing, modifying and coating silica for several years. Modern technology and demanding quality control is deployed at each step of the manufacturing process to ensure highest possible product performance. The extensive experience and knowledge in silica chemistry, along with internal control of the entire value chain, guarantees exceptional quality and excellent batch to batch reproducibility.

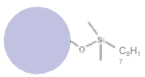
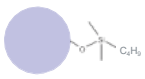
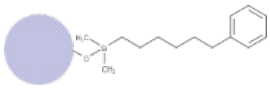
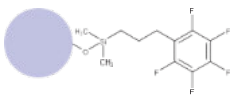
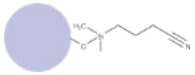
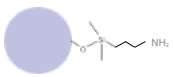


SILICA PRODUCTION AND FUNCTIONALISATION

Nanologica manufactures spherical porous silica particles with controlled pore size, particle size, and particle size distribution, resulting in excellent chromatographic properties. The Scanning Electron Microscope (SEM) image below shows perfect spherical shapes and narrow particle size distribution with no fines or crushed particles. The magnified image shows perfectly smooth silica surfaces with no irregularities.



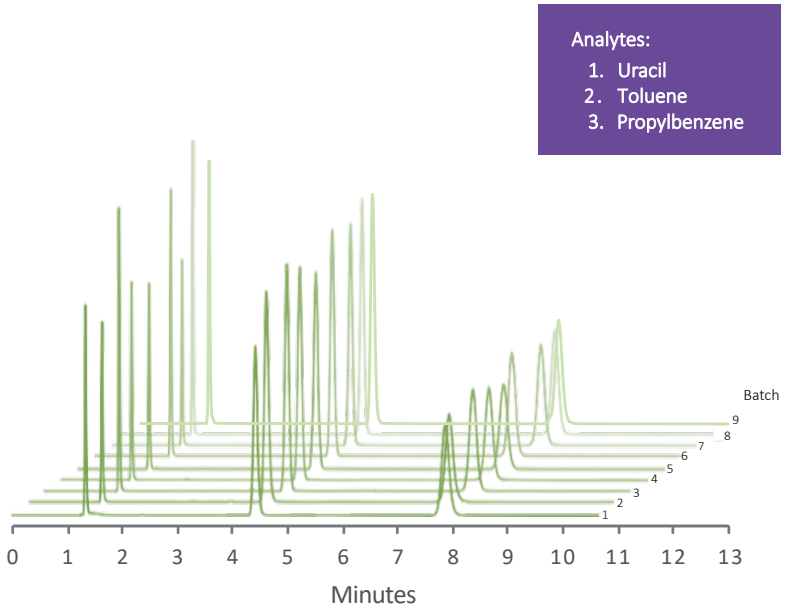
Nanologica offers a range of phases with different and complementary chromatographic properties. The functionalisation is performed using proprietary production protocols, to produce densely functionalised and end-capped silica particles with low residual silanol activity. The coated silica particles exhibit excellent chromatographic performance and outstanding chemical stability.

Stationary phase	Chemical structure	End-capped	USP code
Silica		No	L3
C18 Gold C18 Opal Coreshell C18		Yes	L1
C8		Yes	L7
C4		Yes	L26
Phenyl-Hexyl Coreshell Phenyl-Hexyl		Yes	L11
PFP (Pentafluorophenyl)		Yes	L43
Cyano		Yes	L10
Amino		Yes	L8

REPRODUCIBILITY

Nanologica's coating shows high batch to batch reproducibility for both retention times and efficiencies.

Column	SVEA® C18 Gold 150x4.6 mm 5 µm
Mobile Phase	Acetonitrile/H_2O 70/30%
Flow Rate	1.0 ml/min
Temperature	30°C
Detection	UV 210 nm



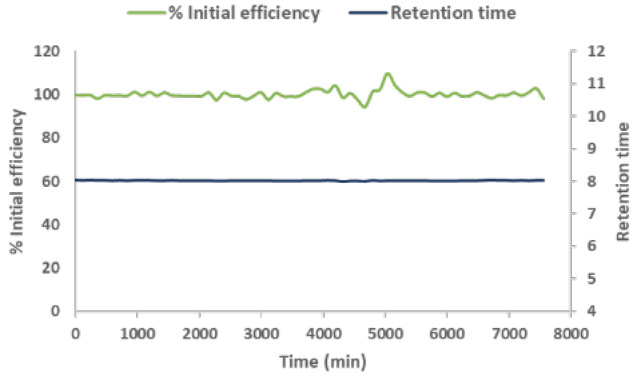
DURABILITY

The SVEA® columns show excellent durability in harsh acidic as well as harsh basic conditions. Both efficiencies and retention times remain almost unaffected even after more than 7 000 column volumes, as shown in the stability tests below.

ASIDIC CONDITIONS

Column	SVEA® C18 Gold 100x4.6 mm 5 µm
Mobile Phase	A - 1% TFA in water, pH 0.9
	B- 1% TFA in acetonitrile
Flow Rate	1.0 ml/min
Temperature	60°C Ethylbenzene
Analyte	

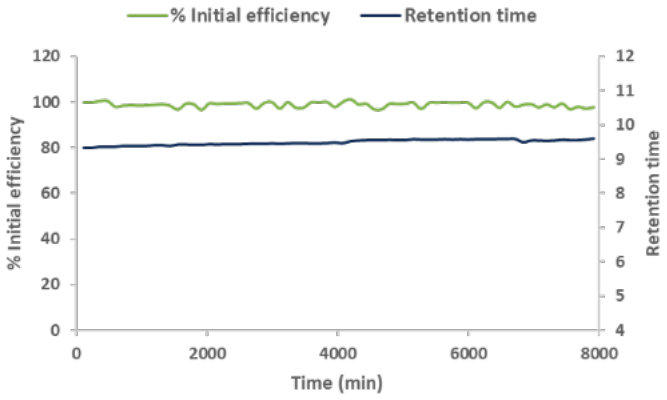
Gradient cycle	10-90% B in 5 min
	90% B for 2 min
	90-10% B in 1 min
	10% B for 2 min



BASIC CONDITIONS

Column	SVEA® C18 Gold 100x4.6 mm 5 µm
Mobile Phase	A - 10 mM ammonium bicarbonate, pH 9.6
	B- Acetonitrile
Flow Rate	1.0 ml/min
Temperature	45°C Progesterone
Analyte	

Gradient cycle	10-90% B in 5 min
	90% B for 2 min
	90-10% B in 1 min
	10% B for 2 min

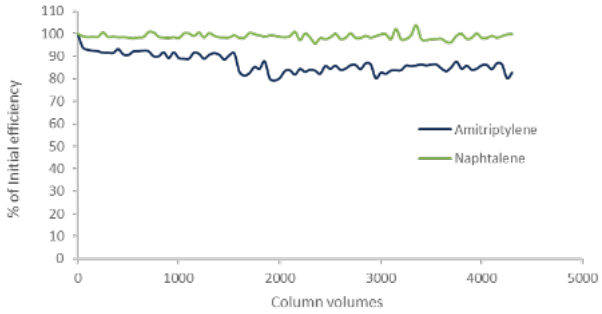


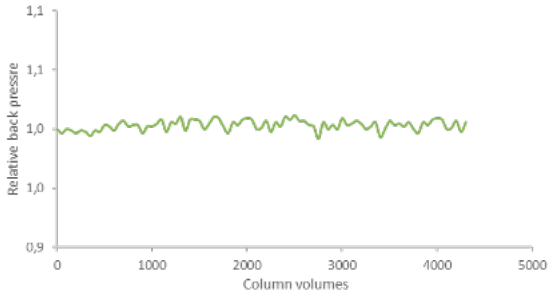
BED STABILITY

Bed stability testing shows maintained efficiency and stable back pressure after close to 100 000 column volumes.

BED STABILITY

Column SVEA® C18 Gold 100x3.0 mm 5 µm
Mobile Phase 20 mM Potassium phosphate buffer at pH 2.7/MeOH 40/60
Flow Rate 0.5 ml/min
Temperature 30°C
Analyte Amitriptylin
Naphthalene





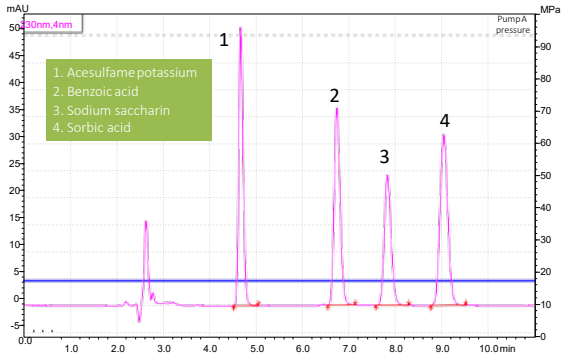
COLUMN LIFE CYCLE

LIFE CYCLE

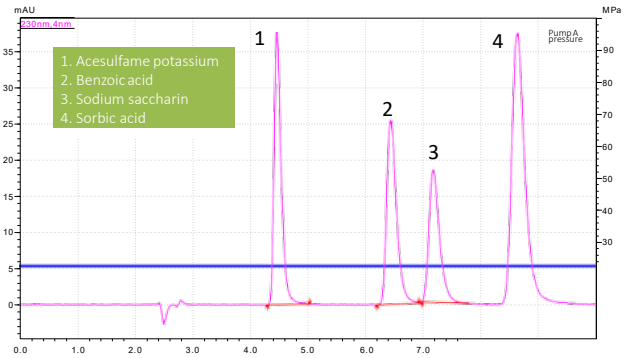
The long life cycle of the SVEA® columns is demonstrated by preserved separation capacity even after 1 700 column injections when analyzing a food sample.

Column SVEA® C18 Gold 250x4.6 mm 5 µm
Mobile Phase Methanol: 20mmol/L Ammonium Acetate=20:80 (v:v) 1.0 ml/min
Flow Rate
Temperature 35°C
Analyte Acesulfame potassium
Benzoic acid
Sorbic acid
Sodium saccharide

Separation of acesulfame potassium, benzoic acid, sodium saccharin and sorbic acid. Analytical sample prepared from preserves widely used in food industry. Data kindly provided by SinoUnison Technology Co., Ltd., China.



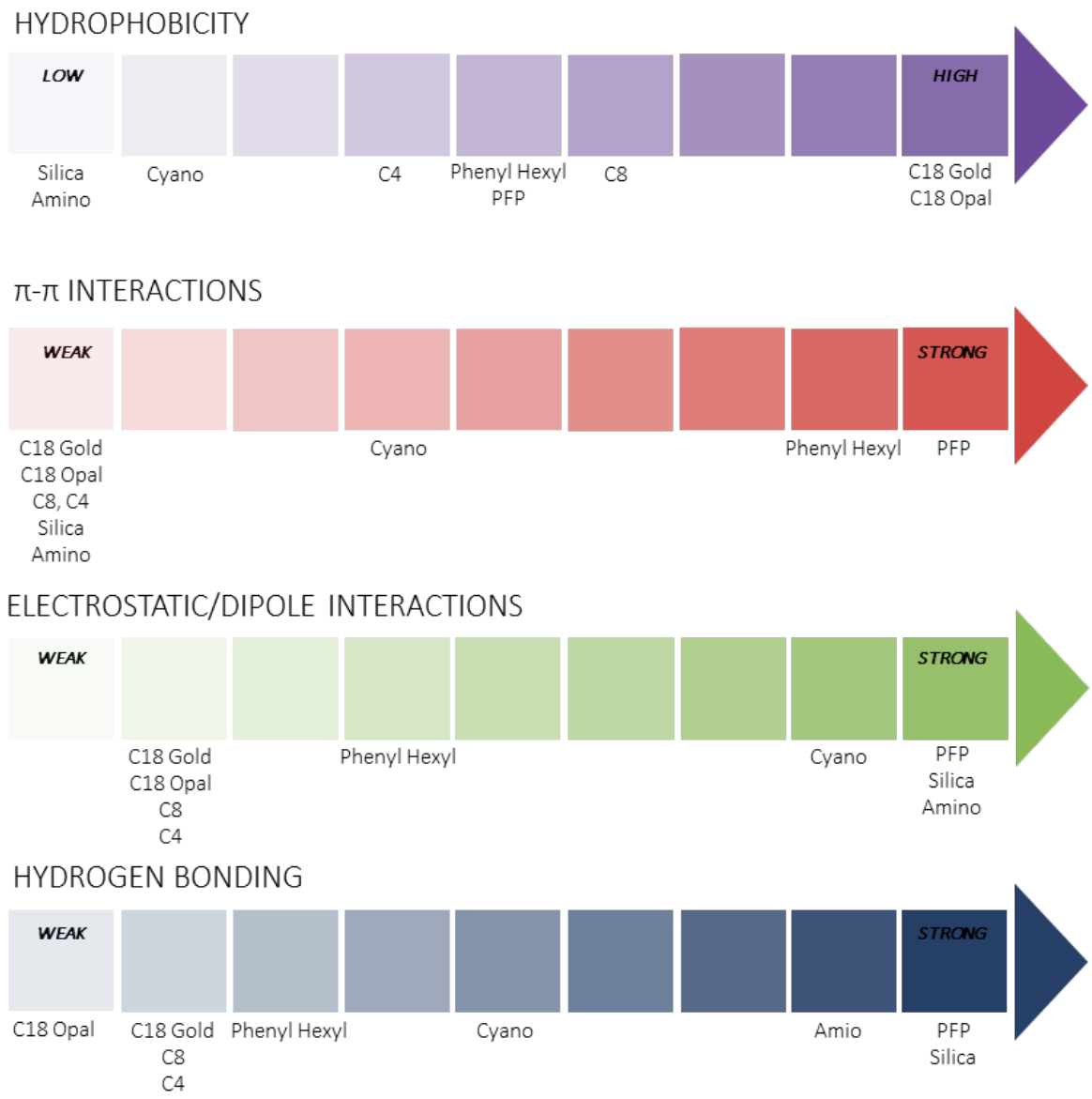
Separation after one injection using a new SVEA® C18 Gold column.



Separation after 1700 injections.

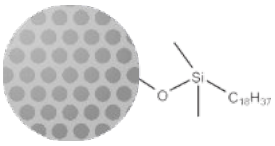
COLUMN SELECTION GUIDE

Different kinds of functionalisation offer different interaction mechanisms between the stationary phase and analytes, to fit a wide range of applications. The figure below is a guideline for reverse phase chromatography, for choosing the right type of bonded phase depending on the interaction between the analyte and the stationary phase.



Silica:	Type B Silica
Particle Size:	3.5, 5 µm
Surface Area:	300 m^2/g
Pore Size:	110 Å
PoreVolume:	0.85 ml/g
Carbon Load:	19%
Ligand Density:	3.7 µmol/m^2
Bonded Phase:	Dimethyloctadecylsilane
End-capping:	Yes
USP Code:	L1
pH Range:	1-10

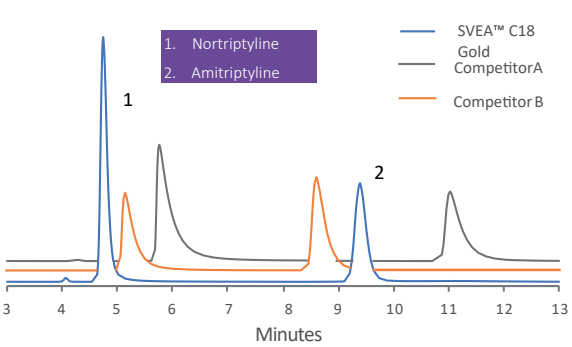
- General first choice column
- High hydrophobic retention
- Wide range of analytes
- Excellent peak shape for acids and bases



SVEA® C18 Gold is the first-choice LC column for a wide range of analytes. The high carbon load provides high retention and selectivity for compounds with moderate to high lipophilicity. Thorough end-capping combined with very low acidity and homogenously distributed residual silanol groups result in excellent peak shape and efficiencies with bases as well as acidic compounds.

Comparison of peak shapes and retention times of Nortriptyline and Amitriptyline

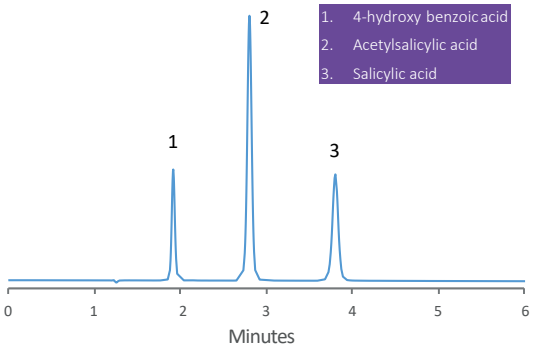
Column	SVEA® C18 Gold 150x4.6 mm 5 µm
Mobile Phase	20% 25 mM KH_2PO_4 pH 7.0 80% methanol
Flow Rate	1 ml/min 30°C
Temperature	UV 210 nm
Detection	



Thorough end-capping and low polarity of the silica surface of SVEA™ C18 Gold gives significantly better peak shapes of anti-depressants, compared to competitor brands.

Acetylsalicylic acid and related compounds

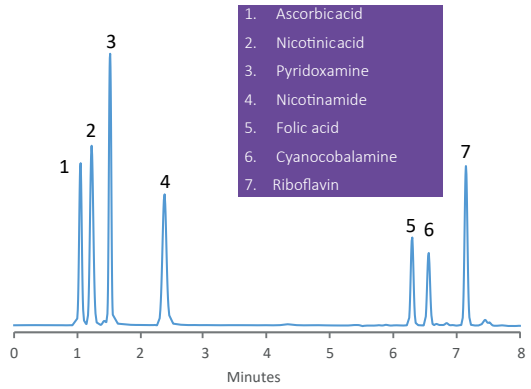
Column	SVEA® C18 Gold 150x4.6 mm 5 µm
Mobile Phase	60% 0.3% H3PO4
	40% acetonitrile
Flow Rate	1 ml/min 30°C
Temperature	UV 237 nm
Detection	



High separation efficiency and symmetrical peak shapes. The tailing factor for salicylic acid is 0.96.

Water soluble vitamins

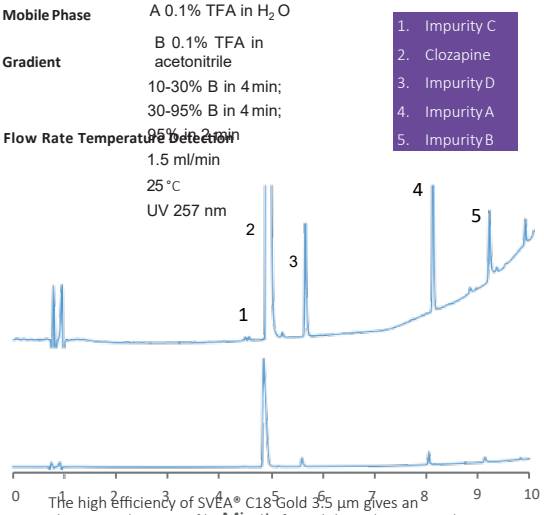
Column	SVEA® C18 Gold 150x4.6 mm 5 µm
Mobile Phase	A 25 mM KH_2PO_4 pH 3.6
Gradient	B acetonitrile
Flow Rate Temperature	5-30% B in 8 min 1.5 ml/min
	25°C



Sharp peaks and selectivities of vitamins.

Clozapine and related impurities

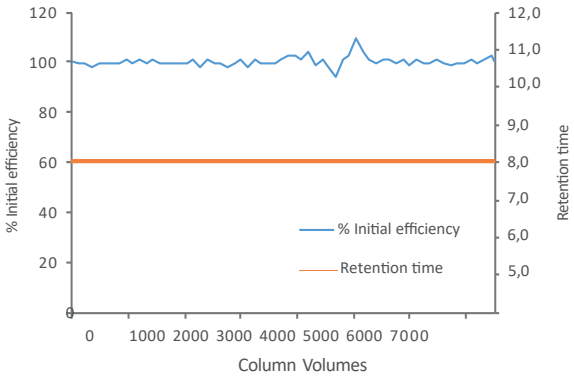
Column	SVEA® C18 Gold 100x4.6 mm 3.5 µm
Mobile Phase	A 0.1% TFA in H_2O
Gradient	B 0.1% TFA in acetonitrile
	10-30% B in 4 min;
	30-95% B in 4 min;
	95% in 2 min
Flow Rate Temperature Detection	1.5 ml/min
	25 °C
	UV 257 nm



The high efficiency of SVEA® C18 Gold 3.5 µm gives an extraordinary resolution profile of an accelerated forced degradation sample of Clozapine.

Low pH stability at high temperature

Column	SVEA® C18 Gold 150x4.6 mm 5 µm
Mobile Phase	A 1% TFA in H_2O pH 0.9 B 1% TFA in acetonitrile
Gradient Cycle	10-90% B in 5 min; 90% B in 2 min 90-10% B in 1 min; 10% B in 2 min
Flow Rate Temperature Detection	1.0 ml/min 60 °C
	UV 254 nm

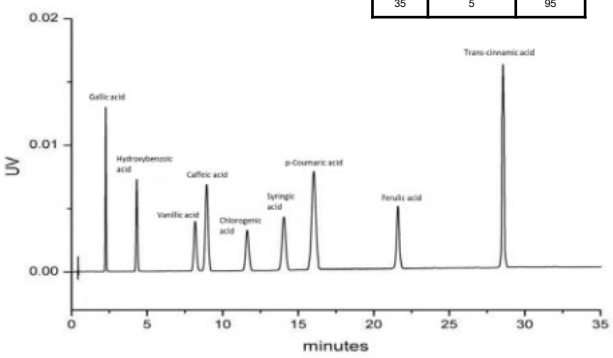


No change in either efficiency or retention time for ehylbenzene after running gradient cycles at pH 0.9 and 60°C for more than 7000 column volumes.

Phenolic compounds in flaxseed oil

Column	SVEA® C18 Gold 50x2.1 mm 1.7 µm
Mobile Phase	Gradient in table
Injection volume	2.0 µl
Flow Rate Temperature Detection	0.3 ml/min
	35 °C
	DAD 280 nm

Time (min)	A% (0.1% formic acid in methanol)	B% (0.1% formic acid in water)
0	5	95
20	15	85
30	45	55
31	5	95
35	5	95



The SVEA® UPLC C18 Gold, 1.7µm 50x2.1 mm column was used for the separation of the various phenolic compounds in flaxseed oil. A good separation of 9 phenolic compounds, with sharp peaks and low tailing, was achieved.

Order Information SVEA® C18 Gold Columns

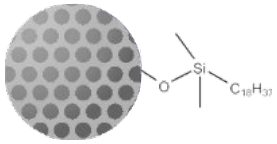
Particle Size	Column ID (mm)	Column Length	Pore Size	Article Number
1.7 µm	2.1	20 mm	110 Å	A112V1
		30 mm	110 Å	A122V1
		50 mm	110 Å	A132V1
		100 mm	110 Å	A152V1
		150 mm	110 Å	A162V1
3.5 µm	2.1	50 mm	110 Å	A332V1
		100 mm	110 Å	A352V1
		150 mm	110 Å	A362V1
	3	50 mm	110 Å	A333V1
		100 mm	110 Å	A353V1
		150 mm	110 Å	A363V1
		250 mm	110 Å	A383V1
	4.6	50 mm	110 Å	A335V1
		100 mm	110 Å	A355V1
		150 mm	110 Å	A365V1
		250 mm	110 Å	A385V1
5 µm	3	50 mm	110 Å	A533V1
		100 mm	110 Å	A553V1
		150 mm	110 Å	A563V1
		250 mm	110 Å	A583V1
	4.6	50 mm	110 Å	A535V1
		100 mm	110 Å	A555V1
		150 mm	110 Å	A565V1
		250 mm	110 Å	A585V1
	10	150 mm	110 Å	A561V9
		250 mm	110 Å	A581V9
	21.2	50 mm	110 Å	A539V9
		100 mm	110 Å	A559V9
		150 mm	110 Å	A569V9
		250 mm	110 Å	A589V9
	30	50 mm	110 Å	A537V9
		100 mm	110 Å	A557V9
		150 mm	110 Å	A567V9
		250 mm	110 Å	A587V9
	50	50 mm	110 Å	A536V9
		250 mm	110 Å	A586V9

Particle Size	Column ID (mm)	Column Length	Pore Size	Article Number
10 µm	10	150 mm	110 Å	A761V9
		250 mm	110 Å	A781V9
	21.2	50 mm	110 Å	A739V9
		100 mm	110 Å	A759V9
		150 mm	110 Å	A769V9
		250 mm	110 Å	A789V9
	30	50 mm	110 Å	A737V9
		100 mm	110 Å	A757V9
		150 mm	110 Å	A767V9
		250 mm	110 Å	A787V9
	50	50 mm	110 Å	A736V9
		250 mm	110 Å	A786V9
15 µm	10	150 mm	110 Å	A961V9
		250 mm	110 Å	A981V9
	21.2	50 mm	110 Å	A939V9
		100 mm	110 Å	A959V9
		150 mm	110 Å	A969V9
		250 mm	110 Å	A989V9
	30	50 mm	110 Å	A937V9
		100 mm	110 Å	A957V9
		150 mm	110 Å	A967V9
		250 mm	110 Å	A987V9
	50	50 mm	110 Å	A936V9
		250 mm	110 Å	A986V9

SVEA® C18 Opal

Silica:	Type B Silica
Particle Size:	3.5, 5 µm
Surface Area:	300 m^2/g
Pore Size:	110 Å
PoreVolume:	0.85 ml/g
Carbon Load:	14%
Ligand Density:	3.7 µmol/m^2
Bonded Phase:	Octadecyl silane
End-capping:	Yes
USP Code:	L1
pH Range:	1-11

- Recommended for high pH applications
- Proprietary coating ensures solely hydrophobic interaction
- Better peak shape for ionisable compounds
- Low bleeding of ligands



SVEA® C18 Opal is coated with a proprietary bonding technology, which provides a fully covered silica surface. The column material is protected against hydrolysis of the ligands at low pH and silica dissolution at high pH. The coating results in only hydrophobic interactions, resulting in excellent peak shape for all types of analytes.

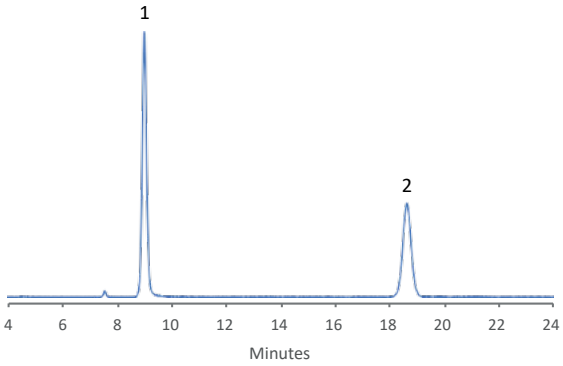
The proprietary bonding technology binds the ligands strongly, providing exceptionally low bleeding.

Separation of Nortriptyline and Amitriptyline

Column Mobile Phase SVEA® C18 Opal 250x4.6 mm 5 µm
20% 25 mM KH_2PO_4 pH 7.0
80% methanol

Flow Rate 1 ml/min
Temperature 30 °C
Detection UV 210 nm

1. Nortriptyline
2. Amitriptyline

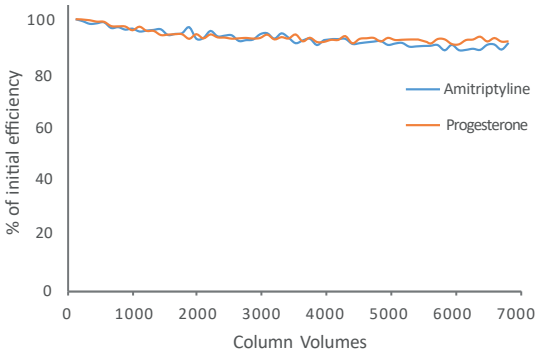


Highly efficient and symmetrical peak shapes for Nortriptyline and Amitriptyline. Tailing factor for Nortriptyline is 1.08, and for Amitriptyline 1.02.

High pH stability at high temperature

Column SVEA® C18 Opal 250x4.6 mm 5µm
Mobile Phase A 10 mM NH_4HCO_4 pH 10.5 B acetonitrile
Gradient 10-50% B in 60 min
Gradient Cycle 10-90% B in 13 min; 90% B in 5 min;
90-10% B in 2 min; 10% B in 5 min

Flow Rate 1 ml/min
Temperature 60 °C
Detection UV 210 nm

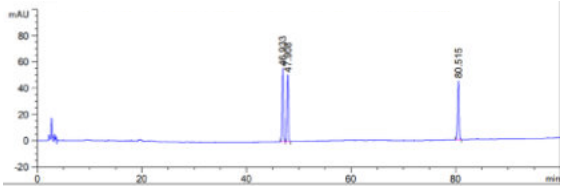


The efficiencies of the neutral (Progesterone) and basic (Amitriptyline) compounds are almost unaffected using gradient cycles after more than 7000 column volumes.

Ginsenoside

Column	SVEA® C18 Opal 5 µm 250x4.6 mm
Mobile Phase	Gradient in table
Flow Rate	1.0 ml/min
Injection volume	10 µl
Sample concentration	2 mg/ml
Temperature	30 °C
Detection	DAD 203nm

Time (min)	A% Acetonitrile	B% Water
0	5	95
20	15	85
30	45	55
31	5	95
35	5	95



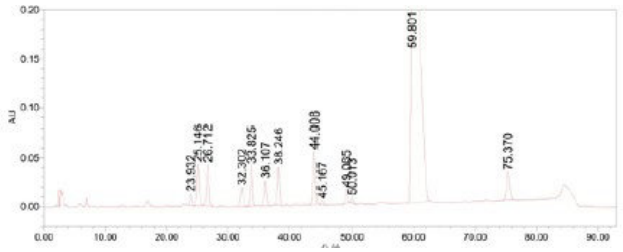
peak	analytes	Peak area	Resolution	Selectivity
1	Rg1	1024	-	
2	Re	840	2.16	1.02
3	Rb1	886	68.35	1.68

The SVEA™ C18 Opal column was used to separate ginsenoside. Also the difficult separation of Rg1 and Re was successfulusing SVEA® C18 Opal.

Azithromycin

Column	SVEA® C18 Opal5 µm 250x4.6 mm
Mobile Phase	Gradient in table
Flow Rate	1.0 ml/min
Injection volume	50 µl
Sample concentration	8 mg/ml
Temperature	60 °C
Detection	UV 210 nm
Sample	Azithromycin including impurities

Time (min)	Mobile phase A 1.8g/ L anhydrous disodium hydrogen phosphate adjusted till pH=8.9 by dilute phosphoric acid or dilute sodium hydroxide	Mobile phase B methanol: acetonitrile (250:750 V/V)
0-25	50-45	50-55
25-30	45-40	55-60
30-80	40-25	60-75
80-81	25-50	75-50
81-93	50	50



Peak order from left to right: M, Q, R, F, J, I, S, H, unknown, A, unknown, azithromycin, B

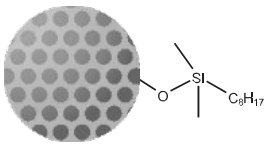
Method: EU Pharmacopoeia 9.0, Azithromycin monograph. Data kindly provided by Yunbo Technologies.

Order information SVEA® C18 Opal Columns

Particle Size	*Column ID (mm)*	*Column Length*	*Pore Size*	*Article Number*
3.5 µm	2.1	50 mm	110 Å	A332V3
		100 mm	110 Å	A352V3
		150 mm	110 Å	A362V3
	3	50 mm	110 Å	A333V3
		100 mm	110 Å	A353V3
		150 mm	110 Å	A363V3
		250 mm	110 Å	A383V3
	4.6	50 mm	110 Å	A335V3
		100 mm	110 Å	A355V3
		150 mm	110 Å	A365V3
		250 mm	110 Å	A385V3
5 µm	3	50 mm	110 Å	A533V3
		100 mm	110 Å	A553V3
		150 mm	110 Å	A563V3
		250 mm	110 Å	A583V3
	4.6	50 mm	110 Å	A535V3
		100 mm	110 Å	A555V3
		150 mm	110 Å	A565V3
		250 mm	110 Å	A585V3

SVEA® C8

Silica:	Type B Silica
Particle Size:	3.5, 5 µm
Surface Area:	300 m^2/g
Pore Size:	110 Å
PoreVolume:	0.85 ml/g
Carbon Load:	11%
Ligand Density:	3.7 µmol/m^2
Bonded Phase:	Dimethyloctylsilane
End-capping:	Yes
USP Code:	L7
pH Range:	1-9

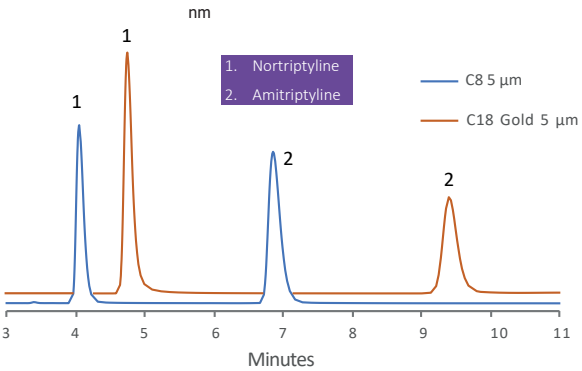


- Similar selectivity for lipophilic compounds as C18 Gold
- Lower retention than C18 Gold
- Slightly different selectivity for ionized acids and bases compared to SVEA® C18 Gold
- Excellent peak shape for acids and bases

An alternative media to SVEA® C18 Gold that gives lower retention. Due to the more hydrophilic nature of the bonded phase, ionized acids and especially bases can have better peak shapes and different selectivity compared to SVEA® C18 Gold. Recommended for mixture containing moderately polar and very hydrophobic compounds.

Comparison of peak shapes and retention times between C8 and C18 Gold for two anti-depressants

Column Mobile Phase	SVEA® C8 150x4.6 mm 5 µm and C18 Gold 5 µm 20% 25 mM KH_2PO_4 pH 7.0 80% methanol
Flow Rate	1 ml/min
Temperature	30 °C
Detection	UV 210 nm

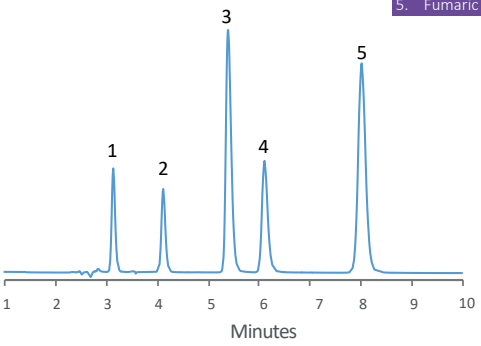


The excellent peak shapes for ionized compounds with SVEA™ C8 is revealed by analysing anti-depressants.

Water soluble organic acids

Column Mobile Phase	SVEA® C8 250x4.6 mm 5 µm 97% 25 mM KH_2PO_4 pH 2.5 3% methanol
Flow Rate	1 ml/min
Temperature	25 °C
Detection	UV 220 nm

1. Tartaric acid
2. Malic acid
3. Lactic acid
4. Maleic acid
5. Fumaric acid

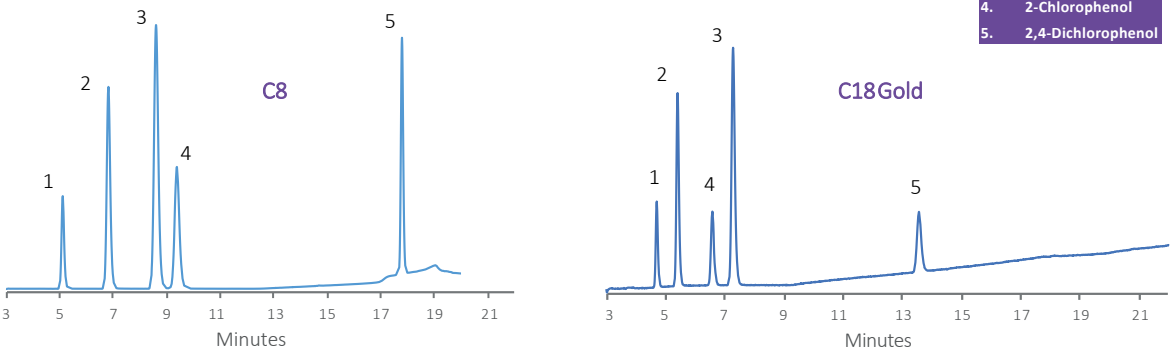


Excellent peak shapes and selectivities of water soluble organic acids are obtained at highly hydrophilic elution conditions.

Comparison of the elution order of phenols between C8 and C18 Gold bonded silica

Column	SVEA® C8 150x4.6 mm 5 µm and SVEA™ C18 Gold 250x4.6 mm 5 µm
Mobile Phase	A 1% AcOH in H_2O B 1% AcOH in methanol
Gradient	C8: 45% B in 10 min 45-90% B in 10 min C18 Gold: 60% B in 6 min 60-80% B in 14 min
Flow Rate	1 ml/min 30 °C
Temperature	UV 280 nm
Detection	

1. Phenol
2. 4-Nitrophenol
3. 2-Nitrophenol
4. 2-Chlorophenol
5. 2,4-Dichlorophenol

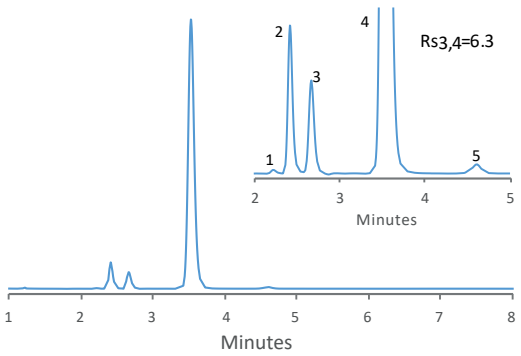


C8 is more hydrophilic than C18 Gold as seen by the reversal of the elution order of 2-nitrophenol and 2-chlorophenol.

Clozapine system suitability test

Column	SVEA® C8 150x4.6 mm 5 µm
Mobile Phase	20% 0.38% Et_3N in H_2O 80% methanol
Flow Rate	1 ml/min 30 °C
Temperature	
Detection	UV 257 nm

1. Impurity C
2. Impurity D
3. Impurity A
4. Clozapine
5. Unknown

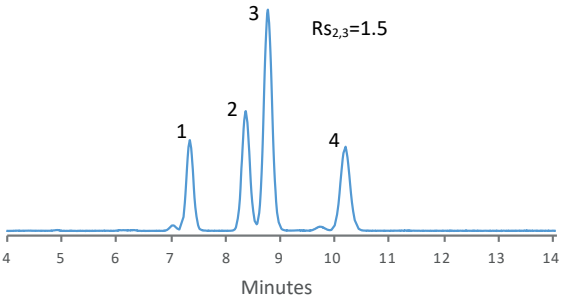


Sharp peaks and resolution.

Atorvastatin (Lipitor) system suitability test

Column	SVEA® C8 100x4.6 mm 3.5 µm
Mobile Phase	58% 50 mM NH_4OAc pH 4.6 30% acetonitrile, 12% THF
Flow Rate	1.2 ml/min 30 °C
Temperature	
Detection	UV 244 nm

1. Impurity A
2. Impurity B
3. Atorvastatin
4. Impurity C



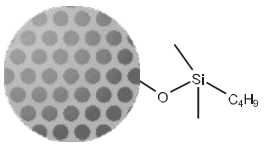
Atorvastatin and its diastereomeric Impurity B are seperated well using SVEA® C8 3.5 µm.

Order information SVEA® C8 Columns

Particle Size	Column ID (mm)	Column Length	Pore Size	Article Number
3.5 µm	2.1	50 mm	110 Å	B332V1
		100 mm	110 Å	B352V1
		150 mm	110 Å	B362V1
	3	50 mm	110 Å	B333V1
		100 mm	110 Å	B353V1
		150 mm	110 Å	B363V1
		250 mm	110 Å	B383V1
	4.6	50 mm	110 Å	B335V1
		100 mm	110 Å	B355V1
		150 mm	110 Å	B365V1
		250 mm	110 Å	B385V1
5 µm	3	50 mm	110 Å	B533V1
		100 mm	110 Å	B553V1
		150 mm	110 Å	B563V1
		250 mm	110 Å	B583V1
	4.6	50 mm	110 Å	B535V1
		100 mm	110 Å	B555V1
		150 mm	110 Å	B565V1
		250 mm	110 Å	B585V1
	10	150 mm	110 Å	B561V9
		250 mm	110 Å	B581V9
	21.2	50 mm	110 Å	B539V9
		100 mm	110 Å	B559V9
		150 mm	110 Å	B569V9
		250 mm	110 Å	B589V9
	30	50 mm	110 Å	B537V9
		100 mm	110 Å	B557V9
		150 mm	110 Å	B567V9
		250 mm	110 Å	B587V9
	50	50 mm	110 Å	B536V9
		250 mm	110 Å	B586V9

Particle Size	Column ID (mm)	Column Length	Pore Size	Article Number
10 µm	10	150 mm	110 Å	B761V9
		250 mm	110 Å	B781V9
	21.2	50 mm	110 Å	B739V9
		100 mm	110 Å	B759V9
		150 mm	110 Å	B769V9
		250 mm	110 Å	B789V9
	30	50 mm	110 Å	B737V9
		100 mm	110 Å	B757V9
		150 mm	110 Å	B767V9
		250 mm	110 Å	B787V9
	50	50 mm	110 Å	B736V9
		250 mm	110 Å	B786V9
15 µm	10	150 mm	110 Å	B961V9
		250 mm	110 Å	B981V9
	21.2	50 mm	110 Å	B939V9
		100 mm	110 Å	B959V9
		150 mm	110 Å	B969V9
		250 mm	110 Å	B989V9
	30	50 mm	110 Å	B937V9
		100 mm	110 Å	B957V9
		150 mm	110 Å	B967V9
		250 mm	110 Å	B987V9
	50	50 mm	110 Å	B936V9
		250 mm	110 Å	B986V9

Silica:	Type B Silica
Particle Size:	3.5, 5 µm
Surface Area:	300 m^2/g
Pore Size:	110 Å
PoreVolume:	0.85 ml/g
Carbon Load:	7%
Ligand Density:	3.7 µmol/m^2
Bonded Phase:	Dimethylbutylsilane
End-capping:	Yes
USP Code:	L26
pH Range:	1-8



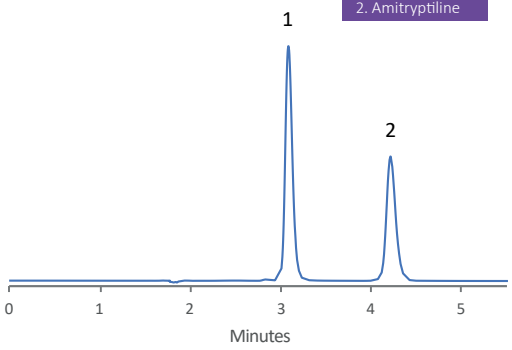
- Recommended for separation of large peptides and proteins
- Very low retention for lipophilic compounds
- Can also be run in HILIC-mode

Recommended for extremely lipophilic compounds to reduce analytical time. Excellent starting point for analysing peptide and protein mixtures. For intermediately polar analytes, such as amino acids, SVEA® C4 can also be run in HILIC-mode.

Separation of Nortriptyline and Amitriptyline

Column Mobile Phase SVEA® C4 150x4.6 mm 5 µm
20% 25 mM KH_2PO_4 pH 7.0
80% methanol
Flow Rate 1 ml/min
Temperature 30 °C
Detection UV 210 nm

1. Nortriptyline
2. Amitryptiline



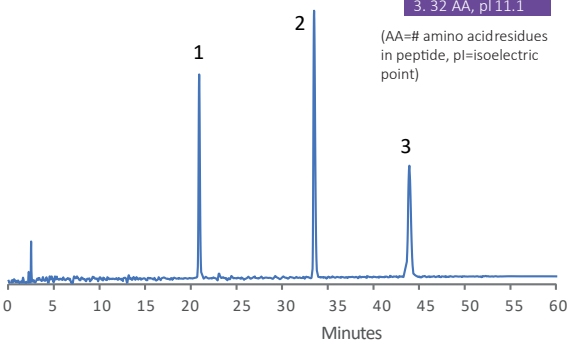
Short retention times and symmetrical peaks of the basic anti-depressants obtained on SVEA® C4.

Peptide mix separation

Column Mobile Phase SVEA® C4 150x4.6 mm 5 µm
A 0.1% TFA in H_2O
B 0.085% TFA in acetonitrile
Gradient 10-50% B in 60 min
Flow Rate 1 ml/min
Temperature 30 °C
Detection UV 215 nm

1. 14 AA, pI 4.5
2. 9 AA, pI 11.7
3. 32 AA, pI 11.1

(AA=# amino acid residues in peptide, pI=isoelectric point)

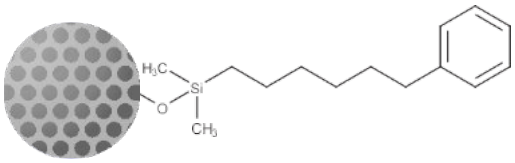


Separation of three different peptides on SVEA® C4.

Order information SVEA® C4 Columns

Particle Size	Column ID (mm)	Column Length	Pore Size	Article Number
3.5 µm	2.1	50 mm	110 Å	C332V1
		100 mm	110 Å	C352V1
		150 mm	110 Å	C362V1
	3	50 mm	110 Å	C333V1
		100 mm	110 Å	C353V1
		150 mm	110 Å	C363V1
		250 mm	110 Å	C383V1
	4.6	50 mm	110 Å	C335V1
		100 mm	110 Å	C355V1
		150 mm	110 Å	C365V1
		250 mm	110 Å	C385V1
5 µm	3	50 mm	110 Å	C533V1
		100 mm	110 Å	C553V1
		150 mm	110 Å	C563V1
		250 mm	110 Å	C583V1
	4.6	50 mm	110 Å	C535V1
		100 mm	110 Å	C555V1
		150 mm	110 Å	C565V1
		250 mm	110 Å	C585V1

Silica:	Type B Silica
Particle Size:	3.5, 5 µm
Surface Area:	300 m^2/g
Pore Size:	110 Å
PoreVolume:	0.85 ml/g
Carbon Load:	16%
Ligand Density:	3.8 µmol/m^2
Bonded Phase:	Dimethylphenylhexylsilane
End-capping:	Yes L11 2-8
USP Code:	
pH Range:	



- Orthogonal chemistry for method development
- Can be used in aqueous conditions
- Recommended for separation of aromatics and/or polar analytes

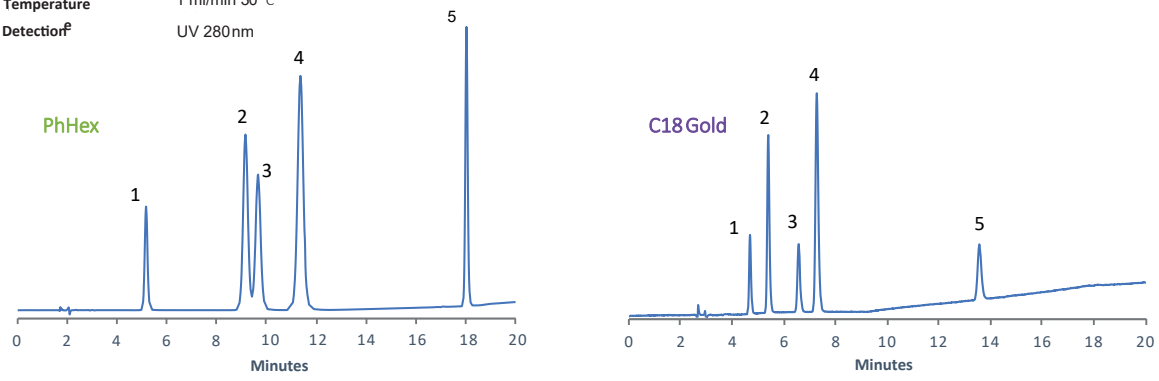
The aromatic ring and the alkyl chain will give a mixed interaction; π-π and hydrophobic interaction, respectively. Good choice as an orthogonal column compared to SVEA® C18/C8 in method development, where the traditional alkyl-based stationary phases fail to provide adequate separation.

This media can be used in highly aqueous conditions (100 % wettability), especially for very polar compounds.

Analyses of various phenols on Phenyl Hexyl and C18 Gold bonded silica

Column	SVEA® PhHex 150x4.6 mm 5 µm and SVEA® C18 Gold 250x4.6 mm 5 µm
Mobile Phase	A 1% AcOH in H_2O B 1% AcOH in methanol
Gradients	**PhHex**: 45% B in 10 min 45-90% B in 10 min **C18**: 60% B in 6 min 60-80% B in 14 min
Flow Rate	1 ml/min
Temperature	30 °C
Detection	UV 280 nm

1.Phenol
2. 4-Nitrophenol
3. 2-Chlorophenol
4. 2-Nitrophenol
5. 2,4-Dichlorophenol

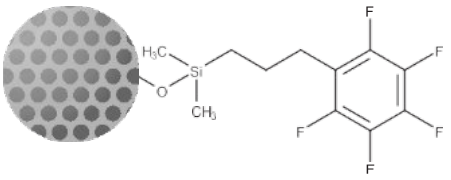


Selectivity difference between Phenyl-Hexyl and C18 Gold for separation of phenols.

Order information SVEA® Phenyl-Hexyl Columns

Particle Size	Column ID (mm)	Column Length	Pore Size	Article Number
3.5 µm	2.1	50 mm	110 Å	F332V1
		100 mm	110 Å	F352V1
		150 mm	110 Å	F362V1
	3	50 mm	110 Å	F333V1
		100 mm	110 Å	F353V1
		150 mm	110 Å	F363V1
		250 mm	110 Å	F383V1
	4.6	50 mm	110 Å	F335V1
		100 mm	110 Å	F355V1
		150 mm	110 Å	F365V1
		250 mm	110 Å	F385V1
5 µm	3	50 mm	110 Å	F533V1
		100 mm	110 Å	F553V1
		150 mm	110 Å	F563V1
		250 mm	110 Å	F583V1
	4.6	50 mm	110 Å	F535V1
		100 mm	110 Å	F555V1
		150 mm	110 Å	F565V1
		250 mm	110 Å	F585V1

Silica:	Type B Silica
Particle Size:	3.5, 5 µm
Surface Area:	300 m^2/g
Pore Size:	110 Å
PoreVolume:	0.85 ml/g
Carbon Load:	11%
Ligand Density:	1.9 µmol/m^2
Bonded Phase:	Dimethylpentafluorophenylpropylsilane
End-capping:	Yes
USP Code:	L43
pH Range:	2-8

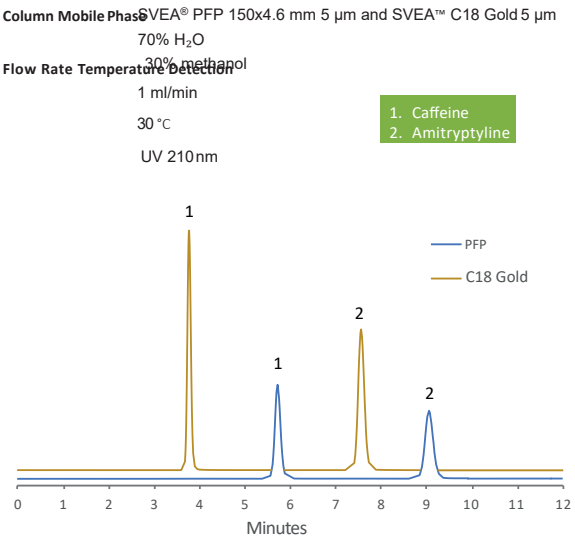


- Strong retention of protic compounds and analytes with high dipole moments
- Strong π-interaction with electron deficient aromatic rings
- Recommended for very polar compounds

Due to the highly electron rich nature of the aromatic rings of SVEA® PFP, the stationary phase interacts strongly with analytes containing polar aprotic and electron deficient aromatic moieties.
Additionally, the highly electronegative surface of the aromatic ring provides strong hydrogen bonding with analytes with protic moieties, such as hydroxyl groups and carboxylic acids. The delocalized charge over the fluorine-carbon bond will interact with analytes containing dipole moments.

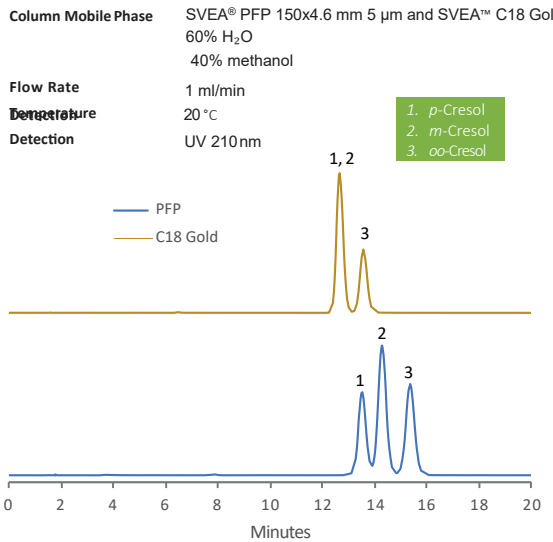
The polar nature of SVEA® PFP ensures a fully wettable stationary phase, making it suitable for analysing very polar compounds.

Comparison between PFP and C18 Gold bonded phases



Strong hydrogen bonding of the PFP column: the hydrogen bonding acceptor, caffeine, and the donor, phenol, has much higher retention than for the C18 Gold.

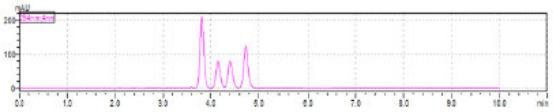
Comparison between PFP and C18 Gold bonded phases



The SVEA® PFP successfully separates three cresol isomers, compared to C18 Gold.

Tocopherols in vitamin E

Column Mobile Phase	SVEA® PFP 3.5 µm 2.1x150 mm
Flow Rate Detection	95%methanol + 5% water
	0.25 ml/min
	SPD-M30A UV 294 mm



Peaks	Retention time	Resolution (USP)	Tailing	Tailing (10%)
1	3.809	--	1.134	1.118
2	4.147	2.143	1.142	1.107
3	4.406	1.535	1.055	1.079
4	4.729	1.832	1.092	1.082

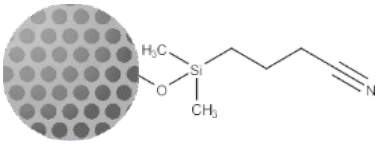
Peak order: 1 Delta tocopherol, 2 Beta tocopherol, 3 Gamma tocopherol, 4 Alfa tocopherol

The SVEA® PFP 3.5µm 2.1x150 mm column managed to perform the difficult separation of alfa, beta, gamma and delta components of vitamin E.

Order information SVEA® PFP Columns

Particle Size	*Column ID (mm)*	*Column Length*	*Pore Size*	*Article Number*
3.5 µm	2.1	50 mm	110 Å	P332V1
		100 mm	110 Å	P352V1
		150 mm	110 Å	P362V1
	3	50 mm	110 Å	P333V1
		100 mm	110 Å	P353V1
		150 mm	110 Å	P363V1
		250 mm	110 Å	P383V1
	4.6	50 mm	110 Å	P335V1
		100 mm	110 Å	P355V1
		150 mm	110 Å	P365V1
		250 mm	110 Å	P385V1
5 µm	3	50 mm	110 Å	P533V1
		100 mm	110 Å	P553V1
		150 mm	110 Å	P563V1
		250 mm	110 Å	P583V1
	4.6	50 mm	110 Å	P535V1
		100 mm	110 Å	P555V1
		150 mm	110 Å	P565V1
		250 mm	110 Å	P585V1

Silica:	Type B Silica
Particle Size:	3.5, 5 µm
Surface Area:	300 m^2/g
Pore Size:	110 Å
PoreVolume:	0.85 ml/g
Carbon Load:	7%
Ligand Density:	3.7 µmol/m^2
Bonded Phase:	3-Cyanopropyldimethylsilane
End-capping:	Yes
USP Code:	L10
pH Range:	2-7.5



- Very polar stationary phase
- Strong dipole-dipole interactions
- Orthogonal phase in RPLC method development
- Recommended for HILIC and Normal Phase

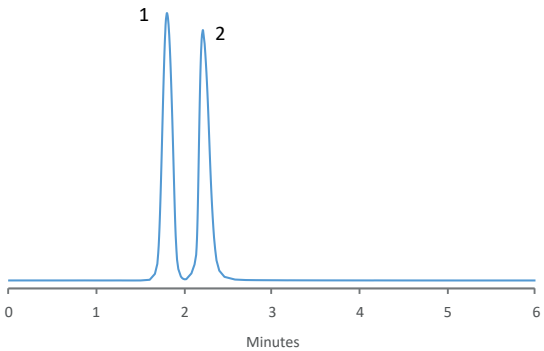
Recommended for analytes having too high retention on an alkyl-based stationary phase, as well as mixtures of very polar and lipophilic analytes. The nitrile group of the stationary phase interacts favourably with analytes containing double and/or triple bonds, making SVEA® Cyano suitable for unsaturated compounds.

Due to its very polar nature, SVEA® Cyano can be used in both HILIC-mode as well as in normal phase chromatography. Please refer to the care and use instructions for additional information.

Separation of two isomeric polar organic acids

Column Mobile Phase	SVEA® CN150x4.6 mm 5 µm 97% 20 mM NH_4OAc pH3.9 3% methanol
Flow Rate	1 ml/min
Temperature	40 °C
Detection	UV 210nm

1.Maleic acid
2.Fumaric acid

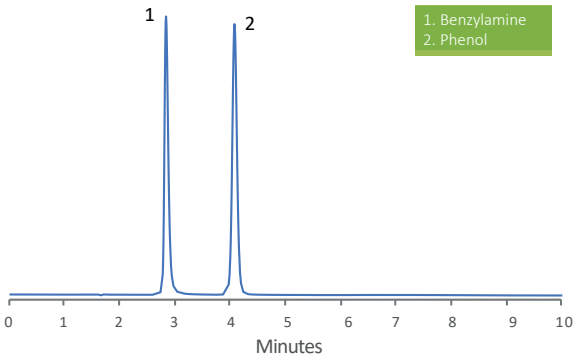


Very short analytical time and base line separation between the two water-soluble cis-/trans-isomeric acids.

Benzylamine analysed on Cyano bonded silica

Column Mobile Phase Flow Rate Temperature Detection	SVEA® CN 150x4.6 mm 5 µm 70% 20 mM KH_2PO_4 pH 7.630% methanol 1 ml/min 30 °C UV 210 nm

1. Benzylamine
2. Phenol

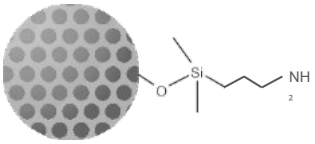


Sharp and symmetrical peaks of basic and highly polar benzylamine.

Order information SVEA® Cyano Columns

Particle Size	*Column ID (mm)*	*Column Length*	*Pore Size*	*Article Number*
3.5 µm	2.1	50 mm	110 Å	Y332V1
		100 mm	110 Å	Y352V1
		150 mm	110 Å	Y362V1
	3	50 mm	110 Å	Y333V1
		100 mm	110 Å	Y353V1
		150 mm	110 Å	Y363V1
		250 mm	110 Å	Y383V1
	4.6	50 mm	110 Å	Y335V1
		100 mm	110 Å	Y355V1
		150 mm	110 Å	Y365V1
		250 mm	110 Å	Y385V1
5 µm	3	50 mm	110 Å	Y533V1
		100 mm	110 Å	Y553V1
		150 mm	110 Å	Y563V1
		250 mm	110 Å	Y583V1
	4.6	50 mm	110 Å	Y535V1
		100 mm	110 Å	Y555V1
		150 mm	110 Å	Y565V1
		250 mm	110 Å	Y585V1

Silica:	Type B Silica
Particle Size:	3.5, 5 µm
Surface Area:	300 m^2/g
Pore Size:	110 Å
PoreVolume:	0.85 ml/g
Carbon Load:	6%
Ligand Density:	3.7 µmol/m^2
Bonded Phase:	Aminopropyl
End-capping:	Yes
USP Code:	L8
pH Range:	2-12



SVEA® Amino is coated with a proprietary bonding technology using organic silane containing aminopropyl functional group, which can reach equilibrium faster and is less sensitive to the water content of the mobile phase than other silica columns. The SVEA® Amino column is suitable for most applications of normal phase chromatography and can also be run in HILIC mode. It can be used for polar compounds in normal phase analysis, and for weak anion exchange or mixtures including water in reverse phase analysis.

- Suitable for HILIC and Normal Phase
- Analysis of carbohydrates in reversed phase
- Wide pH range (2-12) and temperature range (up to 60°C)

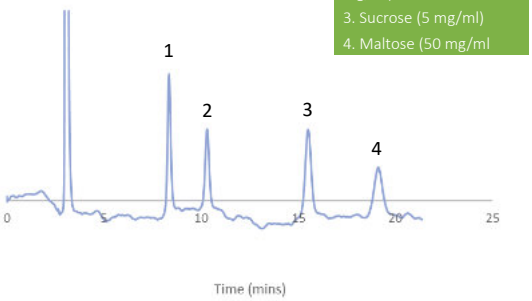
The Amino column is widely used in the reversed-phase analysis of xylose, lactose, glucose and other sugars.

SVEA® Amino can be used at a wide pH range (2-10) and at temperatures up to 60°C.

Separation of four carbohydrates

Column Mobile Phase	SVEA® Amino 5 µm, 250x4.6 mm Acetonitrile/water = 75/25
Flow rate	1 ml/min
Injection volume	3 µl
Temperature	40 °C
Detection	RI 4035

1. Fructose (5 mg/ml)
2. Glucose (20 mg/ml)
3. Sucrose (5 mg/ml)
4. Maltose (50 mg/ml

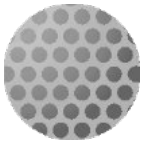


Successful separation of four carbohydrates using a SVEA® Aminocolumn. With asymetry factor 1.01 for sucrode.

Order information SVEA® Amino Columns

Particle Size	Column ID (mm)	Column Length	Pore Size	Article Number
3.5 µm	4,6	150 mm	110 Å	H365V8
		250 mm	110 Å	H385V8
5 µm	4,6	150 mm	110 Å	H565V8
		250 mm	110 Å	H585V8

Silica:	Type B Silica
Particle Size:	3.5, 5 µm
Surface Area:	300 m^2/g
Pore Size:	110 Å
PoreVolume:	0.85 ml/g
Carbon Load:	-
Ligand Density:	-
Bonded Phase:	-
End-capping:	-
USP Code:	L3
pH Range:	2-8



- HILIC and Normal Phase
- Excellent peak shapes for acidic, neutral and basic compounds
- Recommended for non-polar and moderately polar organic compounds

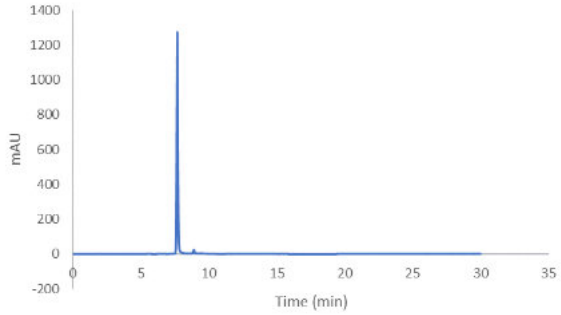
SVEA® Silica is a bare silica column designed for normal phase chromatography. The mechanisms of actions are partitioning of the analytes between an almost stagnant water layer close to the silica surface and the mobile phase; polar interactions and hydrogen bonding etc.

The column is recommended for separation of non-polar and moderately polar organic compounds by normal phase chromatography, and gives excellent peak shapes for acidic, neutral and basic compounds.

Ascorbic acid (high water solubility)

Column	SVEA® Silica 100x30 mm 5 µm
Mobile Phase	A: ACN/20mM ammonium acetate 50/50
	B: ACN/100mM ammonium acetate 90/10
Gradient	0-2 min 100%; 2-10 min 0%; 10-12 min 0%, 12.5-30 min 100%
Flow Rate	0.43 ml/min
Temperature	30 °C
Detection	UV 254 nm

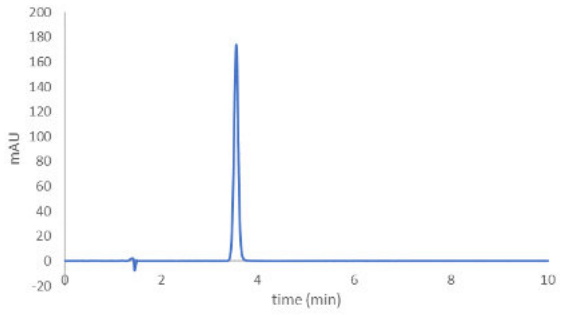
Ascorbic acid



Nortriptyline (basic molecule)

Column	SVEA® Silica 100x30 mm 5 µm 70/30
Mobile Phase	ACN/20 mM ammonium acetate
Flow Rate	0.43 ml/min
Temperature	30 °C
Detection	UV 230 nm

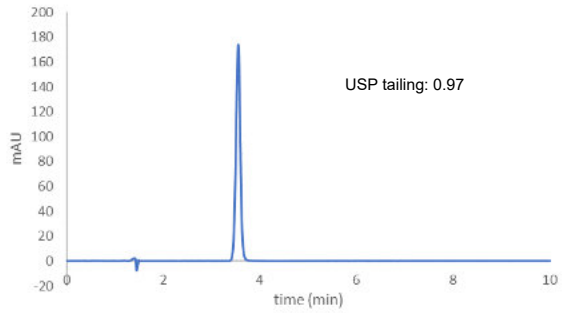
Nortriptyline



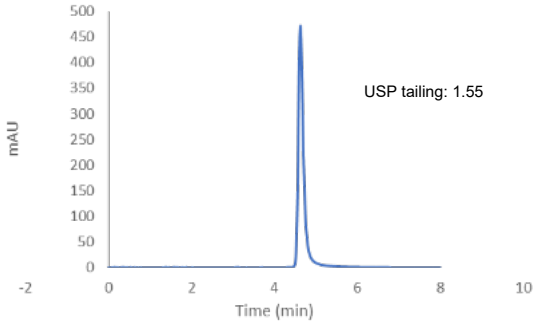
USP tailing for Nortriptyline: 0.97
This shows homogeneous distribution of the silanol groups over the surface.

Comparison of Nortriptyline chromatograms run with unbonded silica and C18 Gold

Column	SVEA® Silica 100x30 mm 5 µm	SVEA® C18 Gold 150x4.6 mm 5 µm
Mobile Phase	70/30 ACN/20 mM ammonium acetate pH 6.8	80/20 MeOH/ 25 mM potassium phosphate pH 7.0
Flow Rate	0.43 ml/min	1.0 ml/min
Temperature	30 °C	30 °C
Detection	UV 230 nm	UV 210 nm



USP tailing: 0.97

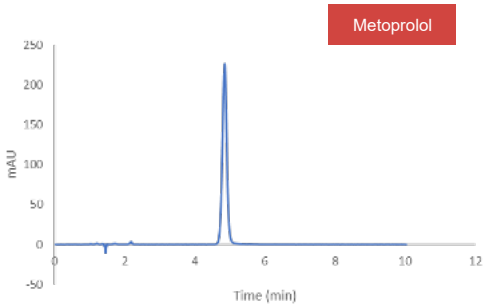


USP tailing: 1.55

This example illustrates analytical runs with a basic molecule which were performed on C18 Gold and unbonded silica SVEA® columns. In both cases pH of the buffer was neutral. Under these conditions, nortriptyline was protonated, and the silica surface was deprotonated. Such conditions would for the C18 covered surface cause secondary interactions between residual silanol groups and the base and one would observe peak tailing. For the unbonded silica, non-even distribution and activity of silanol groups would cause secondary interactions and result in a peak tailing. For both of the phases of the SVEA® columns, the peak tailing is very low, verifying the homogeneous surface coverage.

Metoprolol (basic molecule)

Column	SVEA® Silica 100x30 mm 5 µm
Mobile Phase Flow Rate	70/30 ACN/20 mM ammonium acetate
Temperature Detection	0.43 ml/min 30 °C
	UV 230 nm



USP tailing for Metoprolol: 0.997
Homogenous distribution of silanol groups on the surface.

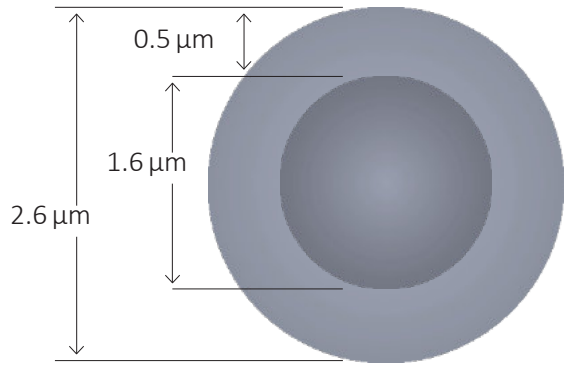
Order information SVEA® Silica Columns

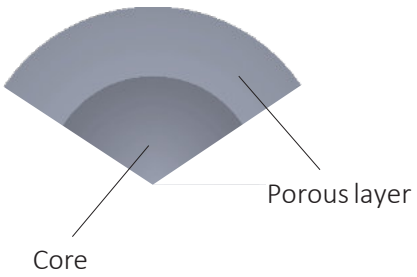
Particle Size	Column ID (mm)	Column Length	Pore Size	Article Number
3.5 µm	2.1	25 mm	110 Å	S312V1
		50 mm	110 Å	S332V1
		100 mm	110 Å	S352V1
		150 mm	110 Å	S362V1
	3	25 mm	110 Å	S313V1
		50 mm	110 Å	S333V1
		100 mm	110 Å	S353V1
		150 mm	110 Å	S363V1
		250 mm	110 Å	S383V1
	4.6	25 mm	110 Å	S315V1
		50 mm	110 Å	S335V1
		100 mm	110 Å	S355V1
		150 mm	110 Å	S365V1
		250 mm	110 Å	S385V1
5 µm	3	25 mm	110 Å	S513V1
		50 mm	110 Å	S533V1
		100 mm	110 Å	S553V1
		150 mm	110 Å	S563V1
		250 mm	110 Å	S583V1
	4.6	25 mm	110 Å	S515V1
		50 mm	110 Å	S535V1
		100 mm	110 Å	S555V1
		150 mm	110 Å	S565V1
		250 mm	110 Å	S585V1
	10	150 mm	110 Å	S561V9
		250 mm	110 Å	S581V9
	21.2	50 mm	110 Å	S539V9
		100 mm	110 Å	S559V9
		150 mm	110 Å	S569V9
		250 mm	110 Å	S589V9
	30	50 mm	110 Å	S537V9
		100 mm	110 Å	S557V9
		150 mm	110 Å	S567V9
		250 mm	110 Å	S587V9
	50	50 mm	110 Å	S536V9
		250 mm	110 Å	S586V9

Particle Size	Column ID (mm)	Column Length	Pore Size	Article Number
10 µm	10	150 mm	110 Å	S761V9
		250 mm	110 Å	S781V9
	21.2	50 mm	110 Å	S739V9
		100 mm	110 Å	S759V9
		150 mm	110 Å	S769V9
		250 mm	110 Å	S789V9
	30	50 mm	110 Å	S737V9
		100 mm	110 Å	S757V9
		150 mm	110 Å	S767V9
		250 mm	110 Å	S787V9
	50	50 mm	110 Å	S736V9
		250 mm	110 Å	S786V9
15 µm	10	150 mm	110 Å	S961V9
		250 mm	110 Å	S981V9
	21.2	50 mm	110 Å	S939V9
		100 mm	110 Å	S959V9
		150 mm	110 Å	S969V9
		250 mm	110 Å	S989V9
	30	50 mm	110 Å	S937V9
		100 mm	110 Å	S957V9
		150 mm	110 Å	S967V9
		250 mm	110 Å	S987V9
	50	50 mm	110 Å	S936V9
		250 mm	110 Å	S986V9

SVEA® CORE

SVEA® Core is a core shell product which consists of a solid core particle coated with a layer of porous silica, as illustrated below. A key feature of core shell columns is the much narrower particle size distribution compared to the fully porous materials. This results in less space among particles in the column and an increased efficiency. For example, columns packed with 3 µm core shell particles produce efficiencies approaching those packed with 2 µm fully porous particles, but at significantly lower back pressures.



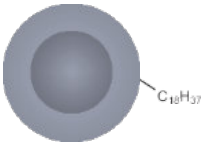


SVEA® Core properties:

- Exceptional peak shape for basic, acidic and chelating compounds
- High stability at low and high pH (1-10)
- Excellent back pressure profile

Silica:	Type B Silica
Particle Size:	2.6 µm
Surface Area:	110-150 m^2/g
Pore Size:Pore	80-100 Å
Volume:	0.25-0.32 ml/g
Carbon Load:	6-8%
Ligand Density:	2.5 µmol/m2
Bonded Phase:	Octadecylsilane
End-capping:	Proprietary
USP Code:	L1
pH Range:	1-10

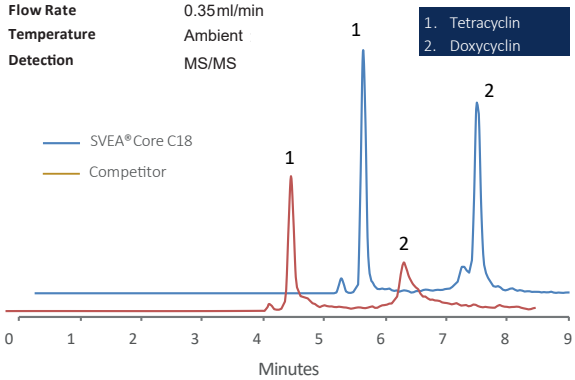
- Core shell technology provides high separation and low back pressures
- Recommended for UPLC applications
- Excellent base stability



The superficially porous silica layer is bonded with the same proprietary chemistry as SVEA® C18 Opal, providing outstanding peak shapes for ionisable compounds and good selectivity for all types of analytes. Core shell technology provides similar efficiencies as sub 2 µm particles while retaining the back pressure of a 3 µm particle, making it possible to run shorter columns on an ordinary HPLC (30-100 mm length).

Comparison between SVEA® Core C18 2.6 µm and a competitor core shell C18 2.6 µm column

Column Mobile Phase	SVEA® Core C18 150x4.6 mm A 0.1% Formic acid in H_2O B methanol
Gradient	10% B in 2 min; 10-90% B in 4 min; 90% B in 3 min
Flow Rate	0.35 ml/min
Temperature	Ambient
Detection	MS/MS

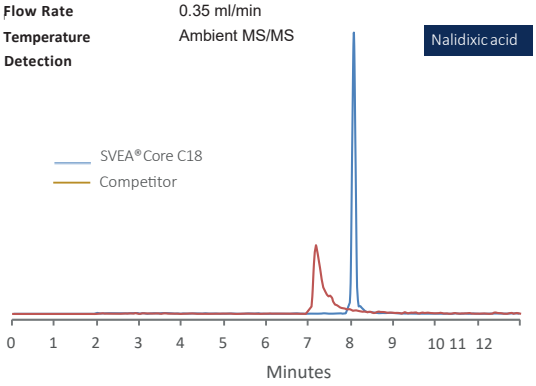


The nice peak shapes from the SVEA® Core C18 column give better quantifications of the compounds of interest.

Data kindly provided by Animal, Plant and Food Inspection Center – APFIC Jiangsu Entry-Exit Inspection and Quarantine Bureau of People's Republic of China

Comparison between SVEA® Core C18 2.6 µm and a competitor core shell C18 2.6 µm column

Column Mobile Phase	SVEA® Core C18 150x4.6 mm A 0.1% Formic acid in H_2O B methanol
Gradient	10% B in 2 min; 10-90% B in 4 min;
Flow Rate	: 0.35 ml/min
Flow Rate	0.35 ml/min
Temperature	Ambient MS/MS
Detection	



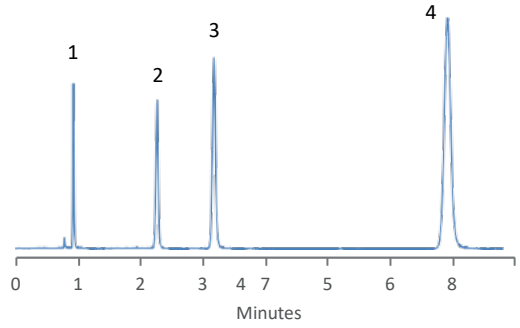
The SVEA® Core C18 column is exhibiting superior chromatographical behaviour compared to the competitor core shell column.

Data kindly provided by Animal, Plant and Food Inspection Center – APFIC Jiangsu Entry-Exit Inspection and Quarantine Bureau of People's Republic of China

β-Blockers

Column SVEA® Core C18 100x4.6mm
Mobile Phase 50% 25 mM KH_2PO_4 pH 7.0
50% methanol
Flow Rate 1 ml/min 40 °C
Temperature
Detection UV 280 nm

1. Atenolol
2. Metoprolol
3. Timolol
4. Pronanolol

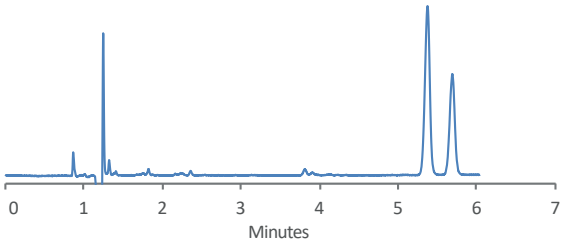


The complete coating of the SVEA® Core C18 column gives excellent peaks of highly basic compounds.

Cis/trans-isomers of 9-octadecenoic acid

Column SVEA® Core C18 150x4.6mm
Mobile Phase 10% 0.5% Formic acid in H_2O
90% acetonitrile
Flow Rate 1 ml/min
Temperature 40 °C
Detection UV 215nm

1. Oleic acid
2. Elaidic acid

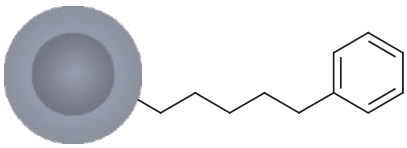


Base-line separation between the cis/trans-isomeric acids.

Order information SVEA® Core C18 Columns

Particle Size	Column ID (mm)	Column Length	Pore Size	Article Number
2.6 µm	2.1	50 mm	110 Å	A232V6
		100 mm	110 Å	A252V6
		150 mm	110 Å	A262V6
	3	50 mm	110 Å	A233V6
		100 mm	110 Å	A253V6
		150 mm	110 Å	A263V6
	4.6	50 mm	110 Å	A235V6
		100 mm	110 Å	A255V6
		150 mm	110 Å	A265V6

Silica:	Type B Silica
Particle Size:	2.6 µm
Surface Area:	110-150 m^2/g
Pore Size:	80-100 Å
PoreVolume:	0.25-0.32 ml/g
Carbon Load:	4-5%
Ligand Density:	2.5 µmol/m^2
Bonded Phase:	Phenyl hexyl silane
End-capping:	Proprietary
USP Code:	L11
pH Range:	1.5-9



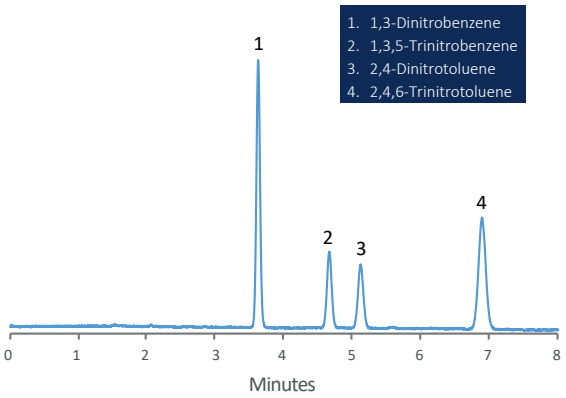
- Orthogonal chemistry combined with core shell technology
- Can be used in aqueous conditions
- Recommended for separation of aromatics and/or polar analytes

The phenyl-hexyl phase gives an alternative selectivity in comparison to classical C18 modifications or for compounds that are difficult to resolve using traditional phenyl phases.

The separation principle is based on two retention mechanisms – π-π interactions and hydrophobic interactions. This UHPLC/HPLC phase is suitable for LC/MS and compatible with highly aqueous mobile phases. Typical applications are aromatic and unsaturated compounds, polar compounds like pharmaceuticals and antibiotics.

Components of explosives

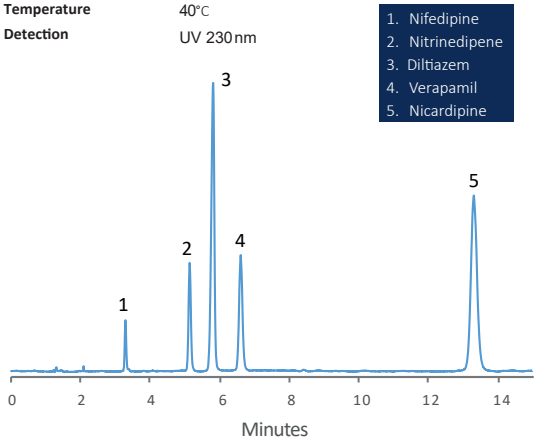
Column SVEA® Core Phenyl Hexyl 100x4.6mm
Mobile Phase 60%water
40% acetonitrile
Flow Rate 1 ml/min
Temperature 40°C
Detection UV 250 nm



Separation of structurally similar aromatic compounds using SVEA® Core Phenyl-Hexyl column.

Calcium antagonists

Column SVEA® Core Phenyl Hexyl 100x4.6mm
Mobile Phase 30% 10 mM KH_2PO_4 pH 6.8
70% methanol
Flow Rate 1 ml/min
Temperature 40°C
Detection UV 230 nm



Excellent chromatografical performance is exhibited by the SVEA® Core Phenyl-Hexyl column.

Order information SVEA® Core Phenyl-Hexyl Columns

Particle Size	*Column ID (mm)*	*Column Length*	*Pore Size*	*Article Number*
2.6 µm	2.1	50 mm	110 Å	F232V6
		100 mm	110 Å	F252V6
		150 mm	110 Å	F262V6
	3	50 mm	110 Å	F233V6
		100 mm	110 Å	F253V6
		150 mm	110 Å	F263V6
	4.6	50 mm	110 Å	F235V6
		100 mm	110 Å	F255V6
		150 mm	110 Å	F265V6

Photo credits: Dr. Jan Blid and Kunal Mukhopadhyay; Nanologica Copyright Nanologica

SVEA® Columns

Bonded Phase	Particle Size	Column ID (mm)	Column lengths						
			20 mm	25 mm	30 mm	50 mm	100 mm	150 mm	250 mm
C18 Gold	1.7 µm	2.1	A112V1	-	A122V1	A132V1	A152V1	A162V1	-
	3.5 µm	2.1	-	-	-	A332V1	A352V1	A362V1	-
		3	-	-	-	A333V1	A353V1	A363V1	A383V1
		4.6	-	-	-	A335V1	A355V1	A365V1	A385V1
	5 µm	3	-	-	-	A533V1	A553V1	A563V1	A583V1
		4.6	-	-	-	A535V1	A555V1	A565V1	A585V1
		10	-	-	-	-	-	A561V9	A581V9
		21.2	-	-	-	A539V9	A559V9	A569V9	A589V9
		30	-	-	-	A537V9	A557V9	A567V9	A587V9
		50	-	-	-	A536V9	-	-	A586V9
	10 µm	10	-	-	-	-	-	A761V9	A781V9
		21.2	-	-	-	A739V9	A759V9	A769V9	A789V9
		30	-	-	-	A737V9	A757V9	A767V9	A787V9
		50	-	-	-	A736V9	-	-	A786V9
	15 µm	10	-	-	-	-	-	A961V9	A981V9
		21.2	-	-	-	A939V9	A959V9	A969V9	A989V9
		30	-	-	-	A937V9	A957V9	A967V9	A987V9
		50	-	-	-	A936V9	-	-	A986V9
C18 Opal	3.5 µm	2.1	-	-	-	A332V3	A352V3	A362V3	-
		3	-	-	-	A333V3	A353V3	A363V3	A383V3
		4.6	-	-	-	A335V3	A355V3	A365V3	A385V3
	5 µm	3	-	-	-	A533V3	A553V3	A563V3	A583V3
		4.6	-	-	-	A535V3	A555V3	A565V3	A585V3
C8	3.5 µm	2.1	-	-	-	B332V1	B352V1	B362V1	-
		3	-	-	-	B333V1	B353V1	B363V1	B383V1
		4.6	-	-	-	B335V1	B355V1	B365V1	B385V1
	5 µm	3	-	-	-	B533V1	B553V1	B563V1	B583V1
		4.6	-	-	-	B535V1	B555V1	B565V1	B585V1
		10	-	-	-	-	-	B561V9	B581V9
		21.2	-	-	-	B539V9	B559V9	B569V9	B589V9
		30	-	-	-	B537V9	B557V9	B567V9	B587V9
		50	-	-	-	B536V9	-	-	B586V9
	10 µm	10	-	-	-	-	-	B761V9	B781V9
		21.2	-	-	-	B739V9	B759V9	B769V9	B789V9
		30	-	-	-	B737V9	B757V9	B767V9	B787V9
		50	-	-	-	B736V9	-	-	B786V9
	15 µm	10	-	-	-	-	-	B961V9	B981V9
		21.2	-	-	-	B939V9	B959V9	B969V9	B989V9
		30	-	-	-	B937V9	B957V9	B967V9	B987V9
		50	-	-	-	B936V9	-	-	B986V9
C4	3.5 µm	2.1	-	-	-	C332V1	C352V1	C362V1	-
		3	-	-	-	C333V1	C353V1	C363V1	C383V1
		4.6	-	-	-	C335V1	C355V1	C365V1	C385V1
	5 µm	3	-	-	-	C533V1	C553V1	C563V1	C583V1
		4.6	-	-	-	C535V1	C555V1	C565V1	C585V1

Phenyl-Hexyl	3.5 µm	2.1	-	-	-	F332V1	F352V1	F362V1	-
		3	-	-	-	F333V1	F353V1	F363V1	F383V1
		4.6	-	-	-	F335V1	F355V1	F365V1	F385V1
	5 µm	3	-	-	-	F533V1	F553V1	F563V1	F583V1
		4.6	-	-	-	F535V1	F555V1	F565V1	F585V1
PFP	3.5 µm	2.1	-	-	-	P332V1	P352V1	P362V1	-
		3	-	-	-	P333V1	P353V1	P363V1	P383V1
		4.6	-	-	-	P335V1	P355V1	P365V1	P385V1
	5 µm	3	-	-	-	P533V1	P553V1	P563V1	P583V1
		4.6	-	-	-	P535V1	P555V1	P565V1	P585V1
Cyano	3.5 µm	2.1	-	-	-	Y332V1	Y352V1	Y362V1	-
		3	-	-	-	Y333V1	Y353V1	Y363V1	Y383V1
		4.6	-	-	-	Y335V1	Y355V1	Y365V1	Y385V1
	5 µm	3	-	-	-	Y533V1	Y553V1	Y563V1	Y583V1
		4.6	-	-	-	Y535V1	Y555V1	Y565V1	Y585V1
Amino	3.5 µm	4.6	-	-	-	-	-	H365V8	H385V8
	5 µm	4.6	-	-	-	-	-	H565V8	H585V8
Silica	3.5 µm	2.1	-	S312V1	-	S332V1	S352V1	S362V1	-
		3	-	S313V1	-	S333V1	S353V1	S363V1	S383V1
		4.6	-	S315V1	-	S335V1	S355V1	S365V1	S385V1
	5 µm	3	-	S513V1	-	S533V1	S553V1	S563V1	S583V1
		4.6	-	S515V1	-	S535V1	S555V1	S565V1	S585V1
		10	-	-	-	-	-	S561V9	S581V9
		21.2	-	-	-	S539V9	S559V9	S569V9	S589V9
		30	-	-	-	S537V9	S557V9	S567V9	S587V9
		50	-	-	-	S536V9	-	-	S586V9
	10 µm	10	-	-	-	-	-	S761V9	S781V9
		21.2	-	-	-	S739V9	S759V9	S769V9	S789V9
		30	-	-	-	S737V9	S757V9	S767V9	S787V9
		50	-	-	-	S736V9	-	-	S786V9
	15 µm	10	-	-	-	-	-	S961V9	S981V9
		21.2	-	-	-	S939V9	S959V9	S969V9	S989V9
		30	-	-	-	S937V9	S957V9	S967V9	S987V9
		50	-	-	-	S936V9	-	-	S986V9
Core C18	2.6 µm	2.1	-	-		A232V6	A252V6	A262V6	-
		3	-	-		A233V6	A253V6	A263V6	-
		4.6	-	-		A235V6	A255V6	A265V6	-
Core PheHex	2.6 µm	2.1	-	-		F232V6	F252V6	F262V6	-
		3	-	-		F233V6	F253V6	F263V6	-
		4.6	-	-		F235V6	F255V6	F265V6	-

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