



Glantreo

Knowledge · Innovation · Service



EIROSHHELL, SOLAS and SOLAD

Next Generation Chromatography

Vision

Glantreo are a small agile innovative company with the ability to produce rapid prototypes. We have all the building blocks, which build synergistically to create next generation chromatography. We have advanced each step from silica to column by ensuring our provenance for every building block and creating a quality system check for each column. Thus Glantreo have developed a remarkable range of HPLC columns, with excellent efficiency, superb separation, for use over a range of pH.

Our technology platforms and quality assurance system has developed a tight specification on pore and particle size, generating columns with exceptional high plate numbers yet low back pressure. Our proprietary silica and surface ligands deliver to a broad array of separation scientists. Increasing throughput whilst providing longer lasting columns and less stress on component parts.

SOLAS™
fully porous
particles
(FPPs)

EIROSELL™
superficially
porous particles
(SPPs)

SOLAD™
non porous
particles
(NPPs)

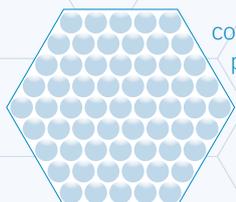
From Silica to Columns



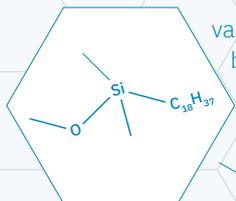
R+D
In-house developed platforms,
SOLAS, EIROSHELL and SOLAD



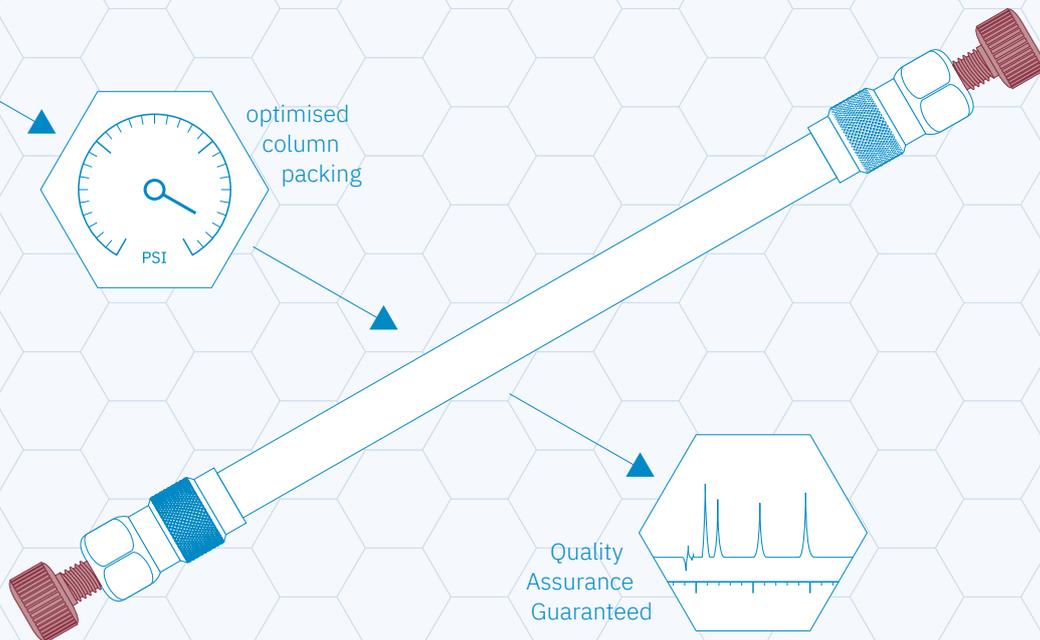
High Performance
Silica Production



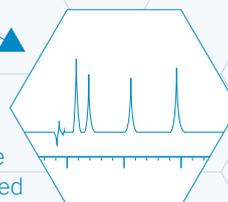
controlled physical
properties, particle size,
pore size and particle size



optimised
column
packing



Quality
Assurance
Guaranteed



Next Generation Chromatography

Glantreo provide knowledge, innovation and service, with our values making us different. Glantreo control the entire process from end to end, creating next generation of chromatography. We are seeking partners who have access to a customer base and routes to market.

Silica Development

Glantreo synthesise silica. We identified a gap in the market, monodispersed silica without classification.

1. Highly monodispersed without the need to size classify leading to high chromatographic efficiency
2. Monodensity leading to higher packing stability as there are no macro pores within the particles.
3. Controlled and Stable Porosity (CSPTM) leading to a wide range of available pore sizes, up to 1000Å, that are consistently stable when packed.
4. 'Hard Silica' (produced with heat during manufacturing) leads to greater stability and longevity of material and columns.

Glantreo have built a platform for over 15 years creating a solid foundation in the production of columns from material science to commercially scalable products. The initial focus was on silica SOLAS fully porous particles (FPP). These spherical particles are pure silica which are highly porous. The EIROSHELL platform produces superficially porous particles (SPPs). SPPs also called core-shell, fused-core shell, partially porous, pellicular, or solid-core. EIROSHELL particles are made of a solid, nonporous, impermeable silica centre surrounded by a porous shell layer with similar properties to those of the fully porous materials (SOLAS). There is an optimum ratio between the core and the shell. We control that ratio and it may vary between application and processes. Our third platform silica process produces our SOLAD, non porous silica particles (NPPs). Our SOLAD particles are highly monodisperse and come in a range of particle sizes.

There are companies who claim to make their own silica who do not actually manufacture silica. Glantreo have the knowledge to control and optimise the physical properties and surface chemistries of our materials.

Glantreo continue to innovate and invent novel nanomaterials working in a range of areas such as drug delivery, diagnostics and energy applications. We know chromatography is a balancing act between resolution and time. This is next generation chromatography.

	SOLAS fully porous particles	EIROSHELL superficially porous particles	SOLAD non porous particles
sizes	1.7µm	1.7µm	
	1.9µm		1.9µm
		2.2µm	
		2.6µm	
	3.0µm		3.0µm
	5.0µm		5.0µm

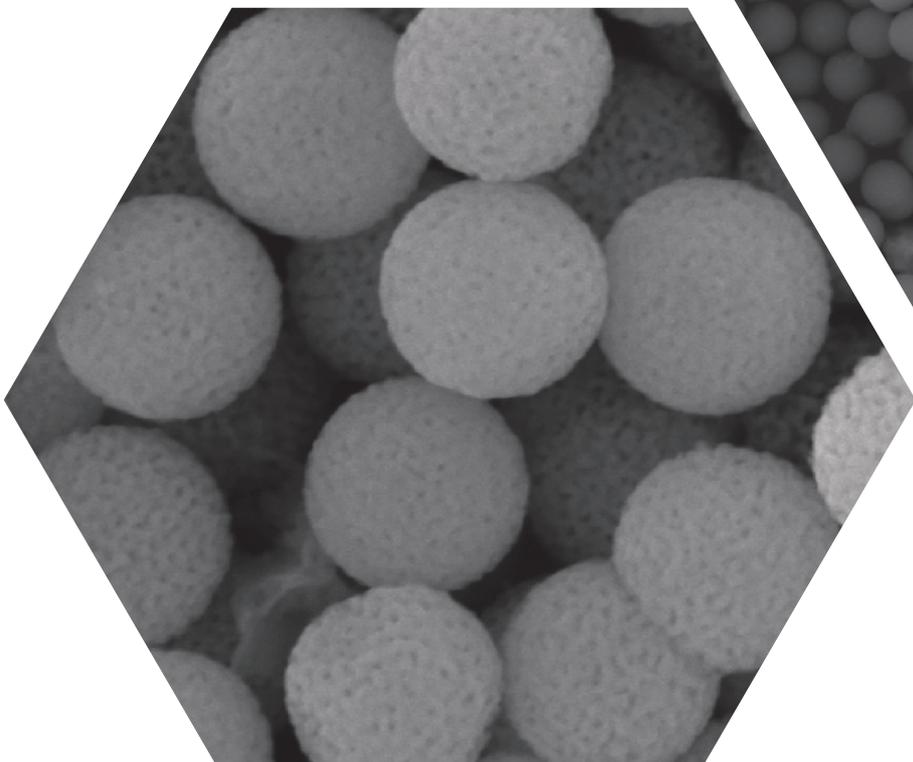
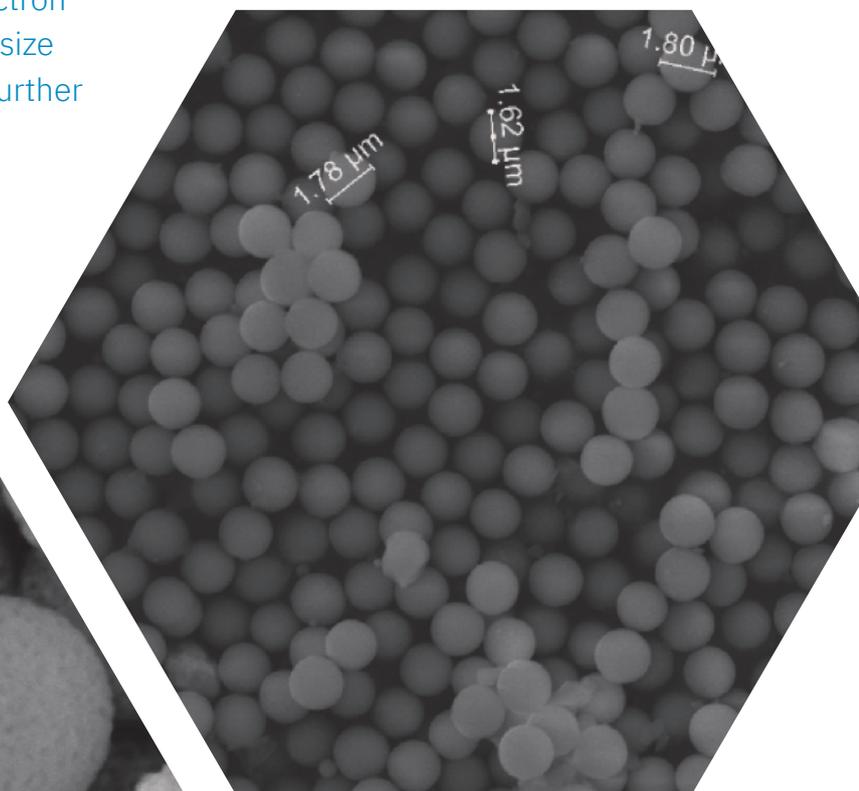
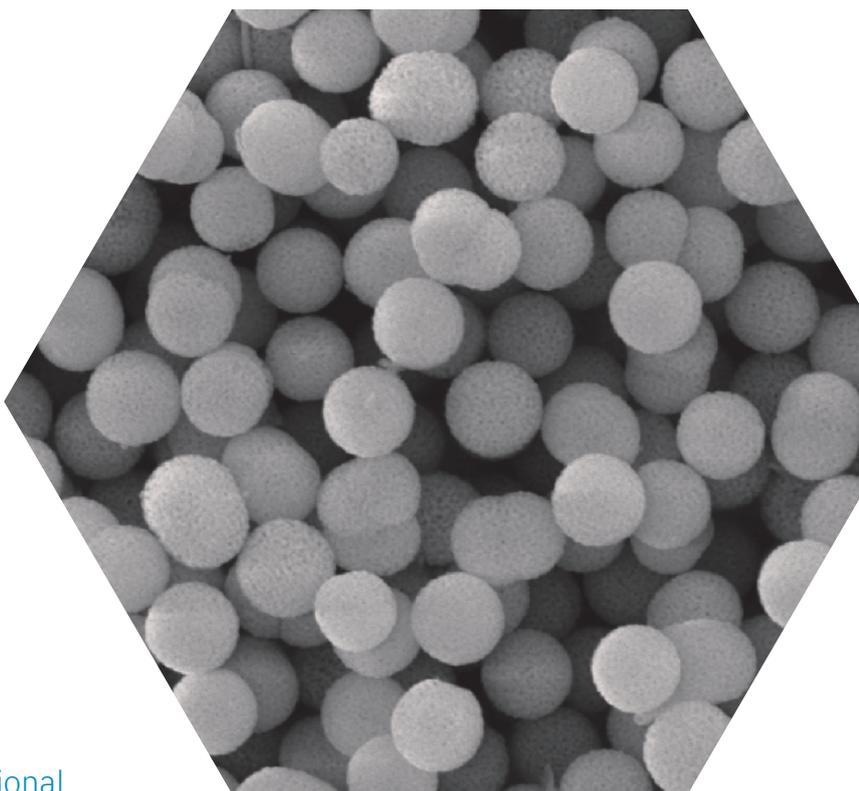
Silica Production

For all our silica particles we have full and optimised control over physical properties and surface chemistry.

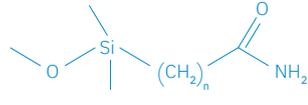
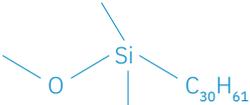
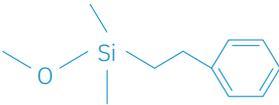
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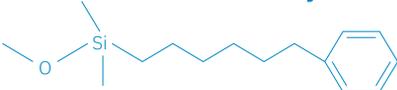
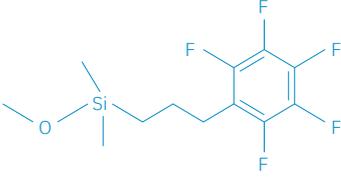
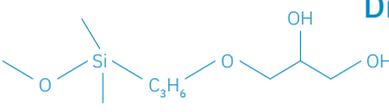
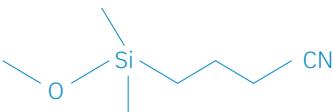
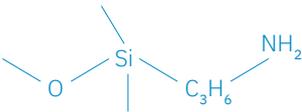
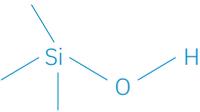
- pore size,
- particles size,
- pore volume,
- particle size distribution
- density
- core: porosity ratio for SPP.

This allows us to provide columns with exceptional separation properties. The SEM (Scanning Electron Microscope) images highlight the fine particle size distribution, with identical spherical shapes. Further magnification features perfectly smooth silica surfaces with no irregularities.



Silica Functionalisation

Stationary Phase	Description	Recommended Uses	USP Code
 <p>C18 Plus</p>	<ul style="list-style-type: none"> • High hydrophobic retention • pH range 2-10 • Wide Applicability 	<ul style="list-style-type: none"> • Acids • Bases • Neutrals 	L1
<p>C18</p>	<ul style="list-style-type: none"> • Proprietary bonded coating yielding Higher hydrophobic retentions • Extended pH range 1-12 • Wide Applicability 		
 <p>C8</p>	<ul style="list-style-type: none"> • General UHPLC/HPLC use • Different selectivity and retention to C18 and C18 plus • More hydrophilic phase 	<ul style="list-style-type: none"> • Highly Hydrophobic compounds • Moderately polar compounds • Steroids • Lipids 	L7
 <p>C4</p>	<ul style="list-style-type: none"> • Unique selectivity and increased retention for highly polar/hydrophilic compounds • Useful for HILIC and Ion-Pairing Chromatography • Less Retention than C8 and C18 for non-polar solutes 	<ul style="list-style-type: none"> • Ideal for Proteins, Peptides, Amino Acids, Hormones and Macromolecule Separations, when combined with large pore size like 1000 Å and 300 Å, • Polar acids and bases, Nucleosides, Oligonucleotides, Vitamins 	L26
 <p>C1 (TMS)</p>	<ul style="list-style-type: none"> • Unique Selectivity for multifunctional compounds • Intermediate polarity • Can be used in NP and RPLC modes • Less hydrophobicity than C18 and C8 	<ul style="list-style-type: none"> • Multifunctional compounds, Non-polar compounds in NP mode, Vitamins, Large Proteins 	L13
 <p>Aqua</p>	<ul style="list-style-type: none"> • Orthogonal selectivity to C18 and C8 phase • RP separation mode with proprietary bonding to prevent hydrophobic collapse • 100% Aqueous compatibility 	<ul style="list-style-type: none"> • Acidic, Bases, Phenolic and highly polar solutes and metabolites 	
 <p>C30</p>	<ul style="list-style-type: none"> • Highest hydrophobic retention • High shape selectivity for hydrophobic, long-chain, structurally related isomers • Alternative to normal phase for lipid analysis • Endcapped 	<ul style="list-style-type: none"> • Fat-soluble vitamins, • Hydrophobic analytes • Lipids, Carotenoids • Fatty acids 	L62
 <p>Phenyl</p>	<ul style="list-style-type: none"> • Unique selectivity than alkyl phases, based on pi-pi interactions • High aromaticity • High hydrophobic retention 	<ul style="list-style-type: none"> • Aromatic and moderately polar compounds 	L11

Stationary Phase	Description	Recommended Uses	USP Code
<p>Phenyl Hexyl</p> 	<ul style="list-style-type: none"> • Orthogonal method development • Stability and alternative selectivity • Balanced aromatic and hydrophobic selectivity 	<ul style="list-style-type: none"> • Polar aromatic compounds • Can be used in aqueous conditions 	L11
<p>Phenyl Hexyl Plus</p>	<ul style="list-style-type: none"> • Proprietary bonded coating yielding Higher hydrophobic retentions • Extended pH range 1-12 		
<p>BiPhenyl</p> 	<ul style="list-style-type: none"> • Heightened selectivity and retention for compounds that are hard to resolve or elute early on C18 and other phenyl chemistries. 	<ul style="list-style-type: none"> • Aromatic and moderately polar analytes • Drugs of abuse • Steroids 	L11
<p>PFP</p> 	<ul style="list-style-type: none"> • Alternative retention and selectivity to alkyl phases. • Enhanced selectivity for stereoisomers • Can be used in RPLC and HILIC modes • Interactions such as π-π, dipole, hydrogen bonding, and ionic interactions 	<ul style="list-style-type: none"> • Very polar compounds. • Can be used in aqueous conditions • Steroids, Isomeric compounds, Substituted aromatics 	L43
<p>Diol</p> 	<ul style="list-style-type: none"> • Can be used in RPLC, NP and HILIC modes • Increased retentivity and reproducibility than bare silica 	<ul style="list-style-type: none"> • Non-polar, moderately polar and multifunctional compounds like pesticides, herbicides, polar natural products, pharmaceutical metabolites 	L20
<p>Cyano</p> 	<ul style="list-style-type: none"> • Very polar stationary phase • Can be used in reversed or normal phase conditions 	<ul style="list-style-type: none"> • Recommended for compounds having too high retention on an traditional alkyl phases, as well as mixtures of very polar and analytes. • Explosives, aromatics, polar compounds, pharmaceuticals 	L10
<p>Amino (NH2)</p> 	<ul style="list-style-type: none"> • Can be used in RPLC, NP and HILIC modes • Wide pH and temperature range 	<ul style="list-style-type: none"> • Polar compounds like Sugars, Sugar Alcohols and other hydroxy compounds, DNA bases in RPLC • Vitamins and Petroleum hydrocarbons in NPLC 	L11
<p>Silica</p> 	<ul style="list-style-type: none"> • Can be used in Normal phase and HILIC modes • Ultra pure metal-free silica with reduced silanol activity for better peak symmetry and high column lifetime • Excellent Reproducibility 	<ul style="list-style-type: none"> • Polar and very polar bases, acids and neutrals, with log P lesser than 0.5 • Pharmaceuticals • Food additives 	L3

Quality Assurance and Control

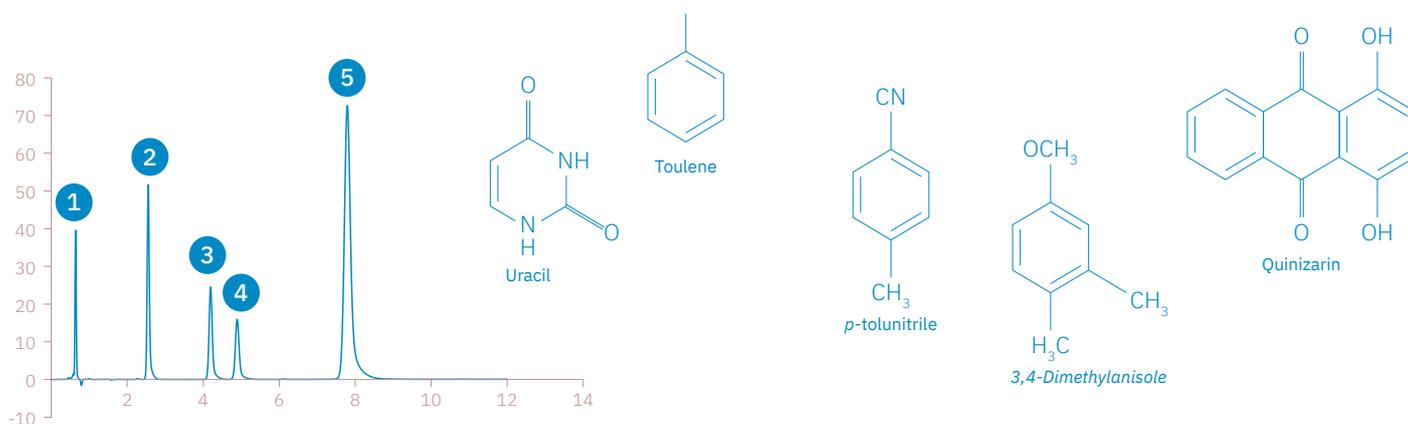
Quality assurance is built into every step ensuring the entire process is managed and controlled creating new generation chromatography. We carry out two checks on each column prior to release.

These include a 3 Analyte (UTN) mix which is included in the **Certificate of Analysis** (COA) as highlighted for a SOLAS column. (see page 9)

The second test is used as part of Glantreo's quality procedures to characterise surface properties of the chromatography media for every column manufactured on site. It is an established method to evaluate interactions between a stationary phase and different kinds of analytes. The different properties of the stationary phase are tested using separation of standard organic chemicals, in elution order; Uracil, Toluene, p-Tolunitrile, 3,4-Dimethylanisole and Quinizarin.

SOLAS C18 – 5 μ m 100 \AA 150mm x 4.6mm

Chromatographic conditions: Mobile Phase: 58:42 Acetonitrile:Water; Flow rate: 1.0mL/min; Injection Volume: 1.0 μ L; UV: 254nm



Elution Number	Compound	Molecule Type	Probe for	Reactivity
1	Uracil	Cyclic Base	Void Volume	Unretained compound
2	Toluene	Aromatic Neutral	hydrophobic character	retention
3	p-Tolunitrile	Aromatic Base	Water probe	Can H bond with Hydrogen
4	3,4-Dimethylanisole	Aromatic neutral with H bonding from Oxygen	End capping	More Silanol present the more tailing that will be observed
5	Quinizarin	Aromatic Neutral	Silanol Probe	H bonding

Certificate of Analysis

SOLAS™ 5.0µm — Batch Number: DIAS6-02

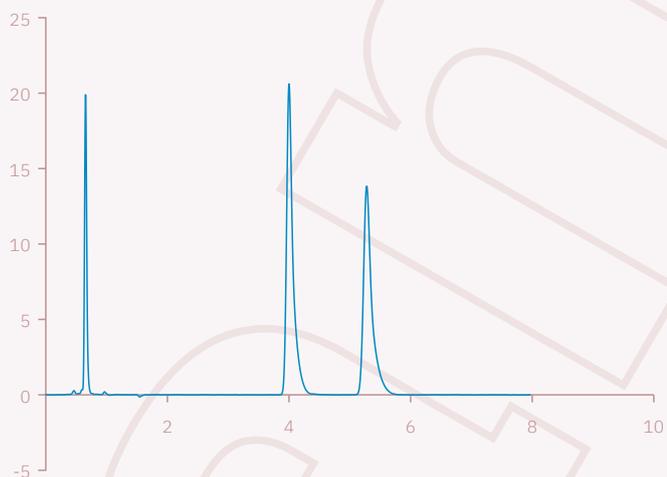
Analysis of unbonded silica

Parameter	Specification	Batch result
Particle size (µm)	4.8 – 5.2	5.0
Particle size distribution ratio (d90/10)	< 1.4	1.3
Average pore diameter (Å)	100-120	110
Average pore volume (cm ³ g ⁻¹)	0.8-1.0	0.8-1.0
Surface area (m ² g ⁻¹)	300-400	350

Analysis of bonded phase (C18)

Parameter	Specification	Batch result
%C (%)	15.0-17.0	16.0

Chromatographic result



Conditions:

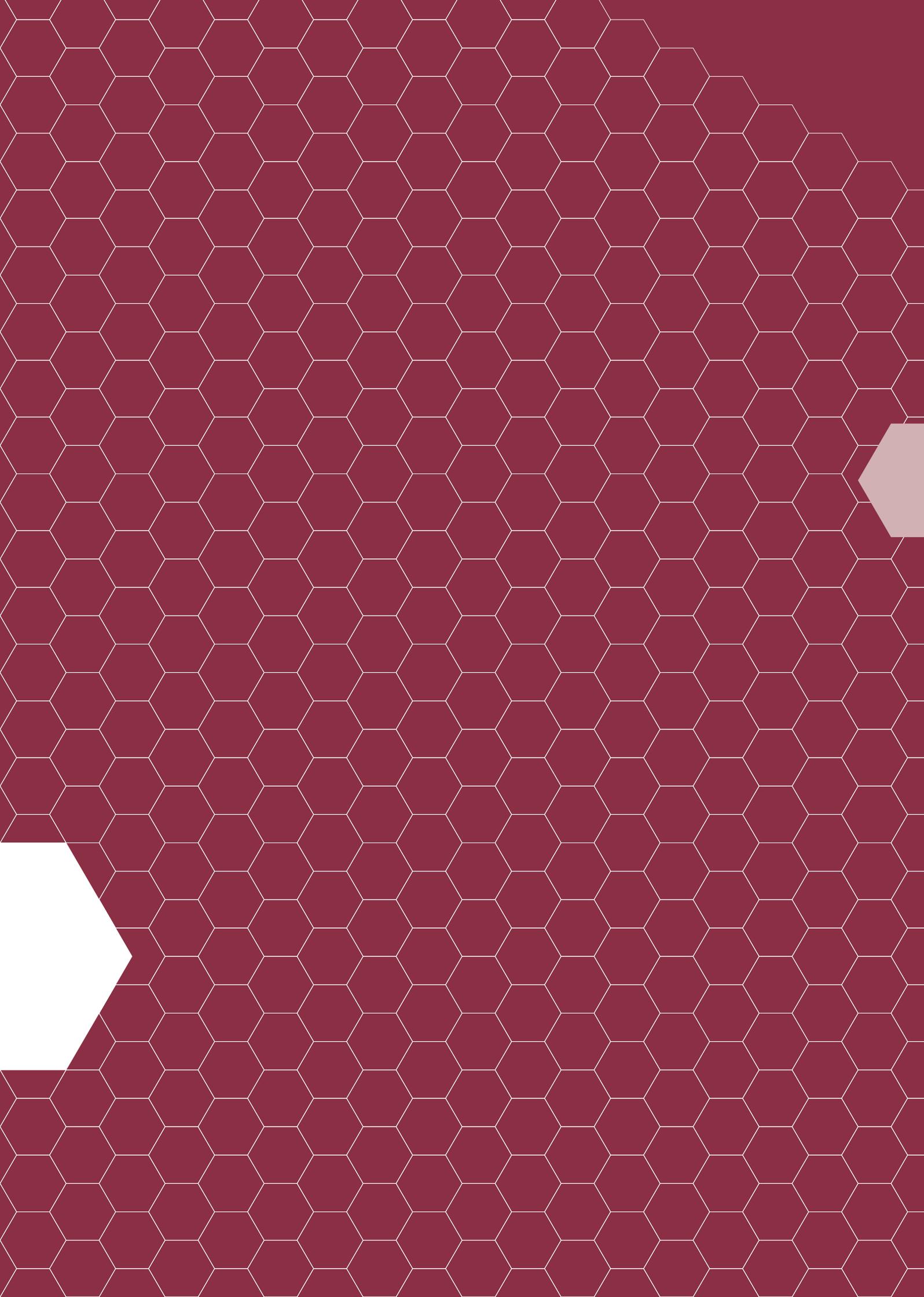
Column dimensions: **4.6mm ID x 150mm**
Mobile Phase: **60:40 Acetonitrile:Water (v:v)**
Flow rate: **2.0 ml/min**
Injection volume: **1.0 µL**
Temperature: **25°C**
Detector: **UV @ 254 nm**

Analytes in eluting order:

- 1. Uracil**
- 2. Toluene**
- 3. Naphthalene**

Measured parameters based on the three peaks above

Peak	RT(Min)	k' Factor	Tailing Factor	Plates (N)	Reduced plate height
1	0.656	0.000	1.209	4174.065	7.187
2	4.009	5.111	1.067	21681.479	1.384
3	5.289	7.062	1.064	22934.244	1.308





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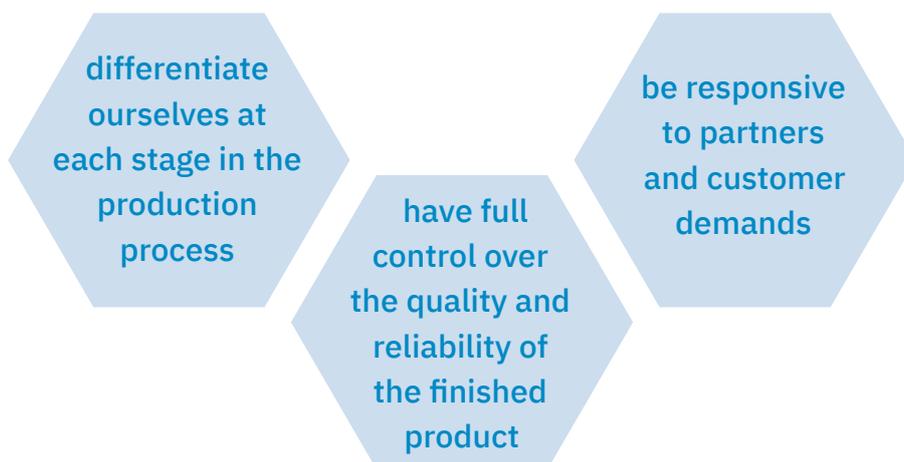
SOLAS™ · EIROSHELL™ · SOLAD™

Column Platforms

What makes us different from our competitors?

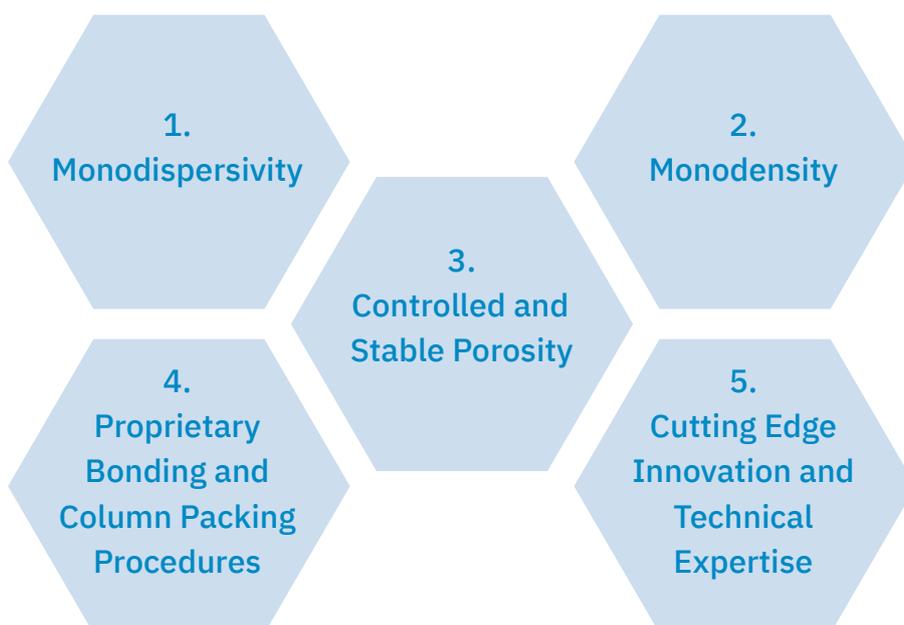
We make the columns ourselves from silica to packing and testing the columns.

This end-to-end production allows us to:



How are our columns different and better?

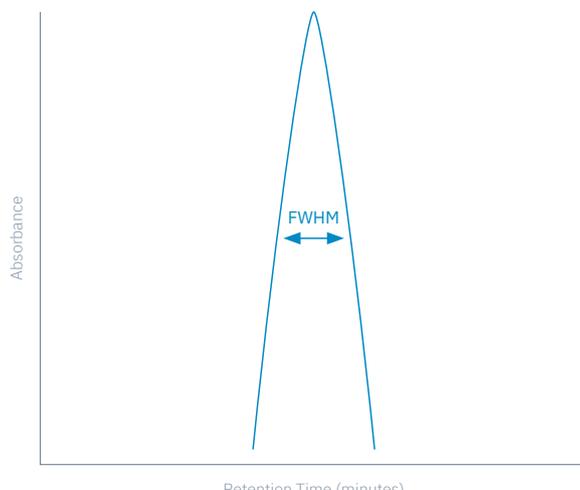
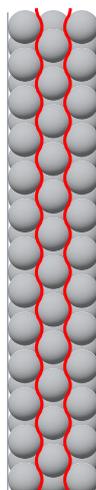
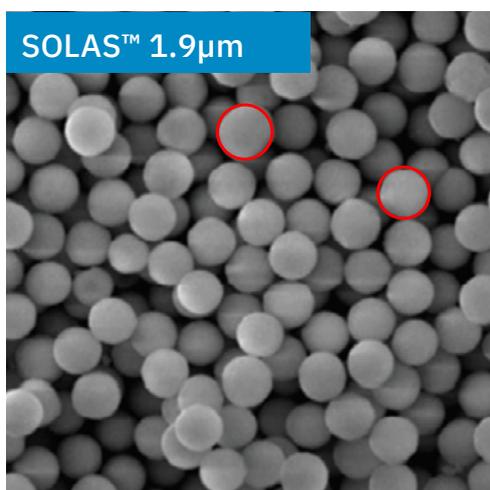
Apart from the above points related to us making the columns ourselves there are 5 key technical features that make our stationary phases different.



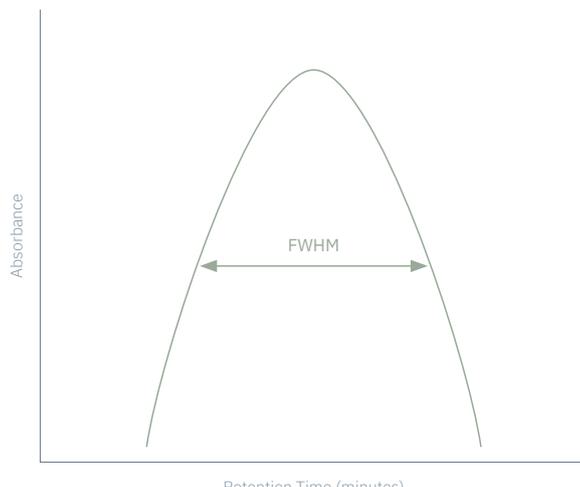
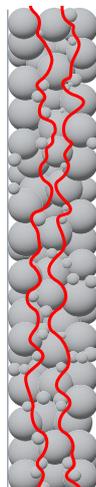
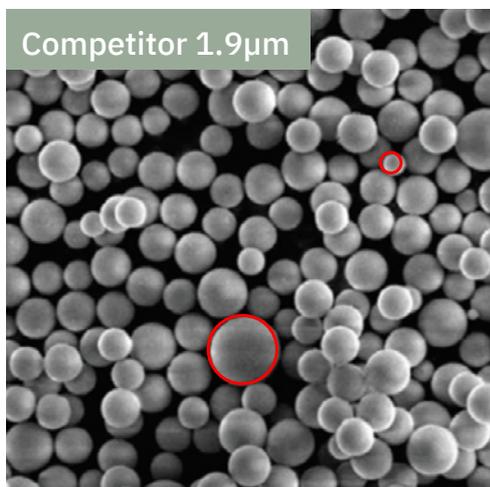
1. Monodispersivity

Our patent protected silica manufacturing processes produce highly monodisperse particles. This is best illustrated in the images below where we compare our SOLAS 1.9 μ m material with a competitor's, commercially available, 1.9 μ m material.

For those who prefer the numbers, the SOLAS™ material has a d90/d10 of 1.2 with the competitors being 1.4

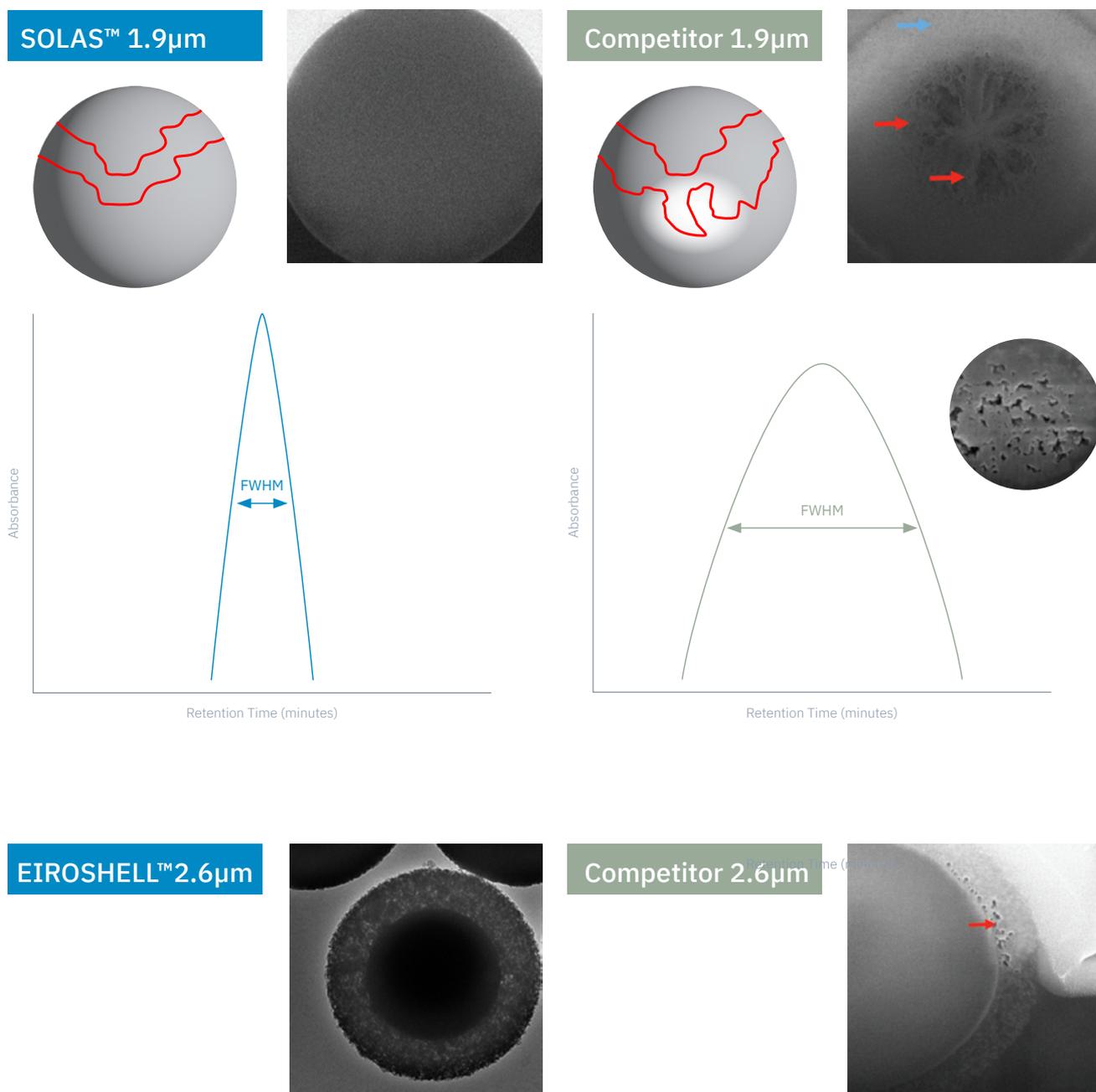


The SEM images show the more monodisperse nature of Glantreo's materials. This will result in a tighter packed column bed, which in turn will have a positive impact on chromatographic performance.



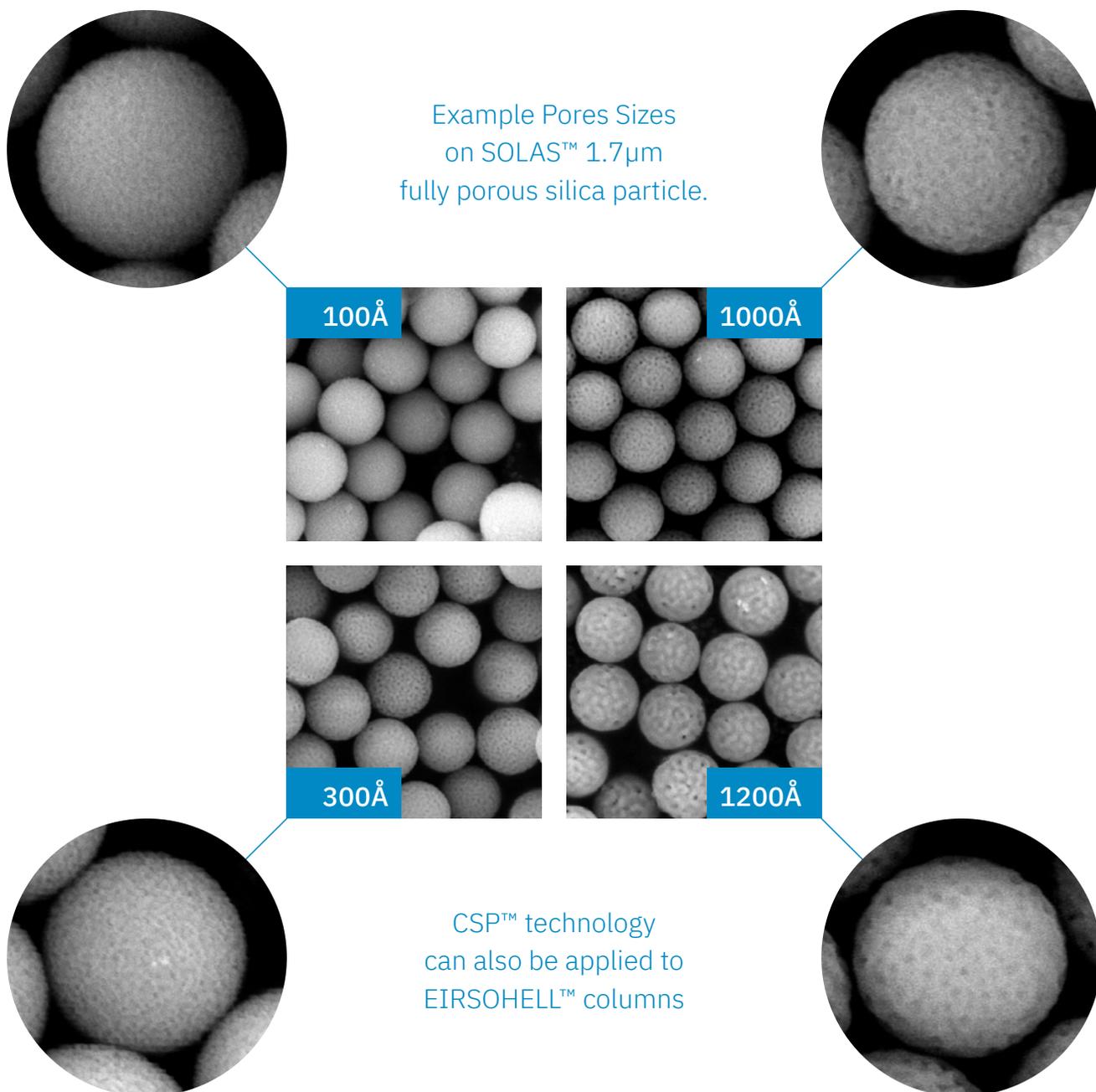
2. Monodensity

Glantreo have developed silica particles to be monodense. A lack of monodensity in underlying silica particles can cause issues for end users in the form of column instability and reproducibility over time. The images below of Glantreo particles illustrate monodensity. In contrast, the images of competitors' particles highlight what are often referred to as voids, holes, macro pores or even doughnuts, to those in the silica manufacturing world.



3. Controlled and Stable Porosity

Pore size and pore volume are important. Pore stability is also important, especially at larger pore sizes. This is why we have developed what we refer to as our Controlled and Stable Porosity (CSP) Technology. This technology has been scaled to over 1000Å pore sizes and can be used in both our SOLAS and EIROSHELL ranges.



4. Proprietary Bonding and Column Packing Procedures

Whilst having world-class silica as a starting point is vital, the ability to add functional groups and to pack the bonded silica into the appropriate column hardware is equally as important.

In addition to our optimised packing methods some key points to note regarding our packing capability are our Capacity (4 & 6 Multi Column Packing Stations give us high capacity), Hardware Quality (low Ra value on hardware finish) and Flexibility (extensive range of hardware and configurable frit choice)

In essence, the chain is as strong as its weakest link with all our links being strong.



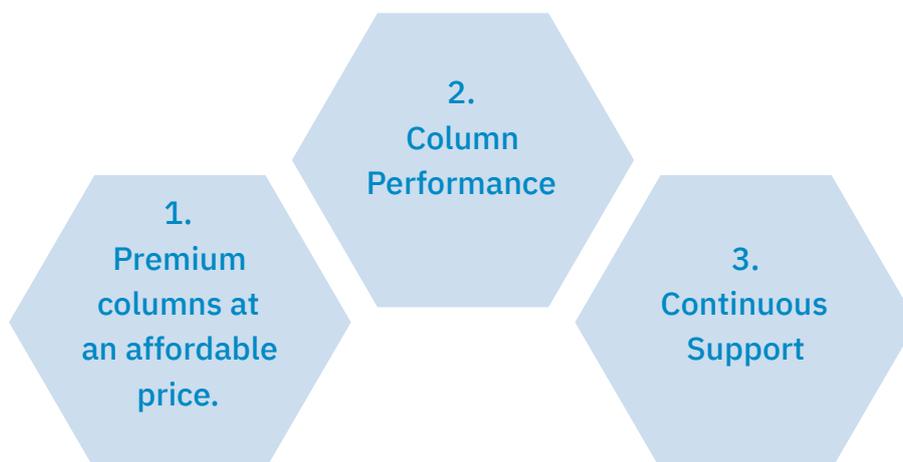
5. Cutting Edge Innovation and Technical Expertise

With a deep expertise, developed over nearly 20 years, the Glantreo team are at the forefront of producing innovative products. These patent protected products are being continuously developed to deliver next generation chromatography to our partners and customers.



How is it better?

What makes us different only matters if it matters to our partners and end users of our columns.



1. Premium columns at an affordable price.

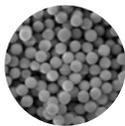
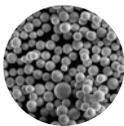
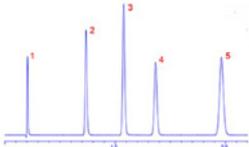
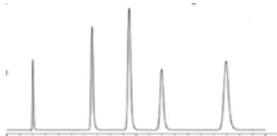
Because we produce end to end we can control costs in ways that other companies who ‘buy in’ all or part of the end product. These savings, we pass on to our partners and customers and allow the end users to access world-class chromatography at an affordable price.



2. Column Performance.

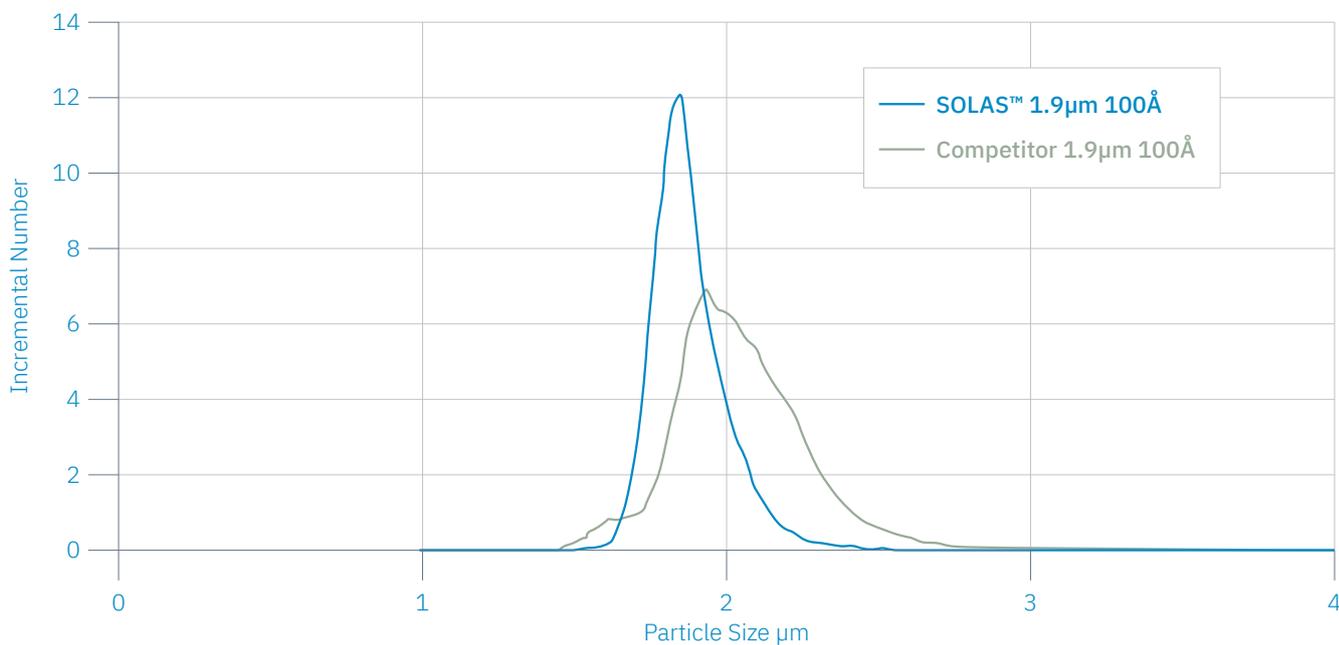
a. Efficient

Conclusion: The below graphs, tables and chromatograms demonstrate that the enhanced monodisperse nature of the Glantreo materials gives superior efficiency than competitor columns without compromising on back pressure.

	SOLAS™ 1.9µm 100Å	Competitor 1.9µm 100Å
		
Monodispersity (d90/d10)	1.2	1.5
Monodense	Yes	No
N	14,700	9,800
h	1.9	2.7
As	1.05	1.15
Backpressure (bar)	280	330
		

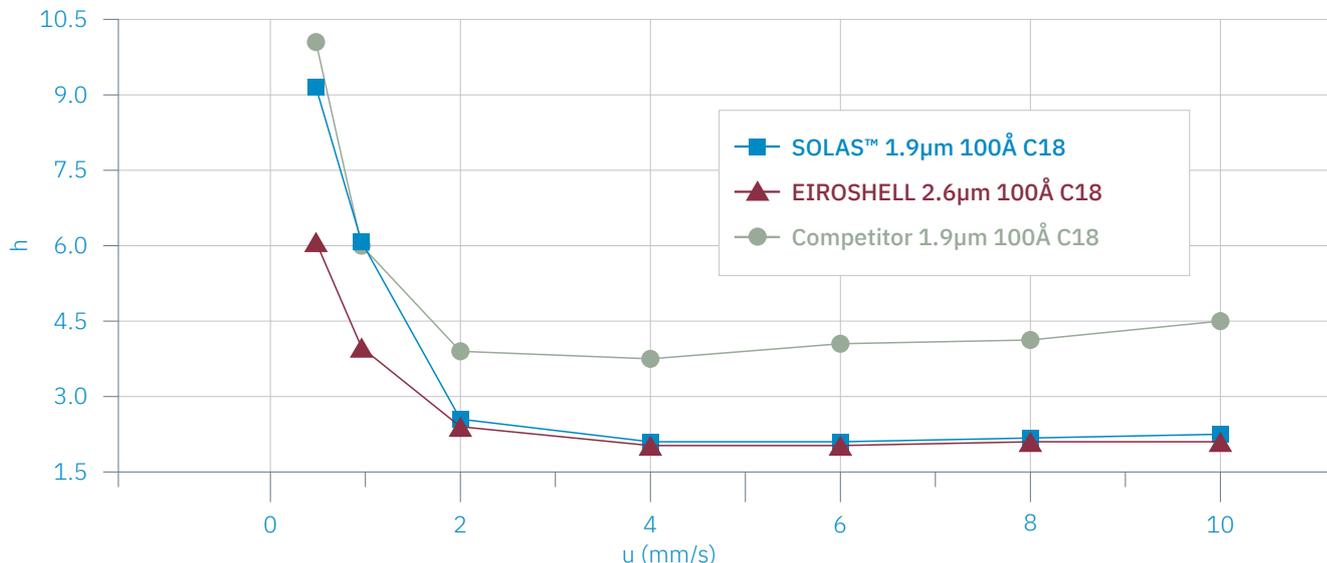
1. Uracil
2. Diazepam
3. Toluene
4. Naphthalene
5. Biphenyl

Conditions: mobile phase: 60% acetonitrile; Temperature: 35°C; UV: 254 nm; Column: 2.1 x 50mm



b. Fast

Conclusion: the below graph demonstrates that our SOLAS and EIROSHELL columns can be run at faster flow rates and still maintain superior efficiency as demonstrated by the reduced plate height.

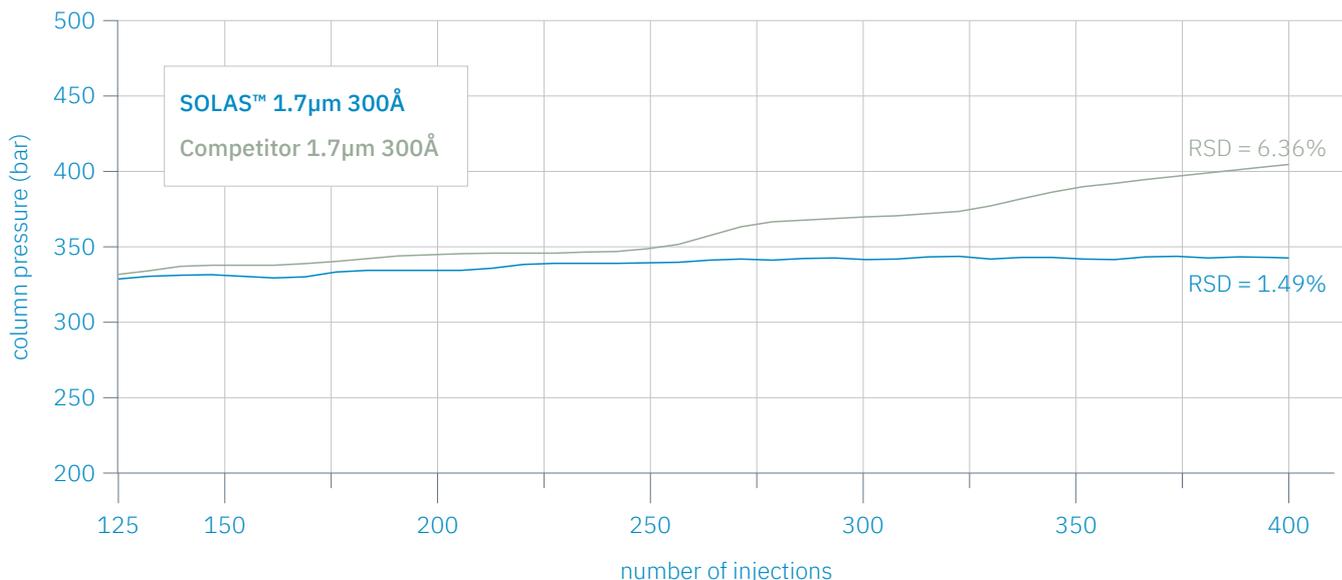


Kinetic plots (h-u) for 1.9µm SOLAS C18 and 2.6µm Eiroshell C18 columns demonstrating comparable, high performance for the two monodisperse particles; a broader-distribution 1.9µm C18 column (Competitor) with lower performance is shown for comparison.

Sample: uracil, diazepam, toluene, naphthalene, biphenyl; columns: 50 × 3.0 mm; mobile phase: 60% acetonitrile/40% water; temp: 35 °C, flow rate: variable; detection: 254 nm.

c. Stability and Longer Life

Conclusion: the below graph shows the superior stability and longer life of our columns compared to our competitors.



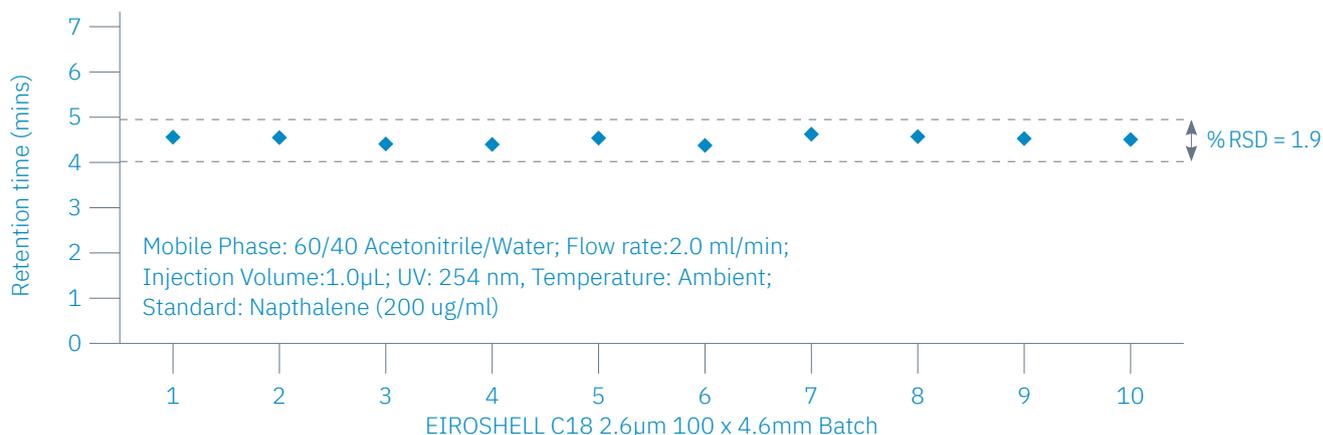
Stability of SOLAS™ 1.7µm 300Å column compared to a Competitor 1.7µm 300Å column showing column back pressure after 400 injections.

Sample: naphthalene (83µg/ml), mobile phase 17.5/82.5 ACN/H2O, flow rate 0.2ml/min, temperature: 30°C.

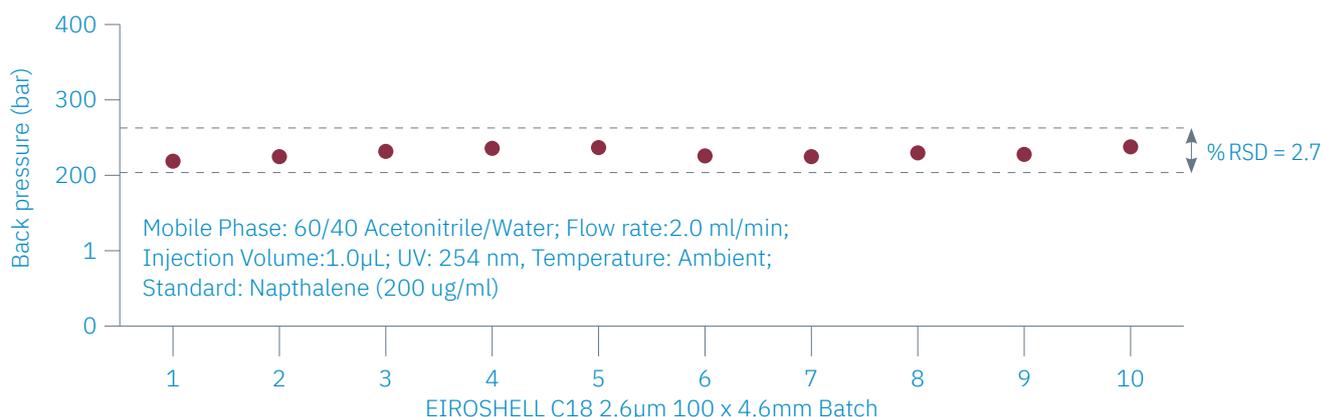
d. Reproducible

Conclusion: the below graphs demonstrate the batch to batch reproducibility of our columns and also the reproducibility of a column over its enhanced lifetime.

Reproducibility: Retention Time (Napthalene)



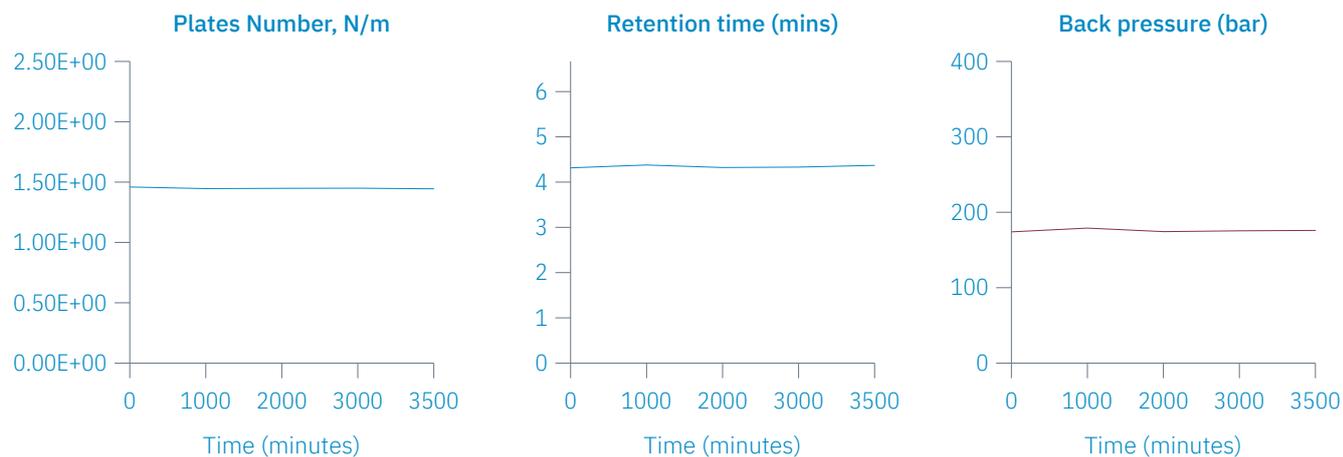
Reproducibility: Back Pressure



Reproducibility: Over Time

EIROSHELL™ 2.6µm C18, 100x4.6mm

Mobile Phase: 60/40 Acetonitrile/Water; Flow rate:1.0 ml/min; Injection Volume:1.0µl; UV: 254 nm; Temperature: Ambient; Standard : Napthalene (166 ug/ml)



3. Continuous Support

With our in-house Research and Development team and highly skilled application scientists, we offer round-the-clock expertise for all Glantreo products, to all our customers. Whether it's a troubleshooting inquiry, trainings, method development support or a new application, Glantreo offers continuous support to its customers.

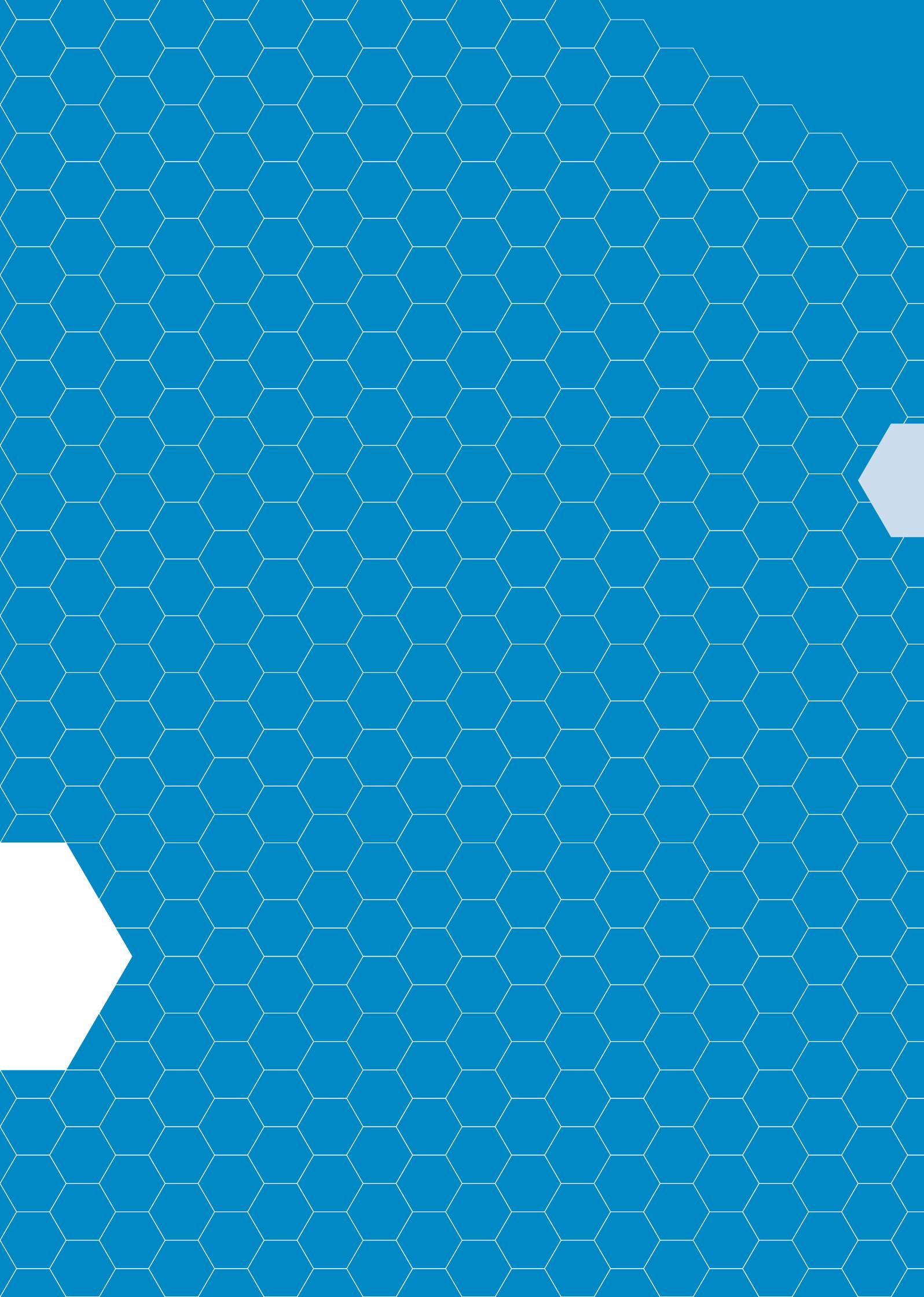


John J. Hogan,
Chief Commercial Officer



John P. Hanrahan,
Chief Technical Officer

Located at
Environmental Research Institute,
Cork, Ireland





Glantreo

Knowledge · Innovation · Service

SOLAS™ · EIROSHELL™ · SOLAD™

Functional Groups

C18

– USP L1

Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

First choice stationary phase
– excellent results for a wide range of analytes

Superior peak shape, efficiency, resolution and lifetime for acids, bases, and neutrals

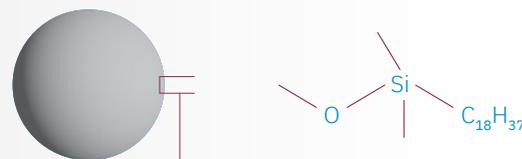
Key Properties

Separation Mechanism: **Hydrophobic Interaction**

pH Range: **2 to 10**

Carbon Load (100Å Pore Size): **SOLAS: 15–18%**
EIROSELL: 8–10%

Endcapping: **Yes 100%**



Recommended Application Areas

Pharmaceuticals

Steroids

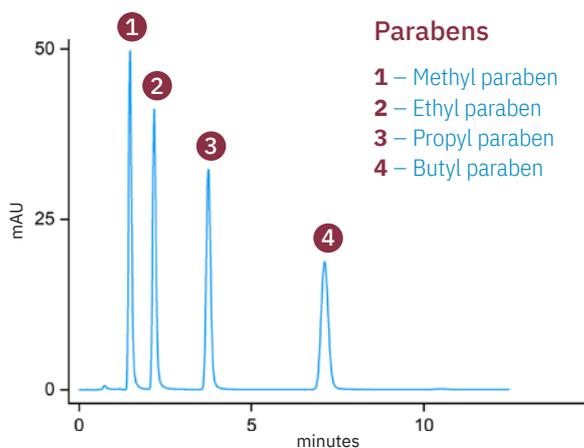
Fatty acids

Vitamins

Proteins

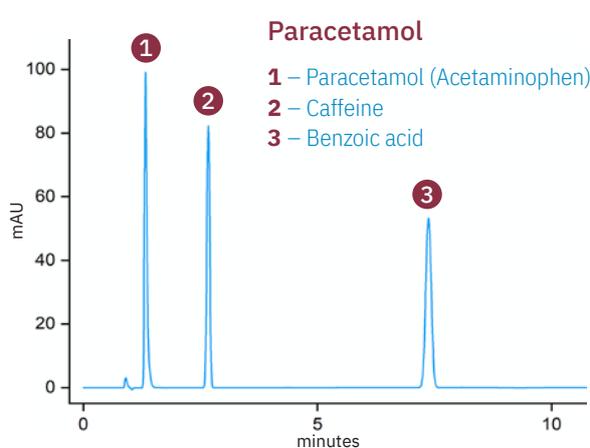
C18 Applications

SOLAS™ 1.7µm C18 50x2.1mm



Mobile Phase: 35/65 Acetonitrile/Water;
Flow rate: 0.2ml/Min; Injection Volume: 1.0µl;
UV: 254nm; Column Temperature: Ambient

EIROSELL™ 2.6µm C18 100x4.6mm



Mobile Phase: 69/28/3 Water/Methanol/Acetic Acid;
Flow rate: 1.0ml/Minute; Injection Volume: 1.0µl;
UV: 275nm; Column Temperature: Ambient

C18 plus

– USP L1

Available on all **Glantreo** silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

Coated with proprietary bonding technology which ensures higher hydrophobic interactions and exceptionally low bleeding

Extended pH range from 1 – 12 for a wide range of applications

High pH stability and chemical resistance for long column lifetime, reliability, and reproducibility

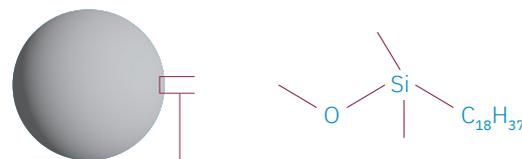
Key Properties

Separation Mechanism: **Hydrophobic Interaction**

pH Range: **1 to 12**

Carbon Load (100Å Pore Size): **SOLAS: 16 – 19%**
EIROSELL: 8 – 10%

Endcapping: **Yes, proprietary**



Recommended Application Areas

Acids, Bases, and Neutrals
across a wide pH range

Pharmaceuticals

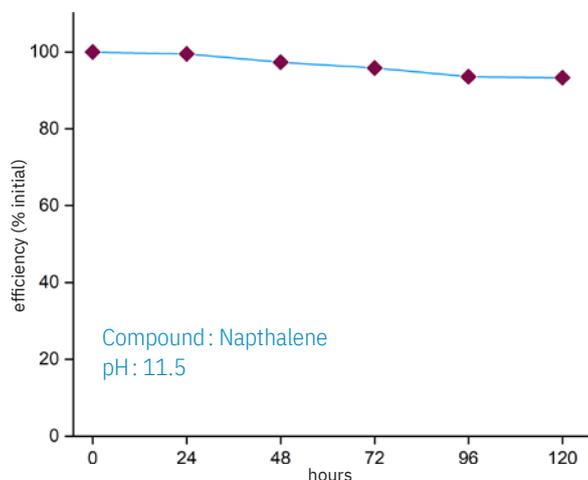
Biomolecules – Proteins, Peptides,
Oligonucleotides, Glycans

Vitamins

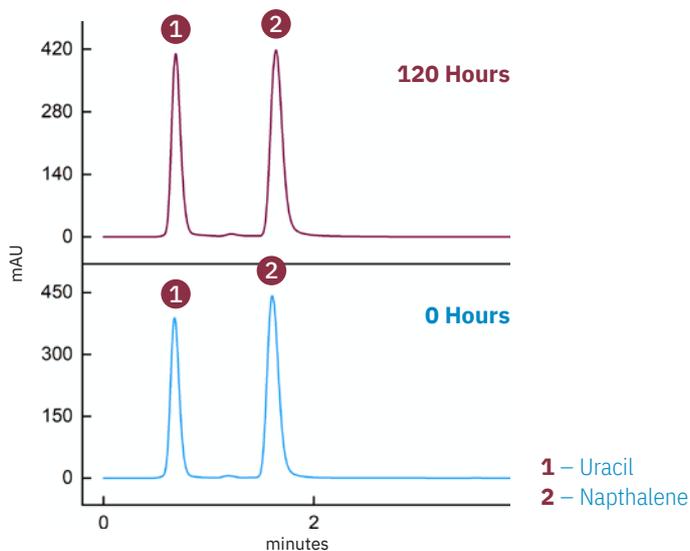
C18 Plus Applications 1/2

1. High pH Stability

EIROSELL™ 2.6µm C18 Plus 50x2.1mm



Compound: Napthalene
pH: 11.5
Mobile Phase: 0.1% TEA in 50/50 Acetonitrile/Water;
Mobile phase pH – 11.5; Flow rate: 0.2ml/Min;
Injection Volume: 5.0µL; UV: 254nm;
Column Temperature: 25°C

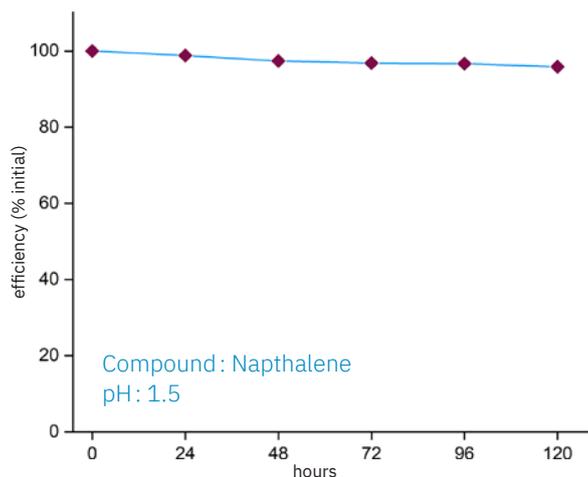


Tips/Advice: Always use a guard column to protect the column from particulates and other detrimental sample components, to increase the column lifetime

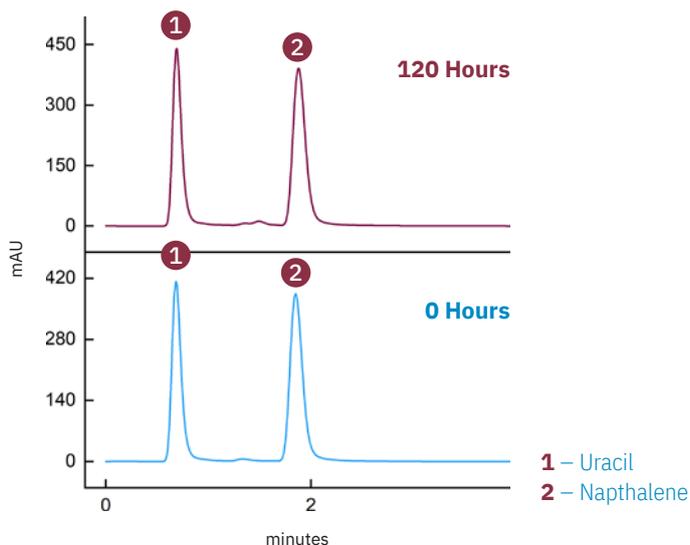
C18 Plus Applications 2/2

2. Low pH Stability

EIROSELL™ 2.6µm C18 Plus 50x2.1mm



Mobile Phase: 0.1% TEA in 50/50 Acetonitrile/Water;
Mobile phase pH – 1.5; Flow rate:0.2mL/Min;
Injection Volume:5.0uL; UV: 254nm; Column
Temperature: 25°C

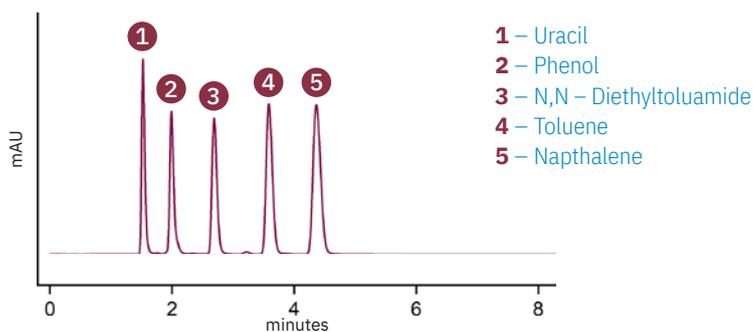


3. Comparison between C18 Plus and C18

Conclusion: Glantreo C18 Plus offers similar elution order and efficiency as Glantreo C18. This is achieved at lower flow rates...a greener alternative with reduced running costs.

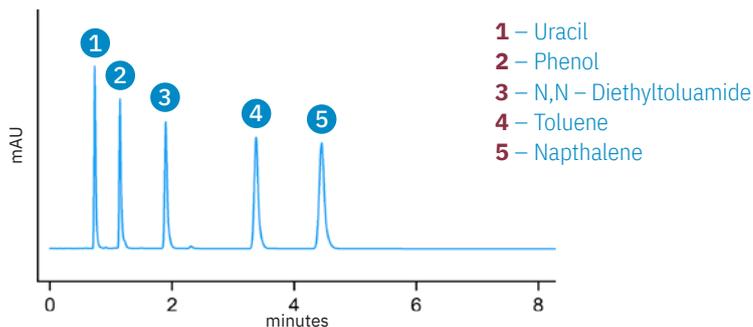
EIROSELL™ 2.6 µm C18 Plus, 50x2.1mm

Mobile Phase: 60/40 Acetonitrile/Water;
Flow rate:0.5ml/Min; Injection Volume:1.0µl;
UV: 254nm; Column Temperature: Ambient



EIROSELL™ 2.6 µm C18, 50x2.1mm

Mobile Phase: 60/40 Acetonitrile/Water;
Flow rate:1.0ml/Min; Injection Volume:1.0µl;
UV: 254nm; Column Temperature: Ambient



C8

– USP L7

- Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).
- Classical C8 phase, ideal for non-polar compounds that are retained too strongly on a traditional C18 column
- Outstanding chemical and mechanical stability, with excellent peak shapes, efficiency, reproducibility and reliability

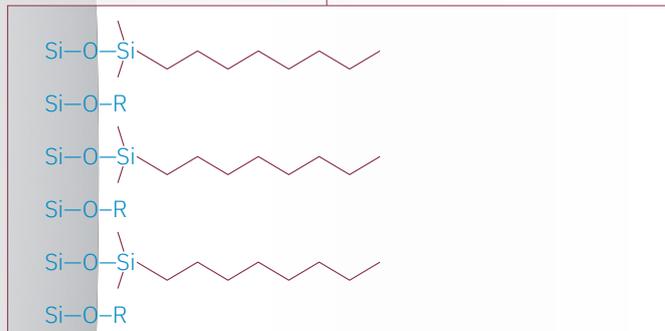
Key Properties

Separation Mechanism: **Hydrophobic Interaction**

pH Range: **2 to 10**

Carbon Load (100Å Pore Size): **SOLAS: 7–9%**
EIROSELL: 6–8%

Endcapping: **Yes 100%**



Recommended Application Areas

Pharmaceuticals

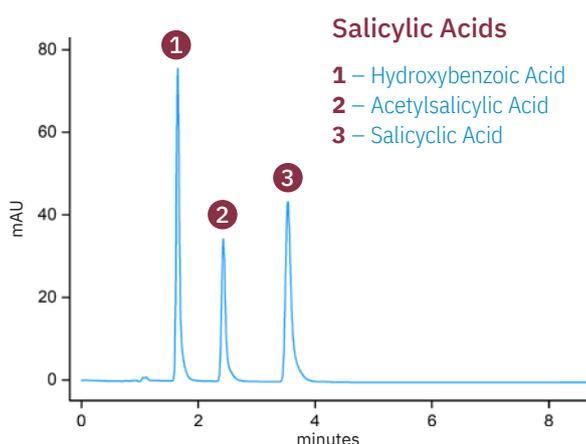
Steroids

Vitamins

Environmental

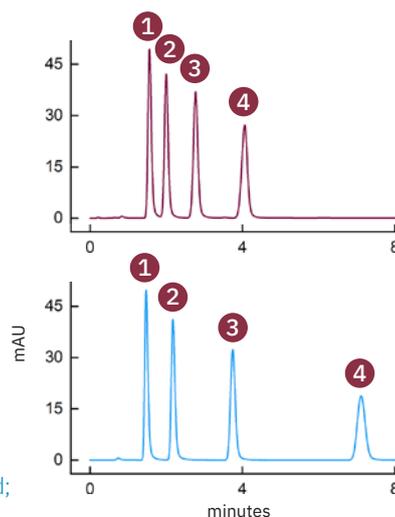
C8 Applications

SOLAS™ 1.7µm C8 100x4.6mm



Mobile Phase: 40/58/2 Acetonitrile/Water/Phosphoric Acid;
Flow rate:1.0ml/Minute; Injection Volume: 1.0µl;
UV: 237nm; Column Temperature: Ambient

Comparison between C8 and C18



SOLAS™ 1.7 µm **C8**, 50x2.1mm

Mobile Phase: 35/65 Acetonitrile/
Water; Flow rate:0.2ml/Min; Injection
Volume:1.0µl; UV: 254nm; Column
Temperature: Ambient

SOLAS™ 1.7 µm **C18**, 50x2.1mm

Mobile Phase: 35/65 Acetonitrile/
Water; Flow rate:0.2ml/Min; Injection
Volume:1.0µl; UV: 254nm; Column
Temperature: Ambient

Parabens

- 1 – Methyl Paraben
- 2 – Ethyl Paraben
- 3 – Propyl Paraben
- 4 – Butyl Paraben

Tips/Advice: For column cleaning, all Glantreo columns can be used in reversed flow direction. Follow the appropriate cleaning procedure. Columns should be washed after each use.

C4

– USP L26

Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

Unique selectivity and increased retention for highly polar/hydrophilic compounds. Can be used in Reversed-phase, HILIC, Ion-pairing modes.

Lower hydrophobicity than C8 and C18, leading to faster separations for very hydrophobic compounds with outstanding efficiency and sensitivity.

Key Properties

Separation Mechanism: **Hydrophobic Interaction**

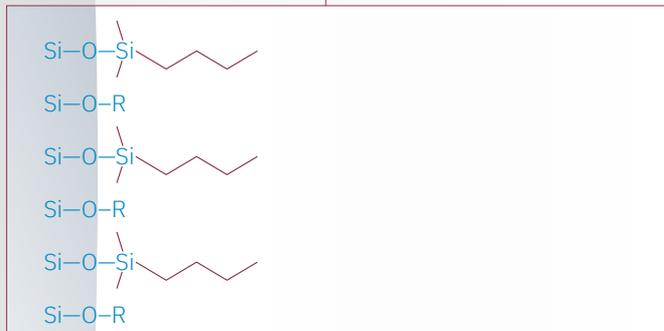
pH Range: **2 to 10**

Carbon Load (1000Å Pore Size): **SOLAS: < 1%**
EIROSELL: < 1%

Carbon Load (300Å Pore Size): **SOLAS: 3 – 5%**
EIROSELL: 4 – 6%

Carbon Load (100Å Pore Size): **SOLAS: 3 – 5%**
EIROSELL: 4 – 6%

Endcapping: **Yes 100%**



Recommended Application Areas

Proteins, Peptides, Amino Acids

Hormones

Polar Acids and Bases

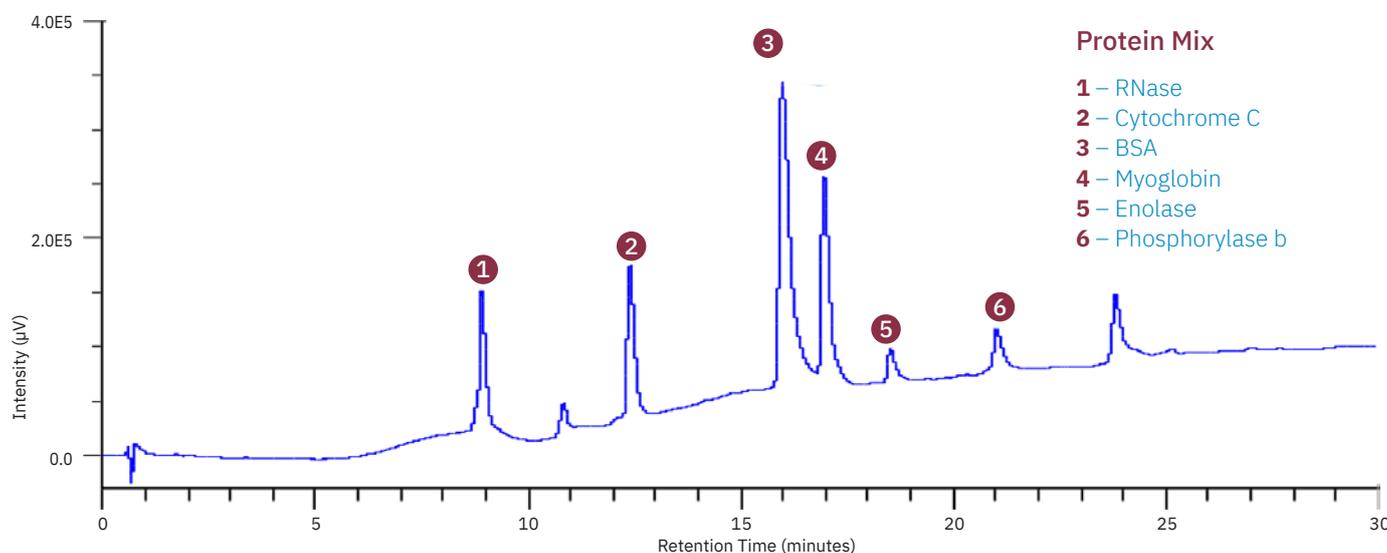
Nucleosides, Oligonucleotides

Vitamins

100Å Pore Size – up to 5000 Da
300Å Pore Size – up to 50 kDa
1000Å Pore Size – up to 150 kDa

C4 Applications 1/2

EIROSELL™ BIO 2.6µm C4 50x2.1mm 1000Å



Protein Mix

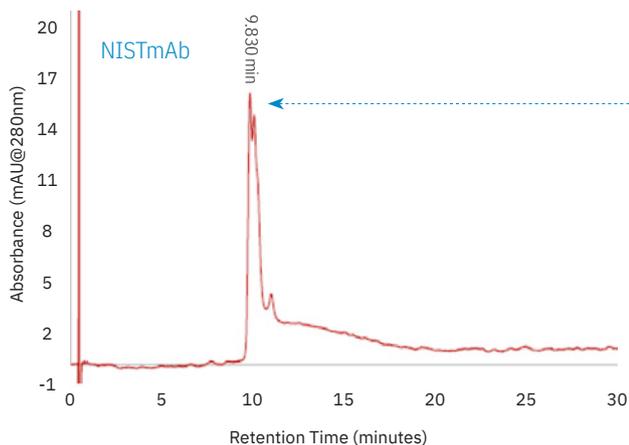
- 1 – RNase
- 2 – Cytochrome C
- 3 – BSA
- 4 – Myoglobin
- 5 – Enolase
- 6 – Phosphorylase b

Mobile Phase: A- 0.1% TFA in Water B- 0.075% TFA in Acetonitrile Gradient- %B 18-70% in 0-25 minutes;
Flow rate: 0.2ml/minute; injection volume:5.0µL; UV: 220nm; Column Oven Temperature: 60°C

Tips/Advice: Our Controlled and Stable Porosity (CSP) technology ensures stationary phase stability, even at larger pore sizes. Our 100Å pore sized columns are stable at up to 1200 bar.

C4 Applications 2/2

SOLAS™ BIO 1.7µm C4 50x2.1mm 1000Å



Mobile Phases (AMT):

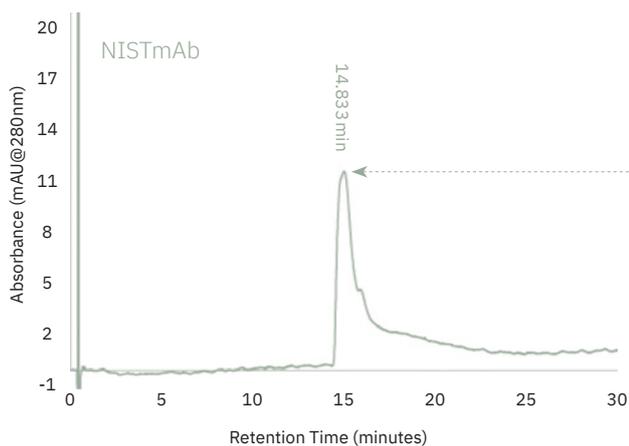
A: LC-MS grade water containing 5% n-propanol, 0.2% TFA

B: LC-MS grade water containing 70% n-propanol, 20% acetonitrile, 0.2% TFA

Flow Rate: 0.4ml/min; Detection: 205nm, 214nm, 240nm, 280nm;

Temperature: 60°C

Competitor 1.7µm C4 50x2.1mm 300Å



Mobile Phases (AMT):

A: LC-MS grade water containing 5% n-propanol, 0.2% TFA

B: LC-MS grade water containing 70% n-propanol, 20% Acetonitrile, 0.2% TFA

Flow Rate: 0.4ml/min; Detection: 205 nm, 214 nm, 240 nm, 280 nm;

Temperature: 60°C

Aqua

– USP L60

Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

Orthogonal selectivity to alkyl phases, with enhanced separation and resolution for samples containing polar, acidic, and basic compounds

Superior stability and durability even under highly aqueous mobile phase

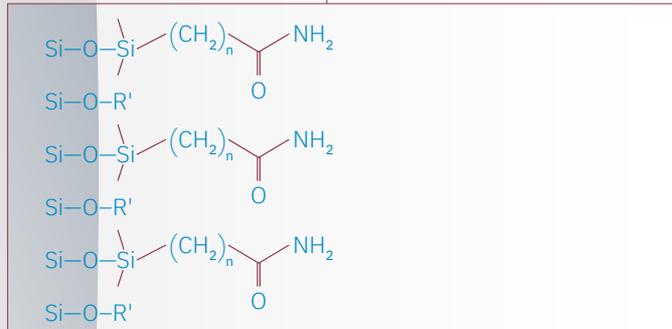
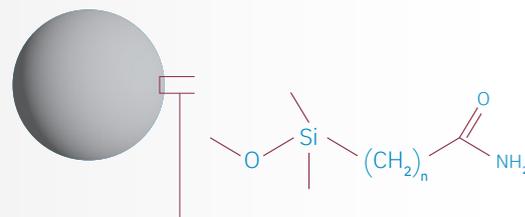
Key Properties

Separation Mechanism: **Hydrophobic and hydrophilic interactions**

pH Range: **2 to 10**

Carbon Load (100Å Pore Size): **SOLAS: 18–20%**
EIROSELL: 8–10%

Endcapping: **Yes**



Recommended Application Areas

Biomolecules

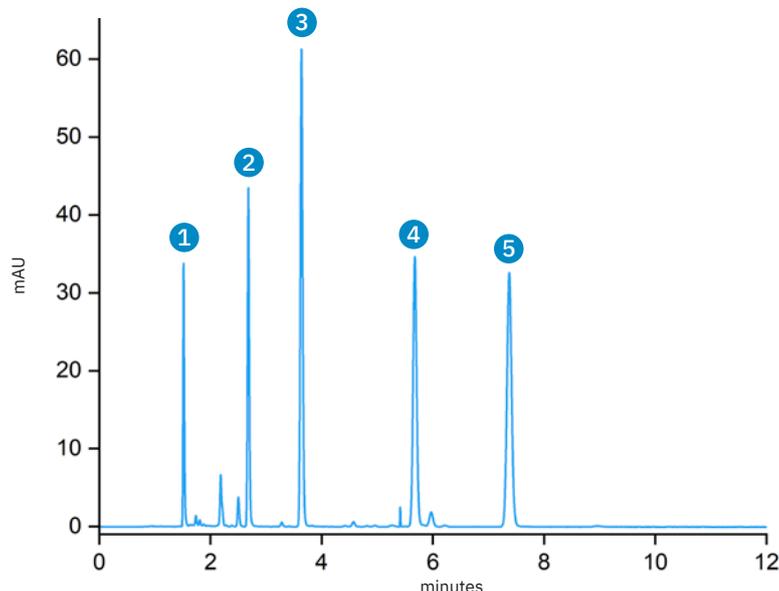
Alcohols, Phenols and Catechins

Polar Acids and Bases

Sugars and carbohydrates

Aqua Applications

SOLAS™ 5.0µm Aqua, 250x4.6mm



- 1** – Uracil
- 2** – Benzene
- 3** – Ethyl benzene
- 4** – Butyl benzene
- 5** – Pentyl benzene

Mobile Phase: 80/20 Acetonitrile/Water (v/v);
Flow rate: 1.5 ml/min; Injection volume: 1.0 µl;
UV: 254 nm ;Temperature: 25°C; Detector:

Tips/Advice: For optimum peak shape and sensitivity, it is recommended to prepare the sample in the operating mobile phase or to use a mobile phase, that is a weaker solvent than the mobile phase.

C30

– USP L62

Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

Higher hydrophobic retention than C18 column

High shape selectivity for hydrophobic, long-chain, structurally related isomers

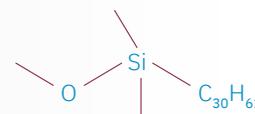
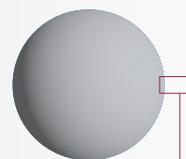
Key Properties

Separation Mechanism: **Strong Hydrophobic Interaction**

pH Range: **2 to 10**

Carbon Load (100Å Pore Size): **SOLAS: 24 – 28%**
EIROSELL: 12 – 15%

Endcapping: **Yes 100%**



Recommended Application Areas

Fat-soluble vitamins

Isomers

Lipids, Carotenoids

Steroids

Tips/Advice: Never use long chain reversed phases like C30 and classical C18 phases with 100% aqueous mobile phase. The hydrophobic chains will collapse.

C1 (TMS)

– USP L13

Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

Unique selectivity for multifunctional compounds, can be used in both Normal-phase and reversed phase modes

Suitable for hydrophilic, highly polar compounds which are difficult to separate with general reversed-phase or normal-phase columns.

Unique stationary bonding technology, providing high efficiency and excellent peak shape symmetry

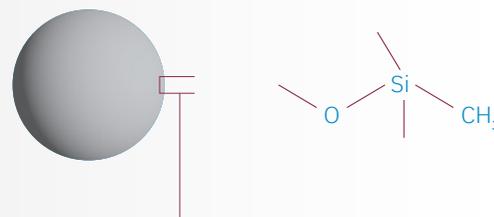
Key Properties

Separation Mechanism: **Weak Hydrophobic and Hydrophilic interactions**

pH Range: **2 to 10**

Carbon Load (100Å Pore Size): **SOLAS: < 1%**
EIROSELL: < 1%

Endcapping: **Yes 100%**



Recommended Application Areas

Multifunctional compounds

Hydrophobic proteins, peptides, vitamins in reversed-phase mode

Polar compounds in normal-phase mode

Phenyl

– USP L11

Available on all Glantreo silica materials

(fully-porous SOLAS™ particles, superficially-porous EIROSELL™ particles and non-porous SOLAD™ particles)

Complementary selectivity to alkyl phases, with preferential retention of aromatic compounds

Excellent choice for analysing complex mixtures of polar and non-polar analytes, especially mixtures containing aromatic compounds

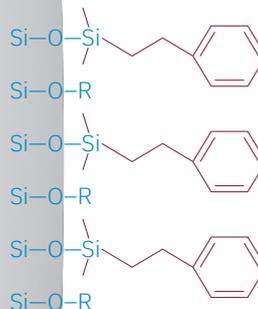
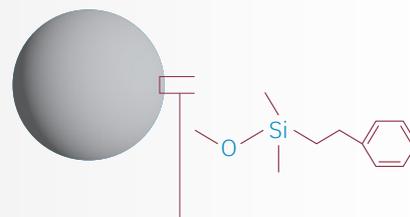
Key Properties

Separation Mechanism: **Hydrophobic Interaction, Aromatic and π - π Interaction**

pH Range: **2 to 10**

Carbon Load (100Å Pore Size): **SOLAS: 4 – 6%
EIROSELL: 2 – 3%**

Endcapping: **Yes 100%**



Recommended Application Areas

Proteins and peptides

Pharmaceuticals

Structural isomers

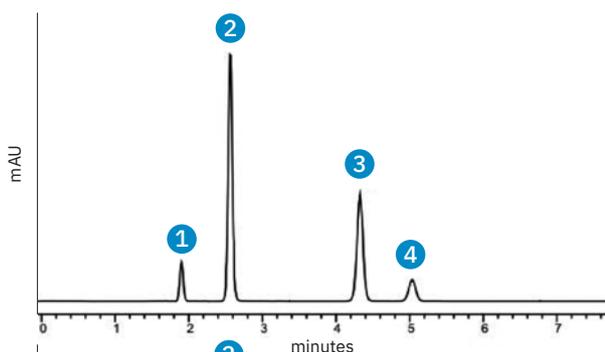
Nucleosides, Oligonucleotides

Phenyl Applications

Comparison between Phenyl and C18

SOLAS™ 5µm Phenyl, 150 x 4.6mm

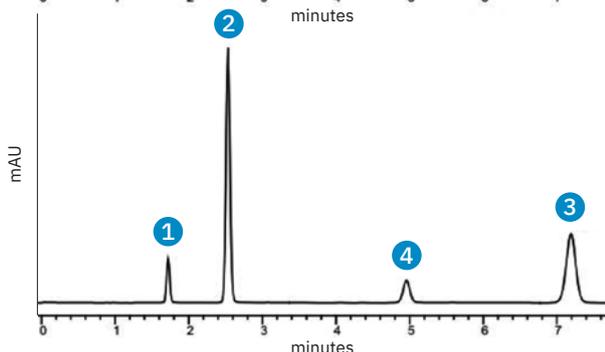
Mobile Phase: 70/30 Methanol/Water;
Flow rate: 1 ml/min; Injection Volume: 1.0µL;
UV: 254nm, Column Temperature: 24°C



1 – Uracil
2 – Phenol
3 – Toluene
4 – Chloro-4-nitrobenzene

SOLAS™ 5µm C18, 150 x 4.6mm

Mobile Phase: 70/30 Methanol/Water;
Flow rate: 1 ml/min; Injection Volume: 1.0µL;
UV: 254nm, Column Temperature: 24°C



1 – Uracil
2 – Phenol
3 – Toluene
4 – Chloro-4-nitrobenzene

Tips/Advice: When setting the flow rate, begin at a low flow rate and gradually increase the flow to the desired level, to minimise the physical shock to the column.

Phenyl Hexyl

– USP L11

Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

Complementary selectivity to alkyl phases, offering balanced hydrophobic and aromatic selectivity

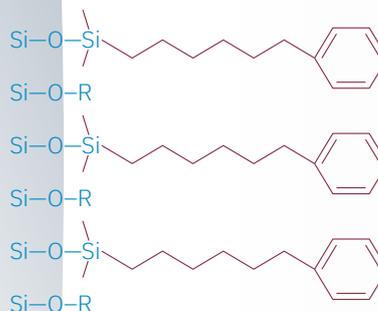
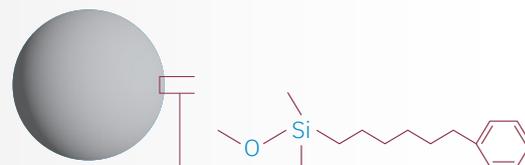
Key Properties

Separation Mechanism: **Hydrophobic Interaction, Aromatic and π - π Interaction**

pH Range: **2 to 10**

Carbon Load (100Å Pore Size): **SOLAS: 8–10%**
EIROSELL: 5–6%

Endcapping: **Yes**



Recommended Application Areas

Proteins, Peptides, Amino Acids

Hormones

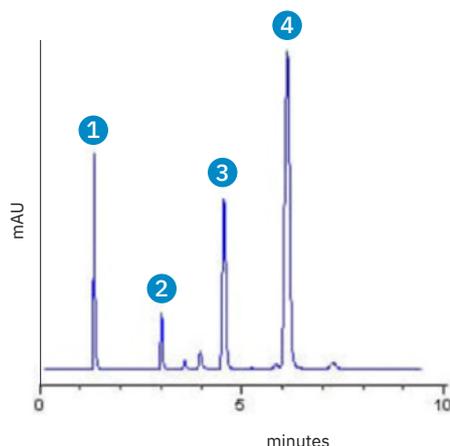
Polar Acids and Bases

Nucleosides, Oligonucleotides

Vitamins

C18 Applications

SOLAS™ 5µm Phenyl Hexyl, 150 x 4.6mm



Steroids

- 1** – Prednisolone
- 2** – Hydrocortison
- 3** – Cortisone
- 4** – Progesterone

Mobile Phase: 60/40 Methanol/Water;
Flow rate: 1ml/min; Injection Volume: 1.0µL;
UV: 254nm; Colum Temperature: 30°C

Tips/Advice: For optimum column lifetime, a mobile phase pH of 2-8 is recommended. The Glantreo C18 Plus and Phenyl Hexyl Plus phases are compatible with an extended pH range of 1-12

Phenyl Hexyl Plus

– USP L11

Available on all Glantreo silica materials

(fully-porous SOLAS™ particles, superficially-porous EIROSHELL™ particles and non-porous SOLAD™ particles)

Complementary selectivity to alkyl phases, offering balanced hydrophobic and aromatic selectivity

Extended pH range from 1-12 for a wide range of applications

High pH stability and chemical resistance for high column lifetime, reliability, and reproducibility

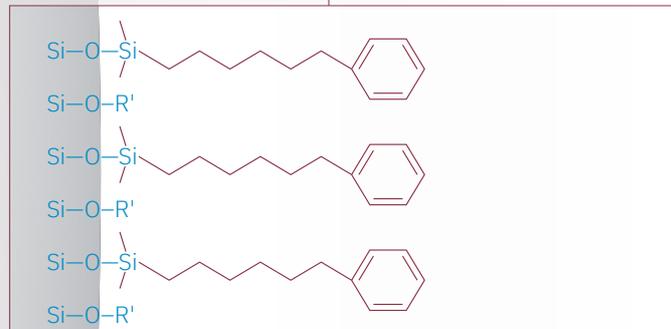
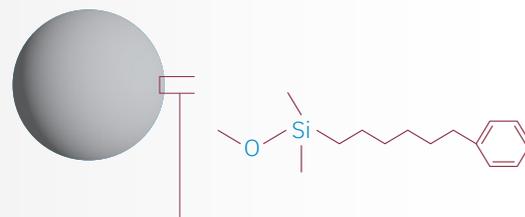
Key Properties

Separation Mechanism: **Hydrophobic Interaction, Aromatic and π - π Interaction**

pH Range: **1 to 12**

Carbon Load (100Å Pore Size): **SOLAS: 8 – 10%**
EIROSHELL: 5 – 6%

Endcapping: **Yes**



Recommended Application Areas

Proteins, Peptides, Amino Acids

Hormones

Polar Acids and Bases

Nucleosides, Oligonucleotides

Vitamins

Tips/Advice: It is very important to make sure that your column is clean before storage. This includes removal of buffer, salts, sample, and ion-pairing agents. Store the column in the recommended solvent mentioned in the Glantreo Certificate of Analysis supplied with the column.

BiPhenyl

– USP L11

Available on all Glantreo silica materials
(fully-porous SOLAS™ particles, superficially-porous EIROSHELL™ particles and non-porous SOLAD™ particles)

Complementary selectivity to alkyl phases

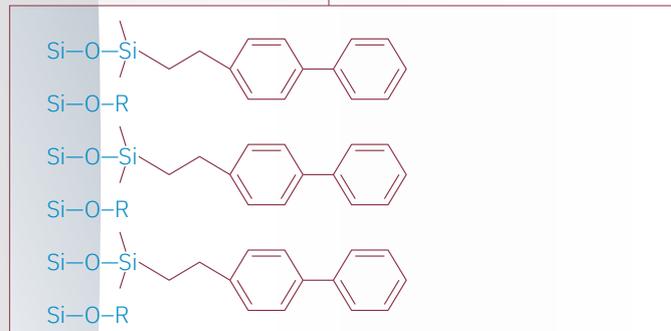
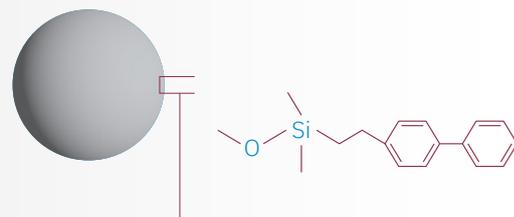
Key Properties

Separation Mechanism: **Hydrophobic Interaction, Aromatic and π - π Interaction**

pH Range: **2 to 10**

Carbon Load (100Å Pore Size): **SOLAS: 8–10%**
EIROSHELL: 5–6%

Endcapping: **Yes**



Recommended Application Areas

Drugs of Abuse

Bioanalysis

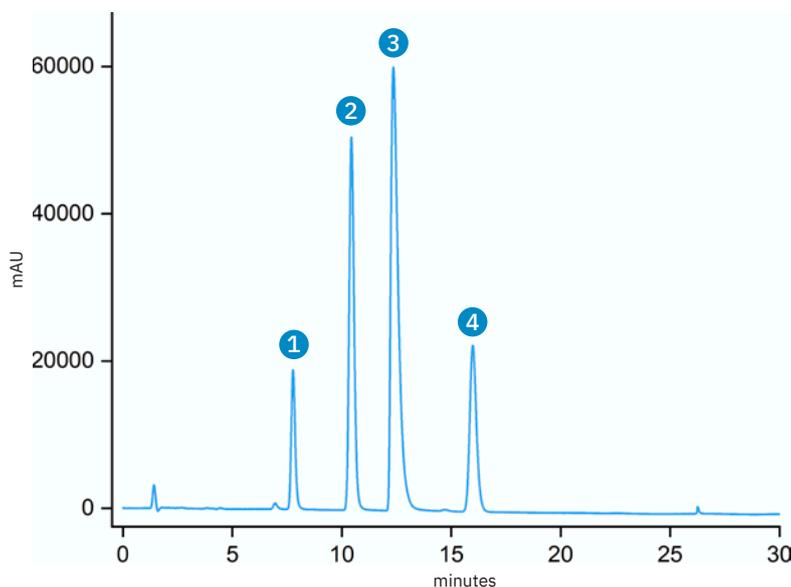
Clinical, forensics and toxicology

Explosives

Steroids, tetracyclines

Biphenyl Applications

EIROSHELL™ 2.6µm CYANO, 150x4.6mm



- 1 – Benzene
- 2 – p-Tolunitrile
- 3 – N,N-Dimethylaniline
- 4 – 1,3,5-Trinitrobenzene

Mobile Phase: 80/20 Acetonitrile/Water;
Flow rate: 0.2 ml/min;
Injection Volume: 1.0µL; UV: 254 and 214 nm;
Column Temperature: 40°C

Tips/Advice: Columns should be handled with care, as every drop or shock can damage the column or the column bed.

PFP

– USP L43

Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

Unique orthogonal selectivity to alkyl, phenyl and phenyl-hexyl phases with superior steric selectivity

Can be used in reversed phase and HILIC modes

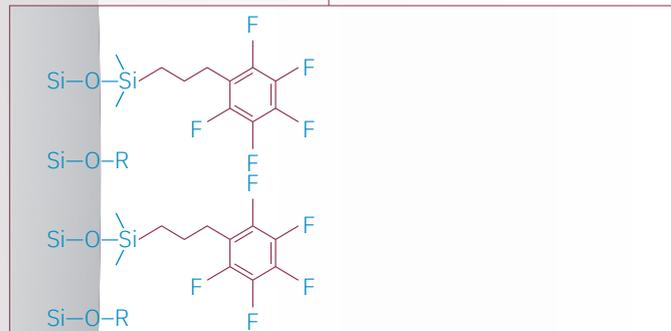
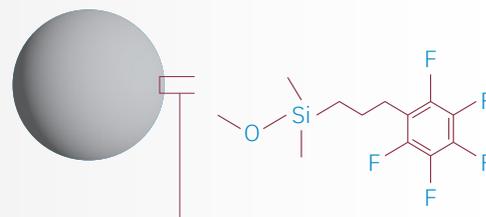
Key Properties

Separation Mechanism: **Hydrophobic Interaction, Aromatic and π - π Interaction, Dipole-dipole Interaction, Hydrogen Bonding**

pH Range: **2 to 10**

Carbon Load (100Å Pore Size): **SOLAS: 5 – 6%
EIROSELL: 4 – 6%**

Endcapping: **Yes**



Recommended Application Areas

Complex natural products

Steroids and highly polar pharmaceuticals

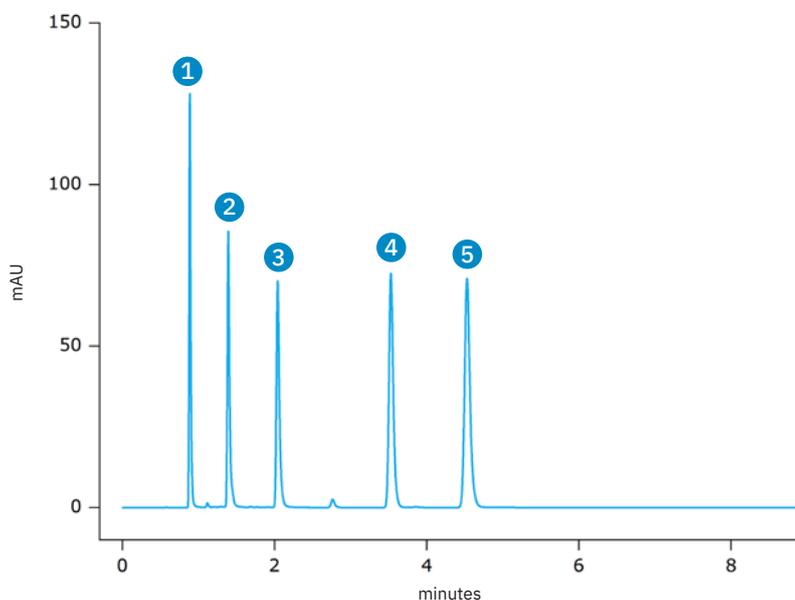
Amines, esters and ketones

Substituted aromatics

Isomeric compounds

PFP Applications

EIROSELL™ 2.6µm PFP, 50x4.6mm



- 1 – Malic Acid
- 2 – Doxylamine
- 3 – Chlorpheniramine
- 4 – Bromopheniramine
- 5 – Diphenhydramine

Mobile Phase: (A) 20 mM Potassium Phosphate, pH 2.5
(B) Acetonitrile; Gradient: A/B (90:10) to (20:80) in 15 mins; Flow rate: 1ml/min; Injection Volume: 1.0µL; UV: 220nm; Column Temperature: 22°C

Tips/Advice: Before injecting the sample, thoroughly equilibrate the column with the mobile phase to be used at the same flow rate and temperature as the method to be applied, to ensure stable chromatographic separation.

Silica

– USP L3

Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

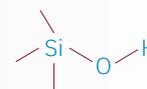
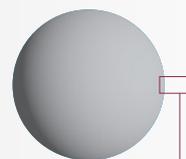
Ultra-pure, unbonded deactivated silica phase which offers excellent peak shape and selectivity for non-polar and moderately polar compounds

Traditional normal phase for use in 100% organic mobile phases. Can also be used in HILIC mode

Key Properties

Separation Mechanism: **Hydrophobic Interaction**

pH Range: **2 to 10**



Si–O–H

Si–O–H

Si–O–H

Si–O–H

Si–O–H

Recommended Application Areas

Small pharmaceutical compounds

Positional isomers

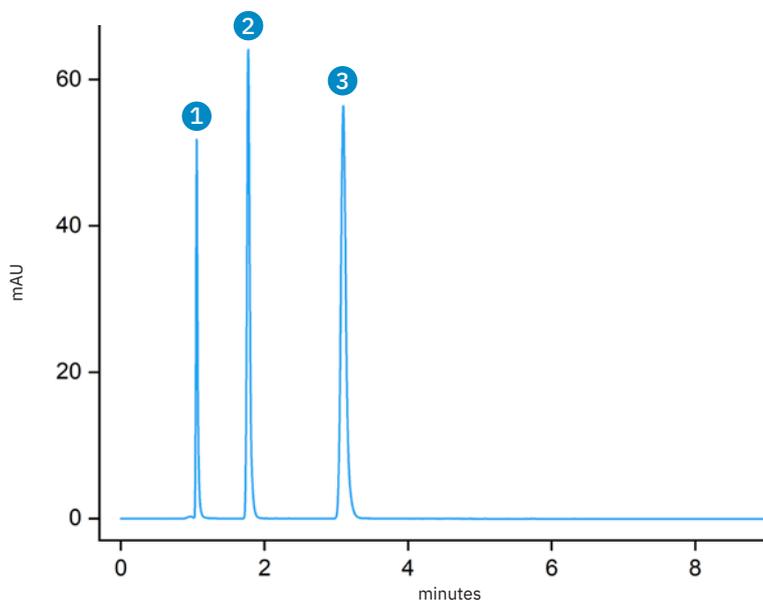
Fat soluble compounds

Food additives

Polar compounds

Silica Applications

SOLAS™ 5.0µm Silica, 150 x 4.6mm



- 1 – Naphthalene
- 2 – Uracil
- 2 – Cysteine

Mobile Phase: 80/20 Acetonitrile/Water/25 mM Ammonium Acetate, pH 6.8 ;
 Flow rate: 1.5 mL/min; Injection Volume: 1.0µL;
 UV: 254 nm; Column Temperature: Ambient

Tips/Advice: Contamination of the column by impurities from the sample or mobile phase can cause changes in peak shape, peak splitting, shifts in retention or high backpressure. Clean the column every single time after analysis to prolong column lifetimes.

Diol

– USP L20

Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

Unique HILIC phase offering increased retentivity and reproducibility. Also offers alternate selectivity to reversed-phase and normal-phase modes

Intermediate polarity between C18 and silica, ideal for separation of low to mid-polar analytes which are difficult to resolve in other phases

Can be used with a wide range of solvents

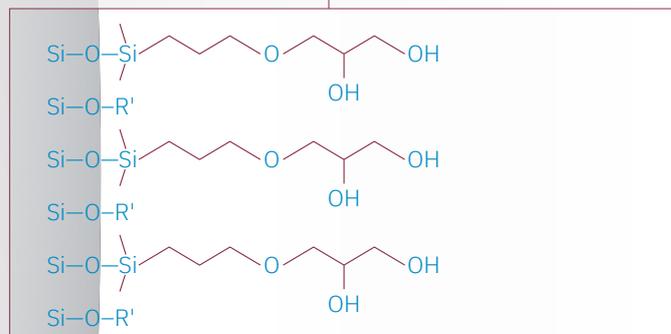
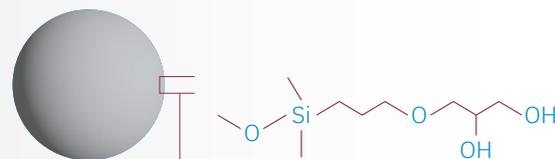
Key Properties

Separation Mechanism: **Hydrophobic Interaction**

pH Range: **2 to 10**

Carbon Load (1000Å Pore Size): **SOLAS: 4 – 6%**
EIROSELL: 1 – 2%

Endcapping: **Yes**



Recommended Application Areas

Sugars

Amino acids and
water-soluble vitamins

Polar biomolecules

Pharmaceutical Metabolites

Pesticides and Herbicides

Polar natural products

Tips/Advice: Use freshly prepared mobile phases and buffers to prevent bacterial growth, particularly for low buffer concentrations and mobile phases around pH 7.

Cyano

– USP L10

Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

Complementary selectivity to alkyl phases, and can be used for a wide range of applications in both reversed-phase and normal-phase modes.

Offers strong retention for highly polar and mid-polar compounds, and faster separation of non-polar compounds than alkyl phases

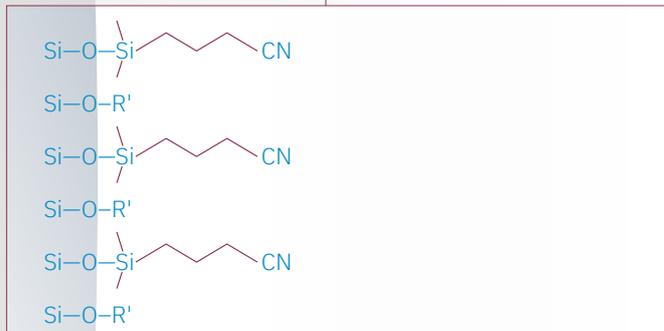
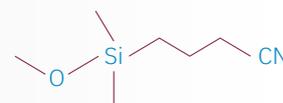
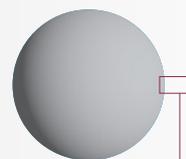
Key Properties

Separation Mechanism: **Hydrophobic and hydrophilic interactions**

pH Range: **2 to 10**

Carbon Load (100Å Pore Size): **SOLAS: 5–6%**
EIROSELL: 2–3%

Endcapping: **Yes**



Recommended Application Areas

Polar and very polar bases, acids, and neutrals

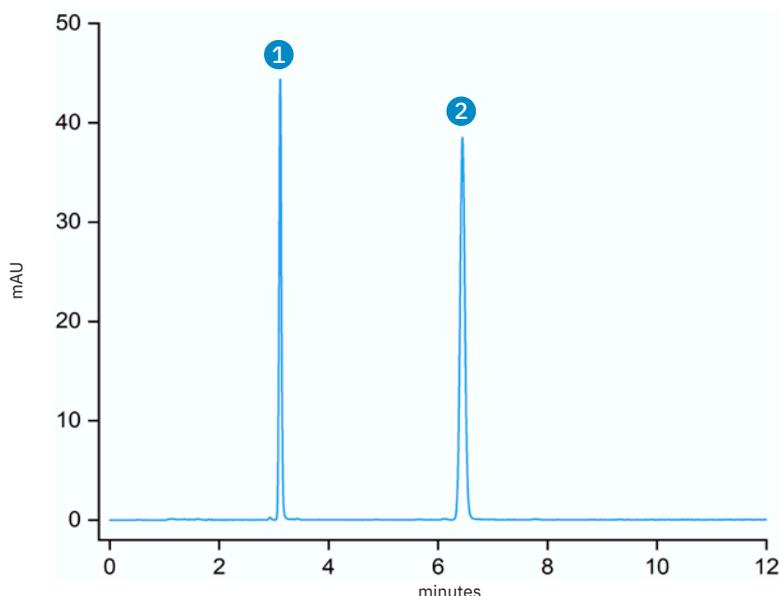
Explosives

Pharmaceuticals

Steroids

Cyano Applications

EIROSELL™ 2.6µm Cyano, 150x4.6mm



1 – Acetophenone
2 – Heptanophenone

Mobile Phase: 50/50/1 Acetonitrile/Water/75 mM Ammonium Acetate;
Flow rate: 1 ml/min; Injection Volume: 1.0µL;
UV: 254nm; Column Temperature: 25°C

Tips/Advice: It is advisable to check the performance of the column, before and after any cleaning protocol, using the QC test conditions on the accompanying chromatogram in the Glantreo Certificate of Analysis.

Amino

– USP L8

Available on all Glantreo silica materials (fully-porous **SOLAS™** particles, superficially-porous **EIROSELL™** particles and non-porous **SOLAD™** particles).

Versatile stationary phase which can be used in normal phase, reversed-phase, weak anion-exchange and HILIC modes

Proprietary bonding technology with ultra-inert, high-efficiency particles for high robustness and reproducibility

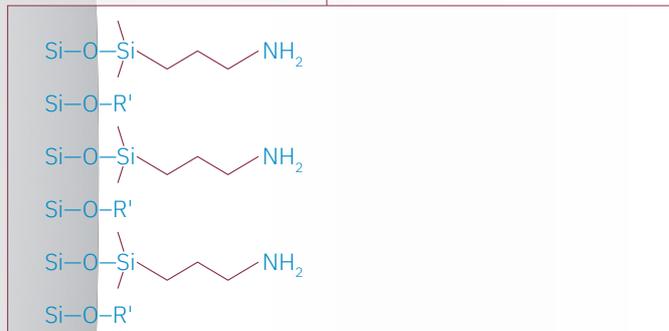
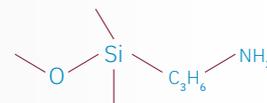
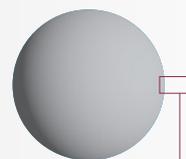
Key Properties

Separation Mechanism: **Hydrophilic and Ionic interactions**

pH Range: **2 to 10**

Carbon Load (100Å Pore Size): **SOLAS: 4 – 5%**
EIROSELL: 2 – 3%

Endcapping: **Yes**



Recommended Application Areas

Sugars and sugar alcohols

Nucleosides, nucleotides,
and oligonucleotides

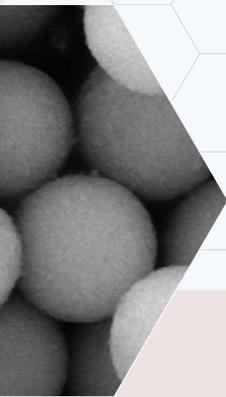
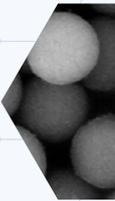
Carbohydrates and vitamins

Anions and organic acids

Tips/Advice: Column lifetime will vary on the pressure, pH, temperature, type, and concentration of buffer used. To maximise column lifetimes, always follow the operating conditions described in the Certificate of Analysis, supplied with the column.







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