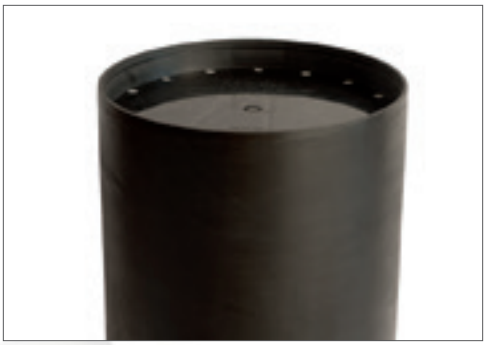


Low Pressure Chromatography

SiliaBond® Chromatographic Phases
SiliaSep™ Flash Cartridges

Solutions for Low Pressure Chromatography

SiliCycle offers a large range of silica-based solutions for low pressure chromatography

- Available in bulk (*SiliaBond*) and in pre-packed flash cartridges (*SiliaSep*)
- Non Polar Phases: C1 to C18, Phenyl, PFP, Cyclohexyl
- Polar Phases: Silica, Amino, Cyano, Diol, Silver Nitrate
- Ion Exchange Phases: SAX, WAX, SCX and WCX
- Alumina
- Florisil

Low Pressure Chromatography

Silica is the most widely used media in chromatography. These bare and bonded supports possess great properties for use as stationary phases and are particularly appreciated for their high mechanical resistance. In chromatography, there are two phases: the stationary phase packed in a column and the mobile phase that will be eluted through the stationary phase. If the analyte has a strong affinity for the mobile phase, there will be no retention. If the analyte interacts strongly with the stationary phase, there will be little or no migration. In a mixture, the interactions between the two phases will generate the separation. So depending on the analyte's polarity, the appropriate stationary phase has to be chosen and the mobile phase's polarity has to be optimized.

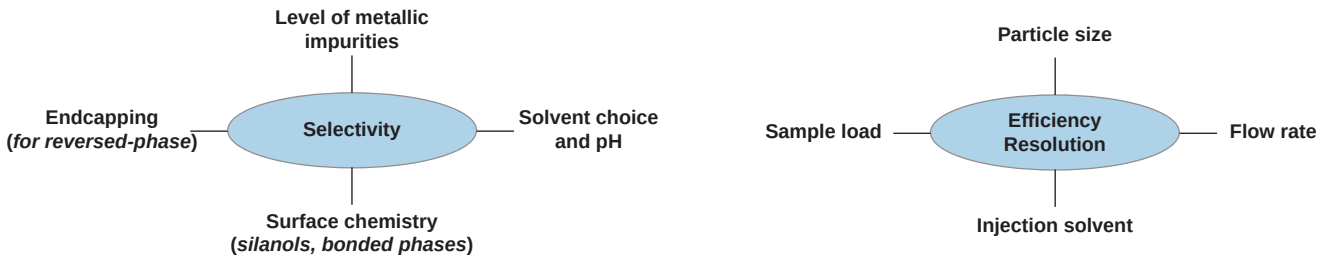
SiliCycle offers you two solutions: pack your own columns using Silia*Bond* / Silia*Flash* or use our pre-packed flash cartridges Silia*Sep*. The enhanced mechanical stability of our silica, which means no fines are created during the packing of the media, guarantees good column performance and lifetime.

Important Separation Parameters

Selectivity: Refers to the ability to retain or release certain types of compounds.

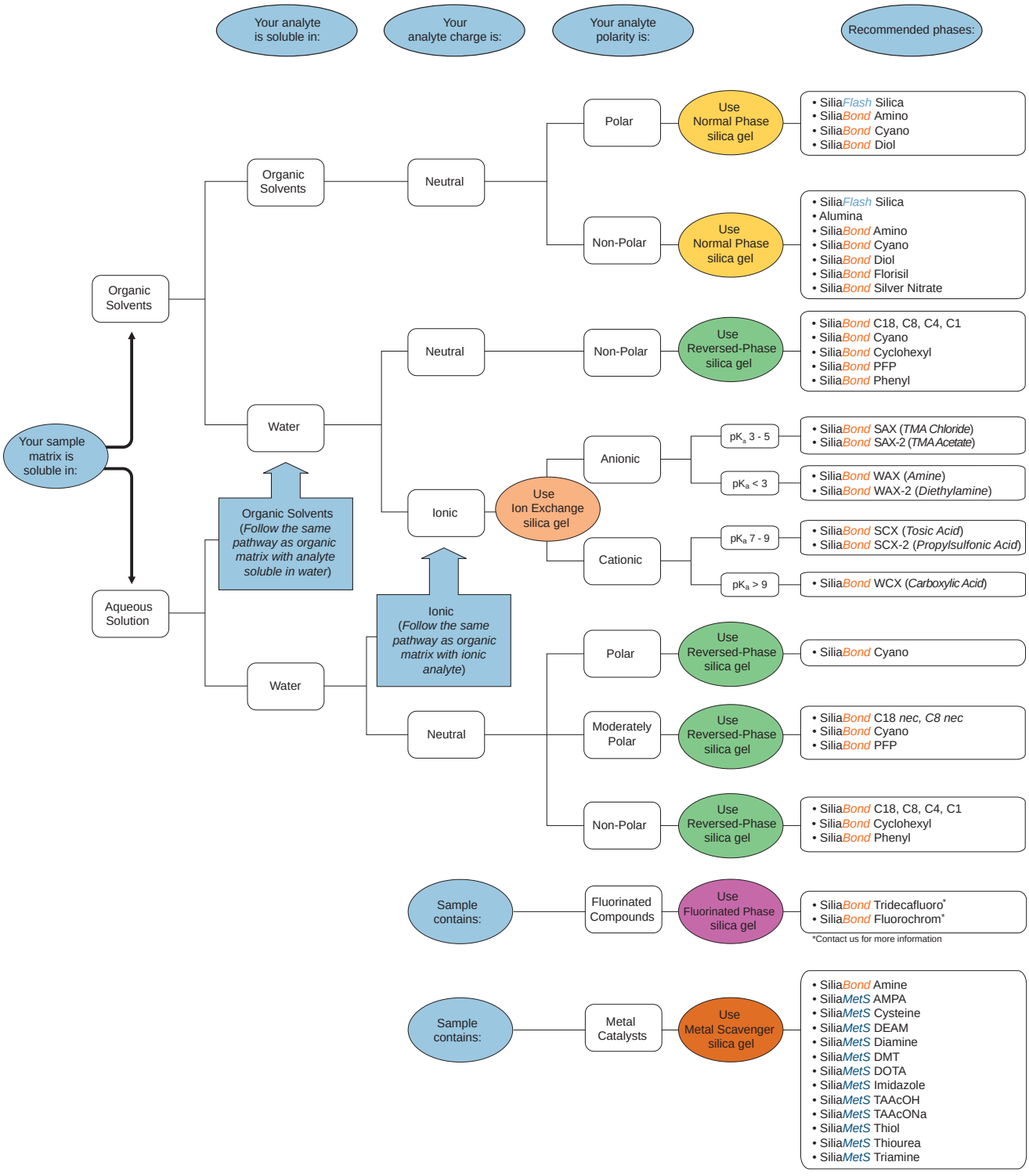
Efficiency & Resolution: The performance of flash cartridges can be measured by different parameters including plate count (*N*) and symmetry (*SI*). The higher (*N*), the better the separation.

Influencing Factors



Sorbent Selection Chart

SiliCycle offers a wide range of Silia*Bond* & Silia*Sep* sorbents to cover many kinds of purification. The following chart is designed to serve as a guide for the selection of the appropriated sorbent based on the characteristics of the sample to be purified.



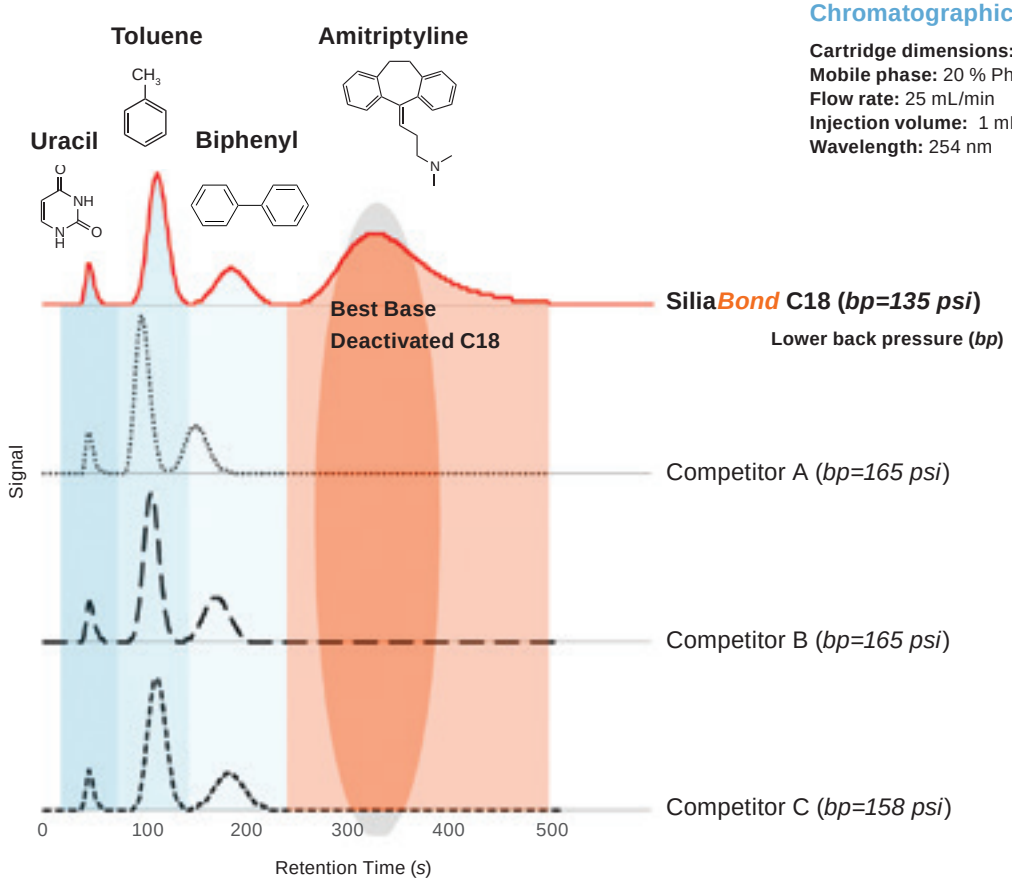
Note: for Metal Scavengers, see page 137 for more information.

Reversed-Phases

In reversed-phase chromatography, the packing material is always non-polar (*hydrophobic*) while the mobile phase is polar to non-polar. An important parameter affecting chromatographic efficiency is the hydrophobicity of the sorbent. As a general rule, stationary phase hydrophobicity increases with the alkyl chain length.

SiliCycle developed a C18 chromatographic phase (*PN: R33230B*) characterized by a homogeneous coverage of the alkyl chains on the surface. Consequently, the endcapping step is more controlled, which leads better separations and inhibition of the non-specific interactions with silanol groups (*highly deactivated silanol phase*).

Compared to competitive products, this endcapped C18 phase with 17 % carbon load exhibits high hydrophobicity and base deactivated properties. We have compared this high-performance chromatographic phase to similar C18 phases on the market (*20 % carbon load*). The comparison was done on a mixture of compounds to evaluate the dead volume (*uracil*), the hydrophobicity (*toluene and biphenyl*) and the silanol activity (*amitriptyline*). The test was done in isocratic conditions, with a mobile phase composed of 80/20 methanol / buffer (*20 nM potassium phosphate pH = 7*).

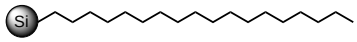
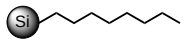
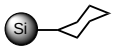
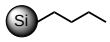
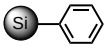
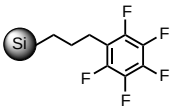
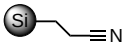


Chromatographic Conditions

Cartridge dimensions: 12 x 150 mm
Mobile phase: 20 % Phosphate buffer in Methanol
Flow rate: 25 mL/min
Injection volume: 1 mL
Wavelength: 254 nm

The basic product, amitriptyline, interacts with residual silanol groups and is retained more than 500 seconds on all the competitor phases, but not on the Silia*Bond* C18. Our C18 phase presents a better separation property thanks to a better endcapped surface. Also, the Silia*Bond* C18 presents lower back pressure compared to the competition.

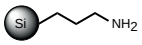
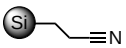
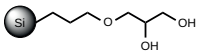
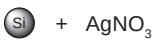
Reversed-Phases Portfolio

Low Pressure Chromatography Reversed-Phases Characteristics			
Sorbent & Sorbent Code	**Structure**	**Characteristics***	**Typical Applications**
C18 R33230B		Endcapping: Yes % C: ≥ 16 % Density: 0.639 g/mL	Indicated for the purification of **low to high polarity compounds**. Provides reproducible purification without the complexity and cost of preparative HPLC.
C18 *nec* R33330B		Endcapping: No % C: 15.5 % Density: 0.640 g/mL	
C8 R30830B		Endcapping: Yes % C: 11.0 % Density: 0.586 g/mL	Presents less retention compared to C18. Typically used for **highly hydrophobic pesticides**, **small peptides** and **large molecule drugs**.
C8 *nec* R31130B		Endcapping: No % C: 11.6 % Density: 0.759 g/mL	
Cyclohexyl (*C6*) R61530B		Endcapping: Yes % C: 9.5 % Density: 0.662 g/mL	Presents less retention compared to C18 and C8, with additional **steric interaction**.
C4 R32030B		Endcapping: Yes % C ≥ 6.67 % Density: 0.656 g/mL	Presents less retention compared to C18 and C8. Widely used for **molecules with large hydrophobic regions**.
C4 *nec* R32130B		Endcapping: No % C ≥ 6.67 % Density: 0.692 g/mL	
C1 R33030B		Endcapping: No % C ≥ 4.17 % Density: 0.559 g/mL	Lower retention compared to other reversed-phases. Used for the purification of **polar and non-polar highly hydrophobic pharmaceutical products**.
Phenyl (*PHE*) R34030B		Endcapping: Yes % C: 8.0 % Density: 0.637 g/mL	Moderate non-polar sorbent with different selectivity for **aromatic compounds** compared to other non-polar sorbents.
Phenyl *nec* (*PHE*) R34130B		Endcapping: No % C: 8.0 % Density: 0.607 g/mL	
Pentafluorophenyl (*PFP*) R67530B		Endcapping: Yes % C: 9.0 % Density: 0.761 g/mL	For a new selectivity approach with aromatic ring interactions, or for the purification of **conjugated compounds (*isomers*)**.
Cyano (*CN*) R38030B		Endcapping: Yes % C: 7.0 % Density: 0.703 g/mL	Versatile sorbent that can be used either as normal or reversed-phase. Indicated for **products with intermediate to extreme polarity**. The slightly hydrophobic nature of the cyano group offers alternative selectivity.

* Typical values
For all sorbents, particle size is 40 - 63 µm and pore diameter is 60 Å.
In bold: most common phases for flash cartridges.
Other phases can be offered on a custom basis, contact us for more information.

Normal Phases Portfolio

Normal phase chromatography is used to separate polar compounds through polar interactions with the support. The interactions take place on the highly polar silanols of the silica gel surface, but there are also moderately polar interactions with the hydrogen bonds on Amino or Diol functions.

Low Pressure Chromatography Normal Phases Characteristics			
Sorbent & Sorbent Code	**Structure**	**Characteristics***	**Typical Applications**
Silica (*Si*) R10030B		Endcapping: No Density: 0.550 g/mL	Most popular sorbent for day-to-day use for the purification of **non-ionic polar organic compounds**.
Silica HP (*Si HP*) R10017B		Part. size: 15 - 40 µm Endcapping: No Density: 0.500 g/mL	High Performance sorbent for difficult separations (***isomers***). Higher loading capacity. Faster flow rate. Less solvent used.
Amine (NH_2) R52030B		Endcapping: Yes % N: ≥ 1.68 % Loading: 1.2 mmol/g Density: 0.700 g/mL	Good alternative for normal phase purification of **compounds with basic properties**. Useful for **monosaccharides** separation. ***Note**: imine formation can be seen with the purification of aldehydes and ketones.*
Amine *nec* (NH_2) R52130B		Endcapping: No % N: ≥ 1.68 % Loading: 1.2 mmol/g Density: 0.700 g/mL	
Cyano (*CN*) R38030B		Endcapping: Yes % N: ≥ 1.93 % Loading: 1.38 mmol/g Density: 0.703 g/mL	Versatile sorbent that can be used either as normal or reversed-phase. Less polar sorbent compared to silica. Used for the purification of **polar organic compounds**.
Cyano *nec* (*CN*) R38130B		Endcapping: No % N: ≥ 1.93 % Loading: 1.38 mmol/g Density: 0.703 g/mL	
Diol nec R35030B		Endcapping: No Loading: 0.97 mmol/g Density: 0.687 g/mL	Good alternative for difficult separation of low to medium polarity samples. Useful for **mono and polysaccharides** separation. Can be used in HILIC mode.
Neutral Alumina AUT-0054	Al_2O_3	Part. size: 75 - 150 µm Endcapping: No	Good retention of **aromatic compounds**, **aliphatic amines** and **compounds containing electronegative functions**.
Florisil AUT-0014	$SiMgO_3$	Part. size: 40 - 75 µm Pore size: 100 Å Endcapping: No	Mainly used for the separation of **chlorinated pesticides**, **polychlorinated biphenyl** (*PCBs*) and **polysaccharides**.
Silver Nitrate ($AgNO_3$) R23530B		Endcapping: No Loading: 10 % w/w Density: 0.604 g/mL	Mainly used for the separation of **cis / trans isomers of unsaturated compounds** such as alkenes, lipids, steroids and terpenes.

* Typical values
For all sorbents, particle size is 40 - 63 µm and pore diameter is 60 Å (*unless otherwise stated*).
In bold: most common phases for flash cartridges
Other phases can be offered on a custom basis, contact us for more information.

Typical Reversed and Normal Phases Applications

The table below will help you select the right media to purify your compounds of interest. All phases are available either in bulk or pre-packed cartridges.

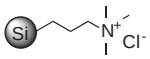
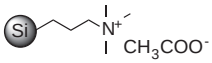
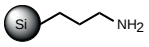
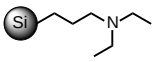
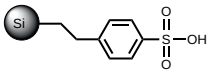
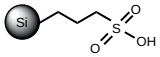
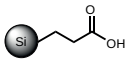
Typical Applications Using Reversed and Normal Phases												
Analytes	**Examples**	**C18**	**C8**	**C6**	**C4**	**C1**	**PHE**	**PFP**	**CN**	**NH_2**	**Si**	**Diol**
Biomolecules	*Peptides, proteins*	x	x	x	x	x						x
Nucleotides	*Deoxyribonucleotides, ribonucleotides*	x								x		
Lipids	*Phospholipids*		x	x	x	x				x		
Carbohydrates	*Sugars*								x	x		x
Glycosides	*Glucosides, fructosides*								x	x		x
Oligosaccharides	*Malto-Oligosaccharides*									x		x
Pesticides	*Organophosphates*	x	x									
PCBs	-	x					x	x				
PAHs	*Anthracene, pyrene*	x	x				x	x				
Drugs	*Basic drugs, metabolites*	x	x	x					x	x	x	
Alkaloids	*Cocaine, morphine, nicotine, quinine*	x	x						x		x	
Analgesics	*Aspirin, acetaminophen, ibuprofen*	x	x					x	x			
Cyclosporine	-	x							x			
Conjugated Compounds	*Phenols, chloroanilines, steroids, caffeine*	x	x	x	x	x	x	x				
Natural Compounds	*Tannins, aflatoxins, flavonoids, carotenoids*	x	x	x	x	x	x	x				
Fat-Soluble Vitamins	*Vitamins A, D, E and K*	x	x									
Water-Soluble Vitamins	*Vitamins B and C*									x	x	
Heterocyclic Compounds	*Dioxins, Furans*	x										

The $AgNO_3$ phase is particularly useful to separate isomers that present unsaturated groups.
The Neutral Alumina phase is used for the separation of aldehydes, ketones, quinines, esters, lactones and glucosides.
The Florisil phase will help analyze pesticides, PCBs and PAHs.

Ion Exchange Phases Portfolio

In ion exchange mode, the silica support is modified by a function carrying a charge with its counter-ion. This counter-ion is exchangeable with other ions in solution. If the immobilized phase is carrying an anion, the exchangeable species is a cation. Inversely, if the immobilized phase carries a cation, the ion exchangeable species will be an anion. Ion exchange phases are widely used in separation and purification.

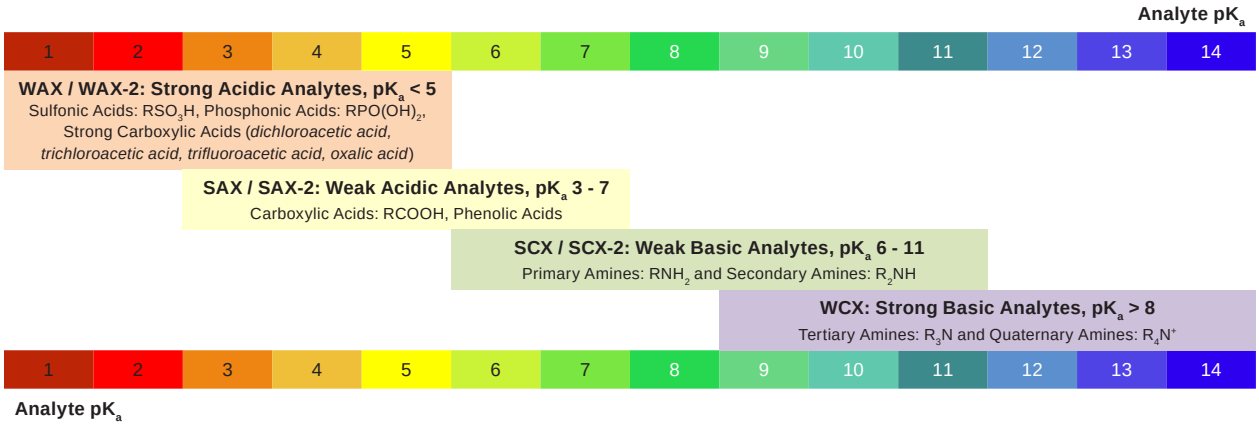
Low Pressure Chromatography Ion Exchange Phases Characteristics

Sorbent & Sorbent Code	Structure	Characteristics*	Typical Applications
SAX *nec* (*TMA Chloride*) R66530B		Endcapping: No Loading: 0.90 meq/g Density: 0.700 g/mL	The quaternary amine is permanently charged (*pH independant*). It is commonly used for the extraction of **weak anions** (*such as **carboxylic acids***) that may not bind strongly enough to weaker anion exchangers. Analysis of **acidic drugs and analgesics**, **biomolecules (*peptides and proteins*) and water-soluble vitamins (*vitamins B and C*)**.
SAX-2 *nec* (*TMA Acetate*) R66430B		Endcapping: No Loading: 0.71 mmol/g Density: 0.665 g/mL	The acetate counter-ion is easily exchangeable (*more than the chloride ion*) for compounds with pK_a < 5, such as carboxylic acids. This phase can be used in organic chemistry applications to **selectively purify acidic compounds** or **remove acidic impurities from reaction mixtures.**
WAX (*Amine*) R52030B		Endcapping: Yes Loading: 1.2 mmol/g Density: 0.700 g/mL	A weak anion exchanger with a pK_a of 9.8. At pH 7.8 or below, the functional groups are positively charged. It facilitates the rapid release of **very strong anions such as sulfonic acids** that may be too strongly retained on SAX.
WAX *nec* (*Amine*) R52130B		Endcapping: No Loading: 1.2 mmol/g Density: 0.700 g/mL	
WAX-2 (*Diethylamine*) R76530B		Endcapping: Yes Loading: 1.04 mmol/g Density: 0.761 g/mL	With a pK_a of 10.5, this phase is prefered over SAX when performing **catch and release purification of compounds bearing a permanent negative charge such as salts of sulfonic acids**. Using SAX in this case could make the release of the compound of interest difficult (*but not necessarily impossible*) due to the strong interaction between the two strong ions.
WAX-2 *nec* (*Diethylamine*) R76630B		Endcapping: No Loading: 1.04 mmol/g Density: 0.761 g/mL	
SCX (*Tosic Acid*) R60530B		Endcapping: Yes Loading: 0.54 meq/g Density: 0.698 g/mL	Due to the very low pK_a (< *1)* these functions are strong cation exchangers since they maintain a negative charge throughout the pH scale. The most common use is likely for **catch and release purification of weak cations (*for example basic drugs and analgesics*)**, **analysis of basic biomolecules (*peptides and proteins*) and water-soluble vitamins (*basic vitamins B and C*)**.
SCX *nec* (*Tosic Acid*) R60430B		Endcapping: No Loading: 0.54 meq/g Density: 0.698 g/mL	
SCX-2 (*Propylsulfonic Acid*) R51230B		Endcapping: Yes Loading: 0.63 mmol/g Density: 0.728 g/mL	
SCX-2 *nec* (*Propylsulfonic Acid*) R51430B		Endcapping: No Loading: 0.63 mmol/g Density: 0.728 g/mL	
WCX (*Carboxylic Acid*) R70030B		Endcapping: Yes Loading: 0.92 mmol/g Density: 0.687 g/mL	A weak cation exchanger with a pK_a of 4.8. A pH of 2.8 or below is needed to neutralize the phase and easily elute strong cationic analytes that are neutralized only at extreme basic conditions. This phase is commonly used for the extraction of **strong cationic species**, which would bind too strongly to strong cation exchangers.
WCX *nec* (*Carboxylic Acid*) R70130B		Endcapping: No Loading: 0.92 mmol/g Density: 0.687 g/mL	

* Typical values
For all sorbents, particle size is 40 - 63 µm and pore diameter is 60 Å.
In bold: most common phases for flash cartridges
Other phases can be offered on a custom basis, contact us for more information.

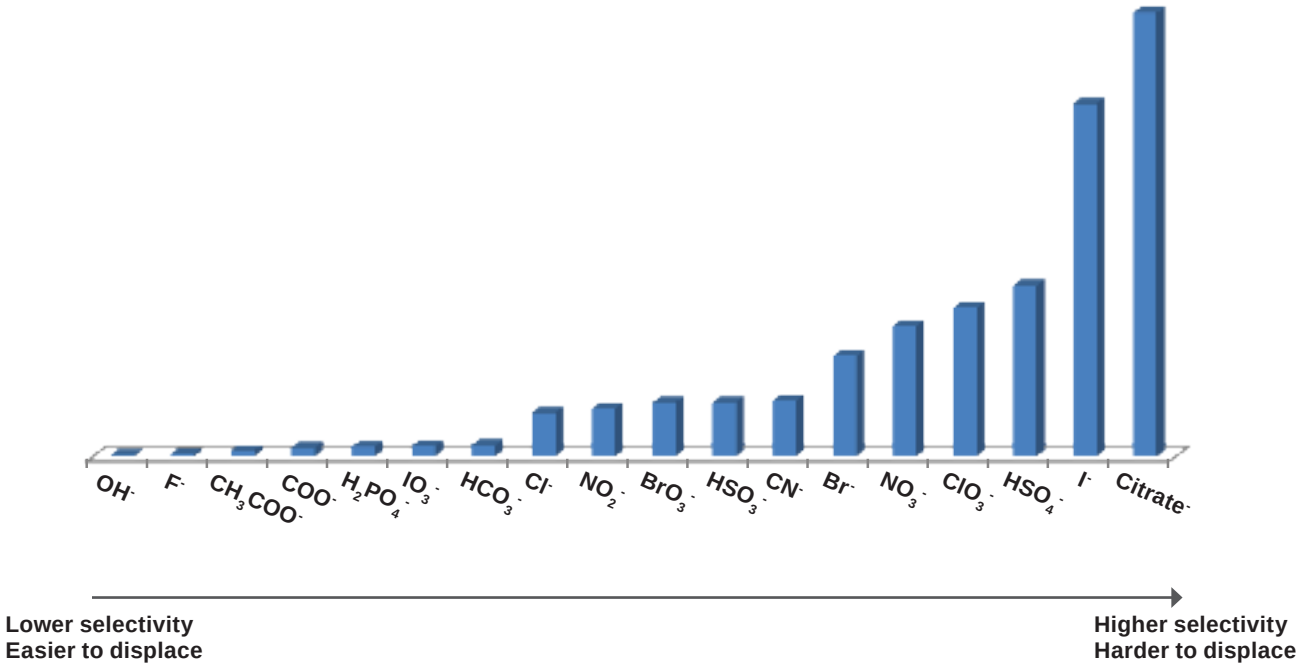
Ion Exchange Phases vs Analyte pK_a

The graph below will help you choose the right phase according to your analyte's pK_a.



Counter-Ion Selectivity in Ion Exchange Mode

SAX phases are always paired with a counter-ion to neutralize the quaternary amine charge. But counter-ions have different selectivites and some are more easily removed from the silica gel by the analyte. You will find below the relative selectivity of standard counter-ions, compared to the hydroxyl ion OH^- (*lowest selectivity*). Always choose a phase paired with a counter-ion less selective than the analyte.



SiliaBond Bulk Ordering Information

To build your own product number, just select the appropriate Sorbent Code (*see pages 229 - 232*) and add the quantity needed* at the end: [Sorbent Code] - [Format].
E.g.: 100 g of endcapped C18 => R33230B-100G (*for 60 Å and 40 - 63 µm silica gel*).

SiliaBond phases are also available on all irregular SiliaFlash silicas (*R100-*) and on all spherical SiliaSphere PC silicas (*S100-*). You will find below the most common bare & bonded silica gels ordered in bulk.

SiliaBond Bulk Ordering Information					
Silica Type** (***Silica Code***)	60 Å, 40 - 63 µm (*30B*)	60 Å, 60 - 200 µm (*40B*)	60 Å, 200 - 500 µm (*70B*)	300 Å, 40 - 63 µm (*30M*)	Spherical 100 Å, 40 - 75 µm (*30E*)
SiliaBond Silica (*R100*)	R10030B	R10040B	R10070B	R10030M	S10030E
SiliaBond Amine (*R520*)	R52030B	R52040B	R52070B	R52030M	S52030E
SiliaBond Diol *nec* (*R350*)	R35030B	R35040B	R35070B	R35030M	S35030E
SiliaBond Cyano (*R380*)	R38030B	R38040B	R38070B	R38030M	S38030E
SiliaBond C18 (*17 %*) (*R332*)	R33230B	R33240B	R33270B	R33230M	S33230E
SiliaBond C8 (*R308*)	R30830B	R30840B	R30870B	R30830M	S30830E
SiliaBond Phenyl (*R340*)	R34030B	R34040B	R34070B	R34030M	S34030E
SiliaBond PFP (*R675*)	R67530B	R67540B	R67570B	R67530M	S67530E
SiliaBond SCX (*R605*)	R60530B	R60540B	R60570B	R60530M	S60530E
SiliaBond SCX-2 (*R512*)	R51230B	R51240B	R51270B	R51230M	S51230E
SiliaBond SAX *nec* (*R665*)	R66530B	R66540B	R66570B	R66530M	S66530E
SiliaBond SAX-2 *nec* (*R664*)	R66430B	R66440B	R66470B	R66430M	S66430E

* Available formats: from a few grams to multi-ton scale. 5 g, 10 g, 25 g, 50 g, 100 g, 250 g, 500 g, 1 kg, 2 kg, 5 kg, etc.
** See page 223 for all available irregular SiliaFlash & spherical SiliaSphere PC silica types and corresponding codes.
Please note product numbers begin by R- for irregular silicas and by S- for spherical silicas.
For Metal Scavengers bulk silicas, see page 206 for more information.

Silia*Sep* Flash Cartridges Features & Benefits

With a more tightly packed silica bed and a homogeneous packing, the use of pre-packed flash cartridges improves purification efficiency by offering superior reproducibility and productivity compared to conventional manual flash chromatography.

Today, various manufacturers offer pre-packed flash cartridges, but performance and quality varies. Silia*Sep* offers superior performances over competitive cartridges. With Silia*Sep*, you will benefit from the same quality that all our products are known for: speed, reliability & selectivity.

Features & Benefits of Silia*Sep*	
Features	**Benefits**
Highest silica gel quality, with lowest level of fines	No product contamination Homogeneous packing, no channelling (*no peak tailing*) High loading capacity (*high surface area*) Direct transfer from TLC to flash chromatography
Innovative packing technology	Consistent packing for reproducible high plate count (*N*) Superior performance & separation Higher resolution with improved band definition (*no tailing*) Greater compound purity & higher recovery
Versatility	Wide choice of cartridge sizes from 4 grams to 1.6 kg (*for bigger columns, consult the Process & Industrial Purification section page 247*) Purification scale-up from milligram to hundreds of grams Variety of sorbents to meet any separation need
Reproducibility, reliability & safety	Leak-free guaranteed by unique one-piece cartridge design Reproducible performance from lot-to-lot (*stringent quality control*) Excellent durability to withstand high pressures Universal luer fittings for compatibility with any flash system
Cost effectiveness	Excellent performance vs price ratio Readily available from stock inventory for many volumes

Silia*Sep* Flash Cartridge Design

Silia*Sep* Flash Cartridge Types Overview

Silia*Sep* Cartridges Characteristics						
Characteristics	**Units**	Silia*Sep* 4 g	Silia*Sep* 12 g	Silia*Sep* 25 g	Silia*Sep* 40 g	Silia*Sep* 80 g
Cartridge Code	-	ISO04	ISO12	ISO25	ISO40	ISO80
Silica Weight	g	Bare: 4 g Bonded: ≥ 5 g	Bare: 12 g Bonded: ≥ 15 g	Bare: 25 g Bonded: ≥ 30 g	Bare: 40 g Bonded: ≥ 45 g	Bare: 80 g Bonded: ≥ 90 g
Qty / Box	unit	Bare: 20 Bonded: 2	Bare: 20 Bonded: 1	Bare: 15 Bonded: 1	Bare: 15 Bonded: 1	Bare: 12 Bonded: 1
Dimension (*ID x Length*)	mm	12 x 98	21 x 117	21 x 165	27 x 169	31 x 237
Column Volume	mL	4.9	17	31	47	123
Recommended Flow Rate	mL/min	15 - 25	20 - 40	20 - 45	25 - 50	40 - 80
Loading Capacity (*Bare Silica*)	g	0.040 - 0.4	0.120 - 1.2	0.250 - 2.5	0.400 - 4.0	0.800 - 8.0
Max Operating Pressure	-	225 psi / 16 bar	225 psi / 16 bar	225 psi / 16 bar	225 psi / 16 bar	225 psi / 16 bar

How to build your own product number:
Product Number ➔ FLH - [Sorbent Code] - [Cartridge Code] E.g.: 4 g cartridge with endcapped C18 silica gel => FLH-R33230B-ISO04

Silia*Sep* Ordering Information

Silia*Sep* Cartridges Ordering Information					
Silia*Sep* Type	Silia*Sep* 4 g	Silia*Sep* 12 g	Silia*Sep* 25 g	Silia*Sep* 40 g	Silia*Sep* 80 g
Silia*Sep* Bare Phases					
Qty / Box	20	20	15	15	12
Silia*Sep* Silica	FLH-R10030B-ISO04	FLH-R10030B-ISO12	FLH-R10030B-ISO25	FLH-R10030B-ISO40	FLH-R10030B-ISO80
Silia*Sep* Silica HP	FLH-R10017B-ISO04	FLH-R10017B-ISO12	FLH-R10017B-ISO25	FLH-R10017B-ISO40	FLH-R10017B-ISO80
Silia*Sep* Bonded Phases					
Qty / Box*	2	1	1	1	1
Silia*Sep* Amine	FLH-R52030B-ISO04	FLH-R52030B-ISO12	FLH-R52030B-ISO25	FLH-R52030B-ISO40	FLH-R52030B-ISO80
Silia*Sep* Diol *nec*	FLH-R35030B-ISO04	FLH-R35030B-ISO12	FLH-R35030B-ISO25	FLH-R35030B-ISO40	FLH-R35030B-ISO80
Silia*Sep* Cyano	FLH-R38030B-ISO04	FLH-R38030B-ISO12	FLH-R38030B-ISO25	FLH-R38030B-ISO40	FLH-R38030B-ISO80
Silia*Sep* C18 (*17 %*)	FLH-R33230B-ISO04	FLH-R33230B-ISO12	FLH-R33230B-ISO25	FLH-R33230B-ISO40	FLH-R33230B-ISO80
Silia*Sep* C8	FLH-R30830B-ISO04	FLH-R30830B-ISO12	FLH-R30830B-ISO25	FLH-R30830B-ISO40	FLH-R30830B-ISO80
Silia*Sep* Phenyl	FLH-R34030B-ISO04	FLH-R34030B-ISO12	FLH-R34030B-ISO25	FLH-R34030B-ISO40	FLH-R34030B-ISO80
Silia*Sep* PFP	FLH-R67530B-ISO04	FLH-R67530B-ISO12	FLH-R67530B-ISO25	FLH-R67530B-ISO40	FLH-R67530B-ISO80
Silia*Sep* SCX	FLH-R60530B-ISO04	FLH-R60530B-ISO12	FLH-R60530B-ISO25	FLH-R60530B-ISO40	FLH-R60530B-ISO80
Silia*Sep* SCX-2	FLH-R51230B-ISO04	FLH-R51230B-ISO12	FLH-R51230B-ISO25	FLH-R51230B-ISO40	FLH-R51230B-ISO80
Silia*Sep* SAX *nec*	FLH-R66530B-ISO04	FLH-R66530B-ISO12	FLH-R66530B-ISO25	FLH-R66530B-ISO40	FLH-R66530B-ISO80
Silia*Sep* SAX-2 *nec*	FLH-R66430B-ISO04	FLH-R66430B-ISO12	FLH-R66430B-ISO25	FLH-R66430B-ISO40	FLH-R66430B-ISO80

* Bigger box sizes available, contact us for more information.
Other phases can be offered, contact us for details.
For Metal Scavengers Cartridges, see page 208 for more information.

Silia*Sep* Cartridges Characteristics

Silia*Sep* 120 g	Silia*Sep* 220 g	Silia*Sep* 330 g	Silia*Sep* XL 800 g	Silia*Sep* XL 1,600 g	Units	Characteristics
IS120	IS220	IS330	IS750	I1500	-	Cartridge Code
Bare: 120 g Bonded: ≥ 130 g	Bare: 220 g Bonded: ≥ 230 g	Bare: 330 g Bonded: ≥ 360 g	Bare: 800 g Bonded: ≥ 870 g	Bare: 1,600 g Bonded: ≥ 1,700 g	g	Silica Weight
Bare: 10 Bonded: 1	Bare: 4 Bonded: 1	Bare: 4 Bonded: 1	Bare: 2 Bonded: 1	Bare: 2 Bonded: 1	unit	Qty / Box
36 x 256	60 x 195	60 x 268	78 x 382	104 x 429	mm	Dimension (*ID x Length*)
190	306	441	1,500	2,900	mL	Column Volume
60 - 120	60 - 180	80 - 180	200 - 300	300 - 450	mL/min	Recommended Flow Rate
1.2 - 12.0	2.2 - 22.0	3.3 - 33.0	8.0 - 80.0	16.0 - 160.0	g	Loading Capacity (*Bare Silica*)
205 psi / 13 bar	160 psi / 11 bar	160 psi / 11 bar	125 psi / 8 bar	100 psi / 7 bar	-	Max Operating Pressure

Silia*Sep* Cartridges Ordering Information

Silia*Sep* 120 g	Silia*Sep* 220 g	Silia*Sep* 330 g	Silia*Sep* XL 800 g	Silia*Sep* XL 1,600 g	Silia*Sep* Type
					Silia*Sep* Bare Phases
10	4	4	2	2	Qty / Box
FLH-R10030B-IS120	FLH-R10030B-IS220	FLH-R10030B-IS330	FLH-R10030B-IS750	FLH-R10030B-I1500	Silia*Sep* Silica
FLH-R10017B-IS120	FLH-R10017B-IS220	FLH-R10017B-IS330	FLH-R10017B-IS750	FLH-R10017B-I1500	Silia*Sep* Silica HP
					Silia*Sep* Bonded Phases
1	1	1	1	1	Qty / Box*
FLH-R52030B-IS120	FLH-R52030B-IS220	FLH-R52030B-IS330	FLH-R52030B-IS750	FLH-R52030B-I1500	Silia*Sep* Amine
FLH-R35030B-IS120	FLH-R35030B-IS220	FLH-R35030B-IS330	FLH-R35030B-IS750	FLH-R35030B-I1500	Silia*Sep* Diol *nec*
FLH-R38030B-IS120	FLH-R38030B-IS220	FLH-R38030B-IS330	FLH-R38030B-IS750	FLH-R38030B-I1500	Silia*Sep* Cyano
FLH-R33230B-IS120	FLH-R33230B-IS220	FLH-R33230B-IS330	FLH-R33230B-IS750	FLH-R33230B-I1500	Silia*Sep* C18 (*17 %*)
FLH-R30830B-IS120	FLH-R30830B-IS220	FLH-R30830B-IS330	FLH-R30830B-IS750	FLH-R30830B-I1500	Silia*Sep* C8
FLH-R34030B-IS120	FLH-R34030B-IS220	FLH-R34030B-IS330	FLH-R34030B-IS750	FLH-R34030B-I1500	Silia*Sep* Phenyl
FLH-R67530B-IS120	FLH-R67530B-IS220	FLH-R67530B-IS330	FLH-R67530B-IS750	FLH-R67530B-I1500	Silia*Sep* PFP
FLH-R60530B-IS120	FLH-R60530B-IS220	FLH-R60530B-IS330	FLH-R60530B-IS750	FLH-R60530B-I1500	Silia*Sep* SCX
FLH-R51230B-IS120	FLH-R51230B-IS220	FLH-R51230B-IS330	FLH-R51230B-IS750	FLH-R51230B-I1500	Silia*Sep* SCX-2
FLH-R66530B-IS120	FLH-R66530B-IS220	FLH-R66530B-IS330	FLH-R66530B-IS750	FLH-R66530B-I1500	Silia*Sep* SAX *nec*
FLH-R66430B-IS120	FLH-R66430B-IS220	FLH-R66430B-IS330	FLH-R66430B-IS750	FLH-R66430B-I1500	Silia*Sep* SAX-2 *nec*

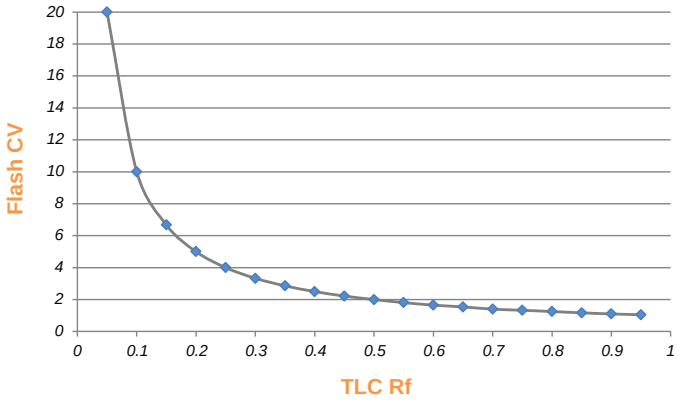
For bigger columns, please consult the Process & Industrial Purification section page 247.

Method Development - Prediction of Column Volumes (*CV*)

TLC data can be used to predict column elution based on the relationship between TLC retention factor (*Rf*) and flash retention time (*measured in column volume, CV*). CV is the number of column volumes required to elute the component from the column, regardless of column dimensions. So the first step to convert a TLC method in flash chromatography is to convert Rf in CV. Rf and CV are inversely proportional:

$$CV = 1 / Rf$$

You will find below a graph showing lower Rfs in TLC means greater CVs in flash (*so better analyte retention*). On the right is a chart giving CV values according to typical Rf values.



Rf vs CV

TLC Rf	Flash CV
0.95	1.05
0.90	1.10
0.85	1.17
0.80	1.25
0.75	1.33
0.70	1.40
0.65	1.54
0.60	1.65
0.55	1.81
0.50	2.00
0.45	2.22
0.40	2.50
0.35	2.86
0.30	3.33
0.25	4.00
0.20	5.00
0.15	6.67
0.10	10.00
0.05	20.00

As CV is a measure of analyte retention, then ΔCV is a measure of two analytes separation and resolution:

$$\Delta CV = CV_1 - CV_2 = (1 / Rf_1) - (1 / Rf_2)$$

Here is a chart giving ΔCV values according to Rf_1 and Rf_2 values.

Rf_2 / Rf_1	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95
0.05	0.00																		
0.10	10.00	0.00																	
0.15	13.33	3.33	0.00																
0.20	15.00	5.00	1.67	0.00															
0.25	16.00	6.00	2.67	1.00	0.00														
0.30	16.67	6.67	3.34	1.67	0.67	0.00													
0.35	17.14	7.14	3.81	2.14	1.14	0.47	0.00												
0.40	17.50	7.50	4.17	2.50	1.50	0.83	0.36	0.00											
0.45	17.78	7.78	4.45	2.78	1.78	1.11	0.64	0.28	0.00										
0.50	18.00	8.00	4.67	3.00	2.00	1.33	0.86	0.50	0.22	0.00									
0.55	18.19	8.19	4.86	3.16	2.16	1.52	1.05	0.69	0.41	0.19	0.00								
0.60	18.35	8.35	5.02	3.35	2.35	1.68	1.21	0.85	0.57	0.35	0.16	0.00							
0.65	18.46	8.46	5.13	3.46	2.46	1.79	1.32	0.98	0.68	0.46	0.27	0.11	0.00						
0.70	18.60	8.60	5.27	3.60	2.60	1.93	1.46	1.10	0.82	0.60	0.41	0.25	0.14	0.00					
0.75	18.67	8.67	5.34	3.67	2.67	2.00	1.53	1.17	0.89	0.67	0.48	0.32	0.21	0.07	0.00				
0.80	18.75	8.75	5.42	3.75	2.75	2.08	1.61	1.25	0.97	0.75	0.56	0.40	0.29	0.15	0.08	0.00			
0.85	18.83	8.83	5.50	3.83	2.83	2.16	1.69	1.33	1.05	0.83	0.64	0.48	0.37	0.23	0.16	0.08	0.00		
0.90	18.90	8.90	5.57	3.90	2.90	2.23	1.76	1.40	1.12	0.90	0.71	0.55	0.44	0.30	0.23	0.15	0.07	0.00	
0.95	18.95	8.95	5.62	3.95	2.95	2.28	1.81	1.45	1.17	0.95	0.76	0.60	0.49	0.35	0.28	0.20	0.12	0.05	0.00

Correlation between ΔCV and Rf_1 & Rf_2

Method Development - From TLC to Low Pressure Chromatography

It is now understood that TLC methods should be optimized so that compounds of interest elute with lower Rfs, ideally between 0.1 and 0.4. Adjust the TLC solvent mixture (*solvent polarity and composition of the mixture*) to obtain the preferred Rfs. An optimized TLC method will assure you a better separation and purification of your compounds in low pressure chromatography, with optimal loading capacity (*you will be able to load more on the cartridge if your compounds are well separated*). We recommend using a flash cartridge phase matching the TLC plate, for a more linear and easy method conversion. You should also run your flash chromatography with the same solvent conditions as your TLC method (*in isocratic mode*).

Case Study

We need to separate two analytes, 1 and 2. We will study two different TLC configurations.

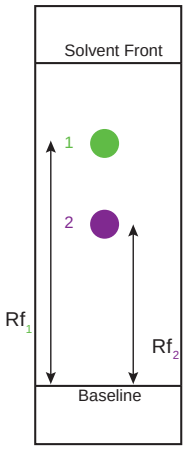


Plate 1

1 and 2 TLC spots are high and well distinct

Converting TLC to Low Pressure Chromatography

	Rf_1	CV_1	Rf_2	CV_2	ΔCV
Plate 1	0.75	1.33	0.5	2	0.67
Plate 2	0.2	5	0.1	10	5

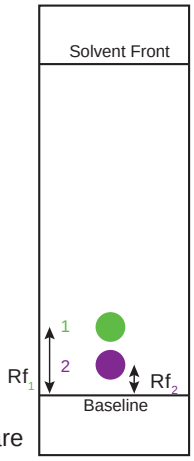
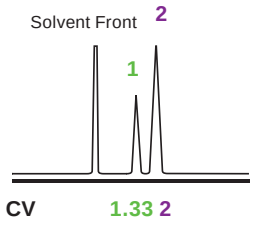
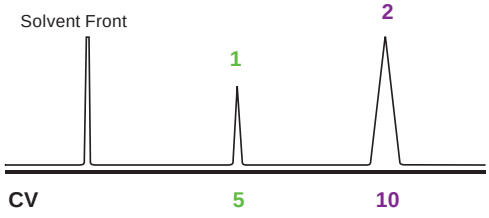


Plate 2

1 and 2 TLC spots are low and quite close



1 and 2 are poorly retained and separated in flash chromatography



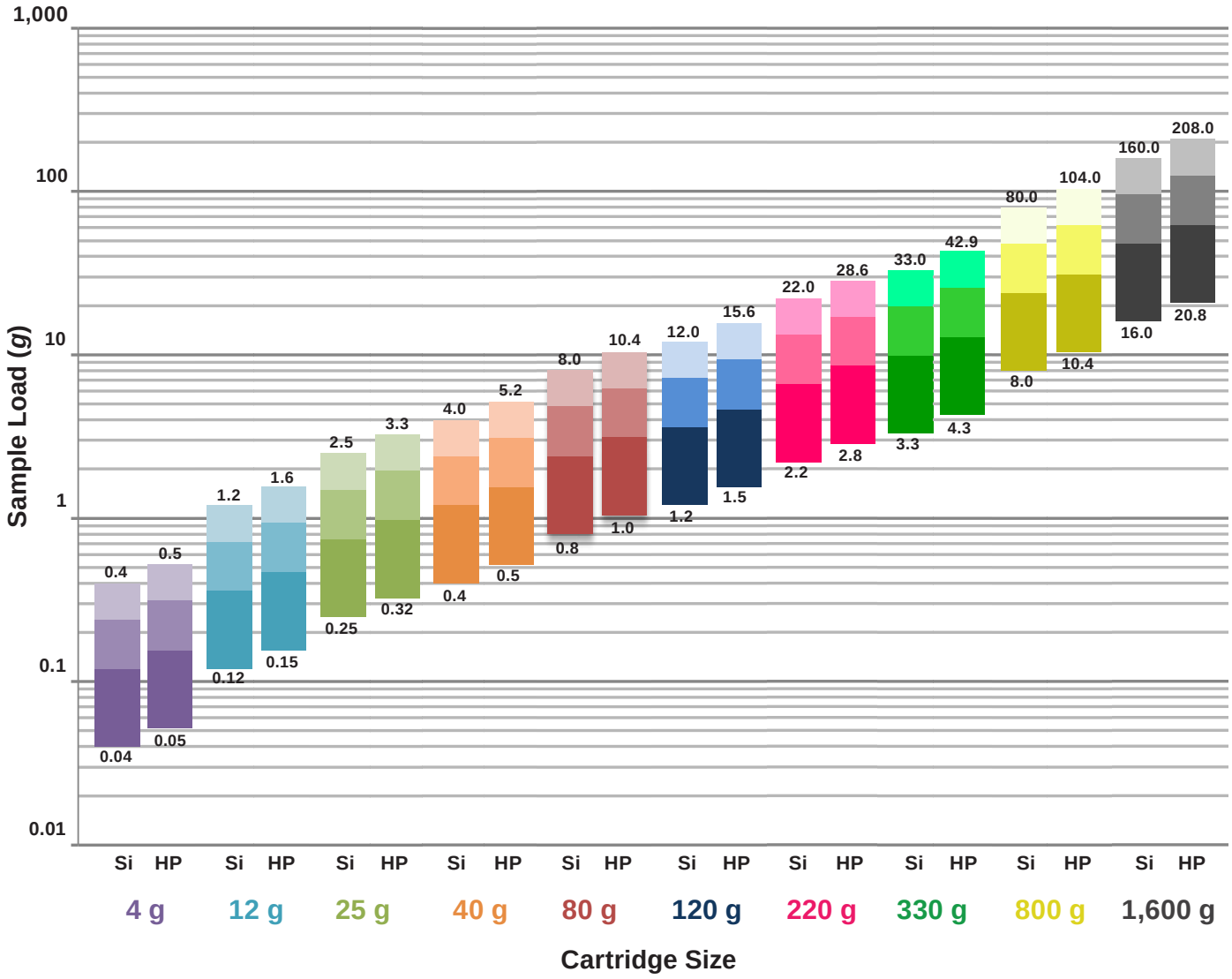
1 and 2 are well retained and separated in flash chromatography

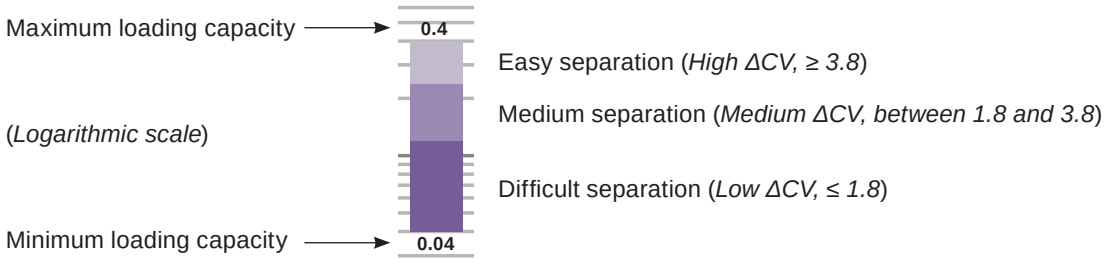
To sum up:

- **The lower the Rfs, the greater ΔCV.**
- **The greater ΔCV, the greater the separation and resolution between the spots (*easier separation*).**
- **The greater ΔCV, the more sample can be loaded onto the column.**

Low Pressure Chromatography Loading Chart

The chart below will help you choose the right cartridge size according to your sample size and your TLC results.





Low Pressure Chromatography Loading Chart

Loading capacity depends on the sample itself, the column dimension and the column chemistry. You will find below the sample loading we recommand with our Silia*Sep* flash cartridges. For easily separated compounds (*ΔCV > 6*) we suggest to load up to 5 % on bonded phases, up to 10 % on bare silica and up to 13 % on bare silica HP.

Low Pressure Chromatography Loading Chart											
Dimension ID x Length (*mm x mm*)	Silia*Sep* Format	Silia*Sep* Phase	Load (*g*)									
			ΔCV = 0.1 - 0.6	ΔCV = 0.7 - 1.2	ΔCV = 1.3 - 1.8	ΔCV = 1.9 - 2.4	ΔCV = 2.5 - 3.1	ΔCV = 3.2 - 3.8	ΔCV = 3.9 - 4.5	ΔCV = 4.6 - 5.2	ΔCV = 5.3 - 6.0	ΔCV > 6
12 x 98	4 g	Bare Silica	0.040	0.080	0.120	0.160	0.200	0.240	0.280	0.320	0.360	0.400
		Bare Silica HP	0.052	0.104	0.156	0.208	0.260	0.312	0.364	0.416	0.468	0.520
		Bonded	0.020	0.040	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.200
21 x 117	12 g	Bare Silica	0.120	0.240	0.360	0.480	0.600	0.720	0.840	0.960	1.080	1.200
		Bare Silica HP	0.156	0.312	0.468	0.624	0.780	0.936	1.092	1.248	1.404	1.560
		Bonded	0.060	0.120	0.180	0.240	0.300	0.360	0.420	0.480	0.540	0.600
21 x 165	25 g	Bare Silica	0.250	0.500	0.750	1.000	1.250	1.500	1.750	2.000	2.250	2.500
		Bare Silica HP	0.325	0.650	0.975	1.300	1.625	1.950	2.275	2.600	2.925	3.250
		Bonded	0.125	0.250	0.375	0.500	0.625	0.750	0.875	1.000	1.125	1.250
27 x 169	40 g	Bare Silica	0.400	0.800	1.200	1.600	2.000	2.400	2.800	3.200	3.600	4.000
		Bare Silica HP	0.520	1.040	1.560	2.080	2.600	3.120	3.640	4.160	4.680	5.200
		Bonded	0.200	0.400	0.600	0.800	1.000	1.200	1.400	1.600	1.800	2.000
31 x 237	80 g	Bare Silica	0.800	1.600	2.400	3.200	4.000	4.800	5.600	6.400	7.200	8.000
		Bare Silica HP	1.040	2.080	3.120	4.160	5.200	6.240	7.280	8.320	9.360	10.400
		Bonded	0.400	0.800	1.200	1.600	2.000	2.400	2.800	3.200	3.600	4.000
36 x 256	120 g	Bare Silica	1.200	2.400	3.600	4.800	6.000	7.200	8.400	9.600	10.800	12.000
		Bare Silica HP	1.560	3.120	4.680	6.240	7.800	9.360	10.920	12.480	14.040	15.600
		Bonded	0.600	1.200	1.800	2.400	3.000	3.600	4.200	4.800	5.400	6.000
60 x 195	220 g	Bare Silica	2.200	4.400	6.600	8.800	11.000	13.200	15.400	17.600	19.800	22.000
		Bare Silica HP	2.860	5.720	8.580	11.440	14.300	17.160	20.020	22.880	25.740	28.600
		Bonded	1.100	2.200	3.300	4.400	5.500	6.600	7.700	8.800	9.900	11.000
60 x 268	330 g	Bare Silica	3.300	6.600	9.900	13.200	16.500	19.800	23.100	26.400	29.700	33.000
		Bare Silica HP	4.290	8.580	12.870	17.160	21.450	25.740	30.030	34.320	38.610	42.900
		Bonded	1.650	3.300	4.950	6.600	8.250	9.900	11.550	13.200	14.850	16.500
78 x 382	800 g	Bare Silica	8.000	16.000	24.000	32.000	40.000	48.000	56.000	64.000	72.000	80.000
		Bare Silica HP	10.400	20.800	31.200	41.600	52.000	62.400	72.800	83.200	93.600	104.000
		Bonded	4.000	8.000	12.000	16.000	20.000	24.000	28.000	32.000	36.000	40.000
104 x 429	1,600 g	Bare Silica	16.000	32.000	48.000	64.000	80.000	96.000	112.000	128.000	144.000	160.000
		Bare Silica HP	20.800	41.600	62.400	83.200	104.000	124.800	145.600	166.400	187.200	208.000
		Bonded	8.000	16.000	24.000	32.000	40.000	48.000	56.000	64.000	72.000	80.000

For alumina sorbent, refer to the bare silica loading capacity.
Note: There is no linearity between TLC and flash for bonded phases (*not the exact same silica*). The loading capacities for bonded phases written above are just informative, they won't necessarily match the ΔCVs measured in TLC.

SiliaSep Solid-Load Cartridges

The use of solid-load technique (*also called dry-load*) will improve chromatography resolution, especially for compounds soluble only in strong solvents or in large volumes of solvents. SiliaSep Solid-Load luer-lock cartridges are designed to be used with SiliaSep flash cartridges for sample loading. To better suit your needs, two formats are available:

- **SiliaSep pre-packed solid-load** (*for liquid injection, various choices of media available: silica, amine, diol, cyano and C18*). You should be able to dilute your sample in 1 column volume at the most. If not, choose a bigger pre-packed solid-load cartridge.
- **SiliaSep empty solid-load** (*for silica-sample slurry, dry by evaporating the solvent for a more concentrated sample and to eliminate any solvent effect on the purification*). For a dry sample slurry, use a 1:1 ratio (*1 g of silica for 1 g of dry sample*) but for an oily sample prefer a 3:1 ratio (*3 g of silica for 1 g of oily sample*).

SiliaSep Solid-Load Cartridges (*Luer-Lock*)

Product Number	Sorbent	Weight / Volume	Description	Qty / Box
SPL-R10030B-10U	Silica (*40 - 63 µm*)	2 g / 10 mL	SiliaSep Silica Pre-packed Solid-Load Cartridge, 2 g, 10 mL	20
SPL-R10030B-10X	Silica (*40 - 63 µm*)	5 g / 10 mL	SiliaSep Silica Pre-packed Solid-Load Cartridge, 5 g, 10 mL	20
SPL-R10030B-60Y	Silica (*40 - 63 µm*)	10 g / 60 mL	SiliaSep Silica Pre-packed Solid-Load Cartridge, 10 g, 60 mL	16
SPL-R10030B-60K	Silica (*40 - 63 µm*)	25 g / 60 mL	SiliaSep Silica Pre-packed Solid-Load Cartridge, 25 g, 60 mL	16
SPL-R10030B-065	Silica (*40 - 63 µm*)	65 g / 150 mL	SiliaSep Silica Pre-packed XL Solid-Load Cartridge, 65 g, 150 mL	12
SPL-R10030B-270	Silica (*40 - 63 µm*)	270 g / 700 mL	SiliaSep Silica Pre-packed XL Solid-Load Cartridge, 270 g, 700 mL	6
SPL-R52030B-10X	Amine	5 g / 10 mL	SiliaSep Amine Pre-packed Solid-Load Cartridge, 5 g, 10 mL	20
SPL-R52030B-60K	Amine	25 g / 60 mL	SiliaSep Amine Pre-packed Solid-Load Cartridge, 25 g, 60 mL	16
SPL-R35030B-10X	Diol	5 g / 10 mL	SiliaSep Diol Pre-packed Solid-Load Cartridge, 5 g, 10 mL	20
SPL-R35030B-60K	Diol	25 g / 60 mL	SiliaSep Diol Pre-packed Solid-Load Cartridge, 25 g, 60 mL	16
SPL-R38030B-10X	Cyano	5 g / 10 mL	SiliaSep Cyano Pre-packed Solid-Load Cartridge, 5 g, 10 mL	20
SPL-R38030B-60K	Cyano	25 g / 60 mL	SiliaSep Cyano Pre-packed Solid-Load Cartridge, 25 g, 60 mL	16
SPL-R33230B-10X	C18 (*17 %*)	5 g / 10 mL	SiliaSep C18 (*17 %*) Pre-packed Solid-Load Cartridge, 5 g, 10 mL	20
SPL-R33230B-60K	C18 (*17 %*)	25 g / 60 mL	SiliaSep C18 (*17 %*) Pre-packed Solid-Load Cartridge, 25 g, 60 mL	16
SPL-0009-010	Empty	- / 10 mL	SiliaSep Empty Solid-Load Cartridge, 10 mL (*with 200 frits*)	100
AUT-0134	-	-	Frits for SiliaSep Empty Solid-Load Cartridge, 10 mL	100
SPL-0012-060	Empty	- / 60 mL	SiliaSep Empty Solid-Load Cartridge, 60 mL (*with 200 frits*)	100
AUT-0135	-	-	Frits for SiliaSep Empty Solid-Load Cartridge, 60 mL	100
AUT-0090-150	Empty	- / 150 mL	SiliaSep Empty Solid-Load Cartridge, 150 mL (*with 24 frits*)	12
AUT-0090-700	Empty	- / 700 mL	SiliaSep Empty Solid-Load Cartridge, 700 mL (*with 12 frits*)	6

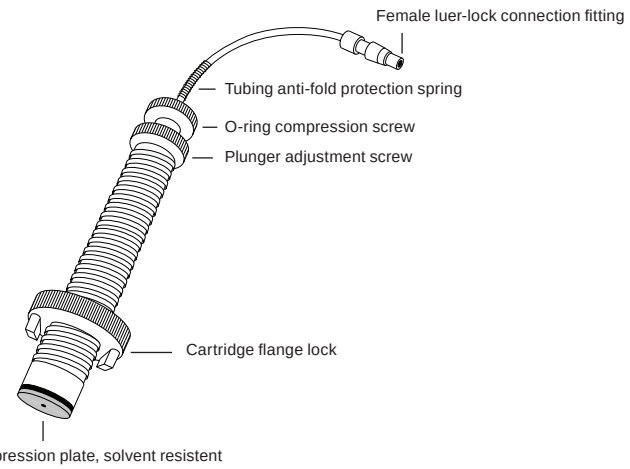
Other Pre-Packed Solid-Load Cartridges phases can be offered, contact us for more information.
Note: for optimal purification performance, solvent removal under vacuum is highly recommended.

SiliaSep Plungers

SiliaSep Plungers*

Product Number	Description
AUT-0060-010	Plunger for 10 mL Solid-Load Cartridge (*16 mm*)
AUT-0060-060	Plunger for 60 mL Solid-Load Cartridge (*27 mm*)

*Ask for SiliaSep Plungers Operating Instructions Guide



Silia*Sep* System Compatibility

The table below will help you determine the compatibility of Silia*Sep* cartridges with your system.

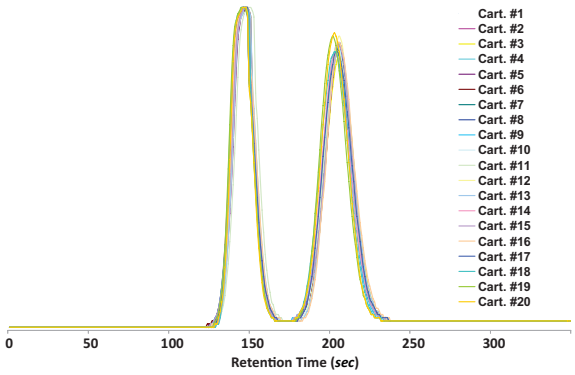
Silia*Sep* System Compatibility		
System	**Silia*Sep* Cartridges**	**Comments**
Teledyne Isco™ CombiFlash®		100 % compatible
Varian® (*Analogix*®) IntelliFlash® & SimpliFlash®		100 % compatible
Interchim PuriFlash™ 430 evo & Spot II (*Armen*®)		100 % compatible
Büchi Sepacore™		100 % compatible
Grace Reveleris™		100 % compatible
Biotage Isolera™		100 % compatible
Biotage Horizon™		Use the Biotage Adapter Kit (*PN: KAD-1006*) or the Solvent Line Replacement (*PN: KAD-1014*)
Biotage SP1 & SP4		Use Support Rings to allow the Silia*Sep* cartridge to sit on the instrument (*Support Ring Kit PN: KAD-1008*)
Biotage FlashMaster™		Use the FlashMaster Adapter Kit (*PN: KAD-1016*) or connect a Silia*Sep* OT cartridge (*see page 246*)

 Direct compatibility

 Compatibility via an adapter

Silia*Sep* Reproducibility

Silia*Sep* and Silia*Sep* HP flash cartridges offer incredible performance over competitive products, due to higher silica gel quality and innovative packing technology. Both cartridge series allow superior results and can be considered the products of choice for all purification needs.



Silia*Sep* 40 g

Silia*Sep* Superior Performance

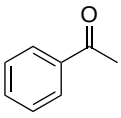
AstraZeneca and Exelixis independently evaluated the performance of Silia*Sep* cartridges against some established players in chromatography and purification*. In this study, cartridge performances were evaluated by the determination of different parameters including selectivity (*α*), plate count (*N*) and resolution factor (*R*). In all cases, Silia*Sep* showed excellent performance over the competition.

Pre-packed cartridges were chosen with the same apparent irregular silica gel grade: **SiliCycle Silia*Sep*** 40 g, **ISCO Redi*Sep*®** 40 g and **Biotage® SNAP** 40 g. Columns were compared on the same system and with the same conditions. Flow rate was set at 40 mL/min.

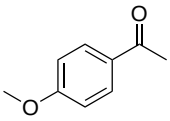
*Find the article: *Molecular Diversity*, **2009**, *13*, 247-252

Cartridge	*Acetophenone 4-Methoxyacetophenone 400 mg*			*Acetophenone 4-Methoxyacetophenone 2 g*			*2-Nitroaniline 4-Nitroaniline 2 g*		
	α	N	R	α	N	R	α	N	R
SiliCycle Silia*Sep* 40 g	2.96	153	2.49	0.68	59	1.62	3.29	15.3	1.39
ISCO Redi*Sep*® 40 g	3.00	122	0.29	0.71	43	0.67	3.05	13.7	1.23
Biotage® SNAP 40 g	2.81	54	low	0.591	low	low	3.34	low	low

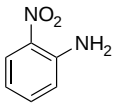
Observed Chromatographic Parameters



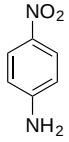
Acetophenone



4-Methoxyacetophenone

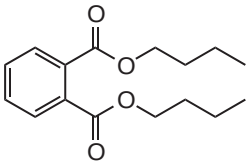


2-Nitroaniline

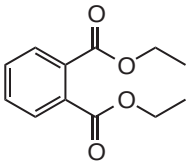


4-Nitroaniline

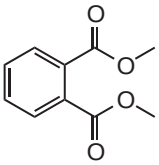
SiliaSep HP - Save Time with Faster Flow Rates



a) Dibutylphthalate



b) Diethylphthalate

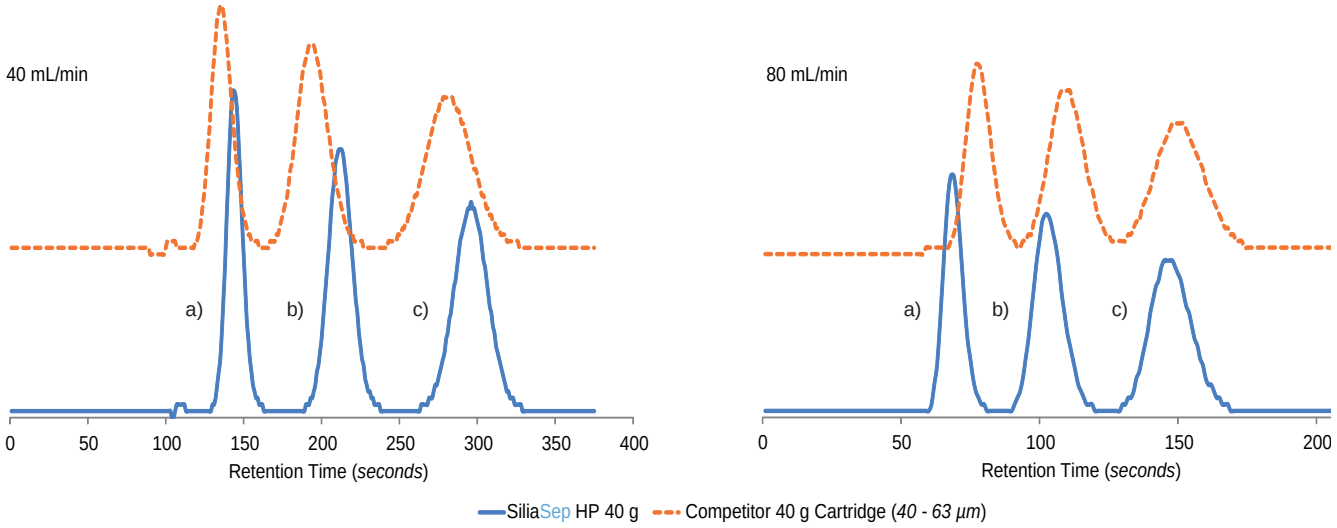


c) Dimethylphthalate

Chromatographic Conditions

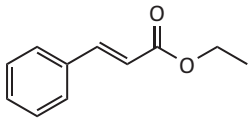
Mobile phase: 20 % EtOAc in Hexane
Injection volume: 5 mL
Wavelength: 254 nm

The greater resolution from SiliaSep HP allows the purification to be run at a higher flow rate with the same efficiency without compromising the quality of the separation.

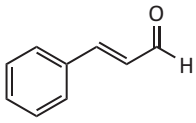


SiliaSep XL - Superior Resolution

SiliCycle evaluated the performance of SiliaSep XL cartridges compared to a well-known brand. For both sizes, 800 g and 1,600 g, SiliaSep XL outperforms the competition.



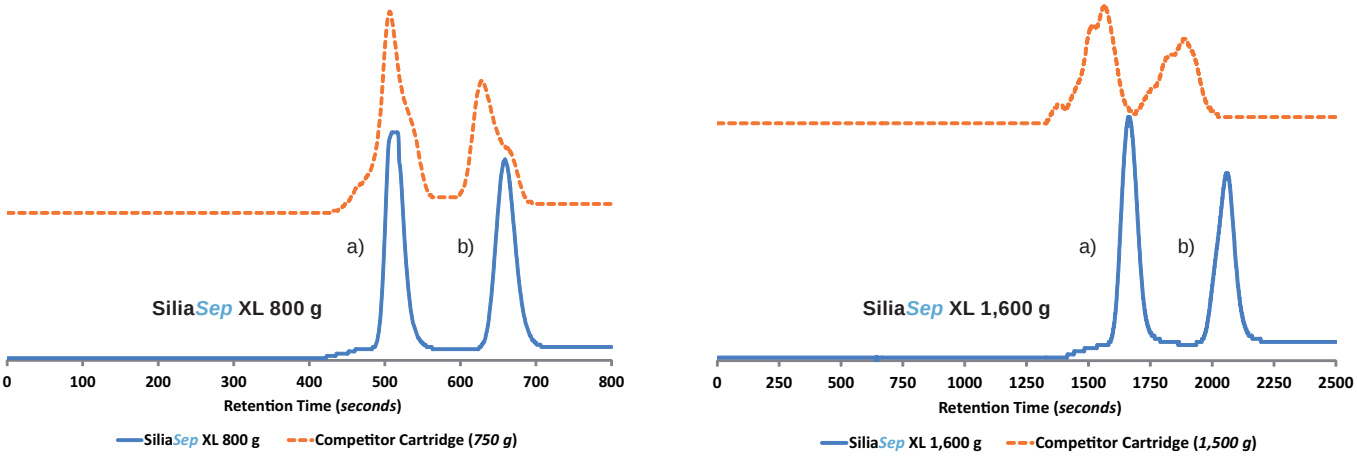
a) t-Ethyl Cinnamate



b) t-Cinnamaldehyde

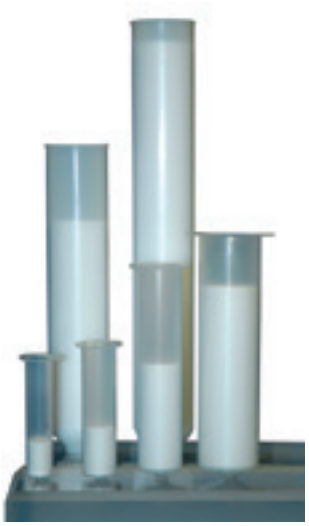
Chromatographic Conditions

Mobile phase: gradient of EtOAc in Hexane
Injection volume: 5 mL
Wavelength: 254 nm



Other Cartridge Type Available: Silia*Sep* OT (*Open Top Flash Cartridges*)

Silia*Sep* OT cartridges are mainly used with vacuum manifolds and automated SPE equipments. They are also directly compatible with FlashMaster™ systems.



Silia*Sep* OT Cartridges (*rated 60 psi*)			
Silica Weight	2 g	5 g	10 g
Dimension (*ID x Length*)	15.8 x 90 mm	20.5 x 100 mm	26.8 x 154 mm
Volume	12 mL	25 mL	70 mL
Qty / Box	20	20	16
Silia*Sep* OT Phases			
Silia*Sep* OT Silica	FLH-R10030B-15U	FLH-R10030B-25X	FLH-R10030B-70Y
Silia*Sep* OT Amine	SPE-R52030B-12U	SPE-R52030B-20X	FLH-R52030B-70Y
Silia*Sep* OT Diol *nec*	SPE-R35030B-12U	SPE-R35030B-20X	FLH-R35030B-70Y
Silia*Sep* OT Cyano	SPE-R38030B-12U	SPE-R38030B-20X	FLH-R38030B-70Y
Silia*Sep* OT C8	SPE-R30830B-12U	SPE-R30830B-20X	FLH-R30830B-70Y
Silia*Sep* OT Phenyl	SPE-R34030B-12U	SPE-R34030B-20X	FLH-R34030B-70Y
Silia*Sep* OT PFP	SPE-R67530B-12U	SPE-R67530B-20X	FLH-R67530B-70Y
Silia*Sep* OT SCX	SPE-R60530B-12U	SPE-R60530B-20X	FLH-R60530B-70Y
Silia*Sep* OT C18 (*17 %*)	SPE-R33230B-12U	SPE-R33230B-20X	FLH-R33230B-70Y
Silia*Sep* OT SCX-2	SPE-R51230B-12U	SPE-R51230B-20X	FLH-R51230B-70Y
Silia*Sep* OT SAX *nec*	SPE-R66530B-12U	SPE-R66530B-20X	FLH-R66530B-70Y
Silia*Sep* OT SAX-2 *nec*	SPE-R66430B-12U	SPE-R66430B-20X	FLH-R66430B-70Y

Silia*Sep* OT Cartridges (*rated 60 psi*)						
Silica Weight	15 g	20 g	25 g	50 g	70 g	100 g
Dimension (*ID x Length*)	26.8 x 154 mm	26.8 x 154 mm	38.2 x 170 mm	38.2 x 170 mm	38.2 x 170 mm	40.0 x 220 mm
Volume	70 mL	70 mL	150 mL	150 mL	150 mL	276 mL
Qty / Box	16	16	10	10	10	12
Silia*Sep* OT Phases						
Silia*Sep* OT Silica	FLH-R10030B-70i	FLH-R10030B-70Z	FLH-R10030B-95K	FLH-R10030B-95M	FLH-R10030B-95N	FLH-R10030B-276F
Silia*Sep* OT Amine	FLH-R52030B-70i	FLH-R52030B-70Z	FLH-R52030B-95K	FLH-R52030B-95M	FLH-R52030B-95N	FLH-R52030B-276F
Silia*Sep* OT Diol *nec*	FLH-R35030B-70i	FLH-R35030B-70Z	FLH-R35030B-95K	FLH-R35030B-95M	FLH-R35030B-95N	FLH-R35030B-276F
Silia*Sep* OT Cyano	FLH-R38030B-70i	FLH-R38030B-70Z	FLH-R38030B-95K	FLH-R38030B-95M	FLH-R38030B-95N	FLH-R38030B-276F
Silia*Sep* OT C8	FLH-R30830B-70i	FLH-R30830B-70Z	FLH-R30830B-95K	FLH-R30830B-95M	FLH-R30830B-95N	FLH-R30830B-276F
Silia*Sep* OT Phenyl	FLH-R34030B-70i	FLH-R34030B-70Z	FLH-R34030B-95K	FLH-R34030B-95M	FLH-R34030B-95N	FLH-R34030B-276F
Silia*Sep* OT PFP	FLH-R67530B-70i	FLH-R67530B-70Z	FLH-R67530B-95K	FLH-R67530B-95M	FLH-R67530B-95N	FLH-R67530B-276F
Silia*Sep* OT SCX	FLH-R60530B-70i	FLH-R60530B-70Z	FLH-R60530B-95K	FLH-R60530B-95M	FLH-R60530B-95N	FLH-R60530B-276F
Silia*Sep* OT C18 (*17 %*)	FLH-R33230B-70i	FLH-R33230B-70Z	FLH-R33230B-95K	FLH-R33230B-95M	FLH-R33230B-95N	FLH-R33230B-276F
Silia*Sep* OT SCX-2	FLH-R51230B-70i	FLH-R51230B-70Z	FLH-R51230B-95K	FLH-R51230B-95M	FLH-R51230B-95N	FLH-R51230B-276F
Silia*Sep* OT SAX *nec*	FLH-R66530B-70i	FLH-R66530B-70Z	FLH-R66530B-95K	FLH-R66530B-95M	FLH-R66530B-95N	FLH-R66530B-276F
Silia*Sep* OT SAX-2 *nec*	FLH-R66430B-70i	FLH-R66430B-70Z	FLH-R66430B-95K	FLH-R66430B-95M	FLH-R66430B-95N	FLH-R66430B-276F

Other phases can be offered, contact us for details.
For Metal Scavengers Cartridges, see page 208 for more information.
Silia*Sep* OT are also available with bar code for automation purposes.

Silia*Sep* Flash Cartridges for Process & Industrial Purification

SiliCycle designs, develops and manufactures innovative and versatile products for world class pharmaceutical and biotechnology companies with gram to multi-ton production capabilities.

For large scale purifications, our state-of-the-art facility allows us to produce high quality chromatographic phases in large batches to supply the most demanding applications. At SiliCycle, we truly understand the needs and challenges you encounter when trying to satisfy both regulatory requirements and the need for economical validated manufacturing. That's why we guarantee on-time delivery and we offer batch reservations, customized products and phases, adapted batch and packaging sizes and complete documentation for regulatory filings.

Our portfolio of process and industrial purification solutions can support scale-up projects from a few grams to several kilograms, while assuring robust and reliable methods.

Make your own Silia*Sep* Flash Cartridges

You can customize your flash cartridges by choosing silica properties and selectivity.

Most all irregular Silia*Flash* silica gels are available to be packed in flash cartridges. Just refer to pages 223 to select the particle size and pore diameter you need.

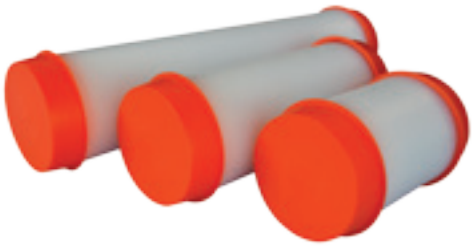
You can also adapt the cartridge's selectivity to your chemistry by choosing any of our metal or organic scavengers as bonded phase. See pages 137 for more information.

Silia*Sep* BT 75 Cartridges

These cartridges are designed to enhance your purifications when using the Biotage™ Flash 75 development-scale purification system. Containing up to 800 g of the highest quality 40 - 63 µm 60 Å silica gel, the Silia*Sep* BT 75 pre-packed cartridges allow purification up to 80 g of sample at maximum 250 mL/min. These cartridges offer a faster and safer solution compared to traditional glass columns.

Specifications & Ordering Information

Silia*Sep* BT 75 Specifications			
Cartridge Type	75S	75M	75L
Cartridge Code	75iS	75iM	75iL
Silica Weight	200 g	400 g	800 g
Qty / Box	Bare: 2* Bonded: 1		
Dimension (*ID x Length*)	75 x 90 mm	75 x 170 mm	75 x 350 mm
Column Volume	300 mL	500 mL	1 L
Recommended Flow Rate	100 - 250 mL/min		
Loading Capacity	0.2 - 20 g	0.4 - 40 g	0.8 - 80 g
Max Operating Pressure	90 psi / 6.5 bar (*inside the compression module*)		



Silia*Sep* BT 75 Ordering Information			
Cartridge Type	75S	75M	75L
Silia*Sep* Bare Phase			
Qty / Box*	2	2	2
Silia*Sep* BT Silica	FLH-R10030B-75iS	FLH-R10030B-75iM	FLH-R10030B-75iL
Silia*Sep* BT Bonded Phases			
Qty / Box	1	1	1
Silia*Sep* BT Amine	FLH-R52030B-75iS	FLH-R52030B-75iM	FLH-R52030B-75iL
Silia*Sep* BT Diol *nec*	FLH-R35030B-75iS	FLH-R35030B-75iM	FLH-R35030B-75iL
Silia*Sep* BT Cyano	FLH-R38030B-75iS	FLH-R38030B-75iM	FLH-R38030B-75iL
Silia*Sep* BT C18 (*17 %*)	FLH-R33230B-75iS	FLH-R33230B-75iM	FLH-R33230B-75iL
Silia*Sep* BT C8	FLH-R30830B-75iS	FLH-R30830B-75iM	FLH-R30830B-75iL
Silia*Sep* BT Phenyl	FLH-R33830B-75iS	FLH-R33830B-75iM	FLH-R33830B-75iL
Silia*Sep* BT PFP	FLH-R67530B-75iS	FLH-R67530B-75iM	FLH-R67530B-75iL
Silia*Sep* BT SCX	FLH-R60530B-75iS	FLH-R60530B-75iM	FLH-R60530B-75iL
Silia*Sep* BT SCX-2	FLH-R51230B-75iS	FLH-R51230B-75iM	FLH-R51230B-75iL
Silia*Sep* BT SAX *nec*	FLH-R66530B-75iS	FLH-R66530B-75iM	FLH-R66530B-75iL
Silia*Sep* BT SAX-2 *nec*	FLH-R66430B-75iS	FLH-R66430B-75iM	FLH-R66430B-75iL

* Box of 10 also available. For part numbers, just add "-10" at the end.
Other phases can be offered, contact us for more information.
For Metal Scavengers Cartridges, please contact us.

Silia*Sep* BT 150 Cartridges

Used on a Biotage™ Flash 150 development-scale purification system, these cartridges allow purification up to 320 g of crude compound at maximum 1 L/min. They are available in two formats: 2.5 kg and 5 kg of high quality 40 - 63 µm 60 Å silica gel. Get higher performances in less time thanks to Silia*Sep* BT 150 cartridges!

Specifications & Ordering Information

Silia*Sep* BT 150 Specifications		
Cartridge Type	150M	150L
Cartridge Code	150iM	150iL
Silica Weight	2.5 kg	5 kg
Qty / Box	Bare: 2* Bonded: 1	
Dimension (*ID x Length*)	150 x 300 mm	150 x 600 mm
Column Volume	4 L	8.5 L
Recommended Flow Rate	0.5 - 1 L/min	
Loading Capacity	3 - 160 g	6 - 320 g
Max Operating Pressure	90 psi / 6.5 bar (*inside the compression module*)	

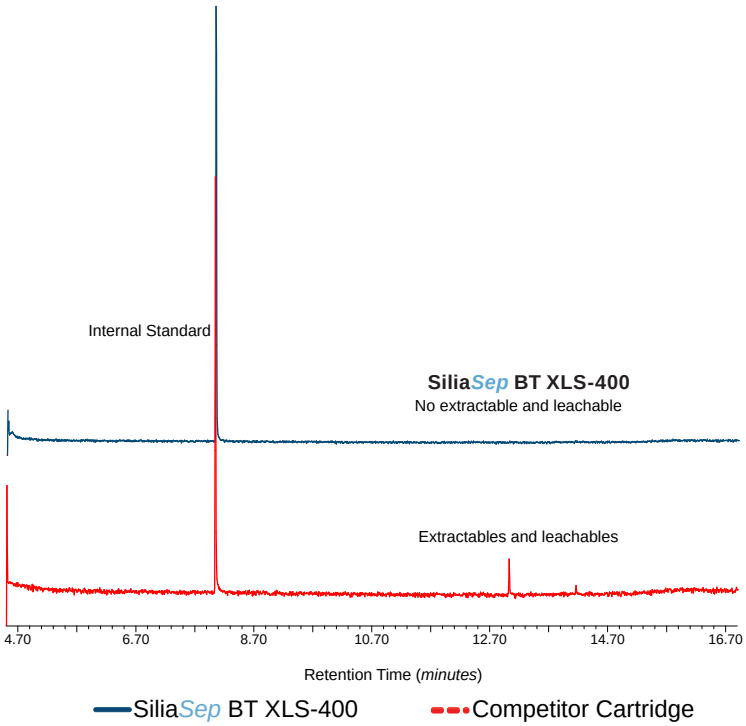
Silia*Sep* BT 150 Ordering Information		
Cartridge Type	150M	150L
Silia*Sep* Bare Phase		
Qty / Box*	2	2
Silia*Sep* BT Silica	FLH-R10030B-150iM	FLH-R10030B-150iL
Silia*Sep* BT Bonded Phases		
Qty / Box	1	1
Silia*Sep* BT Amine	FLH-R52030B-150iM	FLH-R52030B-150iL
Silia*Sep* BT Diol *nec*	FLH-R35030B-150iM	FLH-R35030B-150iL
Silia*Sep* BT Cyano	FLH-R38030B-150iM	FLH-R38030B-150iL
Silia*Sep* BT C18 (*17 %*)	FLH-R33230B-150iM	FLH-R33230B-150iL
Silia*Sep* BT C8	FLH-R30830B-150iM	FLH-R30830B-150iL
Silia*Sep* BT Phenyl	FLH-R33830B-150iM	FLH-R33830B-150iL
Silia*Sep* BT PFP	FLH-R67530B-150iM	FLH-R67530B-150iL
Silia*Sep* BT SCX	FLH-R60530B-150iM	FLH-R60530B-150iL
Silia*Sep* BT SCX-2	FLH-R51230B-150iM	FLH-R51230B-150iL
Silia*Sep* BT SAX *nec*	FLH-R66530B-150iM	FLH-R66530B-150iL
Silia*Sep* BT SAX-2 *nec*	FLH-R66430B-150iM	FLH-R66430B-150iL

* Box of 10 also available. For part numbers, just add "-10" at the end.
Other phases can be offered, contact us for more information.
For Metal Scavengers Cartridges, please refer to page 208.

Silia*Sep* BT XLS-400 Cartridges

These cartridges are designed to enhance your purifications when using the Biotage™ Flash 400 large-scale purification system. The Silia*Sep* BT XLS-400iM cartridge contains 20 kg of the highest quality 40 - 63 µm 60 Å silica gel while the Silia*Sep* BT XLS-400L cartridge contains 41 kg, allowing purification up to respectively 1.3 kg and 2.7 kg of crude reaction mixture.

A more robust black polyethylene body, which provides a really low level of leachables, was chosen. The chromatograms below demonstrate this low to zero leaching of organics from the black polyethylene cartridge, whereas we do observe extractables from the competitor cartridge. Furthermore, the low swelling of our black polyethylene allows the cartridge to be easily removed from the module after use. Lastly, an ingenious endplate sealing system was designed to prevent any silica or solvent leakage.



Solvents tested:

- **Hexane**
- **Acetone**
- **Ethyl acetate**
- **Dichloromethane**
- **Methyl tert-butyl ether**

Silia*Sep* BT XLS-400 Specifications & Ordering Information

Silia*Sep* BT XLS-400 Specifications		
Cartridge Type	XLS-400M	XLS-400L
Cartridge Code	400iM	400iL
Silica Weight	20 kg	41 kg
Qty / Box	Bare: 2* Bonded: 1	
Dimension (*ID x Length*)	400 x 300 mm	400 x 600 mm
Column Volume	28 L	56 L
Recommended Flow Rate	3 - 6 L/min	
Loading Capacity	24 g - 1.3 kg	50 g - 2.7 kg
Max Operating Pressure	90 psi / 6.5 bar (*inside the compression module*)	

XLS-400L

Silia*Sep* BT XLS-400 Ordering Information		
Cartridge Type	XLS-400M	XLS-400L
Silia*Sep* Bare Phase		
Qty / Box*	2	2
Silia*Sep* BT Silica	FLH-R10030B-400iM	FLH-R10030B-400iL
Silia*Sep* BT Bonded Phases		
Qty / Box	1	1
Silia*Sep* BT Amine	FLH-R52030B-400iM	FLH-R52030B-400iL
Silia*Sep* BT Diol *nec*	FLH-R35030B-400iM	FLH-R35030B-400iL
Silia*Sep* BT Cyano	FLH-R38030B-400iM	FLH-R38030B-400iL
Silia*Sep* BT C18 (*17 %*)	FLH-R33230B-400iM	FLH-R33230B-400iL
Silia*Sep* BT C8	FLH-R30830B-400iM	FLH-R30830B-400iL
Silia*Sep* BT Phenyl	FLH-R33830B-400iM	FLH-R33830B-400iL
Silia*Sep* BT PFP	FLH-R67530B-400iM	FLH-R67530B-400iL
Silia*Sep* BT SCX	FLH-R60530B-400iM	FLH-R60530B-400iL
Silia*Sep* BT SCX-2	FLH-R51230B-400iM	FLH-R51230B-400iL
Silia*Sep* BT SAX *nec*	FLH-R66530B-400iM	FLH-R66530B-400iL
Silia*Sep* BT SAX-2 *nec*	FLH-R66430B-400iM	FLH-R66430B-400iL

* Box of 1 also available. For part numbers, just add "-1" at the end.
Other phases can be offered, contact us for more information.
For Metal Scavengers Cartridges, please refer to page 208.

XLS-400M

Silia*Sep* Flash Cartridges - The Whole Picture

Silia*Sep* Flash Cartridges Whole Picture							
Cartridge Format	Scale		Silica Weight	Dimension (*ID x Length*)	Column Volume	Recommended Flow Rate	Loading Capacity
ISO04 to IS330	**Discovery & R&D**		4 g to 330 g	12 x 98 mm to 60 x 268 mm	4.9 mL to 441 mL	15 - 25 mL/min to 80 - 180 mL/min	40 - 400 mg to 3.3 - 33 g
75iS	**Development & Process**		200 g	75 x 90 mm	300 mL	100 - 250 mL/min	0.2 - 20 g
75iM			400 g	75 x 170 mm	500 mL		0.4 - 40 g
75iL			800 g	75 x 350 mm	1 L		0.8 - 80 g
XL 800	**Development & Process**		800 g	78 x 382 mm	1.5 L	200 - 300 mL/min	8 - 80 g
XL 1,600			1.6 kg	104 x 429 mm	2.9 L	300 - 450 mL/min	16 - 160 g
150iM	**Industrial**		2.5 kg	150 x 300 mm	4 L	0.5 - 1 L/min	3 - 160 g
150iL			5 kg	150 x 600 mm	8.5 L		6 - 320 g
400iM	**Industrial**		20 kg	400 x 300 mm	28 L	3 - 6 L/min	24 g - 1.3 kg
400iL			41 kg	400 x 600 mm	56 L		50 g - 2.7 kg

Process Scale-Up Purification Services

SiliCycle is well equipped to promptly assist you develop a lab-scale method and scaling-up to kilo-scale production efficiently. Our scale-up strategies are based on using the same packing material, which is one of the most important aspects of scalability, allowing constant performance and optimal results throughout your purification process.

SiliCycle can provide turnkey solutions to your purification problems by performing your scale-up process separation with our expert staff in our laboratories. Our broad variety of instrumentations allows us to purify and detect a wide range of molecules.

As a chromatographic medias manufacturer, we have a large inventory of phases readily available which helps reduce lead time and cost for your projects. If your separation requires that we develop a special phase, our production team works hand-in-hand with our R&D to support you. Our process scale-up purification service is flexible to ensure that it will fit your needs.

For example, we can develop a low pressure chromatographic extraction on a 25 g flash cartridge, scale it up to a 5 kg or even a 41 kg cartridge and then provide all needed products for the pilot, scale-up work and commercial production.

No other manufacturer of chromatography products offers this.

4 g - 330 g cartridges	200 g - 1.6 kg cartridges	2.5 kg - 41 kg cartridges
Discovery & R&D	**Development & Process**	**Industrial**

All cartridges can be packed with the same lot for extreme reproducibility throughout your scale-up.

Please discover our full range of R&D Services page 287.