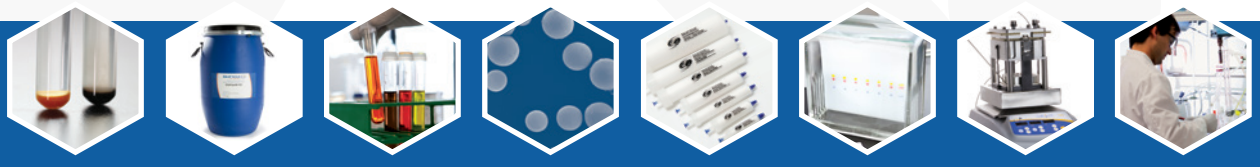
SOLUTIONS FOR CHROMATOGRAPHY, SYNTHESIS & PURIFICATION



SILICYCLE

Solutions for Chromatography, Synthesis & Purification

Scavenging

Synthesis & Catalysis

Chromatography

Sample Preparation

Analysis

R&D Services

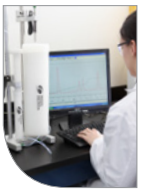
Extraction - Purification

Founded in 1995, SiliCycle is specialized in the development, manufacturing and commercialization of high value silica gels and specialty products for chromatography, purification and synthesis.

Scavenging

Scavengers are functionalized silica gels designed to react and bind excess reagents, metal complexes and / or by-products. Available either in bulk or prepacked, SiliCycle's wide range of scavenging products remove metal and / or organic compounds, to overcome any purification challenge.

Chromatography



Silica is the most widely used media in chromatography. SiliCycle offers a wide range of chromatographic products: Silia*Flash*® irregular silica gels, Silia*Sep*™ flash cartridges, Silia*Bond*® chromatographic phases, Silia*Prep*™ sample preparation cartridges and Silia*Plate*™ TLC plates.

Catalysis & Synthesis

Simplify purification steps by using silica-supported catalysts and reagents: Silia*Cat*® heterogeneous catalysts and Silia*Bond*® reagents & oxidants.

R&D Services

SiliCycle's scientists offer a wide range of R&D services: scavenging screenings, synthetic chemistry services, separation center, custom column packing, material science and analytical services.

Purification

From lab to commercial scale, SiliCycle's complete portfolio ensures efficient purification.
Take advantage of our Silia*Flash*® irregular silica gels, Silia*Sphere*™ spherical silica gels, Silia*Chrom*® HPLC columns and E-PAK® fixed bed flow-through cartridges.

Extraction - Purification Division NEW

SiliCycle offers extraction & purification services (*method development, fractionation, analytical services, etc.*) as well as purified final natural ingredients (*essential oils, omega-3, extracts, etc.*). Benefit from the perfect combination of SiliCycle's purification expertise and raw natural material of the highest quality.

What's New at SiliCycle

Silia*Fast*™ FaPEx®

The FaPEx acronym stands for Fast Pesticide Extraction, an extremely fast yet easy Extraction / Clean up technique for pesticide residues in agricultural products.
Cut up to 60 % of your analysis costs with this 1-step 1-minute cartridge!

E-PAK® Purification Cartridges

E-PAK are radial flow adsorption cartridges developed specifically for pharmaceutical processing.
Available in various sizes from lab to pilot and industrial scale, E-PAK cartridges can be made with Silia*MetS*® metal scavenger or activated carbon.

Silia*Sep*™ HP

Packed with High Performance 25 µm spherical silica gel, Silia*Sep* HP flash cartridges offer superior separation for difficult purifications.

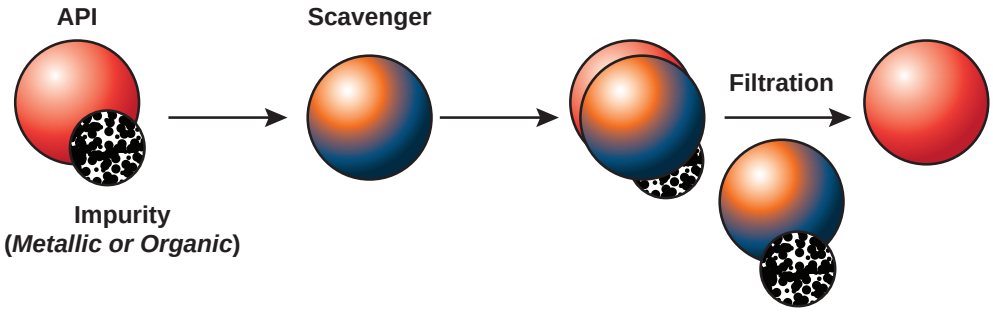
SiliCycle Scavenging Solutions

Metallic & Organic Impurities Removal

- **Increased R&D and manufacturing productivity**
- **Amazingly versatile (*solvents, pH, compatible in batch flow, microwave, etc.*)**
- **Green and environmentally friendly technology**
- **Broadest scope of metals & organics to be scavenged**

Since ancient times, chemists have been searching for techniques and tools to separate, isolate and purify chemical substances from one another to improve the quality of life. It's been a long road since the alchemists of the Middle-Ages understood that their search for the philosophers' stone would depend, at least in part, on good separation of elements.

SiliCycle grafted technology enables more powerful purification processes to help reach new purity standards. Our solutions are extremely versatile and customizable, hence suitable for a use in a vast array of industries, facing different contamination issues.



Easier, Cleaner, Faster, Efficient Purification Processes Using Metal & Organic Scavengers

- **Over two decades of know-how in silica-grafting and scavenging technology**
- **Broadest portfolio of scavengers with many associated applications**
- **Great variety of formats for all purifications scales: from R&D to manufacture scale**
- **Successful technology in a variety of fields, such as pharmaceuticals, organic chemistry labs, agrochemicals, mining, fine chemicals, water and waste treatment**
- **Great compatibility with a myriad of experimental conditions, solvents, pH and temperatures**
- **Strong chemical, physical, thermal and mechanical stability**

Discover what the scavenging technology from SiliCycle has to offer and how it can assist you in these times of environmental changes, tighter quality control and regulatory compliance:

- **Silia*MetS*®** for Metal Impurities Scavenging
- **Silia*Bond*®** for Organic Impurities Scavenging

Metal & Organic Scavengers have the major benefit of being compatible with almost all experimental formats. They may be used as:

Bulk – directly added to a reaction flask or reactor

- All scavengers are available in various packaging formats, from 5 g to 25 kg, even up to multi-ton scale!
- All our scavengers have, by default, the same silica backbone: our Silia*Flash* R10030B (*Particle Size: 40 - 63 µm ; Pore Size: 60 Å*).
- All our Silia*Flash* silica gels of various particle sizes and pore sizes are available as silica backbones upon request.

Flash cartridges

- All scavengers are available pre-packed in flash cartridges, as small-scale cartridges (for *research or discovery labs*) or as kilo-scale cartridges (*up to 2.7 kg of crude reaction material applicable to cartridges*) for large-scale purifications.
- Packings can also be tailored to your available equipment & scales.

SPE cartridges, micro-SPE tips & well plates

All our scavengers are available in pre-packed SPE cartridges, well-plates and microtips.

Even guard cartridges

Silia*Chrom* HPLC Guard Cartridges are designed to effectively protect both analytical and preparative HPLC columns.

E-PAK® Fixed Bed Flow-Through Cartridges

A family of radial flow adsorption cartridges developed specifically for pharmaceutical processing.

E-PAK flow-through purification cartridges, created with proprietary technology, provide rapid adsorption kinetics at flow rates and processing capacities suitable for laboratory, pilot and commercial operations.

They are designed for use with organic and aqueous solvents and incorporate design features useful for the production of active pharmaceutical ingredients (*API*) manufactured in explosion proof environments.

- **Proven cartridge design ensures rapid, simple & reliable technology for metal & organic impurities removal**
- **Eliminates the use of insoluble particulates in reactors**
- **Fixed bed design ensuring safer handling compared to loose medias**
- **Available with Silia*MetS* Metal Scavengers and various grades of activated carbon**
- **Various sizes available for easy scale-up from lab to industrial scale**
- **Large adsorbent capacity in small area footprint increases product recovery and reduces solvent requirements**
- **Extended flow path provides increased contact time and better adsorption performance**

Learn more: **www.silicycle.com/epak**

Silia*MetS*®

Scavengers for Metallic Impurities

Full Metal Removal in a Finger Snap:

- **Clean**
- **Fast**
- **Easy**
- **Hassle-Free**
- **Multi Format**
- **Multi-Scale Applications**

Metal contamination is one of the most frequent encountered purification issue when it comes to synthetic chemistry.

With virtually all industrial chemical processes based on catalysis and mostly organometallic catalysis, classical purification processes have long been non-satisfactory anymore in the industry. It was with this objective in mind that SiliCycle developed a new class of functionalized silicas with organic groups specially chosen for extra effective metal bounding and removal.

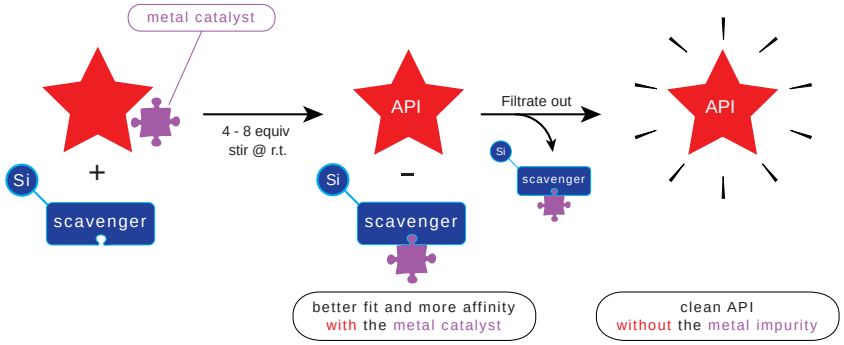
New Pharmaceutical Challenges in Purification

In recent years, the time pressure associated with quickly bringing drug candidates to market has increased the number of transition metal-catalysed reactions progressing from lead optimization to early scale-up. Hence, the removal of post-reaction metal residues has become a major issue in the pharmaceutical industry.

Purification of APIs (*Active Pharmaceutical Ingredients*), or Product of Interest from residual metal catalyst by traditional methods (*chromatography, activated carbon, distillation, etc.*) often leads to problems such as high costs, time loss, low efficiency and reduced API yields.

Yet, not only have Silia*MetS* Metal Scavengers received quite widespread importance in the chemical industry, but they are also becoming a broader purification strategy in fields such as electronics, mining, semi-conductors, optical fibers, metal recycling, natural extracts and so on.

SiliCycle offers a large spectrum of various Silia*MetS* Metal Scavengers that will selectively and exclusively remove metallic contaminants from your experimental solution in a snap: almost all metals were targeted, free or as coordination complexes, and many can be addressed at the same time.



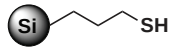
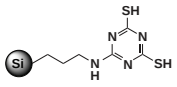
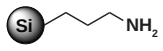
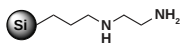
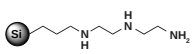
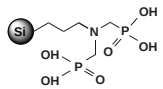
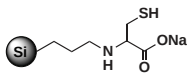
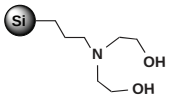
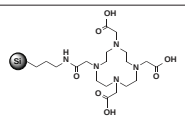
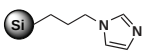
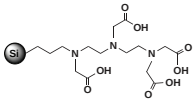
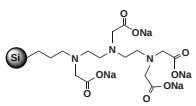
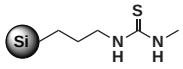
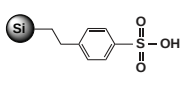
ICH-Q3D Heavy Metal Regulation Ready for Implementation in the Pharmaceutical Industry

Since June 2013, the International Conference on Harmonisation (*ICH*) has been working on its Q3D guidelines on metal elemental impurities in new drugs and new formulations containing known ingredients. After many revisions and improvements, the final version of the Q3D guidelines was finally accepted and signed off by the ICH Steering Committee in December 2014, hence requiring the entire manufacturing industry and supply chain to meet more stringent regulations.

Since December 2015, twenty-four (*24*) metals - well-known to act as catalysts or present in solvents - have been indicted and associated with great health risks, and have been assigned distinctive PDE (*Permitted Daily Exposure*) limits. For example, now that ICH Q3D contains Lithium and Barium, we no longer talk of heavy metals impurities but elemental impurities.

There is no doubt that these new guidelines will be one of the next major challenges to address for production plants and QC labs of the pharmaceutical industry. Take advantage of SiliCycle's expertise and knowledge in the field of grafting technologies to efficiently address this new regulation.

Portfolio

Metal Scavengers Portfolio			
Scavengers	**Structure**	**Brief Description**	**Metals Removed***
PGI-S **Silia*MetS* Thiol** PN: R51030B Loading: ≥ 1.20 mmol/g		Silia*MetS* Thiol is our most versatile and robust metal scavenger for a variety of metals under a wide range of conditions.	**Ag, Hg, Os, Pd & Ru** Cu, Ir, Pb, Rh & Sn
PGI-S **Silia*MetS* DMT** PN: R79030B Loading: ≥ 0.50 mmol/g		Silia*MetS* DMT is the silica-bound equivalent of 2,4,6-trimercaptotriazine (*trithiocyanuric acid, TMT*). It is a versatile metal scavenger for a variety of metals and the preferred metal scavenger for ruthenium catalysts and hindered Pd complexes (*i.e. Pd(dppf)Cl$_2$*).	**Ir, Ni, Os, Pd, Pt, Rh & Ru** Cd, Co, Cu, Fe, Sc & Zn
Silia*Bond* Amine PN: R52030B Loading: ≥ 1.20 mmol/g		Also known for their electrophile scavenging efficiencies and their base reagent qualities, Silia*MetS* Amine, Diamine and Triamine have proven to be very useful for the scavenging of the following metals: Pd, Pt, Cr, W and Zn.	**Cd, Cr, Pd, Pt, Rh & Ru** Co, Cu, Fe, Hg, Pb, W & Zn
Silia*MetS* Diamine PN: R49030B Loading: ≥ 1.28 mmol/g			**Cr, Pd, Pt, W & Zn** Cd, Co, Cu, Fe, Hg, Ni, Pb, Ru & Sc
PGI-S **Silia*MetS* Triamine** PN: R48030B Loading: ≥ 1.11 mmol/g			**Cr, Pd, Pt, W & Zn** Ag, Cd, Co, Cu, Fe, Hg, Ni, Os, Pb, Rh, Ru & Sc
Silia*MetS* AMPA PN: R85130B Loading: ≥ 0.80 mmol/g		Silia*MetS* AMPA is an aminomethyl-alkylphosphonic acid ligand known for its excellent metal-bonding properties. It is particularly efficient to remove Al, Sb, Ni, La, and also very effective for Co, Cu, Fe, Mg and Zn scavenging from reaction intermediates or final APIs.	**Al, Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Mg, Nd, Ni, Pm, Pr, Sb, Sm, Tb, Tm, V & Yb** Co, Cu, Fe, Mg & Zn
Silia*MetS* Cysteine PN: R80530B Loading: ≥ 0.30 mmol/g		Silia*MetS* Cysteine is the silica-bound equivalent of the amino acid cysteine. It is a versatile scavenger for a variety of metals and the preferred metal scavenger for tin residues. By attaching the molecule to the backbone via the amino group, the thiol group remains free and accessible for higher metal scavenging efficiency.	**Cd, Fe, Ir, Os, Ru, Sc & Sn** Ca, Cr, Cs, Cu, La, Mg, Pd, Pt, Rh & Zn
PGI-S **Silia*MetS* DEAM** PN: R54430B Loading: ≥ 0.85 mmol/g		Silia*MetS* DEAM is a versatile scavenger designed to remove trace metal of Ti, Zn, Fe and Ag as well as boronic acids from reaction intermediates or final APIs.	**Ag, Fe, Sn, Ti & Zn**
PGI-S **Silia*MetS* DOTA** PN: R91030B Loading: ≥ 0.38 mmol/g		Silia*MetS* DOTA is a silica-supported tetracarboxylic acid and its various conjugate bases. DOTA molecule is a well-adopted complexing agent. Linked to various metals, so formed-complexes are used as contrast agents in cancer treatments or other medical applications.	**Ca, Cu, Gd, La, Ni & Zn** Co, Fe, Mg, Pd, Pt & Rh
Silia*MetS* Imidazole PN: R79230B Loading: ≥ 0.96 mmol/g		Silia*MetS* Imidazole is a versatile metal scavenger for a variety of metals including Cd, Co, Cu, Fe, Ni, Os, Pd and Rh.	**Cd, Co, Cu, Fe, Ir, Li, Mg, Ni, Os, W & Zn** Cr, Pd & Rh
PGI-S **Silia*MetS* TAAcOH** PN: R69030B Loading: ≥ 0.41 mmol/g		Silia*MetS* TAAcOH & TAAcONa are supported versions of EDTA in their acid and sodium salt forms. These two products are effective metal scavengers for Ca, Mg, Li, Ir, Cs, Os, Sn, Pd, Ni and Cu. Silia*MetS* TAAcOH is effective for metals in low or zero oxidation states, compared to Silia*MetS* TAAcONa which is useful for metals in higher oxidation states (≥ *2*).	**Ca, Co, Ir, Li, Mg, Ni, Os, Ru & Sc** Cr, Cs, Fe, Pd, Rh & Sn
Silia*MetS* TAAcONa PN: R69230B Loading: ≥ 0.41 mmol/g			**Ca, Cd, Cs, Cu, Fe, Ir, La, Li, Mg, Ni, Os, Rh, Sc & Sn** Cr, Pd, Ru & Zn
Silia*MetS* Thiourea PN: R69530B Loading: ≥ 1.07 mmol/g		Silia*MetS* Thiourea is a versatile metal scavenger for all forms of palladium and is widely used in the pharmaceutical industry. Once complexed with a transition metal, it has been reported to be an effective catalyst.	**Pd & Ru** Ag, Cu, Fe, Os, Rh, Sc & Sn
PGI-S **Silia*Bond* Tosic Acid** PN: R60530B Capacity: ≥ 0.54 meq/g		Silia*Bond* Tosic Acid is in a class of strong acids used in different fields of synthetic organic chemistry. The aromatic ring makes it slightly more acidic than other supported sulfonic acids.	**Fe, Rh & Sn** Ag, Cu, Ni, Pd, Pt, Ru & Zn

* Metals removed: **Navy blue**: best scavenger / Light blue: good scavenger

PGI-S : Potentially Genotoxic Impurities (*PGI*) Scavenger - Contact us for more information

SiliaBond®

Scavengers for Organic Impurities

The Importance of Organic Contaminant Removal From APIs

Using excess reagents in organic synthesis is a very common strategy to maximize conversion and product yield. But the benefits of this approach can rapidly be outshined when comes the need to purify the final reaction mixture from excess reagents.

In addition, even reagents used in stoechiometric amounts can lead to an uncomplete reaction, and this is far more common than the other way around.

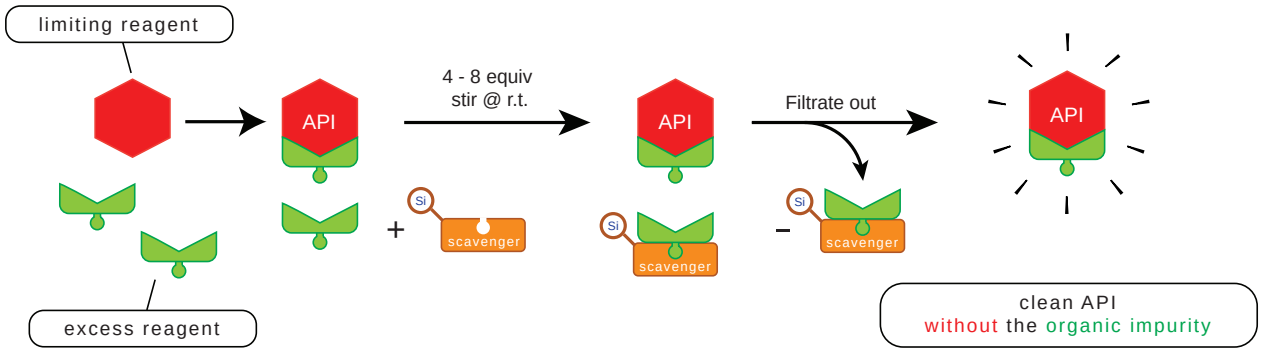
These reagents can either contaminate the API with potentially genotoxic impurities or environmental hazards, or jeopardize subsequent reactions by their reactivity. Indeed, such reagents usually bear nucleophilic, electrophilic, acidic or basic functional groups.

There is a very strong need in organic chemistry and high-throughput screening for simpler work-up and purification processes. Our range of organic scavengers have been widely acknowledged and adopted by early R&D teams up to manufacturing.

How SiliaBond Organic Scavengers Can Help You Purify Your API From Organic Contaminants

Direct scavenging of the undesired compound to isolate the API:

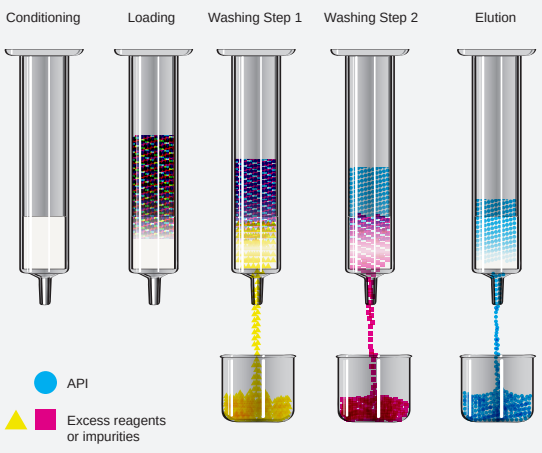
- Silica is bound with a functional group, that will specifically react with a product: either excess reagents (*unreacted*) or impurities.
- The API is recovered by simple filtration as demonstrated on the following scheme:



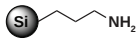
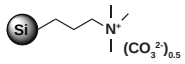
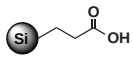
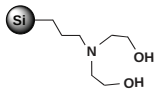
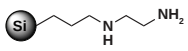
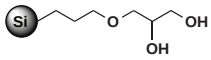
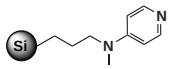
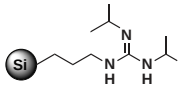
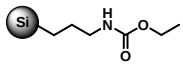
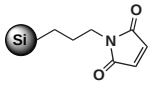
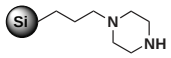
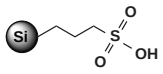
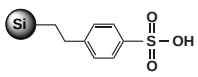
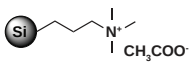
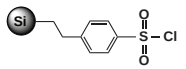
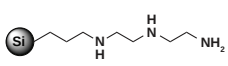
Alternative Method: catch and release of the API

SiliaBond scavenger is packed in a SPE cartridge:

- **Conditioning step**: with six to ten cartridge volumes of solvent
- **Loading step**: API is loaded and trapped onto the cartridge bed
- **Washing steps**: cartridge is washed to filter excess reagents and / or other impurities
- **Elution step**: API is eluted, recovered and purified



Portfolio

Organic Scavengers Portfolio			
Scavengers	**Structure**	**Nature**	**Molecules Removed**
SiliaBond Amine PN: R52030B Loading: ≥ 1.20 mmol/g		Scavenger for Electrophiles (*Covalent Bonding*)	Acyl Chlorides, Aldehydes, Anhydrides, Chloroformates, Isocyanates, Ketones & Sulfonyl Chlorides
		Scavenger for Acids (*Ionic Bonding*) Catch & Release	Acids & Acidic Phenols
SiliaBond Carbonate PN: R66030B Loading: ≥ 0.46 mmol/g		Scavenger for Acids (*Ionic Bonding*) Catch & Release	Acids, Acidic Phenols & Boronic Acids
SiliaBond Carboxylic Acid PN: R70030B Loading: ≥ 0.92 mmol/g		Scavenger for Bases (*Ionic Bonding*) Catch & Release	Primary / Secondary Amines & Anilines
SiliaMetS DEAM PN: R54430B Loading: ≥ 0.85 mmol/g		Scavenger for Electrophiles & Lewis Acids (*Covalent & Ionic Bonding*) Catch & Release	Boronic Acids
SiliaMetS Diamine PN: R49030B Loading: ≥ 1.28 mmol/g		Scavenger for Electrophiles (*Covalent Bonding*)	Acyl Chlorides, Aldehydes, Anhydrides, Chloroformates, Isocyanates, Ketones & Sulfonyl Chlorides
		Scavenger for Acids (*Ionic Bonding*) Catch & Release	Acids & Acidic phenols
SiliaBond Diol PN: R35030B Loading: ≥ 0.97 mmol/g		Scavenger for Electrophiles & Lewis Acids (*Covalent & Ionic Bonding*) Catch & Release	Boronic Acids
SiliaBond DMAP PN: R75630B Loading: ≥ 0.53 mmol/g		Scavenger for Electrophiles (*Covalent Bonding*)	Acyl Chlorides & Sulfonyl Chlorides
SiliaBond Guanidine PN: R68230B Loading: ≥ 0.80 mmol/g		Scavenger for Acids (*Ionic Bonding*) Catch & Release	Acids, Acidic Phenols & Boronic Acids
SiliaBond Carbamate PN: R50130B Loading: ≥ 1.16 mmol/g		Scavenger for Nucleophiles (*Covalent Bonding*)	Alcohols, Alkoxides, Amines, Anilines, Hydrazines, Thiols & Thiolates
SiliaBond Maleimide PN: R71030B Loading: ≥ 0.64 mmol/g		Scavenger for Nucleophiles (*Covalent Bonding*)	Thiols & Thiolates
SiliaBond Piperazine PN: R60030B Loading: ≥ 0.83 mmol/g		Scavenger for Electrophiles (*Covalent Bonding*)	Acyl Chlorides, Aldehydes, Anhydrides, Chloroformates, Isocyanates, Ketones & Sulfonyl Chlorides
		Scavenger for Acids (*Ionic Bonding*) Catch & Release	Acids & Acidic Phenols
SiliaBond Propylsulfonic Acid PN: R51230B Loading: ≥ 0.63 mmol/g		Scavenger for Bases (*Ionic Bonding*) Catch & Release	Amines & Anilines
SiliaBond Tosic Acid PN: R60530B Loading: ≥ 0.54 meq/g			
SiliaBond TMA Acetate PN: R66430B Loading: ≥ 0.71 mmol/g		Scavenger for Acids (*Ionic Bonding*) Catch & Release	Carboxylic Acids
SiliaBond Tosyl Chloride PN: R44030B Loading: ≥ 0.63 mmol/g		Scavenger for Nucleophiles (*Covalent Bonding*)	Alcohols, Alkoxides, Amines, Anilines, Hydrazines, Thiols & Thiolates
SiliaMetS Triamine PN: R48030B Loading: ≥ 1.11 mmol/g		Scavenger for Electrophiles (*Covalent Bonding*)	Acyl Chlorides, Aldehydes, Anhydrides, Chloroformates, Isocyanates, Ketones & Sulfonyl Chlorides
		Scavenger for Acids (*Ionic Bonding*) Catch & Release	Acids & Acidic Phenols

Potentially Genotoxic Impurities (*PGI*) Scavenger - Contact us for more information

SiliaCat®

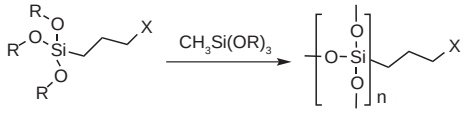
Heterogeneous Catalysts

- **High stability and accurate loading**
- **Rigid & porous structure**
- **Compatibility with a wide range of solvents**
- **Ease of use: no swelling or static charge**
- **Minimal leaching**
- **Fast kinetics**

The SiliaCat Matrix

Inspired by the ORganically MOdified SILica (*ORMOSIL*) technology, the SiliaCat family is composed of new and innovative catalysts.

Resulting from the co-condensation of two organosilane monomers by the sol-gel process, the hybrid organic-inorganic materials present the highest stability and reactivity available with heterogeneous catalysts.



X = DPP, TEMPO

Furthermore, the highly cross-linked framework presents a better resistance compared to post-functionalization process.

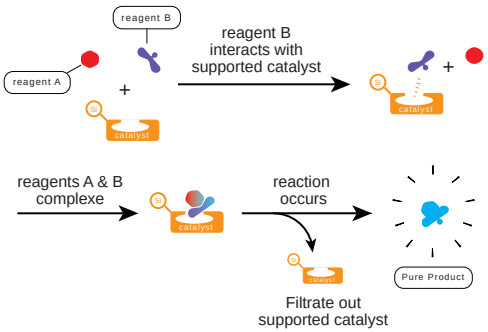
What is SiliaCat Heterogeneous Catalyst?

Usually, heterogeneous catalysts supported on a silica matrix are immobilized by post-modification of the inorganic support.

These supports, however, present a high degree of leaching due to the poor stability of the immobilized phase. With SiliaCat, the ligand is directly cross-linked in an organic-inorganic framework. This results in a high degree of stability of the catalysts.

Compared to homogeneous catalysts, SiliaCat exhibits a good reactivity and selectivity with one of the major advantages being that the catalyst is eliminated from the reaction mixture by a simple filtration.

Forget your purification problems with our SiliaCat catalysts family.



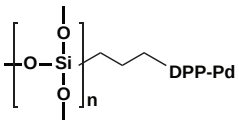
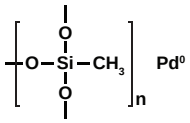
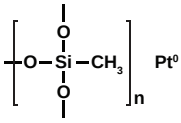
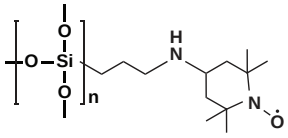
Features and Benefits of SiliaCat Catalysts

- **Reagent concentrated at the surface of the material**
  Reproducible synthesis with high conversion and yield
- **Robustness**
  High thermal and mechanical stability
- **Rigid and porous structure**
  No swelling, solvent independent and air stable
  (*no inert conditions required*)
- **Minimal leaching of organoceramic matrix**
  Easier purification
- **High and accurate catalyst loading**
  Less catalyst required over competitive products
- **High turnover number (*TON*)**
  Low catalytic amount required (*< 1 mol %*)
- **Reusability**
  Multi-uses possible
- **Ease of handling and purification**
  Free flowing, no static charge
  Easily removed by simple filtration
- **Ease of scalability**
  Scalable from mg up to multi-ton scale
- **Available in bulk quantities**
  Can be delivered in large quantities and always in stock

A non-pyrophoric catalyst

Unlike its homogeneous counterpart – which is air unstable and thus pyrophoric – SiliaCat is a 100 % air stable, non-pyrophoric catalyst which catalytic activity is maintained and remains unchanged if kept dry in a tightly closed jar.
Under these conditions, the catalyst is still fully active after even 2 years.

Portfolio

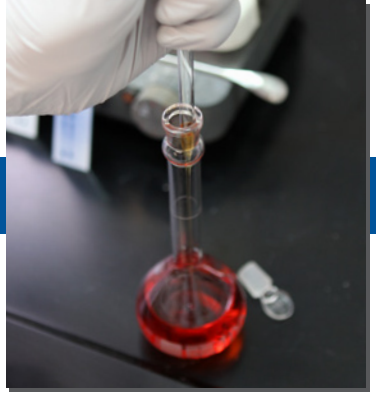
Heterogeneous Catalysts Portfolio			
SiliaCat Name	**Structure**	**Brief Description**	**Typical Applications**
SiliaCat DPP-Pd PN: R390-100		SiliaCat DPP-Pd is a unique diphenylphosphine palladium (II) heterogeneous catalyst made from a leach-resistant organoceramic matrix.	Suzuki, Heck, Negishi, Borylation, Sonogashira, Kumada, Stille
SiliaCat Pd⁰ PN: R815-100		SiliaCat Pd⁰ is a new series of patent-protected sol-gel-entrapped Pd nanocatalysts. It is made from highly dispersed Pd nanoparticles (*uniformly in the range 2.0 - 6.0 nm*) encapsulated within an organosilica matrix. It is a safer alternative for hydrogenation over Pd/C.	Selective debenzylation, Selective hydrogenation, Suzuki, Heck Sonogashira, Kumada, Stille
SiliaCat Pt⁰ PN: R820-100		SiliaCat Pt⁰ is made of organosilica physically doped with nanostructured platinum (0), and is both stable and efficient. Pt nanoparticles (*uniformly in the range 1.5 - 6 nm*) are encapsulated via an alcohol-free sol-gel process typical of enzyme sol-gel encapsulation.	Selective reduction of nitroarenes, Hydrosilylation
SiliaCat TEMPO PN: R723-100		SiliaCat TEMPO is an oxidizing catalyst made from a proprietary class of organosilica-entrapped radicals. This encapsulation process confers enhanced reactivity and properties. The leach-resistant organoceramic matrix makes SiliaCat TEMPO highly efficient and selective compared to homogeneous TEMPO. It also has a superior performance compared to polymer-supported TEMPO in terms of both selectivity and stability. With SiliaCat TEMPO, no activation is required prior to use and selective aldehyde vs acid oxidation is possible.	Oxidation of alcohols or aldehydes

Available Kits

Because all reactions are unique, and that small differences can influence the catalysis efficiency, doing a screening is often recommended, especially if you are new to this technology. This is why we created a special kit containing our four catalysts.

This kit is available in 5 g, 10 g, 25 g, 50 g and 100 g formats (*custom formats are also available, contact us for more details*).

Heterogeneous Catalysts Kit		
Kit Name	**Kit PN**	**Composition**
SiliaCat Heterogeneous Catalysts Kit	K305-100	DPP-Pd, Pd⁰, Pt⁰ & TEMPO



SiliaBond®

Heterogeneous Reagents & Oxidants

Discover how our heterogeneous reagents & oxidants can optimize your synthesis

Our heterogeneous supports for chemical synthesis are offered in two different forms:

- **SiliaBond Reagents (*for both catalytic & stoechiometric reactions*)**
- **SiliaBond Oxidants**

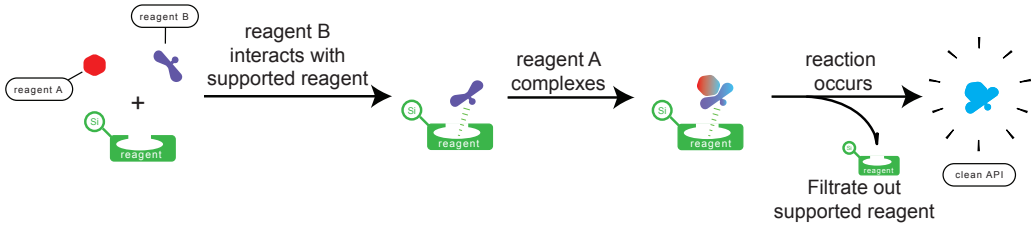
What are SiliaBond Heterogeneous Reagents & Oxidants?

Increasingly, the use of heterogeneous reagents in organic synthesis and chemical production is growing in importance. This technology is completely in line with the industries seeking improved sustainability and reduced ecological footprint.

This strong trend is directly derived from the inherent benefits offered by silica-based heterogeneous reagents & oxidants:

- **Extremely easy product / API isolation and purification** (*simple & quick filtration of the heterogeneous support*)
- **Eliminates or strongly reduces the need for laborious purifications**
- **No leaching of silica or catalyst and no cross contamination**
- **Highly suitable for either batch or continuous flow applications**
- Convenient for high throughput medicinal & discovery chemistry
- Improved reactivity & selectivity over homogeneous reagents / catalyst
- Compares very favourably to polymer-based reagents: no swelling, thermally stable, more easily scalable, faster kinetics, compatible with all solvents and mechanically stable

Here is the reaction mechanism:

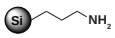
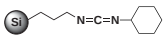
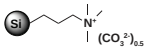
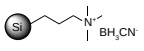
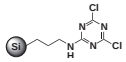
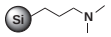
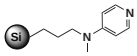
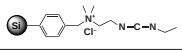
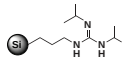
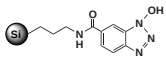
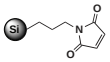
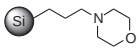
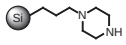
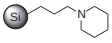
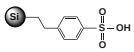
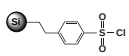


Reactions that can be done with SiliaBond reagents & oxidants

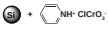
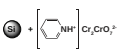
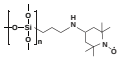
- **Acylation / Esterification**
- **Alkylation / Etherification**
- **Amide Coupling**
- **Various Cross-Couplings**
- **Cyanation**
- **Deprotection of Ethers**
- **Ether Formation**
- **Fmoc, Bsmoc Deprotections**
- **Friedel-Crafts Alkylation**
- **Fries Rearrangement**
- **Michael Addition**
- **Tosylate Formation**
- **Urea Synthesis**
- **And so many more...**

Portfolio

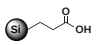
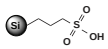
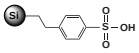
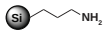
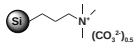
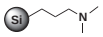
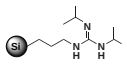
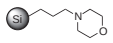
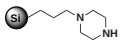
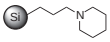
Catalysts & Reagents Portfolio

Name & Product Number	Structure	Loading / Density
Silia*Bond* $AlCl_x$ PN: R74530B		≥ 1.60 mmol/g 0.781 g/mL
Silia*Bond* Amine PN: R52030B		≥ 1.20 mmol/g 0.700 g/mL
Silia*Bond* Carbodiimide PN: R70530B		≥ 0.91 mmol/g 0.751 g/mL
Silia*Bond* Carbonate PN: R66030B		≥ 0.46 mmol/g 0.608 g/mL
Silia*Bond* Cyanoborohydride PN: R66730B		≥ 0.87 mmol/g 0.705 g/mL
Silia*Bond* Dichlorotriazine PN: R52230B		≥ 0.60 mmol/g 0.781 g/mL
Silia*Bond* Dimethylamine PN: R45030B		≥ 1.14 mmol/g 0.705 g/mL
Silia*Bond* Diphenylphosphine PN: R39030B		≥ 0.75 mmol/g 0.588 g/mL
Silia*Bond* DMAP PN: R75630B		≥ 0.53 mmol/g 0.674 g/mL
Silia*Bond* EDC PN: R70630B		≥ 0.32 mmol/g 0.770 g/mL
Silia*Bond* Guanidine PN: R68230B		≥ 0.80 mmol/g 0.732 g/mL
Silia*Bond* HOBt PN: R70730B		≥ 0.56 mmol/g 0.766 g/mL
Silia*Bond* Maleimide PN: R71030B		≥ 0.64 mmol/g 0.644 g/mL
Silia*Bond* Morpholine PN: R68030B		≥ 0.99 mmol/g 0.666 g/mL
Silia*Bond* Piperazine PN: R60030B		≥ 0.83 mmol/g 0.671 g/mL
Silia*Bond* Piperidine PN: R71530B		≥ 1.03 mmol/g 0.660 g/mL
Silia*Bond* Tosic Acid PN: R60530B		≥ 0.54 meq/g 0.698 g/mL
Silia*Bond* Tosyl Chloride PN: R44030B		≥ 0.63 mmol/g 0.761 g/mL

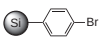
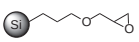
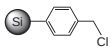
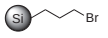
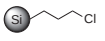
Oxidants Portfolio

Name & Product Number	Structure	Loading / Density
Silia*Bond* $KMnO_4$ PN: R23030B		10 % w/w 0.593 g/mL
Silia*Bond* PCC PN: R24030B		20 % w/w 0.693 g/mL
Silia*Bond* PDC PN: R24530B		20 % w/w 0.651 g/mL
Silia*Cat* TEMPO PN: R723-100		≥ 0.70 mmol/g 0.550 - 0.650 g/mL

Acids & Bases Portfolio

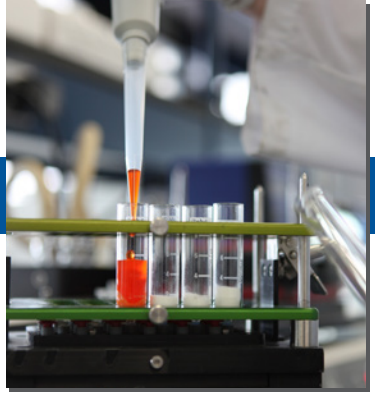
Name & Product Number	Structure	Loading / Density
Silia*Bond* Carboxylic Acid PN: R70030B		≥ 0.92 mmol/g 0.687 g/mL
Silia*Bond* Propylsulfonic Acid PN: R51230B		≥ 0.63 mmol/g 0.728 g/mL
Silia*Bond* Tosic Acid PN: R60530B		≥ 0.54 mmol/g 0.698 g/mL
Silia*Bond* Amine PN: R52030B		≥ 1.20 mmol/g 0.700 g/mL
Silia*Bond* Carbonate PN: R66030B		≥ 0.46 mmol/g 0.608 g/mL
Silia*Bond* Dimethylamine PN: R45030B		≥ 1.14 mmol/g 0.705 g/mL
Silia*Bond* Guanidine PN: R68230B		≥ 0.80 mmol/g 0.732 g/mL
Silia*Bond* Morpholine PN: R68030B		≥ 0.99 mmol/g 0.666 g/mL
Silia*Bond* Piperazine PN: R60030B		≥ 0.83 mmol/g 0.671 g/mL
Silia*Bond* Piperidine PN: R71530B		≥ 1.03 mmol/g 0.660 g/mL

Linkers Portfolio

Name & Product Number	Structure	Loading / Density
Silia*Bond* Allyl PN: R53530B		≥ 1.08 mmol/g 0.613 g/mL
Silia*Bond* Bromophenyl PN: R55030B		≥ 0.99 mmol/g 0.742 g/mL
Silia*Bond* Glycidoxy PN: R36030B		≥ 0.82 mmol/g 0.662 g/mL
Silia*Bond* Phenylmethylchloride PN: R56530B		≥ 1.14 mmol/g 0.637 g/mL
Silia*Bond* Propyl Bromide PN: R55530B		≥ 1.39 mmol/g 0.748 g/mL
Silia*Bond* Propyl Chloride PN: R59030B		≥ 1.39 mmol/g 0.751 g/mL

Available Formats:
from 5 g to 25 kg, even up to multi-ton scale!

Not finding what you are looking for? Contact us!



SiliCycle MiniBlock®

Parallel Synthesis Platform

SiliCycle offers two personal parallel synthesizers, for quick discovery & generation of new leads, route scouting (*especially in peptide synthesis*) and screening for optimal reaction conditions: MiniBlock and MiniBlock XT.

Both equipments are compact enough to fit on any laboratory bench top, allowing researchers to speed up their work and enhance their productivity. They represent valuable cost-effective alternatives to automated equipments.

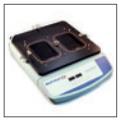
SiliCycle MiniBlock

for solid-phase synthesis & easy post-reaction clean-up

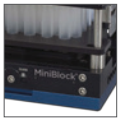
SiliCycle MiniBlock allows synthesis via solid-phase and solution-phase, as well as filtration and SPE purification to be carried out on the same platform. MiniBlock is designed to run 12 to 96 parallel syntheses, with reaction volumes from 4 mL to 20 mL.

Inert conditions
Continuous inert gas flow enables air / moisture sensitive reactions. Easily add reagents through the septum layer.
No cross-contamination between tubes and no evaporative loss.

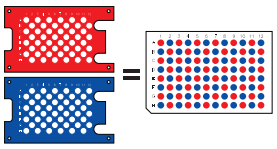
Shaking & washing
High performance orbital shaker with integrated basins for wash and rinse capability. Customized and configured to provide even and vigorous vortex mixing for one or two reactors. No need to use magnetic stir bars.



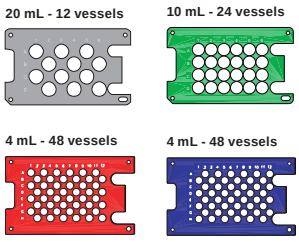
Two colors available
Reactor base can be chosen either red or blue.



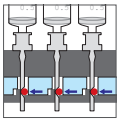
96 format
Combine a Red 48-Positions reactor to a Blue 48-Positions reactor to get a 96-well format.



Configure your SiliCycle MiniBlock to suit your needs
Easily set up your reactor in a 12, 24 or 48-Positions format, with reaction tubes from 4 mL to 20 mL.
All parts are color-coded for fast and easy recognition.



Products collection
Collect products from SiliCycle MiniBlock cleanly and efficiently with just the turn of a key.



Unique built-in valve
Provides rapid bottom filtration of all reaction tubes at the same time - no need to invert or disassemble the reactor. Saves time and prevents cross-contamination.

Parallel synthesis & purification

Forget tedious work-up and purification issues!
To purify your samples directly after synthesis, just stack your MiniBlock reactor onto a second one filled with Silia*Prep* MB pre-packed SPE cartridges. Open the valve to filter and purify your extracts.

We offer 500 mg / 4 mL cartridges (*compatible with 48-Positions format*) and 1 g / 10 mL cartridges (*compatible with 24-Positions format*).

Typical reactions performed

The SiliCycle MiniBlock Family is widely used by chemists in all departments and sectors of activity.

The flexibility of the design allows you to rapidly configure these compact parallel reactors to comply with any reaction condition your chemistry may require:

- Peptide synthesis
- Acylation & alkylation
- Sulfonylation
- Reduction
- Reductive amination
- Heterocycle formation
- Enolate formation
- S_nAr
- Suzuki coupling
- Saponification
- Metallation
- Grignard reaction
- Heck reaction
- Stille reaction
- Sonogashira

SiliCycle MiniBlock XT

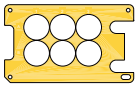
for reflux capability and higher reaction volumes

SiliCycle MiniBlock XT is designed for solution-phase synthesis at high temperatures, up to 160°C. All reaction tubes can be heated and cooled down at the same time, condensation is efficient enough to observe a real reflux. MiniBlock XT allows to run 6 to 48 parallel syntheses, with reaction volumes from 11.5 mL to 110 mL.

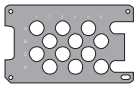
Inert conditions
Continuous inert gas flow enables air / moisture sensitive reactions. Easily add reagents through the septum layer. No cross-contamination between tubes and no evaporative loss.

Configure your SiliCycle MiniBlock XT to suit your needs
Easily configure the SiliCycle MiniBlock XT to choose the scale (*11.5 to 110 mL*) and number of experiments (*6 to 48-Positions*) based on your project requirements. All parts are color-coded for fast and easy recognition.

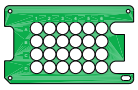
110 mL - 6 vessels



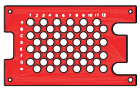
55 mL - 12 vessels



18 mL - 24 vessels



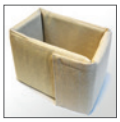
11.5 mL - 48 vessels



Efficient reflux
A single reflux jacket cools all vessels. No need for individual condensers. Fittings are provided for quick and easy connection to your cooling liquid.

Easy reaction setup
All vessels are sealed with a single septum layer. Easy access to reactions.

Heating and cooling
When using the insulation wrap, temperature uniformity and reproducibility is within 1°C at 80°C.



Shaking & heating
Shaking & heating are provided by a magnetic hotplate stirrer, requiring minimal hood space. Consistent agitation and uniform heating to all reaction tubes.

Modular racks
Readily interchangeable reaction vessel racks enable simple conversion between 6, 12, 24 and 48-Positions arrays. The 24 and 48-Positions vessel racks are compatible with parallel centrifugal evaporators.

Ready to order kits!

MiniBlock and MiniBlock XT are available in ready to order kits, with everything you need for your parallel synthesis: reactor, shaker, consumables and maintenance items. Just pick the kit that suits your chemistry!

You don't know which kit will best match your needs? Answer this interactive form to find out: www.silicycle.com/mbfinder

Contact us for more information: miniblock@silicycle.com

SiliaFlash® & SiliaSphere™ PC

Silica Gels for Chromatography

With pore diameters ranging from 30 to 1,000 Ångström (Å) and particle sizes up to 1,200 µm, SiliCycle offers products to meet all your requirements.

We offer one of the most reliable portfolios for flash and gravity grades for low to medium-high pressure. Our silica gels are ideal for preparative chromatography, from laboratory to pilot-plant processes and production scale. In addition to performance, SiliCycle's silica gels also ensure consistency, reliability and reproducibility.

- **High purity silica with the lowest level of fines on the market**
  No contamination, lower back-pressure and superior separation
- **Exceptional narrow particle and pore size distributions**
  Optimal separation and resolution
- **Batch-to-batch, year-to-year consistency**
  Reliable chromatography
- **Neutral pH**
  Wide range of products can be purified, even acid sensitive ones
- **Low metal content & controlled water content**
  Symmetrical peaks without tailing
- **High mechanical stability**
  Can be used under high pressures without surface abrasion
- **High surface area and density**
  Greater loading capacity, enabling more silica for the same volume. Solvent economy (*smaller dead volume*)
- **Availability in bulk quantities**
  Always in stock with on-time delivery

Choosing Between SiliaFlash Irregular and SiliaSphere PC Spherical Gels

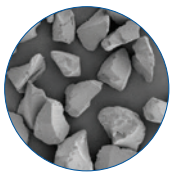
Irregular silica gels are traditional in flash or gravity chromatography and have always been a spontaneous choice for preparative chromatography. Nowadays, spherical particles are used increasingly.

Cost is very important in preparative and process chromatography, and the use of monodisperse spherical particles with narrow particle size distribution is more expensive. It is possible in this case to use irregular silica but the separation may not provide the desired results.

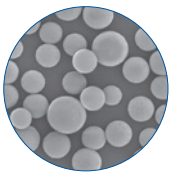
For these situations, SiliCycle has developed a more affordable class of spherical particles for preparative chromatography: SiliaSphere PC.

Advantages of using SiliaSphere PC materials over standard irregular silica gels include the following:

- **Increased efficiency of the eluent's flow characteristics**
- **Higher resolution**
- **Ease of packing / better packing reproducibility**
- **Higher mechanical stability**



SiliaFlash® Irregular silica



SiliaSphere™ PC Spherical silica

SiliaFlash: Different Grades for Different Requirements

Over the years, SiliCycle has developed two different grades for the two most popular irregular gels used in the industry: 40 - 63 µm, 60 Å & 60 - 200 µm, 60 Å. Those two grades of each gel are available to address all of our customers' requirements, depending on their applications, areas of research, budgets and so on.

Two Different Grades of 40 - 63 µm, 60 Å Gels

Grade	Superior Grade	Standard Grade
Name (*PN*)	**F60** (*R10030B*)	**P60** (*R12030B*)
Particularities	• Extra step to reduce metal content to minimum level • Tighter particle size distribution • Fines have been removed	• Fines have been removed • Lower price

Both compare favorably with the overall industry average of a 40 - 63 µm distribution, and each grade offers its own particle size distribution profile.

Two Different Grades of 60 - 200 µm, 60 Å Gels

Grade	Superior Grade	Standard Grade
Name (*PN*)	**G60** (*R10040B*)	**GE60** (*R10140B*)
Particularities	• Extra step to reduce metal content to minimum level • Tighter particle size distribution • Fines have been reduced to minimal level	• Fines have been reduced to minimal level • Lower price

Each grade offers its own particle size distribution profile.

Portfolio

Available formats: from 1 kg to 25 kg, even up to multi-ton scale!

Silia*Flash* Irregular Silica Gels Portfolio

Product Number	Particle Size		Pore Diameter (Å)
	µm	mesh	
R10137L	75 - 150	100 - 200	30
R10130A	40 - 63	230 - 400	40
R10150A	60 - 120	325 - 625	
R10140A	60 - 200	70 - 230	
R10160A	120 - 200	70 - 125	
R10170A	200 - 500	35 - 70	
R10180A	500 - 1,000	18 - 35	
R10023B	20 - 45	*	60
R10030B (*F60*)	40 - 63	230 - 400	
R12030B (*P60*)			
R10530B (*Acid-Washed*)			
R10150B	60 - 120	325 - 625	
R10040B (*G60*)	60 - 200	70 - 230	
R10140B (*GE60*)			
R10137B	75 - 150	100 - 200	
R10157B	105 - 175	86 - 140	
R10160B	120 - 200	70 - 125	
R10165B	150 - 250	60 - 100	
R10170B	200 - 500	35 - 70	
R10180B	500 - 1,000	18 - 35	
R10130D	40 - 63	230 - 400	90
R10140D	60 - 200	70 - 230	
R10157D	105 - 175	86 - 140	
R10170D	200 - 500	35 - 70	
R10180D	500 - 1,000	18 - 35	
R10181D	800 - 1,200	16 - 22	
R10130H	40 - 63	230 - 400	150
R10150H	60 - 120	325 - 625	
R10140H	75 - 250	60 - 200	
R10157H	105 - 175	86 - 140	
R10160H	120 - 200	70 - 125	
R10170H	200 - 500	35 - 70	
R10072H	250 - 500	35 - 60	
R10180H	500 - 1,000	18 - 35	
R10181H	800 - 1,200	16 - 22	
R10130M	40 - 63	230 - 400	300
R10140M	60 - 200	70 - 230	
R10170M	200 - 500	35 - 70	

Silia*Sphere* PC Spherical Silica Gels Portfolio

Product Number	Particle Size		Pore Diameter (Å)
	µm	mesh	
S10095W-A	25	*	50
S10030B-A	50	300	60
S10027B-A	60	250	
S10034B-A	75	200	
S10040B-A	100	150	
S10063B-A	150	100	
S10066B-A	200	70	
S10068B-A	300	50	
S10020C	20 - 45	*	70
S10040C	75 - 200	70 - 200	
S10030C	40 - 75	200 - 400	
S10070C	200 - 500	35 - 70	
S10095D-A	25	*	90
S10020E	20 - 45	*	100
S10030E	40 - 75	200 - 400	
S10040E	75 - 200	70 - 200	
S10065E	150 - 250	60 - 100	
S10070E	200 - 500	35 - 70	
S10030G-A	50	300	120
S10034G-A	75	200	
S10040G-A	100	150	
S10063G-A	150	100	
S10020M	20 - 45	*	300
S10030M	40 - 75	200 - 400	
S10040M	75 - 200	70 - 200	
S10070M	200 - 500	35 - 70	
S10020P	20 - 45	*	500
S10030P	40 - 75	200 - 400	
S10040P	75 - 200	70 - 200	
S10070P	200 - 500	35 - 70	
S10020S	20 - 45	*	800
S10030S	40 - 75	200 - 400	
S10040S	75 - 200	70 - 200	
S10070S	200 - 500	35 - 70	
S10020T	20 - 45	*	1,000
S10030T	40 - 75	200 - 400	
S10040T	75 - 200	70 - 200	
S10070T	200 - 500	35 - 70	

* Mesh equivalent too small to exist as real screen size.

Acid-washed Silia*Flash* silica gel for extra purity (*R10530B*)

SiliCycle also manufactures an acid-washed Silia*Flash* 40 - 63 µm, 60 Å irregular silica gel. This product gel has been developed to ensure a pH-controlled media with even lower levels of trace metal contaminants for maximal purity.

SiliaBond®

Chromatographic Phases

Thanks to its high mechanical resistance, silica is the most widely used media in chromatography. With SiliaBond irregular silica gels, SiliCycle offers a large range of solutions for low pressure chromatography, to help cover many kinds of purification.

We guarantee superior quality and stability of our phases: no fines will appear when packing the media. Glass gravity columns will give excellent performance and lifetime!

Solutions for Low Pressure Chromatography

For all our listed SiliaBond sorbents, particle size is 40 - 63 µm and pore diameter is 60 Å. But we can graft any irregular SiliaFlash or spherical SiliaSphere PC silica gel, with the function of your choice. Contact us for more information.

All functionalized SiliaBond sorbents are available in bulk but also pre-packed in SiliaPrep SPE cartridges and SiliaSep flash cartridges.

Reversed-Phases

In reversed-phase chromatography, the packing material is always hydrophobic (*non polar*) while the mobile phase is polar. The more hydrophobic the packing material, the more retention of non polar analytes.

Usual reversed-phases are standard alkyl chains grafted on silica (*C18, C8, C4, C1*) and cyclic or aromatic functions (*Phenyl, Pentafluorophenyl, Cyclohexyl*).

Important parameters to keep in mind in reversed-phase chromatography:

- **Carbon load** (*% C*) will give the relative hydrophobicity of the packing media. Most of the time, it varies between 4 % and 19 %.
- **Endcapping**: it is impossible to react with all available silanol groups (*free -OH groups on the silica surface*) when functionalizing silica. But these free silanols are acidic and will react with basic compounds, so we endcap them with a capping agent to avoid non-specific bindings.

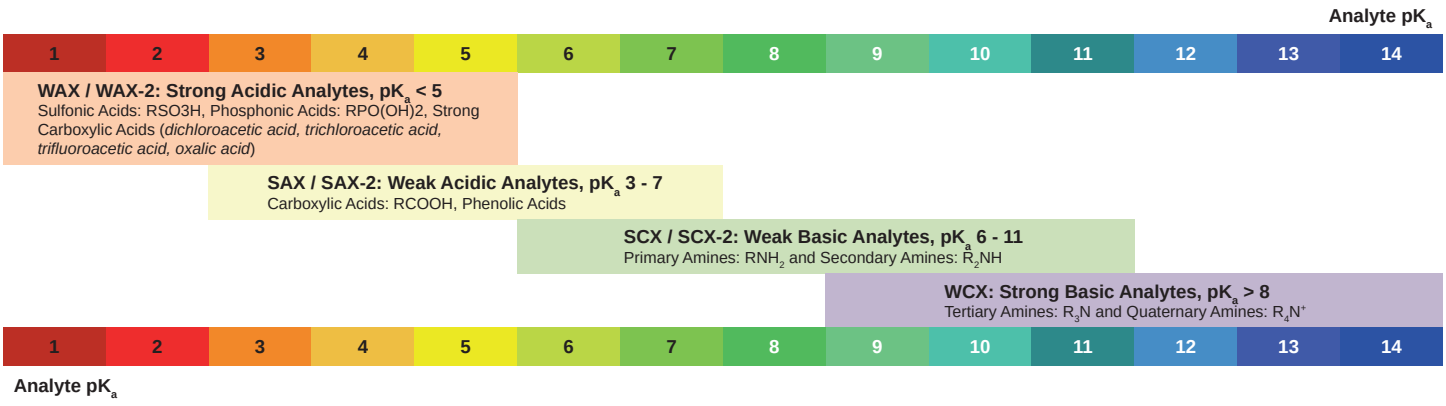
Normal Phases

In normal phase chromatography, the packing material is always polar while the mobile phase is non polar. The interactions between analytes and sorbent mainly take place on the highly polar silanols of the silica gel surface. Some hydrogen bonds can also happen on polar functionalized groups.

Usual normal phases are ungrafted silica, polar functions (*amino, cyano and diol*) or alternative adsorbents (*Alumina and Florisil for example*).

Ion Exchange Phases

In ion exchange chromatography, both silica support and analytes must be ionized. If the stationary phase (*packing material*) is positively charged, anionic analytes only will retain (*these phases are called WAX & SAX*). And in the contrary if the stationary phase is negatively charged, cationic analytes only will retain (*these phases are called WCX & SCX*). Hence, pH of the mobile phase is of crucial importance and needs to be chosen carefully, so that both functions are charged:

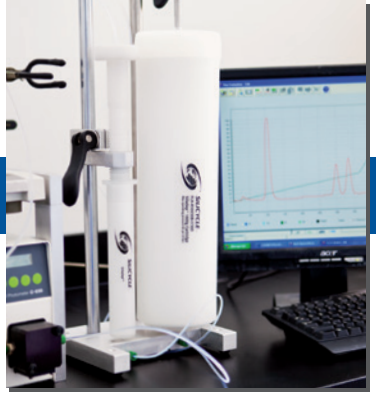


Portfolio

Available formats: from 5 g to 25 kg

	Low Pressure Chromatography Phases Portfolio		
	Sorbent	**Characteristics**	**Typical Applications**
Reversed-phases	**C18** PN: R33230B	% C: ≥ 16 % Density: 0.639 g/mL	• Purification of low to high polarity compounds • Reproducible purification without complexity and cost of preparative HPLC
	C8 PN: R30830B	% C: 11.0 % Density: 0.586 g/mL	• Less retention compared to C18 • For highly hydrophobic pesticides, small peptides and large molecule drugs
	Cyclohexyl (*C6*) PN: R61530B	% C: 9.5 % Density: 0.662 g/mL	• Less retention compared to C18 and C8 • Additional steric interaction
	C4 PN: R32030B	% C: ≥ 6.67 % Density: 0.656 g/mL	• Less retention compared to C18 and C8 • For molecules with large hydrophobic regions
	C1 PN: R33030B	% C: ≥ 4.17 % Density: 0.559 g/mL	• Lower retention compared to other reversed-phases • For purification of polar and non-polar highly hydrophobic pharmaceutical products
	Phenyl (*PHE*) PN: R34030B	% C: 8.0 % Density: 0.637 g/mL	• Moderate non-polar sorbent • Alternative selectivity for aromatic compounds, compared to other reversed-phases
	Pentafluorophenyl (*PFP*) PN: R67530B	% C: 9.0 % Density: 0.761 g/mL	• For alternative selectivity approach with aromatic ring interactions • For purification of conjugated compounds (*isomers*)
Normal Phases	**Cyano** (*CN*) PN: R38030B	% C: 7.0 % % 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 than silica • For organic compounds with intermediate to extreme polarity
	Silica (*Si*) PN: R10030B	Density: 0.550 g/mL	• Most popular sorbent for day-to-day use • For purification of non-ionic polar organic compounds
	Silica HP (*Si HP*)	Particle size: 25 µm Density: 0.500 g/mL	• High Performance sorbent for difficult separations (*isomers*) • Higher loading capacity, faster flow rate, less solvent used
	Diol nec PN: R35030B	Loading: 0.97 mmol/g Density: 0.687 g/mL	• For difficult separation of low to medium polarity samples • Can be used in HILIC mode • For mono and polysaccharides separation
	Neutral Alumina PN: AUT-0054	Particle size: 50 - 200 µm	• For aromatic compounds, aliphatic amines & compounds containing electronegative functions
	Florisil PN: AUT-0014	Particle size: 40 - 75 µm Pore size: 100 Å	• For separation of chlorinated pesticides, polychlorinated biphenyls (*PCBs*) & polysaccharides
	Silver Nitrate (*$AgNO_3$*) PN: R23530B	Loading: 10 % w/w Density: 0.604 g/mL	• For separation of cis / trans isomers of unsaturated compounds (*alkenes, lipids, steroids and terpenes*)
Ion Exchange Phases	**Amine** (*NH_2, WAX*) PN: R53030B	Loading: 1.2 mmol/g Density: 0.700 g/mL	**In normal phase**: for purification of compounds with basic properties, or for monosaccharides separation **In ion exchange**: • Weak anion exchanger (*pK_a of 9.8*), positively charged at pH below 7.8 • For very strong anions (*such as sulfonic acids*), that may be too strongly retained on SAX
	WAX-2 (*Triethylamine*) PN: R76530B	Loading: 1.04 mmol/g Density: 0.761 g/mL	• Weak anion exchanger (*pK_a of 10.5*), positively charged at pH below 8.5 • For catch & release of compounds bearing a permanent negative charge (*ie salts of sulfonic acids*)
	SAX (*TMA Chloride*) PN: R66530B	Loading: 0.90 meq/g Density: 0.700 g/mL	• Strong anion exchanger, permanently positively charged (*pH independant*) • For weak anions (*such as carboxylic acids*) that may not bind strongly enough on WAX • For analysis of acidic drugs / analgesics, biomolecules (*peptides and proteins*) & water-soluble vitamins (*vitamins B and C*)
	SAX-2 (*TMA Acetate*) PN: R66430B	Loading: 0.71 mmol/g Density: 0.665 g/mL	• Easily exchangeable acetate counter-ion (*more than chloride ion*) • For compounds with pK_a < 5 (*such as carboxylic acids*)
	SCX (*Tosic Acid*) PN: R60530B	Loading: 0.54 meq/g Density: 0.698 g/mL	• Strong cation exchanger (*pK_a < 1*), permanently negatively charged (*pH independant*) • For catch and release purification of weak cations (*basic drugs / analgesics*), basic biomolecules (*peptides and proteins*) & water-soluble vitamins (*basic vitamins B and C*)
	SCX-2 (*Propylsulfonic Acid*) PN: R51230B	Loading: 0.63 mmol/g Density: 0.728 g/mL	
	WCX (*Carboxylic Acid*) PN: R70030B	Loading: 0.92 mmol/g Density: 0.687 g/mL	• Weak cation exchanger (*pK_a of 4.8*), neutralized at pH below 2.8 • For strong cationic species, which would bind too strongly on SCX

For all sorbents, particle size is 40 - 63 µm and pore diameter is 60 Å.
All bonded phases are available endcapped and non-endacapped.



SiliaSep™

Flash Cartridges

With SiliaSep, benefit from the same quality that all our products are known for: selectivity, speed & reliability.

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.

SiliaSep Cartridge Design

SiliaSep Features & Benefits

High silica gel quality, with low 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

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

Versatility

- Wide choice of cartridge sizes from 4 g to 41 kg
- Purification scale-up from milligram to kilograms
- Variety of sorbents to meet any separation need

Effective packing technology

- Consistent packing for reproducible high plate count (*N*)
- Excellent performance & separation
- High resolution with tight band definition (*no tailing*)
- Great compound purity & recovery

Cost effectiveness

- Excellent performance vs price ratio
- Readily available from stock inventory for many volumes

Portfolio

All Silia*Sep* cartridges are available in:

- **Bare silica** (*standard 40 - 63 µm grade and High Performance 25 µm grade*)
- **Bonded phases**: Amine, Diol, Cyano, C18, C8, Phenyl, PFP, SCX, SAX, etc.

Solid-load cartridges & plungers also available. Contact us!

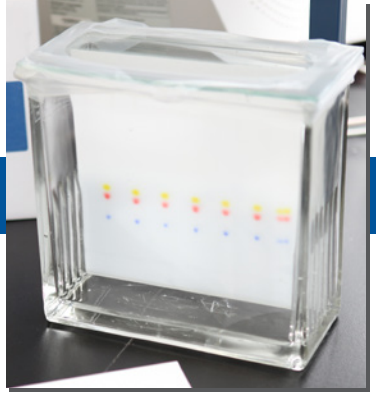
Make your own Silia*Sep* Flash Cartridges!

You can customize your flash cartridges by choosing silica properties and selectivity.
Any Silia*Flash* (*irregular silica gels*), Silia*Sphere* (*spherical silica gels*), Silia*Bond* (*chromatographic phases*) or Silia*MetS* / Silia*Bond* (*metal & organic scavengers*) is available to be packed in Silia*Sep* cartridges to accomodate your chemistry.

Flash Cartridges Portfolio

	Cartridge	Code	Silica weight	Dimensions	Column volume	Recommended flow rate	Loading capacity	Max operating pressure
Discovery & R&D	**Silia*Sep* 4 g**	ISO04	Bare: 4 g Bonded: ≥ 5 g	12 x 98 mm	4.9 mL	15 - 25 mL/min	Bare: 0.04 - 0.4 g Bonded: 0.02 - 0.2 g	225 psi / 16 bar
	Silia*Sep* 12 g	ISO12	Bare: 12 g Bonded: ≥ 15 g	21 x 117 mm	17 mL	20 - 40 mL/min	Bare: 0.12 - 1.2 g Bonded: 0.06 - 0.6 g	
	Silia*Sep* 25 g	ISO25	Bare: 25 g Bonded: ≥ 30 g	21 x 165 mm	31 mL	20 - 45 mL/min	Bare: 0.25 - 2.5 g Bonded: 0.125 - 1.25 g	
	Silia*Sep* 40 g	ISO40	Bare: 40 g Bonded: ≥ 45 g	27 x 169 mm	47 mL	25 - 50 mL/min	Bare: 0.4 - 4 g Bonded: 0.2 - 2 g	
	Silia*Sep* 80 g	ISO80	Bare: 80 g Bonded: ≥ 90 g	31 x 237 mm	123 mL	40 - 80 mL/min	Bare: 0.8 - 8 g Bonded: 0.4 - 4 g	
Development & Process	**Silia*Sep* 120 g**	IS120	Bare: 120 g Bonded: ≥ 130 g	36 x 256 mm	190 mL	60 - 120 mL/min	Bare: 1.2 - 12 g Bonded: 0.6 - 6 g	205 psi / 13 bar
	Silia*Sep* 220 g	IS220	Bare: 220 g Bonded: ≥ 230 g	60 x 195 mm	306 mL	60 - 180 mL/min	Bare: 2.2 - 22 g Bonded: 1.1 - 11 g	160 psi / 11 bar
	Silia*Sep* 330 g	IS330	Bare: 330 g Bonded: ≥ 360 g	60 x 268 mm	441 mL	80 - 180 mL/min	Bare: 3.3 - 33 g Bonded: 1.65 - 16.5 g	
	Silia*Sep* BT 75S	75iS	200 g	75 x 90 mm	300 mL	100 - 250 mL/min	Bare: 0.2 - 20 g Bonded: 0.1 - 10 g	90 psi / 6.5 bar (inside the compression module)
	Silia*Sep* BT 75M	75iM	400 g	75 x 170 mm	500 mL		Bare: 0.4 - 40 g Bonded: 0.2 - 20 g	
	Silia*Sep* BT 75L	75iL	800 g	75 x 350 mm	1 L		Bare: 0.8 - 80 g Bonded: 0.4 - 40 g	
	Silia*Sep* XL 800 g	IS750	Bare: 800 g Bonded: ≥ 870 g	78 x 382 mm	1.5 L	200 - 300 mL/min	Bare: 8 - 80 g Bonded: 4 - 40 g	125 psi / 8 bar
	Silia*Sep* XL 1,600 g	I1500	Bare: 1,600 g Bonded: ≥ 1,700 g	104 x 429 mm	2.9 L	300 - 450 mL/min	Bare: 16 - 160 g Bonded: 8 - 80 g	100 psi / 7 bar
	Silia*Sep* XL 3,000 g	I3000	Contact us for more information					
Industrial	**Silia*Sep* BT 150M**	150iM	2.5 kg	150 x 300 mm	4 L	0.5 - 1 L/min	Bare: 3 - 160 g Bonded: 1.5 - 80 g	90 psi / 6.5 bar (inside the compression module)
	Silia*Sep* BT 150L	150iL	5 kg	150 x 600 mm	8.5 L		Bare: 6 - 320 g Bonded: 3 - 160 g	
	Silia*Sep* BT XLS-400M	400iM	20 kg	400 x 300 mm	28 L	3 - 6 L/min	Bare: 24 g - 1.3 kg Bonded: 12 - 650 g	
	Silia*Sep* BT XLS-400L	400iL	41 kg	400 x 600 mm	56 L		Bare: 50 g - 2.7 kg Bonded: 25 g - 1.35 kg	

Silia*Sep* BT cartridges are designed to enhance your purifications when using Biotage™ Flash 75 or 150 development-scale purification systems, or Biotage Flash 400 large-scale purification system. These cartridges offer a faster and safer solution compared to traditional glass columns and allow purification up to 2.7 kg of sample.



SiliaPlate™

Thin Layer Chromatography Plates

- **Rapid and cost-efficient results**
- **Facility selecting and optimizing chromatographic conditions prior to flash chromatography purification or HPLC analysis**
- **Only small quantities of compounds are required for analysis**
- **High sample throughput capability (*up to 20 samples simultaneously*)**
- **Affordable products**

Thin-layer chromatography (*TLC*) is a quick, simple, inexpensive and extremely versatile technique for both analytical and preparative analysis. Widely used in numerous scientific fields, it is particularly popular for reaction monitoring and screening, compound contamination assessment and sample purification.

Why choose SiliaPlate?

SiliaPlate represents an efficient and economical alternative to other TLC plate manufacturers while demonstrating high separation power, which is due to our narrow particle size distribution silica gel.

The extraordinary hardness of our silica layer, combined to a homogeneous coating and layer thickness, allows excellent separations. Each TLC batch is chemically and physically controlled by our Quality Control department to ensure lot-to-lot and layer-to-layer reproducibility.

SiliaPlate Selection Guide

Available Backings			
Properties	**Glass**	**Aluminum**	**Plastic**
Advantages	• Rigid • High chemical resistance • High heating stability and charring resistance • Transparent	• Thin • Low weight & consequent shipping costs • High heating stability • Low fragility • Possible to cut with scissors • Can be stored in notebook	• Thin • Low fragility • Possible to cut with scissors • High chemical resistance • Can be stored in notebook
Thickness (*approx.*)	2.0 - 2.5 mm	1.5 - 2.0 mm	1.5 - 2.0 mm
Total Weight	High	Low	Medium
Heating Stability	High	High	Below 175°C
Fragility	High	Low	Low
Cutting with Scissors	Impossible	Easily	Possible
Chemical Resistance	High	Low	High

Available Matrices (*or Adsorbents*)		
Classical Silica Gel	**Reversed-Phases**	**Normal Phases**
A universal matrix for daily, fast, reliable analysis of the largest spectra of molecules The particle size distribution used for the silica is related to the nature of the plate. For standard TLC, silica gel with a mean particle size of 10 - 14 µm is used compared to HPTLC, where a smaller particle size is required. In both cases, pore diameter is always 60 Å. Can be unmodified or functionalized, and suitable for a myriad of molecules of functionalities & polarities, such as aflatoxins, alkaloids, barbiturates, fatty acids, flavonoids, glycosides, lipids, nucleosides, proteins, pesticides, sweeteners, vitamins and so on.	**The two most popular modes of separation employed in TLC are normal and reversed-phases.** In normal phase separation, the mobile phase is less polar than the stationary phase. Inversely, in reversed mode, the mobile phase (*usually a mixture of water and organic solvent*) is more polar than the stationary phase (*C18*). When satisfactory separations cannot be achieved by unmodified silica, other functionalized matrices have been designed for specific applications: C2, C8 and C18 phases are functionalization of silica performed using organosilanes of various chain lengths. Retention of molecules & ability to tolerate water in the moving phase are directly dependent on the chains length.	• Diol and Cyano (*CN*) are moderately polar. They can thus be suitable for both normal and reversed-phase chromatography, depending on your application. • Amino phases (NH_2) show weak anion exchange characteristics, great for charged compounds.

Portfolio

SiliCycle offers different types of plates for thin-layer chromatography applications: classical TLC, high performance TLC (*also called HPTLC*) and preparative TLC (*PLC*). The plate types are selected based on the type of analysis required and the available budget.

Types of TLC Plates Offered			
Properties	**Classical TLC**	**HPTLC**	**Preparative TLC**
Applications	Quick, inexpensive, flexible and classical separations	Highly sophisticated separations, complex samples	Purification on a TLC plate
Analysis	Qualitative	Qualitative & Quantitative	Quantitative
Detection	UV - Stains	Instrumented analysis	UV
Distribution [*Mean Particle Size*]	5 - 20 µm [*10 - 14 µm*]	4 - 8 µm [*5 - 6 µm*]	5 - 40 µm [*22 - 25 µm*]
Layer Thickness	200 - 250 µm	150 - 200 µm	500 - 2,000 µm
Typical Sample Volume	1 - 5 µL	0.1 - 0.5 µL	5 - 20 µL

CLASSICAL TLC Plates

Glass

- Analytical Silia*Plate* TLG-R10014B-323 (BEST SELLER)
- Scored Analytical Silia*Plate*
- Channeled Analytical Silia*Plate* (*with or without Preadsorbent Zone*)
- Specialty Sorbents Silia*Plate*
  - Silia*Plate* $AgNO_3$ (*Silver Nitrate 10 - 15 or 20 % impregnated*) TLC: particularly for C=C double-bonded compounds
  - Silia*Plate* Aluminum Oxide TLC: great for alkaloids, aliphatic compounds, aromatics, steroids
  - Silia*Plate* Cellulose TLC: perfect for challenging separations of sensitive biomolecules carrying ion exchange groups

Aluminum

- Silia*Plate* Al TLA-R10011B-323 (BEST SELLER)
- Silia*Plate* Al C18

Plastic

- Silia*Plate* Pl

HPTLC Plates

Silia*Plate* Bare HPTLC

Silia*Plate* Reversed-Phase Modified HPTLC

- Silia*Plate* C18 HPTLC
- Silia*Plate* C8 HPTLC
- Silia*Plate* C2 HPTLC

Silia*Plate* Normal Phase Modified HPTLC

- Silia*Plate* NH_2 (*Amine*) HPTLC: a weak anion exchanger, ideal when dealing with charged compounds
- Silia*Plate* CN (*Cyano*) HPTLC: moderately polar, hence suitable for both normal & reversed chromatography depending on your needs
- Silia*Plate* Diol HPTLC

PREPARATIVE TLC Plates

- Silia*Plate* Prep TLG-R10011B-341 (BEST SELLER)
- Scored Silia*Plate* Prep
- Silia*Plate* C18 Prep ; $AgNO_3$ Prep ; Alumina Prep

TRIAL PACKAGES

Trial Package of Functionalized Silia*Plate* TLC Plates with Glass Backing (*5 plates of each, scored / box*)

Composition: C18, C8, C2, NH_2 & CN

ACCESSORIES

- Silia*Plate* Rectangular TLC Developing Chamber
- TLC Cutter Guide for Silia*Plate* (*up to 20 x 20 cm*)
- Pencil Glass Cutter for Silia*Plate*
- Scrapper for TLC Plates
- Silia*Plate* TLC Spotting Guide
- and others

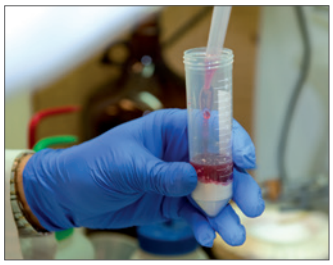
SiliaQuick™ & SiliaFast™

Sample Preparation & Pesticide Analysis

Two comprehensive solutions available from SiliCycle to simplify your sample prep and analysis: SiliaQuick™ QuEChERS and SiliaFast™ FaPEx®.

If you are frustrated with time and expenses of your sample prep & cleanup procedures, we have simple, economical, highly performant new alternatives to share with you!

SiliaQuick™ QuEChERS



The QuEChERS technique was developed in 2003 by USDA (*United States Department of Agriculture*) scientists to simplify and accelerate the analysis of pesticides in various fruit and vegetable samples. The name QuEChERS is formed by an acronym of the properties that are observed with this technique: ***Qu***ick, ***E***asy, ***Ch***eap, ***E***ffective, ***R***ugged and ***S***afe.

Initially popularized for the detection and analysis of traces of pesticides in a high throughput environment, scientists have expanded the use of this method to the analysis of a vast array of herbicides, fungicides, antibiotics, drugs and any other compounds present in a myriad of food, beverage, animal and human matrices.

The QuEChERS technique can be summarized as a three-step methodology, starting with a **Liquid Extraction**, followed by a dispersive **Solid-Phase Extraction** clean-up and completed by a **LC or GC Analysis**.

In comparison to traditional sample preparation analysis – a combination of Liquid-Liquid Extraction & Solid-Phase Extraction – the QuEChERS methodology is about 6 times faster, uses 6 - 9 times less solvent, is a safer, greener, much less costly technique, and require no additional and cumbersome apparatus (*funnels, rotary evaporators, etc.*).

SiliaFast™ FaPEx® AVAILABLE SOON!

One of the fastest extraction / clean-up approach for pesticide residue analysis

FaPEx stands for "***Fa****st* ***P****esticide* ***Ex****traction*" and may be considered as "*QuEChERS made even easier*".

This 1-step extraction method preceding LC/MS/MS or GC/MS/MS analysis will ensure you:

- **Extraction of thousands of pesticides simultaneously**
- **Reduction by at least 60 % of labor cost**
- **Up to 120 X faster than existing methods**
- **Less operating equipment, less organic solvents and waste than QuEChERS**
- **Impressive versatility**
- **High reliability**

Want to learn more?

Contact us: **sampleprep@silicycle.com**

Silia*Quick* QuEChERS Portfolio

Step 1: Liquid Extraction

Silia*Quick* QuEChERS Liquid Extraction Step		
Original Method	Buffered Methods	
	AOAC 2007.01 Method	EN 15662 Method
10 g Sample	15 g Sample	10 g Sample
4 g $MgSO_4$; 1.5 g NaCl	6 g $MgSO_4$; 1.5 g NaOAc	4 g $MgSO_4$; 1 g NaCl ; 1 g SCTD ; 0.5 g SCDS
PN: **QE-0001-100P** (*packets only*) PN: **QE-0001-100K** (*packets & tubes*)	PN: **QE-0002-100P** (*packets only*) PN: **QE-0002-100K** (*packets & tubes*)	PN: **QE-0003-100P** (*packets only*) PN: **QE-0003-100K** (*packets & tubes*)

Step 2: dSPE (*dispersive Solid Phase Extraction*)

Silia*Quick* QuEChERS dSPE Step					
Cap Color for 2 mL tubes	Matrix	2 mL tubes for small extract volumes		15 mL tubes for large extract volumes	
		AOAC 2007.01	EN 15662	AOAC 2007.01	EN 15662
Clear	**General matrices** • Apples • Bananas • Broccoli • ...	150 mg MgSO4 50 mg PSA PN: **QD-1000-2T**	150 mg MgSO4 25 mg PSA PN: **QD-1001-2T**	1200 mg MgSO4 400 mg PSA PN: **QD-2000-15T**	900 mg MgSO4 150 mg PSA PN: **QD-2001-15T**
Pink	**Pigmented matrices** • Lettuces • Peppers • Strawberries • ...	150 mg MgSO4 50 mg PSA 50 mg GCB PN: **QD-1002-2T**	150 mg MgSO4 25 mg PSA 2.5 mg GCB PN: **QD-1003-2T**	1200 mg MgSO4 400 mg PSA 400 mg GCB PN: **QD-2002-15T**	900 mg MgSO4 150 mg PSA 15 mg GCB PN: **QD-2003-15T**
Green	**Highly pigmented matrices** • Urine • Avocados • Coffee • ...	150 mg $MgSO_4$ 50 mg PSA 50 mg GCB 50 mg C18 PN: **QD-1004-2T**	150 mg $MgSO_4$ 25 mg PSA 7.5 mg GCB PN: **QD-1005-2T**	1200 mg $MgSO_4$ 400 mg PSA 400 mg GCB 400 mg C18 PN: **QD-2004-15T**	900 mg $MgSO_4$ 150 mg PSA 45 mg GCB PN: **QD-2005-15T**
Blue	**Fatty and waxed matrices** • Milk • Shrimps • Blood • Liver • ...	150 mg $MgSO_4$ 50 mg PSA 50 mg C18 PN: **QD-1006-2T**	150 mg $MgSO_4$ 25 mg PSA 25 mg C18 PN: **QD-1007-2T**	1200 mg $MgSO_4$ 400 mg PSA 400 mg C18 PN: **QD-2006-15T**	900 mg $MgSO_4$ 150 mg PSA 150 mg C18 PN: **QD-2007-15T**

Bulk Sorbents Available for Your Own Recipe Creation

Bulk Sorbents for QuEChERS			
Product		Product Number	Available Quantities
Silia*Quick*™ Anhydrous Magnesium Sulfate (*$MgSO_4$*)		AUT-0310	• 5 g • 10 g • 25 g • 50 g • 100 g • 250 g • 500 g • 1 kg • 5 kg • 10 kg • 25 kg • ... up to multi-ton! Contact us for details.
Silia*Quick*™ C18		AUT-1313	
Silia*Quick*™ Primary Secondary Amine (*PSA*)	Endcapped	AUT-0312	
	Non-endcapped	AUT-1312	
Silia*Quick*™ Amine		AUT-0412	
Silia*Quick*™ Graphitized Carbon Black (*GCB*)		AUT-0311	

Silia*Prep*™ and Silia*PrepX*™

SPE Cartridges and Well Plates

- **Wide variety of sorbents**
- **Tight particle size distribution**
- **Very good packing (*no fines*)**
- **High recovery and yield**

Silica-based and polymeric sorbents

Solid-phase extraction (*SPE*) is designed for rapid sample preparation and purification prior to chromatographic analysis.

Our Silia*Prep* (*silica-based*) and Silia*PrepX* (*polymeric*) families of SPE cartridges and well plates have been created to cover the entire spectrum of solid-phase extraction. This complete range of sorbents allows treatment of most common matrices:

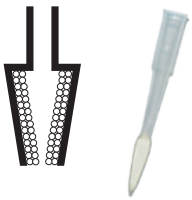
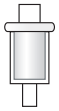
- human and animal biological fluids
- waste waters
- petrochemical residues
- toxicological residues
- food and beverage

Silia*Prep* and Silia*PrepX* products are made using state-of-the-art technology giving you the highest quality and the best lot-to-lot reproducibility. These advanced sorbents are providing you a clean extract, which reduces ion suppression and increases selectivity for LC/MS/MS applications. All our ultra pure Silia*Flash* silica gels and functionalized Silia*Bond* silica gels are available in SPE formats. Just tell us what you need!

Cartridge sizes

We can provide a complete range of SPE cartridge lengths and diameters. Please note we also offer rimless and flangeless cartridges.

Silia*Prep* Cartridge Sizes

Tips Micro SPE cartridges	Mini-Silia*Prep* SPE Cartridges		SPE Cartridges (*most standard formats*)					
	500 mg	1,000 mg	1 mL	3 mL	6 mL	12 mL	25 mL	10 mL
								

Bigger sizes (*70 mL, 150 mL & 276 mL*) are also available under Silia*Sep* OT branding.

Tips for your method development

Tips for your method development

Sorbent Type	Silica-Based (*SiliaPrep*)	Polymeric (*SiliaPrepX*)
Sorbent Capacity	Load up to 5 % of bed weight: 100 mg of silica-based sorbent will retain up to 5 mg of sample	Load up to 10 % of bed weight: 100 mg of polymeric sorbent will retain up to 10 mg of sample

- Not enough sorbent: ANALYTE LOSS => low recovery and reproducibility
- Too much sorbent: MORE EXPENSIVE => more solvent used, taller SPE cartridges
- Concentrated samples: double the bed weight to avoid analyte loss

Portfolio

Available formats

SiliaPrep Formats						
Silica Cartridges	Large Reservoir Volume Silica Cartridges	Mini-SPE Silica Cartridges	96 Well Plates Silica	Polymeric Cartridges	96 Well Plates Polymeric	Tips Micro-SPE Cartridges
• 1 mL / 50 mg • 1 mL / 100 mg • 3 mL / 200 mg • 3 mL / 500 mg • 6 mL / 500 mg • 6 mL / 1 g • 6 mL / 2 g • 12 mL / 2 g • 25 mL / 5 g	• 10 mL / 200 mg • 10 mL / 500 mg	• 500 mg • 1,000 mg	• 2 mL / 50 mg • 2 mL / 100 mg	• 1 mL / 30 mg • 3 mL / 30 mg • 3 mL / 60 mg • 6 mL / 100 mg • 6 mL / 200 mg • 6 mL / 500 mg	• 2 mL / 10 mg • 2 mL / 30 mg	• 10 µL / 30 µg • 200 µL / 75 µg • 200 µL / 400 µg • 10 µL / 4 mg • 200 µL / 10 mg • 1,000 µL / 50 mg

Also available, under Silia*Sep* OT branding: 70 mL with 10 g / 15 g / 20 g, 150 mL with 25 g / 50 g / 70 g and 276 mL with 100 g.

Available phases

SPE Cartridges & Well Plates Portfolio		
Mode	SiliaPrep Phase	Application
Reversed-Phases: non-polar sorbents	**Silia*Prep* C18 (*Plus, 17 %, WPD, nec*)**	For organic compounds from water, drugs & metabolites from fluids
	Silia*Prep* C8 (*endcapped & nec*)	For extremely non-polar and large compounds (*PAH, vitamin D, oils*)
	Silia*Prep* Phenyl & Pentafluorophenyl (*PFP*)	For aromatic compounds, complex natural products
Normal Phases: polar sorbents	**Silia*Prep* Cyano**	For acidic, basic and neutral compounds from aqueous solutions
	Silia*Prep* Silica & Silica WPD (*Widepore*)	For various compounds from non-polar solvents, structural isomers
	Silia*Prep* Diol nec	For polar compounds from non-polar solvents, structural isomers
	Silia*Prep* Florisil & Florisil Pesticide Residues	For chlorinated pesticides, PCB's and polysaccharides
	Silia*Prep* Alumina (*Acidic, Neutral & Basic*)	For aromatic compounds and aliphatic amines
Ion Exchange Phases: ionic sorbents	**Silia*Prep* SAX & SAX-2 (*TMA Chloride & Acetate*)**	For weak acidic molecules (pK_a *3 - 5*)
	Silia*Prep* Carbonate	For scavenging of TFA, extraction of acids (*boronic acids & acidic phenols*)
	Silia*Prep* WAX (*Amine*)	For strong acidic molecules (pK_a *< 3*), structural isomers, saccharides
	Silia*Prep* SCX & SCX-2 (*Tosic & Propylsulfonic Acids*)	For weak basic molecules (pK_a *7 - 9*), catch & release of amines
	Silia*Prep* WCX (*Carboxylic Acid*)	For strong basic compounds (pK_a *> 9*)
Mixed Mode & Specialty Phases	**Silia*Prep* C8/SAX-2 nec**	For isolation of acidic & neutral drugs / metabolites from physiological fluids
	Silia*Prep* SCX-2/SAX nec	For separation of acidic and basic molecules from non ionizable ones
	Silia*Prep* PCB nec	For extraction of PCB's from waste oil (*hexane extract*)
	Silia*Prep* CleanDRUG	For drugs of abuse applications
	Silia*Prep* CleanENVI	For PAH's, PCB's, herbicides and pesticides from waste waters
Polymeric Phases	**Silia*PrepX* HLB & DVB**	For drugs & metabolites from biological fluids, API from tablets and cream
	Silia*PrepX* SAX & WAX	For acidic compounds & metabolites, highly stable in organic solvents
	Silia*PrepX* SCX & WCX	For basic compounds, highly stable in organic solvents
Metal Scavengers	**Silia*Prep* Thiol**	For scavenging of various metals (*Ag, Hg, Os, Pd, Ru, etc.*)
	Silia*Prep* DMT	For scavenging of various metals (*Ir, Ni, Os, Pd, Pt, Rh, Ru, etc.*)
	Silia*Prep* Cysteine	For scavenging of various metals (*Cd, Fe, Ir, Os, Ru, Sc, Sn, etc.*)
	Silia*Prep* Imidazole	For scavenging of various metals (*Cd, Co, Cu, Fe, Ir, Li, Mg, Ni, Os, W, Zn*)

Silia*Chrom*® Plus

HPLC Columns

- **Excellent efficiency and column-to-column reproducibility**
- **Long lifetime**
- **Broad pH range from 1.5 to 9**
- **Compatibility with 100 % aqueous and organic mobile phases**
- **High surface coverage presenting no bleeding for LC/MS applications**

SiliCycle offers a wide range of chromatographic selectivities and R&D work to continually enhance our portfolio to suit our customer's requirements and offer unique and powerful new products.

Both our raw material and finished HPLC columns are QC-validated in our ISO 9001-2008 registered manufacturing facilities. Manufacturing is done following strict SOPs in order to offer exceptional column performance, peak symmetry and lot-to-lot reproducibility.

SiliCycle's unique sol-gel process technology allows us to offer complete silica-based solutions to HPLC end-users. Whether they require use under a wide range of pH values, stability with 100 % aqueous or organic mobile phases or low bleed material for LC/MS applications: we have the solution for you.

The Silia*Chrom* Plus portfolio ranges from reversed-phase to normal phase columns for analysis of acidic, neutral and basic compounds, columns for biochromatography of large molecules and SFC columns for API separation. A wide variety of column dimensions, particle and pore sizes are available to accommodate the vast majority of applications.

Silia*Chrom* Plus columns for high reproducibility

Years of research and development have led to the release of these proprietary silica-based materials for challenging separations requiring high column performance, enhanced chromatographic resolution, lot-to-lot reproducibility and extended column lifetime.

Reduced silanol activity, high surface area and lot-to-lot controlled surface coverage have indeed led to exceptional silica. The resulting HPLC columns are extremely reliable, offering high performance and peak symmetry to QA/QC laboratories and research centers. This silica gel rapidly became a popular packing material for scientists all over the world facing challenging separations on a regular basis.

In a nutshell, the Silia*Chrom* Plus series offer robust columns for everyday work.

Proprietary HPLC column packing process

Superior HPLC columns can only be produced with excellent materials and packing techniques. Silia*Chrom* Plus columns are made from extremely pure silica and are well known for their high efficiency and resolution capacity. Based on spherical, totally porous silica, Silia*Chrom* Plus columns provide enhanced chemical and mechanical stability, complete endcapping and very high loading capacity.

All Silia*Chrom* Plus columns are packed using our proprietary slurry packing process in order to achieve column-to-column reproducibility and guarantee above-average selectivity, resolution, performance, peak symmetry and lifetime when used according to the phase and material specifications.

SiliCycle is recognized for its strong expertise in column packing technology. All Silia*Chrom* Plus columns are packed using a consistent methodology to achieve an extremely stable and uniform column bed, leading to high column lifetime and column-to-column reproducibility.

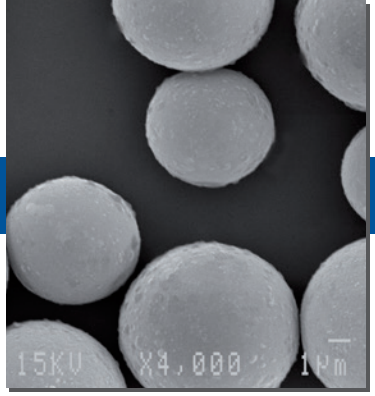
Portfolio

HPLC Columns Portfolio

SiliaChrom Plus	SiliaChrom Plus dt
For your everyday separations	**100 % aqueous compatible**
• C18 & C18-300 (*USP L1*) • C8 & C8-300 (*USP L7*) • C4 & C4-300 (*USP L26*) • PFP (*USP L43*) • Phenyl (*USP L11*) • Cyano (*USP L10*) • Amine (*USP L8*) • Diol (*USP L20*) • Silica & Silica-300 (*USP L3*) • SAX (*USP L14*) • SCX (*USP L9*)	• C18 (*USP L1*)
Main Characteristics	
• Wide range of selectivities • Ultra pure metal-free silica (*99.9999 % purity*) • High column performance and resolution • Enhanced batch-to-batch reproducibility • Extended column lifetime • Reduced silanol activity, better peak symmetry • Extremely low bleeding for LC/MS applications • Easy scale-up to preparative formats	• Ultra pure metal-free silica (*99.9999 % purity*) • High sensitivity for LC/MS • Stable from 100 % aqueous to 100 % organic mobile phase • Universal: acidic, neutral and basic analysis • Enhanced retention of hydrophilic molecules • Inertness for acidic and basic analytes

HPLC Columns Characteristics

SiliaChrom Plus Phases	Particle Size (µm)	Pore Size (Å)	Specific Surface Area (m^2/g)	Carbon Load (%)	pH Range	USP Code	T Limit (°C)	Pressure Limit (psi)
SiliaChrom Plus C18	3, 5, 10	100	370 - 430	15	2.0 - 8.0	L1	60	5,500
SiliaChrom Plus C18-300	3, 5, 10	300	80 - 120	8	2.0 - 8.0	L1	60	4,000
SiliaChrom Plus C8	3, 5, 10	100	370 - 430	8	2.0 - 8.0	L7	60	5,500
SiliaChrom Plus C8-300	3, 5, 10	300	80 - 120	5	2.0 - 8.0	L7	60	4,000
SiliaChrom Plus C4	3, 5, 10	100	370 - 430	6	2.0 - 8.0	L26	60	5,500
SiliaChrom Plus C4-300	3, 5, 10	300	80 - 120	3	2.0 - 8.0	L26	60	4,000
SiliaChrom Plus PFP	3, 5, 10	120	320 - 360	9	2.0 - 8.0	L43	60	5,500
SiliaChrom Plus Phenyl	3, 5, 10	100	370 - 430	7	2.0 - 8.0	L11	60	5,500
SiliaChrom Plus Cyano	3, 5, 10	100	370 - 430	7	2.0 - 8.0	L10	60	5,500
SiliaChrom Plus Amine	3, 5, 10	100	370 - 430	8	2.0 - 8.0	L8	60	5,500
SiliaChrom Plus Diol	3, 5, 10	100	370 - 430	7	2.0 - 8.0	L20	60	5,500
SiliaChrom Plus Silica	3, 5, 10	100	370 - 430	-	2.0 - 8.0	L3	60	5,500
SiliaChrom Plus Silica-300	3, 5, 10	300	80 - 120	-	2.0 - 8.0	L3	60	4,000
SiliaChrom Plus SAX	3, 5, 10	Proprietary information			2.0 - 8.0	L14	60	4,500
SiliaChrom Plus SCX	3, 5, 10				2.0 - 8.0	L9	60	4,500
SiliaChrom Plus dt C18	3, 5, 10	100	410 - 440	18	1.5 - 9.0	L1	60	5,000



SiliaSphere™

Spherical Silica Gels

SiliaSphere, the right choice for superior...

- **Chromatographic performance**
- **Loading capacity**
- **Reproducibility**
- **Chemical & physical stability**

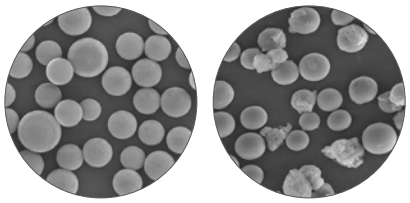
SiliaSphere as a Silica Matrix

SiliCycle has a strong know-how and expertise in silica gel manufacturing. To support the increasing demand on our spherical silicas, we have developed an optimized and highly controlled large-scale production process for all of our SiliaSphere products without decreasing the quality of the silica.

Particle shape, pore & particle size distributions, silica gel purity and surface properties, all have their influence on chromatographic performance. Therefore, in order to develop the most efficient process, all these parameters need to be evaluated and optimized to ensure batch-to-batch reproducibility.

SiliaSphere is manufactured from an organic form of silicon (*alkoxydes*). This ensures very low metal content as the starting material is purified by distillation. Deionized water is used to hydrolyze the silicon alkoxydes. Careful monitoring and control of the parameters that induce precipitation provide spherical silica gels with the desired characteristics. SiliaSphere products are characterized by a very low metal content and exceptional stability. Furthermore, our manufacturing process ensures quality and reproducibility in pore size, surface area, particle size and morphology for all SiliaSphere products.

Perfectly Spherical Particle Shape



SiliaSphere Competitor

The perfectly spherical shape of SiliaSphere silicas, combined to their smooth surfaces free of any cracks, cavities and fines make them the packing of choice for chromatography.

SiliaSphere sphericity compares favorably to well-known brands in spherical silica gel, as demonstrated by the scanning electron microscope (*SEM*) left picture.

Features and Benefits of SiliaSphere Spherical Silica Gels

- **High purity silica gels**
  Consistency, reliability & reproducibility
- **Perfect spherical shape, free of any cavities or cracks**
  Ease of column packing and high resolution
- **Exceptional narrow particle size distribution**
  Optimal separation and resolution
- **Strong mechanical stability**
  Low back-pressure without surface abrasion
- **Same well controlled processes for all SiliaSphere**
  Easy scalability
- **Availability in bulk quantities at affordable price**
  On-time delivery

Characteristics

SiliaSphere Monodispersed Characteristics						
Properties / Pore Diameter	**60 Å**	**80 Å**	**100 Å**	**120 Å**	**300 Å**	**1,000 Å**
Specific Surface Area (m^2/g)	≥ 450	≥ 450	≥ 400	≥ 300	≥ 80	≥ 20
Pore Volume (*mL/g*)	0.85 - 1.15				0.75 - 1.05	
pH (*5 % w/w*)	4 - 7					
Available Particle Sizes (*µm*)	3, 5, 10, 15	1.8, 2.2, 3, 5, 10, 15, 20	1.8, 2.2, 3, 5, 7, 10, 15, 20		3, 5, 10, 15	10, 15

Portfolio

Formats: 100 g, 500 g, 1 kg, 5 kg, 10 kg, 25 kg, etc.

Bare Monodispersed Spherical Silicas						
Particle Size (*µm*)	Pore Diameter (*Å*)					
	60 Å	80 Å	100 Å	120 Å	300 Å	1,000 Å
1.8	N/A	S10001F-A	S10001E-A	S10001G	N/A	N/A
2.2	N/A	S10002F-A	S10002E-A	S10002G	N/A	N/A
3	S10003B	S10003F-A	S10003E-A	S10003G-A	S10003M	N/A
5	S10005B	S10005F-A	S10005E-A	S10005G-A	S10005M	N/A
7	N/A	N/A	S10006E-A	S10006G-A	N/A	N/A
10	S10007B	S10007F-A	S10007E-A	S10007G-A	S10007M	S10007T
15	S10008B	S10008F-A	S10008E-A	S10008G-A	S10008M	S10008T
20	N/A	S10009F-A	S10009E-A	S10009G-A	N/A	N/A

Most Popular Bonded Phases			
Mode	Normal (*NP*)	Reversed (*RP*)	Ion Exchange (*IEX*)
Mode Mechanism	Polar or hydrophilic	Non-polar or lipophilic / hydrophobic	Ionic
Typical Stationary Phase	Bare silica or polar functionalized silica (*Amine, Cyano or Diol*)	Functionalized silica (*mostly C18, C8, C4, Cyano, Phenyl and PFP*)	Ionic functionalized silica (*SAX, SCX, WAX, WCX*)
Stationary Phase Polarity	Polar	Non-polar	Anionic or cationic exchanger
Typical Mobile Phase	Non-polar organic solvents such as hexane, dichloromethane, THF	Mixtures of water or aqueous buffers and organic solvents (*mostly ACN, MeOH, THF*). Ion pairing agents can also be added.	Water, buffers, acid, base
Mobile Phase Polarity	Non-polar	Polar	Buffer or ionic

Typical Applications of Most Common Phases				
Sorbent Phase	Mode			Typical Applications
	NP	RP	IEX	
C18		X		Great start for method development. Presents the maximum retention of non-polar compounds. Typically used for peptides, pesticides, PCBs, PAHs, drugs, etc.
C8		X		Presents less retention compared to C18. Mainly used for highly hydrophobic pesticides, small peptides and heavy drugs.
C4		X		Presents less retention compared to C18 and C8. Widely used for molecules with large hydrophilic regions such as peptides, proteines and zwitterions (*in 300 Å*).
C1		X		Lower retention compared to other reversed-phases. Used for the purification of polar and non-polar pharmaceutical products, highly hydrophobic molecules.
Phenyl (*PHE*)		X		Moderate non-polar sorbent with different selectivity for aromatic compounds compared to other non-polar sorbents.
Pentafluorophenyl (*PFP*)		X		For a new selectivity approach or the purification of conjugated compounds (*isomers*).
Cyano (*CN*)	X	X		**In normal phase**: less polar sorbent compared to silica, used for the purification of polar organic compounds. **In reversed-phase**: moderate non-polar sorbent with less hydrophobicity than C18 or C8. Purification of cyclosporine and carbohydrates.
Diol	X			Moderate polar sorbent with a neutral character. Used to extract polar compounds. Alternative to silica when acidic character is problematic.
Silica	X			Most polar sorbent with a slight acidic character. Used for purification of polar and non-ionic compounds.
Amino (NH_2) (*WAX*)	X		X	**In normal phase**: polar sorbent with a basic character, with less retention and a different selectivity for acidic / basic compounds compared to silica. **In ion Exchange mode**: a weak anion exchanger with 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 retained irreversibly on SAX.
Tosic Acid (*SCX*)			X	Due to the very low pK_a (< *1*), this silica is a strong cation exchanger. The most common use is likely for catch and release purification of weak cations.
TMA Chloride (*SAX*)			X	The quaternary amine is permanently charged and commonly used for the extraction of weak anions that may not bind strongly enough to weaker anion exchangers (*WAX*).
TMA Acetate (*SAX-2*)			X	The acetate counter ion is easier to exchange compared to the chloride ion. It is used for compounds with pK_a < 5, such as carboxylic acids, or to selectively purify acidic compounds or remove acidic impurities from reaction mixtures.

SiliCycle R&D Services

We thrive on making your projects come to life!

- **We listen. We understand. We work with you**
- **We are flexible, commited, reliable, innovative, fast & affordable**
- **Our objective: invest our experts' talent in your very own expertise**
- **Assistance to start-ups & young tech companies**
- **Wide range of services offered**

SiliCycle is a leading service provider, offering turnkey solutions based on its long expertise in organic chemistry, catalysis, material science and analytical chemistry. We are recognized worldwide for the development, the manufacturing and the commercialization of high value silica gels and specialty products for chromatography, analytical and organic chemistry.

Our Scientific Team Expertise & Talents

- **Analytical Chemistry**
  - Analytical method development and optimization (*HPLC, GC, etc.*)
  - Extraction of natural compounds
  - Sample preparation using various techniques (*SPE, QuEChERS, etc.*)
- **Medicinal & Organic Chemistry**
  - Total synthesis of natural products, active ingredients and small molecules
  - Synthesis of very elaborated heterocycles, building blocks and complex intermediates
  - Enantioselective total synthesis and asymmetric catalytic synthesis of various compounds
  - Boronic acids, fluorine and peroxide-based chemistries
  - Green chemistry and organic chemistry in water
- **Catalysis & Organometallic Chemistry**
  - Homogeneous and heterogeneous catalysis (*coupling, hydrogenation, oxidation, etc.*)
  - Development of solid-supported catalysts
- **Chemical Engineering, Material Chemistry**
  - Encapsulation of active ingredients in various matrices
  - Materials characterization using various techniques
  - Surface modifications and functionalization of materials
  - Synthesis of organosilanes and organosilicon compounds

Certification

As a certified ISO 9001-2015 company, we have rigourous quality system in place: all procedures and employees are in line to assure you ultimate quality and an unbeatable customer service.

R&D Services overview

We offer R&D services to pharmaceutical & medicinal industries, to drug discovery, development & manufacturing markets, to analytical, clinical & QC labs, official organizations as well as academic & government institutions.

Our R&D Services are categorized into 7 streams:

Metal & Organic Scavenging Screenings

- Best Screening Conditions Evaluation
- Process Scale-Up & Transfer to Production

Synthetic Chemistry Services

- Custom Chemical Synthesis
- Catalysis Services
- Process Services

Separation Center

- Compound Extraction & Sample Preparation
- Method Development, Optimization & Transfer
- Impurity Isolation & Structure Elucidation

Custom Column Packing

- Exotic Phases & Column Dimensions Available
- Packing of Custom-Made Phases
- Batch Reservation

Material Science

- Grafting & Encapsulation
- Optimization of Grafted Catalysts
- Customized Particle Size Distribution

Analytical Laboratory & Quality Control

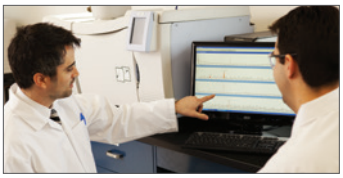
- Cost-Effective Quality Control Support
- SOPs
- Regulatory Compliance Assistance

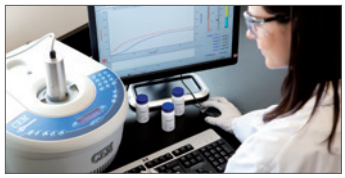
Facility & Lab Infrastructure

Built in 2009 and located in Quebec City (*Canada*), the SiliCycle Headquarters is a new cutting-edge plant with a multi-ton scale manufacturing capability. Since its construction, SiliCycle has been successfully audited on numerous occasions (*more than 100 audits*).



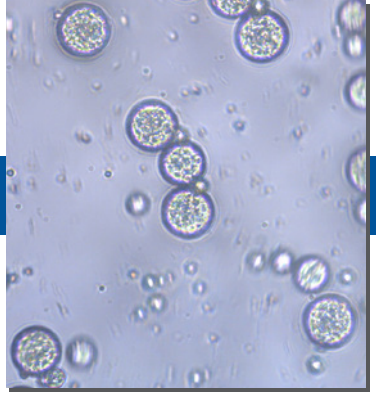

With state-of-the-art instrumentation park in the areas of chromatography, spectroscopy and manufacturing combined to an application support laboratory, we are devoted to extend your R&D and make your project a success.



Contact us

Email: **services@silicycle.com**



in silica™ technologies

Silica Microspheres for Ingredient Sequestration

***in silica*™ microspheres technology enables breakthrough applications by sequestrating actives & volatile ingredients.**

How to improve a high-value ingredient

in silica™ serves the ingredients that need better efficiency, safety and cost / benefit ratio. This technology associates your high-value ingredient with scientifically selected silicas to form versatile micron-sized spherical particles. The resulting composite material grants increased stability, controlled release, easier formulability and proprietary competitive advantages to your original volatile or active. *in silica*™ aims to enable breakthrough cosmetics, perfumes and drugs.

Features & benefits

***in silica*™ is**:

- **Silica-made**
- **Porous microspheres**
- **Ingredient sequestered during syntheses**
- **Environment-friendly**
- **1 to 100 microns spheres loaded with up to 75 % of ingredient**

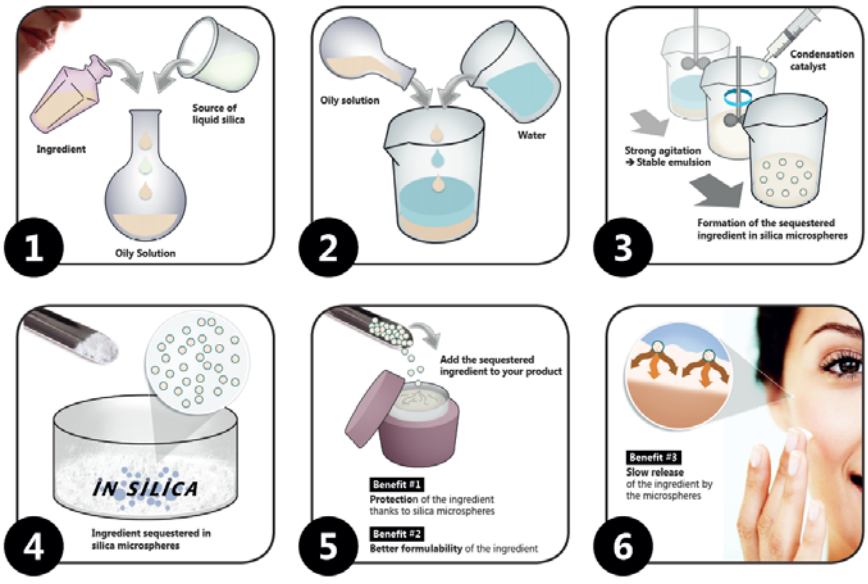
***in silica*™ is not**:

- **Polymer**
- **Core-shell capsules**
- **Impregnation**
- **Regulatory banned**
- **Nanoparticle**

in silica™ can improve sensitive ingredients, volatiles, essential oils, synthetic fragrances, vitamins and other hydrophobic actives (*for example, retinol*) with:

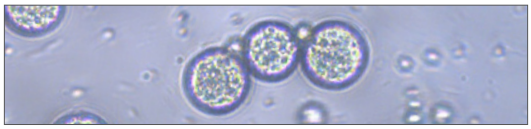
- **protection** against degradation
- **slow release** for increased safety and efficacy (*progressive desorption, indirect contact*)
- **flexibility** in formulation of unstable, oxidable or viscous ingredients (*incorporating lipophilic actives in aqueous formulations*)
- **modulated desorption** for novel olfactory experiences (*variation in duration, intensity and desorption order*)
- **ingredient's integrity** (*no heating required*)
- **cost-efficiency** gains (*less material for desired activity level*)
- **regulation-compatible** material, process and products

How it works



What it looks like

The micron-sized particles show a neat, spherical morphology, without nano debris.



The ingredient creates its own three-dimensional pore network during emulsion.

The end-of-process composite material is a fine and silky powder. Other ready-to-formulate forms available on demand.

Portfolio

Take advantage of *in silica*™ microspheres technology

- **Quick Proof**™
  You send 500 g of your ingredient, we design a microsphere around it, it comes back to you within weeks with basic characterization. It will establish how your difficult-to-formulate ingredient or your precious volatile can benefit from *in silica*™.
- **Rapid Improv**™
  You send 1.5 kg of your ingredient, we treat it with an adapted panel of various silicas and processes, it comes back to you within a month. It will establish the optimal path of improvement of your ingredient with extensive analytical pack.
- **Tailored R&D**
  A program designed specifically for your ingredient and its purposes.
  Price and duration to be determined.
- **Ingredient Manufacturing**
  SiliCycle manufactures tailored microspheres containing your ingredients for gram-scale experimental lots up to production runs.

Rétinol Véritable™ NEW

Rétinol véritable™ is a novel product of SiliCycle coming from *in silica*™ technologies.

- pure retinol stabilized by porous silica microspheres
- without any undesirable or nocive additives

This ingredient benefits from the technology added value, such as a strong protection against degradation. The molecule also benefits from the controlled desorption, which limits skin irritation since there is no high dose contact.

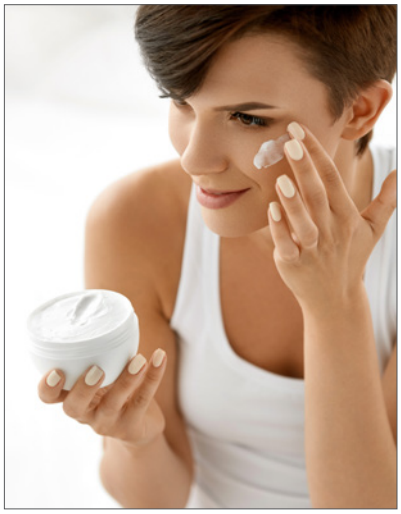
SiliCycle's approach enable breakthrough anti-aging cosmetics in a world leaning on pure and neutral skincare products.

Exfoliating Silicas

Silicas are an environmentally friendly alternative to plastic microbeads banned for the manufacturing of personnal care products.

We offer safer and sustainable substitute silicas as exfoliating agents for your formulation.

Exfoliating Silicas	
Property	**Specifications**
Particle Size Available	• 100 µm • 150 µm • 200 µm • 300 µm • 500 µm
Volatile Content	≤ 8 %
SiO_2	≥ 99.0 %



Contact Us

Email: **insilica@silicycle.com**

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@in_silica

Specialized Services in Extraction & Purification

SiliCycle, your partner of choice when it comes down to active ingredients from various biomasses

Our Extraction & Purification Division offers services to help other companies to develop or purifiy their products.

Amongst our most requested services are:

- **Water or organic extraction of various molecules**
- **Enrichment and fractionation for ingredients**
- **Purification processes from laboratory to semi-industrial level**
- **Development of analytical methods to reach the requested purity**

For example, we offer:

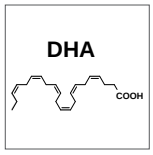
- The **development of extraction processes** from different biomasses, either animal or vegetal

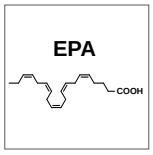


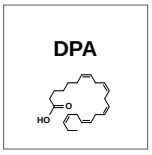

- The **refining and purification** of natural oils enabling us to reach **ultra-high grade of purity**




- The production of **health ingredients** like Omega-3 and Polyphenols





- The **extraction of essential oils and hydrosols** from the boreal forest




- Validated technologies to **scale up processes** from laboratory to industrial level




Capabilities & Equipment

Overview of some equipments:

- **Alembics** (*30 L, 180 L & 1,300 L*)
- **Blenders, Grinders & Mixers** (*various sizes*)
- **Centrifuge Filtration Devices** (*various sizes*)
- **Rotary Evaporators** (*various sizes*)
- **Lyophilization / Freeze Drying Equipments** (*5 L & 5,600 L*)
- **Reactors & Fermentation Tanks** (*up to 4,000 L*)
- Several Instruments for **Analysis, Chromatography & Purification**










Contact us

Email: **extraction-purification@silicycle.com**

Essential Oils

Science Grows within our Boreal Forest

Our Expertise

Our strengths reside in our privileged access to plant resources and in the production of essential oils of superior quality, that are certified 100 % organic, pure and natural. Our research and analysis platform allows precise and rigorous characterization of essential oils.

Our Products & Recommended Area of Use

Recommended Areas of Use						
Essential Oils	Major Properties	Aromatherapy	Cosmetics	Soaps / Cleaning	Food (*gastronomic*)	Biocide / Repulsive
Labrador Tea	Anti-inflammatory, decongestive, healing agent, detoxifying	✓	✓	✓	✓	✓
Sweet Gale	Respiratory antiseptic, mucolytic / expectorant, anticatarrhal	✓	✓		✓	✓
Sweet Fern	Astringent, antibacterial, strong food aromatic potential, anti-inflammatory	✓	✓		✓	✓
Balsam Poplar	Anti-inflammatory, antiseptic, anti-allergenic, healing agent, skin soothing	✓	✓		✓	
Jack Pine	Hypertensive, airways opener, stimulant, anti-infectious, antiseptic	✓				
Balsam Fir	Decongestant, mucolytic, antiseptic, anti-inflammatory, antispasmodic	✓	✓	✓	✓	
Black Spruce	Anti-inflammatory, antispasmodic, anti-infectious, antiparasitic	✓	✓	✓		

Harvest Calendar

Harvest Calendar												
Essential Oils	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Labrador Tea												
Sweet Gale												
Sweet Fern												
Balsam Poplar												
Jack Pine												
Balsam Fir												
Black Spruce												

Certification

Our products are certified organic by Ecocert ICO and USDA. Furthermore, harvest and transformation are certified ISO 14001 which guarantees environmental responsibility and contributes to sustainable development.

Our Products

Bog Labrador Tea
(*Ledum groenlandicum*)

Sweet Gale
(*Myrica gale*)

Sweet Fern
(*Comptonia peregrina*)

Balsam Poplar
(*Populus balsamifera*)

Jack Pine
(*Pinus banksiana*)

Balsam Fir
(*Abies balsamea*)

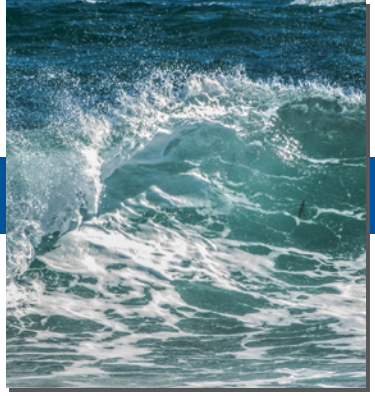
Black Spruce
(*Picea mariana*)

Our Services

- **Steam and water distillation & custom extraction**
- **Distillation testing and extraction**
- **Essential oils analysis**

Contact us

Email: **extraction-purification@silicycle.com**



Marine Extracts & Omega-3

When marine natural raw material of highest quality adds up with Silicycle's purification expertise

What we offer:

- **Ultra-Pure Fatty Acids**
- **Purified Marine Extracts**

Extracted from:

- **Fish**
- **Crustaceans**
- **Phocidae**
- **Algae**
- **Various Marine Sources**

Our Omega-3

Omega-3 fatty acids (*also called ω-3 fatty acids or n-3 fatty acids*) are polyunsaturated fatty acids (*PUFAs*) with a double bond at the third carbon atom from the end of the carbon chain.

The three types of omega-3 fatty acids involved in human physiology are α-Linolenic Acid (*ALA*), found in plant oils, Eicosapentaenoic Acid (*EPA*) and Docosahexaenoic Acid (*DHA*), both commonly found in marine oils.
More recently, Docosapentaenoic Acid (*DPA*) is recognized as a potent essential fatty acid, acting as a metabolic pool which can be either transformed in EPA or DHA.

Marine algae and phytoplankton are the primary sources of DHA and EPA. Seal oil (*Phocidae*) is the richest source of DPA, which is absent from most fish oils.

Mammals are unable to synthesize omega-3, but can metabolized them by using the shorter chain omega-3 fatty acid ALA, from their diet, to produce longer chains omega-3 fatty acids like EPA and DHA.

SiliCycle offers a broad spectrum of essential fatty acids from different marine sources, which can be standardized either on the total omega-3 content or any of the individual omega-3 fatty acid normally found in marine biomasses (*mainly EPA, DHA and DPA*). SiliCycle is mastering extraction and purification of omega-3 fatty acids, easily achieving pharmaceutical grade standards (*≈ 99 % purity, X-Pure Omega*).

Available products

- 18 - 23 % Omega-3 Fatty Acids (*from Phocidea*)
- 50 - 60 % Omega-3 Fatty Acids (*from various marine sources*)
- 75 - 85 % Omega-3 fatty acids (*from various marine sources*)
- 75 - 97 % DHA, EPA or DPA (*from various marine sources*)

Vegetal Extracts & Natural Ingredients

SiliCycle offers a range of vegetal extracts using water as the only solvent, which can be sold either on a liquid or a dried solid form.

This gentle way of extraction is selectively extracting molecules soluble in water, leaving less soluble molecules within the by-product generated from this first extraction. SiliCycle also has the setup to do water-ethanol extraction, either on fresh material or from these first generated by-products, to extract other valuable molecules which would not have been extracted by water only.

All the raw materials used for these extractions are from different parts of the plants and trees from the boreal forest (*flower, stem, root, bark, gum, cones and needles*), which were used traditionally by the First Nations of Canada to treat different ailments.

What we offer:

- **Essential Oils & Hydrosols**
- **Purified Vegetal Extracts**

Extracted from:

- **Plants and Trees of the Boreal Forest**

X-Pure Omega

Fatty Acids for Cell Culture Supplementation

- **99 %+ pure**
- **Certified sterile**
- **Packaged in convenient re-sealable twist cap vials**
- **Purified with SiliCycle's innovative technology**
- **Provided with an unparalleled quality of service**

Current Cell Culture Situation

Mammalian cells are routinely cultured using a usual basal medium that is a bicarbonate-buffered isotonic aqueous solution, with high level of glucose supplemented with vitamins as well as essential amino acids. It is boosted with bovine calf serum (*up to 10 %*) and customized with a set of purified growth factors and antibiotics.

It was recently highlighted that there is a severe lack in the composition of such cell culture medium. Effectively, they are deficient in one of the paramount cell components: essential fatty acids.

X-Pure Omega for Cell Culture

Omega ω-3 and ω-6 fatty acids are essential to maintain the homoeostasis of the human body. As we know, every cell needs essential fatty acids in order to function properly. Yet, there is only trace-levels of essential fatty acids in common fetal bovine serums and calf serums. As a result, the lipid composition of cultured cell membranes is not physiological and contains mainly saturated fatty acids, also known as *"bad fat"*. This has leaded scientists to study the effects of essential fatty acid supplementation on many cell types, and outcomes have been well documented in vivo and in vitro.

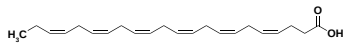
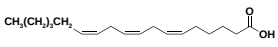
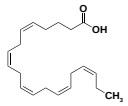
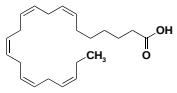
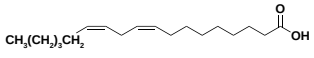
SiliCycle's X-Pure Omega polyunsaturated fatty acids (*PUFAs*) are 99 %+ pure ; certified sterile and provided in convenient re-sealable twist cap vials. You now have access to X-Pure Culture Omega: a product pipeline specifically designed to be used as a cell culture supplement.

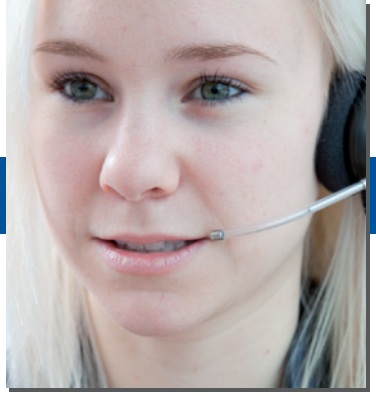
Applications

Examples of cell types than can be supplemented with X-Pure Omega:

- **Adipocytes**
- **Cancer cells**
- **Cardiomyocytes**
- **Endothelial cells**
- **Fibroblasts**
- **Keratinocytes**
- **Macrophages**
- **Microglia**
- **Smooth muscle cells**

X-Pure Omega Portfolio

Polyunsaturated Fatty Acids		
Type	**Product**	**Structure**
Omega-3	**Docosahexaenoic Acid (*DHA*)** 22:6	
	Linolenic Acid 18:3	
	Eicosapentaenoic Acid (*EPA*) 20:5	
	Docosapentaenoic Acid (*DPA*) 22:5	
Omega-6	**Linoleic Acid** 18:2	



Contact Us

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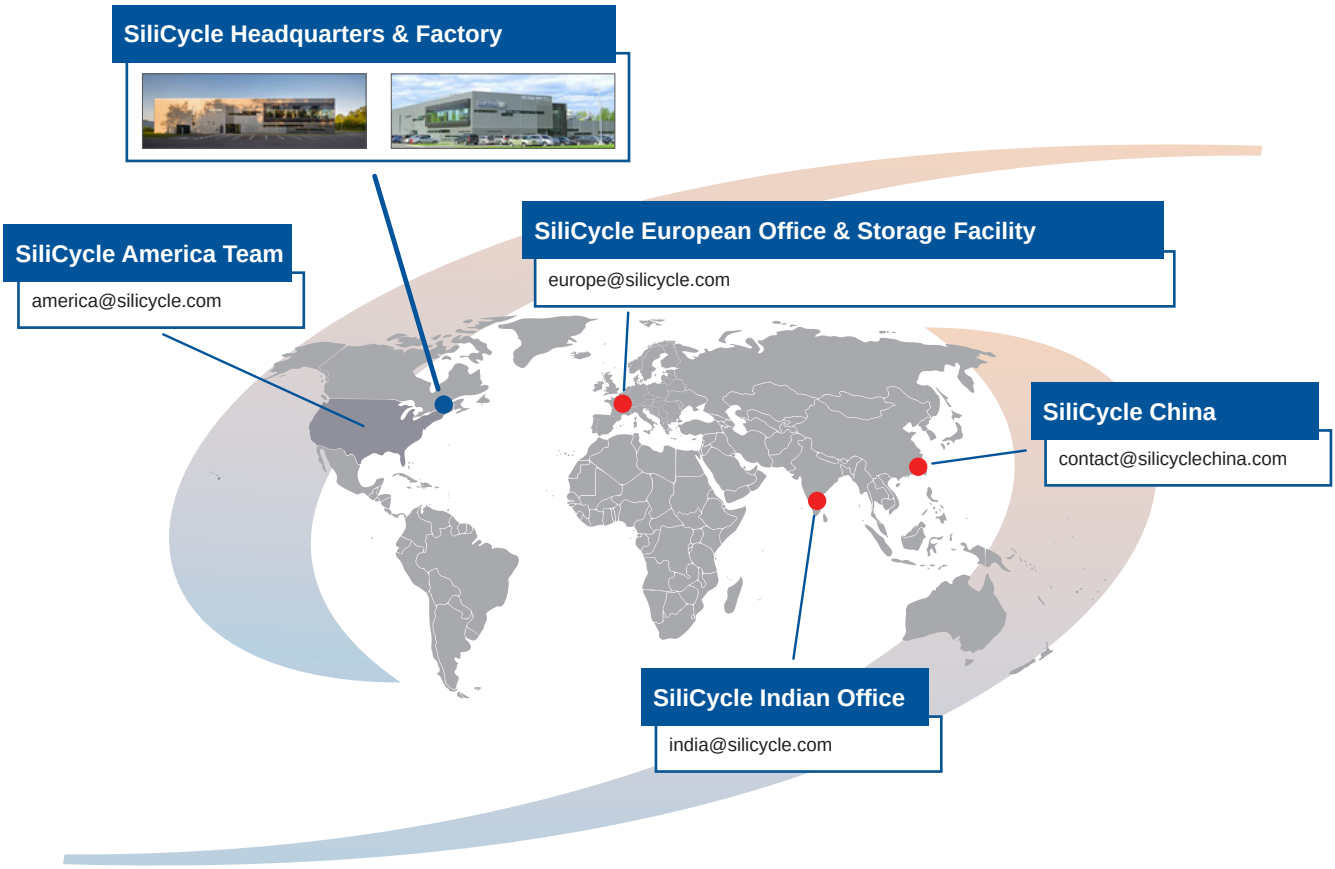


Technical Support

At SiliCycle, we are committed to providing the best technical support possible. Our worldwide Technical Support Group is comprised of a team of highly qualified M. Sc., Ph. D. Chemists and Engineers, Technical Support Professionals and Service Coordinators who are prepared to troubleshoot, answer questions and provide solutions for your service and applications needs.

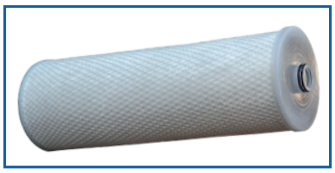
In order to better respond to your technical inquiries, feel free to contact us in three different ways:

E-mail: **support@silicycle.com**

Phone:
- International **+1 418.874.0054**
- USA and Canada **+1 877.745.4292** (*Toll-Free*)

Founded in 1995, SiliCycle® Inc. is specialized in the development, manufacturing and commercialization of high value silica-based and specialty products for chromatography, analytical and organic chemistry.

E-PAK®: FLOW CARTRIDGES FOR METAL REMOVAL NEW

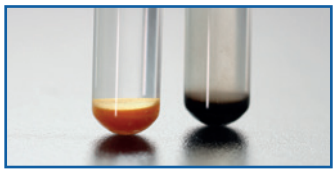


- Eliminates the use of insoluble particulates in reactors
- High adsorption capacity and flow rate
- Various sizes available for easy scale-up from lab to industrial scale

METAL & ORGANIC SCAVENGING

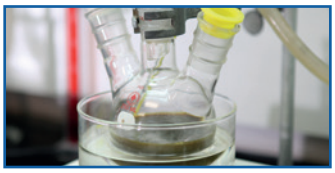
Removal of:
- Metals
- Electrophiles & Nucleophiles
- Potential Genotoxic Impurities (*PGI*)
- Other organic residues

CATALYSIS & SYNTHESIS



- Couplings (*Suzuki, Stille, Heck, ...*)
- Debenzylations & Hydrogenations
- Oxidations
- And Many More Reactions

ACIDS, BASES & REAGENTS



- Acido-basic Reactions
- Amide Couplings
- Reductive Aminations
- Other Reactions

SAMPLE PREPARATION

- SPE & Well Plates
- Micro-SPE Tips
- QuEChERS & FaPEx NEW
- SPE Hardware & Manifold

HIGH PRESSURE CHROMATOGRAPHY

- Bulk Sorbents
- HPLC Columns
- SFC Columns
- Guard Cartridges & Accessories

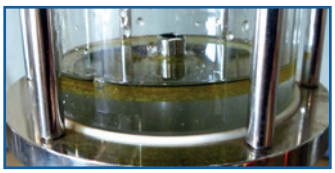
EQUIPMENTS

- Personal Parallel Synthesizer: MiniBlock® & MiniBlock® XT
- Vacuum Manifold

LOW PRESSURE CHROMATOGRAPHY

- Bulk Silica Gels (*Irregular & Spherical*)
- Bonded Phases
- TLC Plates
- Pre-packed Flash Cartridges

EXTRACTION & PURIFICATION NEW



- Extraction & Purification Services
- Essential Oils
- Purified Natural Extracts
- Extra-Pure Omega-3

R&D SERVICES

- Scavenging Screening
- Method Development & Optimization
- Impurities Identification
- Custom Column Packing

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