

WE PROVIDE  
SOLUTIONS  
TO THE GLOBAL  
CHEMICAL INDUSTRY





## Metal Scavengers and Organic Scavengers – SiliaMetS® & SiliaBond®

Removal of post-reaction impurities, among others, has become a major issue in the pharmaceutical industry. SiliCycle is a pioneer in metal and organic scavenging solutions. We have nearly two decades of expertise in silica-grafting and scavenging technologies, and the broadest portfolio of scavengers. Purification of APIs by traditional methods (*chromatography, activated carbon, distillation, etc.*) often have drawbacks such as high costs, time loss, low efficiency and reduced final yields.



## R & D Services from SiliCycle

SiliCycle offers R&D Services based on its expertise in Catalysis, Material Science, Organic and Analytical Chemistry. Our team is composed of experts who specialize in each one of these fields.

### Metal scavengers screening services

Having problems removing any leftover metal catalyst? Our Metal Scavenger Screening Services are innovative and provide on-hand solutions to the pharmaceutical and fine chemical industries. Working with a product that needs to be free of residual metals and requires restricted synthesis conditions (*solvent, humidity, temperature*), SiliCycle's experts will quickly develop the most efficient metal scavenging process (*time and cost savings*). Since most cases involve working with APIs or other patented materials, we will always work and ensure an easy technology transfer under a confidentiality agreement.

### Portfolio of services

- **Scavenging screening**
  - Metal scavenging
  - Electrophile & nucleophile scavenging
  - PGI scavenging
- **Catalysis services**
  - Catalyst evaluation, testing and scavenging
  - Catalytic process optimization
  - Scale-up of catalytic reactions
  - Tailor-made catalyst development to fit your requirements
  - Scavenging of residual metal catalyst
- **Organic services**
  - Small batch synthesis of active ingredients or intermediates
  - Synthesis pathway optimization
  - Literature research for synthetic feasibility
  - Scale-up of existing or new reactions
- **Chromatography, purification & analytical services**
  - Method development & optimization
  - Sample preparation optimization
  - Method scale-up or preparative chromatography
  - Impurities determination
  - Compound extraction or isolation
- Polyphenols and omega-3 purification
- Material science services
- Custom HPLC packing services

To overcome these drawbacks, SiliCycle has developed two families of scavengers that have significantly improved how chemists can purify APIs: SiliaMetS metal scavengers and SiliaBond organic scavengers.

The backbone of all those products is SiliCycle's SiliaFlash® F60 (40-63 µm, 60 Å) (*our UltraPure bare silica gel*) which provides superior performance for all types of applications, due to its narrow particle size distribution and exceptional purity. What's more, we can provide different particle sizes or pore diameters on a custom basis.

### SiliaMetS and SiliaBond, your final scavenging solution

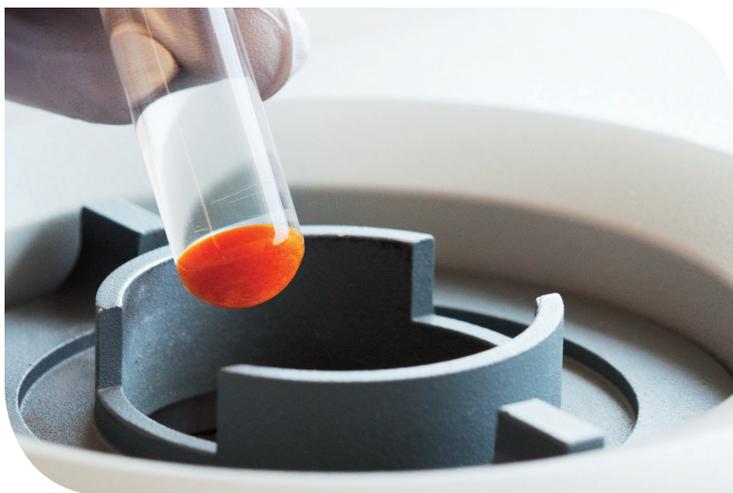
- Highly selective and cost-effective alternative for the removal of impurities
- Experience team to help you develop and optimize your conditions
- Free of leaching
- High selectivity for total recovery of the API
- Fast kinetics even at r.t. for maximal time-saving
- Excellent thermal and mechanical stability
- Compatibility with flow chemistry and microwave
- Available in both bulk and fixed bed mode
- Kits available for initial screenings

## Heterogeneous Catalysts - SiliaCat®

Are you familiar with SiliCycle's silica-supported heterogeneous catalysts? Gathered under the SiliaCat brand, which are made using an innovative technology, consisting of an organically modified silica matrix, described as a sol-gel hybrid organic-inorganic material. The properties related with these catalysts include:

- High thermal and mechanical stability
- High reactivity and excellent selectivity.

The SiliaCat family is an essential tool in the chemical manufacturing industry, as it opens the door for a "Green" and environmentally friendly synthetic route development. Recyclable and almost leach-proof, their use significantly reduces the amount of waste generated, eliminating costly downstream treatments. Because of the properties stated above, these heterogeneous catalysts are less hazardous to human health. And since they are supported, they significantly reduce the amount of handling and decrease the risks of accidents associated with the use of their homogeneous analogs.



**These catalysts can be used in a wide range of reactions such as:**

- Couplings (Suzuki, Stille, Heck, Sonogashira, Kumada, etc.)
- Selective debenzoylation
- Hydrogenation, like squalene to squalane
- Hydrosilylation
- Oxidation

**SiliaCat catalysts portfolio:**

- **DPP-Pd**, diphenylphosphine palladium (II) heterogeneous catalyst
- **S-Pd**, thiol-based palladium (II) heterogeneous catalyst
- **Pd<sup>0</sup>\***, a Pd nanocatalyst made from highly dispersed Pd<sup>0</sup> nanoparticles encapsulated within an organosilica matrix
- **Pt<sup>0</sup>\***, made from nanostructured platinum (0) particles encapsulated via an alcohol sol-gel process
- **TEMPO\***, made from proprietary class organosilica-entrapped radicals

Please do not hesitate to contact us to find out what our catalysts can do for you.



## Silica Gels for Chromatography - SiliaFlash®

Synthetic silica is primarily composed of silicon dioxide and has become indispensable in today's world, in regard to its exceptional chemical stability. Consequently, uncountable commercial applications are now relying on silica. For instance, it is the most widely used stationary phase for chromatography.

For nearly two decades, SiliCycle has been exploring silica's great possibilities and versatility in order to challenge new technologies.

In our quest to improve and provide the best quality products, SiliCycle has continuously reviewed how it can make the difference, with the largest selection of silica of different shapes and sizes on today's global market. We are recognized as a worldwide leader for our outstanding quality silica gel, let us prove to you how we distinguish ourselves from the competition!

**Features and benefits of SiliaFlash:**

- High purity silica gel
- Outstanding quality due to our closely controlled manufacturing process
- Reproducible properties (*chemical, physical and structural*)
- High loading capacity
- No scale-up limitation
- Tightest particle size distribution of the market
- Low trace metal content
- Controlled water level content
- Neutral pH & high surface area
- Flash chromatography grades of 40 µm and, above all, exempt of fines (*small particles under 10 microns*):
  - No clogging or increased back-pressure
  - No particle passing through the filter
  - More regular, stable and reproducible chromatography
  - Faster and more even flow rate for better separation



## Pre-packed Flash Cartridges – SiliaSep™

Fast, reliable & selective. Add these features to a top grade silica gel and you will find a pre-packed flash cartridge that will allow you to achieve great peak resolutions time and time again.

**SiliaSep cartridges offer you all you need to perform in your lab:**

- Fast, reliable, easily reproducible & selective
- Sustains high pressures without leaking
- A choice of two grades of silica gels (40-63 & 15-40 microns)
- A wide array of phases
  - Reversed & normal phases
  - Ion exchangers
  - Metal and organic scavengers
  - Etc.
- Wide choice of sizes
  - From: 4 g to 1.6 kg
- Innovative packing technology
- Cartridge designed to fit any flash system

### Process purification cartridges

- Cartridge sizes from: 2.5 kg, 5 kg & 41 kg
- Compatible with Biotage Flash™ 150 and 400 systems
- Higher plate count (*N*) and smaller plate height compared to similar cartridges
- Superior yields and resolution compared to OEM Cartridges

If your laboratory's high throughput demands require results that are processed quickly, SiliaSep columns are the best partners for your venture. Want more information? Contact us for more details.



## Thin Layer Chromatography (TLC) Plates – SiliaPlate™

Over the years, TLC plates have become scientists' best friend for quick, simple, versatile and inexpensive analysis for separation & identification of chemicals. Applications range from reaction monitoring to sample preparation, and include compound purity evaluation, optimization of chromatographic conditions, quantitative analysis and much more.



Because no plate is universal for all possible applications, SiliCycle has been offering the best and most diversified portfolio of TLC plates.

SiliaPlate TLC plates represent an efficient yet economical alternative to other TLC manufacturers, while demonstrating famous separation performance and robustness. Let us prove you our commitment to excellence.

### Why choose SiliCycle as your partner of choice for your chromatography needs:

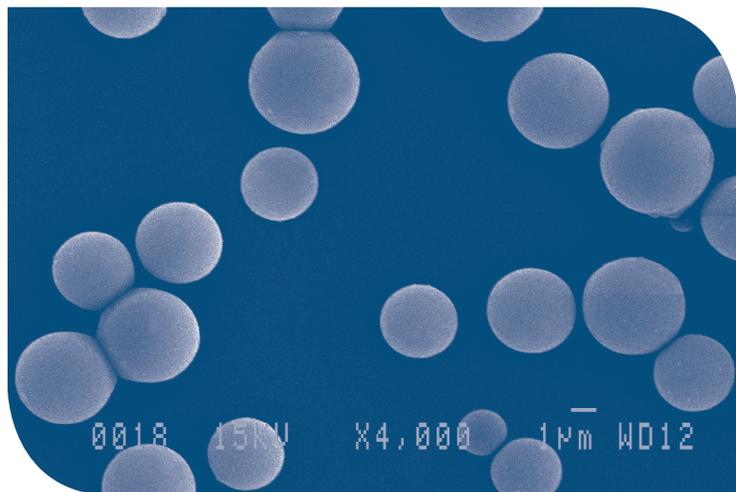
- Made with extra-hard coating to ensure no cracking or blistering
- Smooth, uniform and dense layer to maximize separation efficiency
- Unsurpassed batch-to-batch consistency
- Separation conditions optimized by using the same silica gel as in your flash cartridges

### Our offering and key features:

- Classical, high performance and preparative TLC
- Wide range of backings: glass, plastic and aluminum
- Various adsorbents available: silica, alumina and cellulose
- All plates made of a unique gypsum binder or special inorganic hardening agent
- All plates available with or without UV indicator (*F254*)
- Wide range of modified layers also available: CN, Diol, NH<sub>2</sub>, C18, C8, C2, Silver nitrate, etc.
- TLC accessories available (*cutters, chambers, etc.*)

# Bulk HPLC & Preparative Spherical Medias - SiliaSphere®

For two decades, SiliCycle has been dedicated to silica gel manufacturing and has achieved a strong know-how and recognized expertise in this field. Furthermore, we have developed and optimized a highly controlled, large-scale, production process for all our SiliaSphere products, without compromising silica quality.



SiliaSphere silica gels are manufactured from an organic form of silicon (*alkoxydes*). This silica is characterized by very low metal content and exceptional stability. Even at extreme pH levels, the raw material is purified by distillation and deionized water is used to hydrolyze the silicon alkoxydes. Our manufacturing process ensures quality and reproducibility for characteristics such as:

- Particle shape and morphology
- Pore and particle size distribution
- Purity

Because every detail has crucial impact on your chromatographic performance, all previously mentioned parameters of our SiliaSphere silica gels are consistently and carefully monitored to ensure batch-to-batch reproducibility and efficiency.

## SiliaSphere bulk media features:

- Recognized leader of high quality spherical silica gels, for analytical and preparative chromatography
- One of the best silica on the market with unbeatable performance
- Broadest portfolio of chromatographic phases
- Wide range of formats for all purification scales

## SiliaSphere silica characteristics:

- **Phase:** C18, C8, C4, C1, Silica, Amine, Cyano, Diol, PFP, Phenyl, SCX, SAX-2, etc.
- **Particle size:** 1.8, 2.2, 2.5, 3, 5, 7, 10, 20 µm
- **Pore size:** 60, 80, 100, 120, 150, 300, 1 000 Å



## HPLC Columns - SiliaChrom®

With over 40 different phases (*and we continue to develop additional, unique and powerful HPLC sorbents*) our SiliaChrom series of HPLC columns surely has the reversed, normal or specialty phase you need for your application. We carefully monitor all our manufacturing processes, from raw material synthesis to packing.

All columns are packed using a consistent proprietary packing process to achieve a uniform and stable bed, for a long lifetime and column-to-column reproducibility. The SiliaChrom HPLC portfolio offers a broad variety of selectivities for various types of chromatography such as:

- Reversed, normal phases and ion exchange chromatography
- Biochromatography of large molecules
- Conventional size exclusion chromatography for large proteins and peptides
- Supercritical fluid chromatography for API separations

## SiliaChrom HPLC columns features:

- High plate count (*excellent column efficiency*)
- Long lifetime and column-to-column reproducibility
- Broad pH range stability
- Compatibility with a wide variety of mobile phases
- High surface coverage presenting no bleeding for LC-MS applications
- Guard columns also available

## Column characteristics:

- **Phase:** C18, C8, C4, C1, Silica, Amide, Amine, Cyano, Diol, HILIC, PFP, Phenyl, SCX, SAX, etc.
- **Particle size:** 2.2, 2.5, 3, 5, 10, 20 µm
- **Pore size:** 100, 150, 300 Å
- **Length:** 5, 10, 20, 30, 50, 100, 150, 200, 250 mm
- **ID:** 2.0, 2.1, 3.0, 4.6, 10, 20, 30, 50, 100 mm

## New phases available:

- PFP and SCX



## Solid-Phase Extraction Products (SPE cartridges & Well Plates) – SiliaPrep™ & SiliaPrepX™

Solid-Phase Extraction (SPE) is the basis of analytical laboratories. A crucial step of this process is sample preparation, as a clean sample will yield better results. To achieve this goal SiliCycle has designed SiliaPrep, which is a silica-based sorbent exempt of fines, and SiliaPrepX, a polymeric one, that can be found in cartridges, well plates or tips formats.

### Choose from a wide variety of phases:

- Polar & non-polar phases
- Ion exchange
- Mixed-mode & specialty phases

### From a selection of sorbents for cleaner extracts with:

- Human and animal biological fluids
- Waste water
- Petrochemical and toxic residues
- Food and beverages, etc.

### And from handy accessories:

- Vacuum manifolds & adapters
- Empty tubes
- Phase separator columns

Try SiliCycle's sample preparation solutions to reduce false positives and achieve high quality data, on the very first time. Plus, with tools such as SiliCycle's vacuum manifolds, designed to help you achieve a next step of productivity in your research, you cannot fail. Trying them is the first step to better results.

### Need help to develop your Method?

Contact us and take advantage of our services.

## QuEChERS – SiliaQuick™

There is a growing need for applications in food and environmental areas able to cope with the analysis of a large number of analytes in very complex matrices. New analytical procedures demand sensitivity, robustness, effectiveness and high resolution with reduced analysis time.



A new sample preparation approach has been developed. It's called QuEChERS and that says it all: an acronym for **Quick, Easy, Cheap, Effective, Rugged and Safe**. With QuEChERS, lab efficiency is improved not only with respect to time and consumable savings but also in terms of space requirements, waste generation and much higher sample throughput.

Recently, the QuEChERS technique has spread worldwide and gained more and more popularity, so that it has become one of today's the strongest approach for sample preparation.

### Why use QuEChERS as sample preparation:

- Easy-to-use and economical pre-weighed packets available
- As easy as 1-2-3, and maximal time-savings
- Groundbreaking sample preparation method for multi-residue analysis
- Ideal for reliable and straightforward sample preparation for rapid screening
- Wide selection to support traditional AOAC 2007.01 and EN 15662 methods
- High recoveries for a very broad scope of pesticides belonging to various chemical classes
- High versatility outside of its traditional application areas
- No glassware required

### Why choose SiliCycle's SiliaQuick QuEChERS !

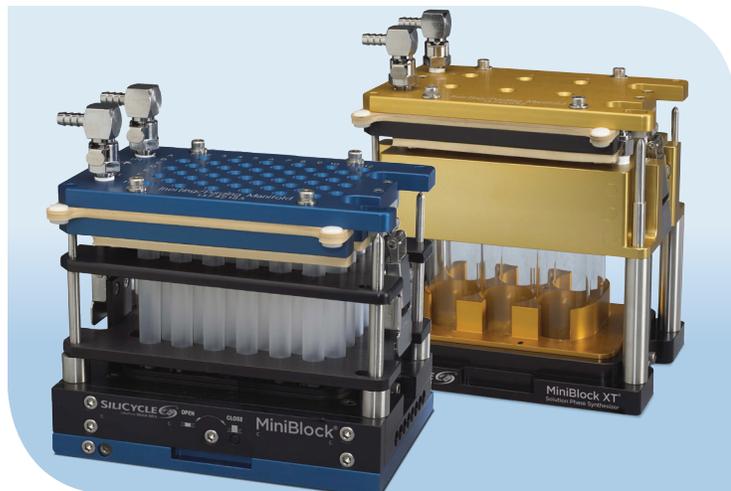
- Go green by using packets with reusable tubes
- Among the best pricing of the industry
- Bulk sorbents available for customized methods
- Personalized assistance for specific support and determining the most suitable QuEChERS method for your project

# SiliCycle Consumables

## Vials, caps & septa

Wondering why choosing SiliCycle's vials, caps & septa and what all our consumables have in common?

Our range of products includes popular choices such as 2 mL crimp & screw vials, as well as anything more specific. Trust us, we will meet any of your needs: clear or amber glass, crimp or screw vials with or without caps, inserted, bounded or without septa, certified or not.



## SiliCycle MiniBlock®

The only platform that offers you full internal «flow-through» parallel processing of chemical reactions. Previously supported by Mettler Toledo, the MiniBlock® product line is now manufactured and supplied by SiliCycle Inc. With this exceptional synthesis tool, combined with our unique expertise in purification, metal scavenging, catalysis and silica-supported reagents, chemists can quickly screen for optimal reaction conditions and optimize critical process parameters. Its unique valve body design enables processes where filtration is critical, including solid-phase organic synthesis, use of silica-supported scavengers silica with solution phase synthesis and parallel purification via Solid-Phase Extraction (SPE).

### The SiliCycle MiniBlock reactors features:

- Patented reactor which is available in 48, 24, 12 and 6 position arrays for reaction vessel volumes of respectively 4 mL, 10 mL, 20 mL and 40 mL
- Yield synthesis products for high throughput or large volume applications
- Provides reaction agitation and temperature control for the entire system

### The parallel synthesis and purification station:

- Ideal for parallel synthesis
- Post-reaction clean-up with the use of SiliaPrepMB SPE pre-packed with:
  - Chromatographic or ion exchange phases
  - Silica-supported reagents or catalysts
  - Metal or organic scavengers
- Transfer reaction products from one block to a second or by passing through a SPE filter plate.

Make the choice many chemists have made to increase productivity, more so than any other similar tool. Designed by chemists for chemists, the SiliCycle MiniBlock has been improved to take a broader range of chemistry methodologies. It can be adapted to best match your needs and budget.

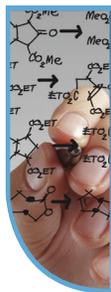


Because of their high quality, our products are used by recognized customers all over the world. We pride ourselves in our ability to assist you with any technical, chemical or research support.

### Membrane & syringe filters

Looking for fast and efficient filtration, then our membrane and syringe filters could be your answer. Consisting of micro-porous films (made from Nylon, PTFE, PVDF, PES or RC), with various diameters, they are specifically conceived for cell retention, particle collection, clarification and sterile filtration of aqueous solutions, particulate analysis, microbiological analysis and microscopy. Our broad portfolio is meant to cover all your purification needs and fields of applications.

For highly polluted or contaminated samples, simply use a syringe filter with a glass fiber pre-filter, which prevents membrane blockage or bursting.



**Custom R&D Services**

- Scavenging Screening
- Catalysis Services
- Organic Services
- Chromatography, Purification & Analytical Services
- Material Science Services
- Custom Packing Services

*Other services available*



**Scavenging Technology (Silica-Based)**

- Metal Scavengers
- Electrophiles
- Nucleophiles
- Potential Genotoxic Impurities (PGI)
- Etc.



**Sample Preparation**

- SPE Cartridges and Well-Plates
- Micro-SPE Tips
- QuEChERS
- Accessories (Vacuum Manifold, Collection Plates, etc.)
- Etc.



**Chromatography**

- Irregular Silica Gels
- Spherical Silica Gels for Preparative Chromatography
- Chromatographic Phases (C18, NH<sub>2</sub>, ...)
- Flash Cartridges and Accessories
- TLC Plates
- Etc.



**Analytical Chromatography**

- Spherical Silica Gels
- HPLC Columns and Guard Columns
- HPLC Column Distributions for Different Manufacturers
- Etc.



**Heterogeneous Catalysis**

- Coupling (*Suzuki, Stille, Heck, Sonogashira, Kumada*)
- Debonylation
- Hydrosilylation
- Hydrogenation
- Oxydation
- Etc.



**Organic Synthesis**

- Amide Coupling
- Oxydation
- Reductive Amination
- Other Reagents Available



**Equipments**

- SiliCycle MiniBlock
- TLC Scanner
- Vacuum Manifold
- Other Equipments on Our Website



**Consumables**

- Syringe Filters
- Membrane Filters
- Vials & Caps
- Etc.

## WE PROVIDE SOLUTIONS TO THE GLOBAL CHEMICAL INDUSTRY.

Founded in 1995, SiliCycle® Inc. is a worldwide leader in the development, the manufacturing and the commercialization of high value silica-based and specialty products for chromatography, analytical and organic chemistry. Our business extends to more than fifty countries and our customer portfolio includes companies in a wide range of markets.

At SiliCycle, we are at the forefront of the chromatography industry, owing to the extraordinary purity of our silica gels and polymeric sorbents, combined with our capacity to rapidly adapt our products to meet the specific requirements of scientists worldwide.

We lead the way in offering innovative first-rate *UltraPure* products. Our automated manufacturing processes are continuously optimized to ensure high purity and a low percentage of fine particles, thereby guaranteeing optimal performance. With our multi-ton manufacturing capacity, we are your partner of choice for all your analysis, metal removal, catalysis, synthesis, and purification requirements.

SiliCycle is also a leading service provider, offering turnkey solutions based on its expertise in organic chemistry, material science, analytical chemistry to name only a few. With state-of-the-art instrumentation in the areas of chromatography, spectroscopy, and manufacturing combined to an applications support laboratory, we are devoted to extend your R&D and make your project a success.

SiliCycle has several sales offices in many countries such as China, India, European Union (*France & Germany*) just to name a few. All products are available worldwide through SiliCycle or via distributors.

We are committed to providing you with the highest quality products and services in the industry

Information about SiliCycle is available at [www.SiliCycle.com](http://www.SiliCycle.com)



### SiliCycle Inc.

Worldwide Headquarters  
2500, Parc-Technologique Blvd  
Quebec City (Quebec) G1P 4S6  
CANADA  
Tel.: 1 418 874.0054

Toll Free: 1 877 745.4292  
(North America only)  
Fax: 1 418 874.0355  
[www.SiliCycle.com](http://www.SiliCycle.com)  
[info@SiliCycle.com](mailto:info@SiliCycle.com)

### SiliCycle China

Chinese Office  
[china@SiliCycle.com](mailto:china@SiliCycle.com)

### SiliCycle Europe

European Office  
[europe@SiliCycle.com](mailto:europe@SiliCycle.com)

### SiliCycle India

Indian Office  
[india@SiliCycle.com](mailto:india@SiliCycle.com)