



MaterialHarvest

Material Harvest Ltd. Silica Gel Products 2010 Catalogue



Material Harvest Limited is a Cambridge (UK) based supplier of chemical products for synthesis, purification, manufacture and desiccation. Founded by PhD chemists from The University of Cambridge and The University of Bristol, Material Harvest aims to deliver affordable and high-quality consumables to chemists in university and industrial research laboratories.

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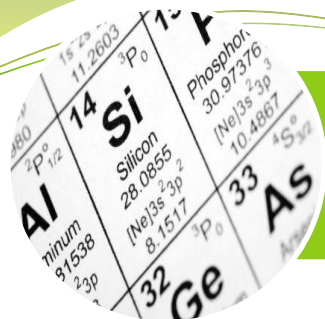


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Silica Gels for Column Chromatography

Column Chromatography

Silica gel is used in the purification and isolation of synthetic compounds (i.e. post-reaction *harvesting* of chemical products). The high purity, low percentage of fine particles and neutral pH of Material Harvest® silica gels provide an ideal stationary phase for optimum and reproducible chemical purification.

Our “Academic Grade” Silica Gel 60

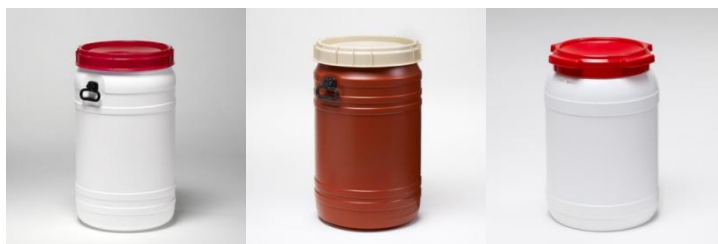
The number “60” indicates that the mean pore diameter of the silica particles is 60 Å. This is the most commonly used silica in university and industrial laboratories. In terms of the particle size distribution, the most common grades are mesh 70 – 230 for **gravity** chromatography and mesh 230 – 400 for **flash** chromatography.

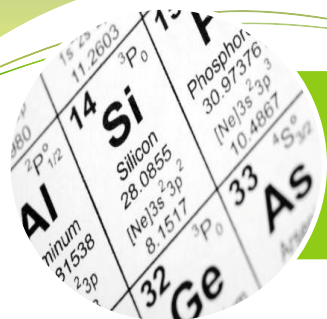
Product Code	Particle Size	Pore Size	Surface Area
MH 0100101	mesh 70 – 230 (63 – 200 µm)	60 Å	500 m ² /g
MH 0100102	mesh 230 – 400 (40 – 63 µm)	60 Å	500 m ² /g

Please see our web page for current prices. We offer some of the most competitive rates in the industry, as well as academic and consumption-based discounts.

Packaging

Our multi-kg drums are some of the best in the industry, offering an **air-tight** and **water-tight** seal for the long-term preservation of quality. Such packaging protects the silica gel during laboratory floods and from chemical vapours.





Silica Gels for Column Chromatography

Silica Gel Customisation

We can supply on demand silica gels that exhibit unusual or exotic specifications. For example, most particle size distributions from mesh 60 to 400 can be catered for. The pore size, pore volume, mean surface area, pH and water content can also be altered to match your requirements or intended application.

Below is a non-exhaustive list of the particle size distributions that we have previously supplied. Please email your desired specifications to enquiries@materialharvest.com and a member of our team will contact you to discuss your requirements.

Particle Size (mesh)	Particle Size (μm)	Pore Size	Surface Area
60 – 100	150 – 250	40, 60 or 90 Å	400 – 500 m^2/g
60 – 120	125 – 250	40, 60 or 90 Å	400 – 500 m^2/g
80 – 120	125 – 180	40, 60 or 90 Å	400 – 500 m^2/g
80 – 160	100 – 180	40, 60 or 90 Å	400 – 500 m^2/g
100 – 200	75 – 150	40, 60 or 90 Å	400 – 500 m^2/g
200 – 300	45 – 75	40, 60 or 90 Å	400 – 500 m^2/g
200 – 400	40 – 75	40, 60 or 90 Å	400 – 500 m^2/g
300 – 400	40 – 45	40, 60 or 90 Å	400 – 500 m^2/g



Florisil® for Column Chromatography

Florisil®

Florisil® is a hard powdered magnesia-silica gel, manufactured in the United States, often referred to as "activated magnesium silicate". As a highly selective adsorbent it is employed in the following areas of preparative and analytical chromatography:

- Extraction of steroids, sex hormones and related compounds
- Separation of lipids (glycerides, free fatty acids, sterols, cholesterol esters etc)
- Decolourisation of fats, oils and waxes
- Purification and isolation of alkaloid natural products by column chromatography
- Separation of nitrogen-containing compounds from hydrocarbons
- Cleanup of pesticide residues and purification of chlorine-containing pesticides
- Separation of aromatic compounds from aliphatic-aromatic mixtures
- Purification of active pharmaceutical ingredients (APIs)
- Isolation of antibiotics and vitamin assays

Florisil® is particularly useful in the separation of polar compounds that normally "streak" over regular silica. It is available in a variety of particle size or mesh grades suitable for column chromatography - please see our web page for current prices.

Product Code	Particle Size	Pore Size	Grade
MH 0200201	mesh > 200	60 Å	"A" (standard)
MH 0200202	mesh 100 – 200	60 Å	"A" (standard)
MH 0200203	mesh 60 – 100	60 Å	"PR" (pesticide residue analysis)
MH 0200204	mesh 60 – 100	60 Å	"A" (standard)
MH 0200205	mesh 30 – 60	60 Å	"A" (standard)

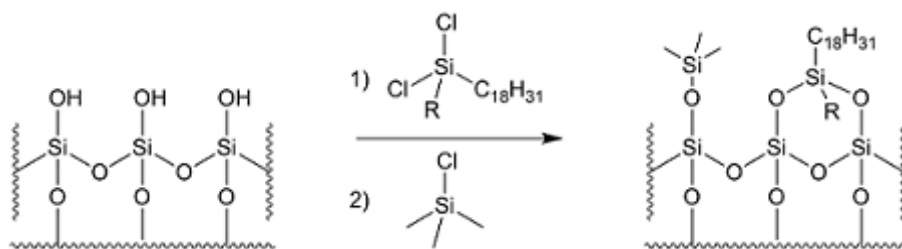


Reverse Phase Silica

Reverse Phase Chromatography

In reverse phase chromatography, the silica gel is functionalised with an alkyl substituent such as octadecyl ($C_{18}H_{37}$). The result is that polar compounds elute faster than their non-polar counterparts, which is opposite to chromatography with regular silica gel.

Our reverse phase silica is manufactured in accordance to the highest specifications. As shown below, the synthetic process entails grafting octadecyl moieties on the surface of regular silica, followed by end-capping of the residual OH groups. The end-capping process makes this product insoluble in polar solvents including methanol.



Our “Academic Grade” C18 Silica

The most common reverse phases have pore size 60 Å and particle size distribution of mesh 230 – 400 (40 – 63 µm). In terms of the loading or carbon content, 17% is one of the most common configurations. Reverse phases having "high" carbon content (23%) or "low" carbon content (11%) are also available, but these may be more useful in situations where compounds elute too quickly or too slowly, respectively.

Product Code	Particle Size	Pore Size	Carbon Content	Surface Area	Pore Volume
MH 0500601	mesh 230 – 400	60 Å	17%	500 m ² /g	0.8 ml/g
MH 0500602	mesh 230 – 400	60 Å	23%	500 m ² /g	0.8 ml/g
MH 0500603	mesh 230 – 400	60 Å	11%	500 m ² /g	0.8 ml/g

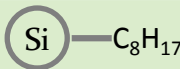
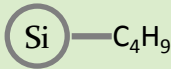
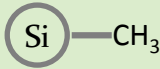
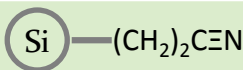
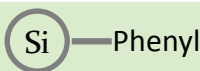


SiliaBond® Reverse Phase Silica Gels

Reverse Phase Chromatography with exotic sorbents

C18 silica gel is not the only reverse phase available in the industry. Other variants, having a shorter alkyl chain or cyclic moieties, are often employed in the separation of mixtures that are difficult to purify using C18 silica.

Brought to you by SiliCycle Inc, pioneers in the development of functionalised silica gels, these sorbents are gathered under the name SiliaBond® (trade mark of SiliCycle Inc). All products have particle size 40 – 63 µm (mesh 230 – 400) and pore size 60 Å.

Product Code	Name (SiliaBond®)	Structure
R31030B R31130B	SiliaBond® C8 (endcapped) SiliaBond® C8 (non-endcapped)	
SiliaBond® C8 exhibits a moderate degree of hydrophobicity. It is often used instead of C18 silica gel when shorter retention times are required.		
R32030B R32130B	SiliaBond® C4 (endcapped) SiliaBond® C4 (non-endcapped)	
SiliaBond® C4 exhibits less retention towards non-polar compounds than SiliaBond® C8. It is useful in the separation of large biomolecules and structures that possess hydrophilic moieties (or hydrophobic regions buried within a 3D structure).		
R33030B	SiliaBond® C1 (endcapped)	
SiliaBond® C1 exhibits the lowest commercial degree of hydrophobicity. It is particularly useful in the separation of large biomolecules having extensive hydrophobic regions.		
R38030B R38130B	SiliaBond® Cyano (endcapped) SiliaBond® Cyano (non-endcapped)	
The polarity of SiliaBond® Cyano marks the separation between the polar and non-polar phases, hence it is used in both normal and reverse phase chromatography. It is the least retentive sorbent in either case, so it is useful when dealing with polarity extremes (i.e. extremely polar or extremely non-polar compounds).		
R34030B R34130B	SiliaBond® Phenyl (endcapped) SiliaBond® Phenyl (non-endcapped)	
SiliaBond® Phenyl is uniquely selective for aromatic molecules and fatty acids.		



SiliaBond® Silica-Bound Reagents and Scavengers

Functionalised Silica Gels for Organic Synthesis

Solid-bound reagents and scavengers are used in chemistry to expedite synthesis and purification. The advantages of using such materials are as follows:

- Toxic or difficult to remove reagents and by-products can be immobilised and thus separated from the product by filtration
- Chromatography and liquid-liquid extractions, which are challenging to scale up and time consuming, are avoided
- A large excess of reagent can be used, which drives the reaction to completion
- One-pot multiple step reactions are easier to carry out
- They are suitable for use in flow-through applications and automated synthesis

Advantages of Functionalised Silica

Functionalised silica has a number of advantages over polymer-bound alternatives:

- **Fast Kinetics:** since the silica particles are surface functionalised, the rate of reaction is not controlled by diffusion in and out of a polymer
- **Solvent Independent:** Silica neither shrinks nor swells in any solvent and, because it is end-capped, it is completely insoluble
- **Easy to use:** Silica does not carry a static charge; it is free flowing and easy to weigh out and handle. Its high density makes it suitable for small volume work, it does not require extensive washing for high recoveries and it does not stick to glassware
- **Thermally Stable:** Most SiliaBond® silica gels can withstand temperatures of over 200 °C and are suitable for use in microwave synthesisers
- **Flexible Formats:** Since it does not swell, silica can be packed into a variety of flow through formats including HPLC columns, Flash/SPE cartridges and 96 well plates

SiliaBond® Reagents and Scavengers

Brought to you by SiliCycle Inc, pioneers in the development of functionalised silica gels, these sorbents are gathered under the name SiliaBond® (trade mark of SiliCycle Inc). All products have particle size 40 – 63 µm (mesh 230 – 400) and pore size 60 Å.

For more detail please refer to our web page and to the SiliCycle catalogue, which can be downloaded from www.materialharvest.com/welcome/catalogues.html.



Flash Cartridges and SPE Columns

Flash Cartridges and SPE Columns by Luknova Inc

Material Harvest Ltd. is proud to distribute products by Luknova Inc – Boston-based manufacturers of flash chromatography consumables and their accessories.

Luknova Inc design and produce high-performance pre-packed flash columns, solid load columns, solid phase extraction (SPE) cartridges and column adaptors. The Luknova® (trade mark of Luknova Inc) pre-packed flash cartridges and SPE columns are available with the following sorbents:

- Normal phase silica gel (60 Å, mesh 230 – 400)
- Reverse phase (C18) silica (23% carbon content; 60 Å, mesh 230 – 400)
- Amine-functionalised silica (8% amine content; 60 Å, mesh 230 – 400)
- Cyano-functionalised silica (8.5% cyanopropyl content; 60 Å, mesh 230 – 400)
- SAX-functionalised silica columns (8% SAX content; 60 Å, mesh 230 – 400)
- SCX-functionalised silica (11% SCX content; 60 Å, mesh 230 – 400)
- Alumina columns (acidic, neutral or basic)
- Florisil® (including pesticide residue analysis grade Florisil®)

The complete Luknova® catalogue can be downloaded in PDF format from our web page (www.materialharvest.com/welcome/catalogues.html). Alternatively, please email enquiries@materialharvest.com to request an electronic copy or a hard copy of the same.





TLC Plates

Analytical TLC Plates

Our analytical TLC plates are fabricated with F254 indicator and available in glass-backed format. We supply them in boxes of 10 plates that are wrapped, in pairs of two plates, with a protective barrier film that reduces moisture and chemical vapour permeation.

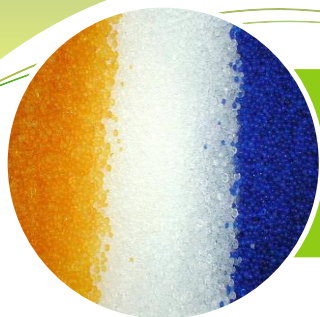
Product Code	Size	Thickness	Indicator	Quantity per box
MH 0100501	20 × 20 cm	250 µm	F254	10 plates

Preparative TLC Plates

Our preparative TLC plate technology gives rise to robust plates having thickness values of up to 2.0 mm. These preparative plates are fabricated with F254 indicator and are supplied in boxes of 10 plates that are wrapped, in pairs of two plates, with a protective barrier film that reduces moisture and chemical vapour permeation.

Product Code	Size	Thickness	Indicator	Quantity per box
MH 0100502	20 × 20 cm	500 µm	F254	10 plates
MH 0100503	20 × 20 cm	1000 µm	F254	10 plates
MH 0100504	20 × 20 cm	1500 µm	F254	10 plates
MH 0100505	20 × 20 cm	2000 µm	F254	10 plates

Please see our web page for current prices. We offer some of the most competitive rates in the industry, as well as academic and consumption-based discounts.



Silica Gel Desiccants

Silica Gels For Desiccators and Desiccant Cabinets

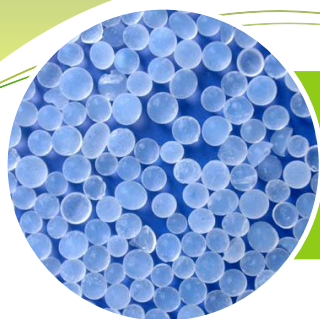
The microporous structure of silica gel affords a high surface area (up to 800 m²/g) that is ideal for the scavenging of atmospheric moisture. Since there is no chemical reaction associated with the dehydration process, desiccated compounds are never exposed to harmful by-products or contaminants.

Silica gel is used widely as a laboratory desiccant for the following reasons:

- It can adsorb up to one third of its own weight in water vapour
- It has an almost indefinite shelf-life if stored under airtight conditions
- Once saturated with water, silica can be regenerated by gentle heating
- With the exception of strong alkalis and hydrofluoric acid (HF), it is inert and resistant to attack or corrosion
- It is non-toxic, non-flammable and easy to handle
- It maintains the appearance of a dry product and its shape remains unchanged even when fully saturated with water

Self-indicating silica gels possess a chemical compound or dye that changes colour as moisture is adsorbed; the most common types are “blue” and “orange” silica gels.

Product Code	Type of Desiccant	Surface Area (m ² /g)	Granule Size (mm)	Format
MH 0100401	Blue	700 – 800	1 – 3	1 – 175 kg
MH 0100402	Blue	700 – 800	2 – 5	1 – 175 kg
MH 0100403	Blue	700 – 800	4 – 8	1 – 175 kg
MH 0100404	Orange	700 – 800	1 – 3	1 – 175 kg
MH 0100405	Orange	700 – 800	2 – 5	1 – 175 kg
MH 0100406	Orange	700 – 800	4 – 8	1 – 175 kg



“Type C” Silica Gels

“Type C” Silica Gels

Silica gels designated as “Type C” exhibit large pore sizes and surfaces populated by silicon-hydride (Si-H) groups (as opposed to silanols, Si-OH, which are found in regular silica gel). These sorbents are frequently employed in the following areas of industrial and analytical chemistry:

- Aqueous normal phase chromatography (including HPLC)
- Refining of petrochemical products by adsorption of aromatic hydrocarbons
- Adsorptive separation of organic gases and liquids
- Desiccation of industrial and commercial products
- As catalysts or catalyst carriers for the manufacture of industrial products including melamine (cyanuramide), maleic anhydride, butadiene rubber and acrylic nitrite

Product Code	Particle Size (μm)	Mean Pore Size (Å)*	Mean Pore Volume (ml/g)*	Surface Area (m ² /g)*
MH 0100301	125 – 425	80 – 120	0.8 – 1.1	300 – 450
MH 0100302	125 – 425	80 – 120	0.8 – 1.1	300 – 450
MH 0100303	300 – 850	80 – 120	0.8 – 1.1	300 – 450
MH 0100304	300 – 850	80 – 120	0.8 – 1.1	300 – 450
MH 0100305	125 – 425	80 – 120	0.8 – 1.1	450 – 600
MH 0100306	125 – 425	80 – 120	0.8 – 1.1	450 – 600
MH 0100307	300 – 850	80 – 120	0.8 – 1.1	450 – 600
MH 0100308	300 – 850	80 – 120	0.8 – 1.1	450 – 600

* Parameter is adjustable within the specified range



Beer Stabilising Silica

Beer Stabilising Silica

Beer contains naturally occurring proteins and polyphenols that react during storage to afford colloidal complexes. These complexes are insoluble at the cold temperatures used to store beer, giving rise to an undesirable cloudiness known as “chill haze”.

The formation of haze in beer is often accelerated by oxidation during processing, by the introduction of headspace air during packaging or by the presence of metals like copper and iron.

Since it is not currently possible to filter out chill haze precursors, breweries employ stabilisers to prevent haze formation in the first place. One of the most common stabilisers to this effect is silica gel; it works by adsorbing the proteins that give rise to chill haze, without affecting the proteins necessary for an attractive and stable foam head. The silica is subsequently removed by filtration, giving rise to a tasty beverage that retains clarity during extended storage at refreshingly low temperatures.

Product Code	Type of Desiccant
SiO ₂ (%):	> 98.0
Moisture Content (Wt. %):	< 8.0
Particle Size (µm):	7 – 15
pH Value:	5.0 – 8.0
Pore Volume (ml/g):	1.2 – 1.6
Pore Diameter (nm):	14 – 18
Specific Surface Area (m ² /g):	200 – 300



Silica Gels for Household Products

Silica Gel Packets for Industrial Desiccation

Sachets or bags that contain silica gel must be flexible, robust and able to “breathe” (so that water molecules can penetrate the packet and be adsorbed by the desiccant). The most common sachet materials include tea-bag paper, fabric, cotton, oriented polypropylene (OPP) and Tyvek™; the packet itself can be either heat-sealed or sewn.

We can supply a wide range of silica gel sachets and bags that are suitable in the desiccation of food products, pharmaceuticals, electronic components, lenses and transport containers (personal or industrial).

Silica Gel for Cat Litter

Silica gel cat litter has the highest absorption capacity of any litter: it can absorb 4 - 6 times as much liquid as a regular clay or clumping alternative. Silica-based cat litters are also exceptionally lightweight in comparison to traditional litters.

Other Commercial Applications

Silica gel is a common household product – it is used in a variety of industries that influence our everyday lives. We can supply silica granules or beads in most formats and specifications that are required to achieve prescribed industrial applications.

Below is a non-exhaustive list of examples where we can supply tailor-made silica to address unique applications. Please email enquiries@materialharvest.com for more information including cost, our capacity and lead times.

- High efficiency silica granules for flower and plant desiccation
- Powdered silica for the manufacture of toothpaste and related products
- Silica gel anticaking agents for cosmetic products
- Silica gels for the development of shoe deodorisers or moisture absorbers
- Fragrant or coloured silica beads for decorative applications



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