AGC Chemicals
Chemistry for a Blue Planet

AGC

FINE SILICA PRODUCTS



Your Global Source for Fine Silica

INTRODUCTION

Fine silica products are manufactured by AGC Si-Tech Co., Ltd. of Fukuoka, Japan, which was originally founded in 1948. Silica gel production started in the early 1950s and a range of brands has since been developed over the past few decades.

A unique manufacturing technology is implemented to produce silica gel products that are used in a variety of products in people's everyday lives. Continuous innovation based on customer feedback ensures that a complete range of products is available for medical, industrial and cosmetics applications.

AGC Chemicals Europe markets and sells the full range of silica products throughout Europe, the Middle East and Africa. The commercial centre is located in Amsterdam, Netherlands, where the dedicated product and marketing manager and European customer service team are located.

Fine silica products are designed as resin additives for applications where gentle tactile feel is paramount. Furthermore, they can replace abrasive microplastics particles in cosmetics and body care products. The particles have a lower coefficient of friction than titanium dioxide and other commonly used fillers. On a molecular level, the particles are perfectly spherical in shape which means they move more freely to give this superior tactile feel.

Once combined with resins, fine silica offers improved surface smoothness and dispersibility. Uses are widespread, including catalyst support for cosmetics, film and synthetic leather, as well as a matting agent for paints and as a filler for coated printing papers.

There are currently five grades available in the product range:

- M.S. GEL®
- SUNSPHERE®*
- SUNSPERA®
- AbSolute® High Cap
- SUNLOVELY®

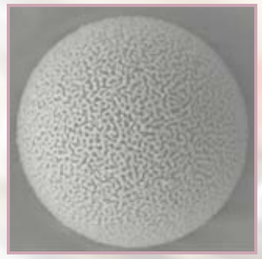
*Sold under the SOLESPHERE™ trademark in the United States of America

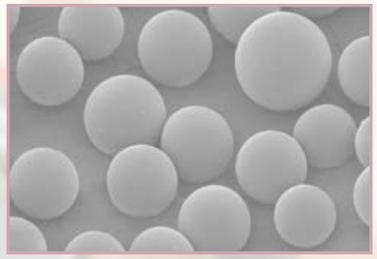
M.S. GEL®

M.S. GEL® (microspherical gel) is a silica-based high purity spherical gel. The perfectly spherical shape enables higher loading capacity with lower column back pressure and good separation.

Features

- Particles: 1.6 - 200µm
- Specific surface: 30 - 900m^2/g
- Pore size: 4 - 200nm
- Spherical, all-porous fine particles free from cavities and cracks
- Packs into compact form



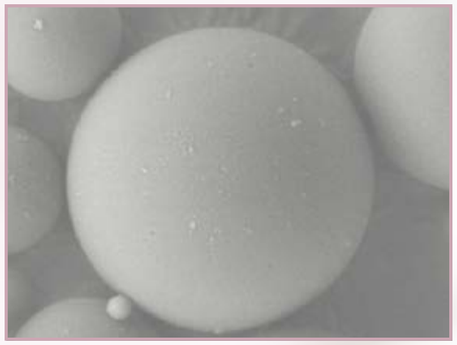


Applications

- Process chromatography
- Separation media for proteins, peptides & APIs (active pharmaceutical ingredients)
- Purification of electronic materials
- Release agent for cosmetics, fragrances and antiseptics
- Catalysts supports and resin fillers
- Key component in HPLC (high performance liquid chromatography) packings
- Adsorption and removal of ionised compounds from organic solvents
- Intermediate medicine

M.S. GEL® is a liquid chromatography column packing agent available in an average particle size range of 1.6 to 200µm with narrow particle size distribution. Additionally, the average pore diameter control range is 4 to 200nm and the pore size distribution is narrow. Custom orders are possible to combine particle size and pore diameter.

SUNSPHERE®



SUNSPHERE® consists of spherical micro-porous silica particles (amorphous silicon dioxide, SiO_2). Made up of freely rolling particles, SUNSPHERE® is soft and smooth to the touch, whilst its multiporous composition maintains an excellent capacity for absorption.

Derived from silica, SUNSPHERE® also has excellent heat resistance properties as well as being white, odourless and chemically stable, making it suitable for use on skin.

It has a variety of uses from cosmetics and toiletries to industrial applications such as a matting agent for paints and as a filler for coated printing paper. SUNSPHERE® is also used as a catalyst support carrier and in synthetic leather.

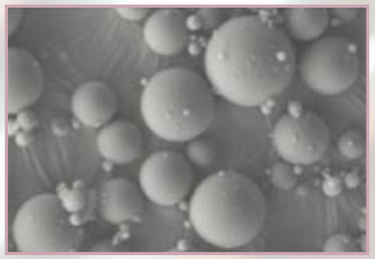
Features

- Particles: 3 - 20μm
- Superior moisture absorption capacity: 30 - 400ml/100g
- Excellent heat resistance
- Corrosion-free and non-polluting

Applications

- Cosmetic ingredient in make-up and skin care products
- Release controller for deodorants and fragrances
- Drug carrier
- Matting agent and surface modifier
- Dehumidifying agent
- Filler for ink-jet print paper
- 3D printer resins
- Thickening agent for paint
- Catalysts supports
- Coating material for recording media
- Specialised paint for electronic materials

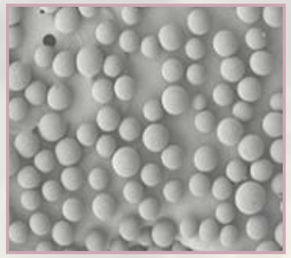
SUNSPHERE® improves the physical properties of various materials. It is available in a wide range of particle sizes to suit different applications.



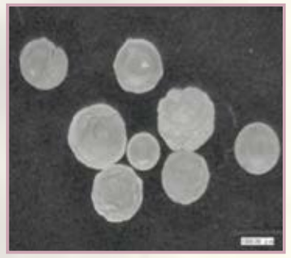
SUNSPERA®

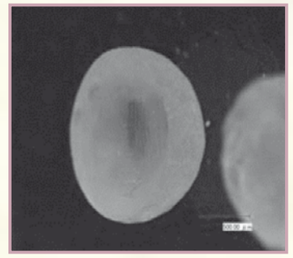
SUNSPERA®, one of the more recent products launched, is used as a catalyst support in the manufacture of polyethylene and polypropylene, playing a more important role than simply that of a carrier for a catalyst compound. The properties of the silica gel have a significant effect on both the polymerisation process and the properties of the finished polymer.

The pore structure, spherical shape and particle distribution of SUNSPERA® for catalyst support are precisely defined. Using SUNSPERA® gives improved finished polymer resin by increasing the bulk density and also ensures enhanced productivity.



Bare Silica before Polymerisation





After Polymerisation

Features

- Precisely designed pore structure, spherical shapes and size distribution
- Improved morphology of finished polymers
- Optimises production
- Narrow particle distribution and no fine particles

Series	Average particle size (μm)	Specific surface area (m^2/g)	Pore volume (ml/g)	Pore diameter (nm)
HH	5～40	800	0.8	5
HB	5～40	700	1.6	20
MB	5～40	450	1.8	30
LB	5～40	300	2	40
D-70-120A(LV)	70	450	1.7	12

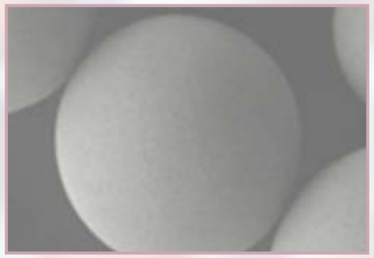
SUNSPERA® is available in average particle diameters from 3μm to 100μm to suit any application. Surface areas are available from 40 - 800m^2/g. The ability to select the sphere size, pore size and spherical structure of this fine silica product makes it possible to provide long-lasting, physicochemical-specific characteristics to specific media.

AbSolute® High Cap

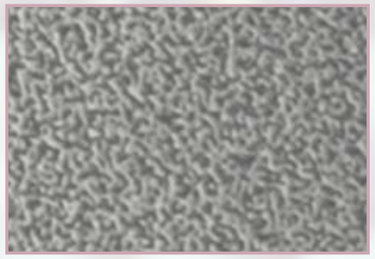
AbSolute® High Cap is a high performance Protein A media which has been developed for the capture of monoclonal and polyclonal antibodies from large volume fermentation feedstock. It is based on a modified silica matrix that exhibits strong mechanical, thermal and chemical stability.

Exceptional mechanical properties combined with a unique kinetic performance allow operations at higher velocities (up to 1,500cm/h, depending on column size and equipment).

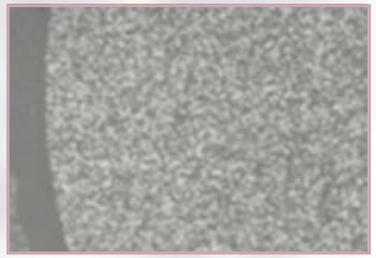
The epoxy coating of AbSolute® High Cap has been optimised for chemical resistance and Non Specific Binding (NSB). Silica backbone degradation and Protein A leakage during NaOH exposure is thus prevented. Microscopic views of the particles, including a cross section and surface of the particles are shown below.



Particles



Surface of Particle



Cross Section

Features

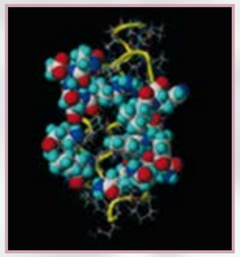
- Small particle size: 35 ± 2µm
- Perfect spherical shape
- Narrow particle size distribution
- Pore size: 100 ± 15nm
- Pore volume: 1.6 - 1.8ml/g
- Improves productivity by 200 - 300% compared with industry standards
- Ligand density is more than 10mg/ml

Applications

- Capture of monoclonal and polyclonal antibodies

New Recombinant Protein A

Selectivity
Stability
Thermodynamics
Ligand availability



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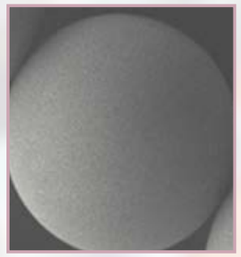
New Silica Based Bead



Chemically stable
Flow dynamics/kinetics
Mechanical properties

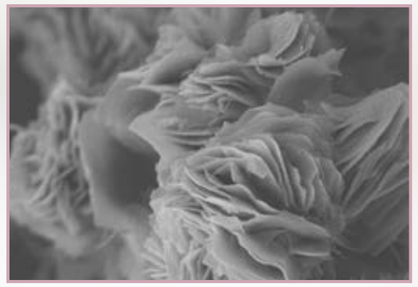
AbSolute® High Cap is engineered to give the highest Dynamic Binding Capacities (DBC) at low and high linear velocities with high selectivity, which reduces resin consumption and improves productivity.

SUNLOVELY®

SUNLOVELY® consists of functional fine particles that are microscopic secondary particles formed by nano-sized ultra-thin silicon dioxide (SiO_2) fine particles, overlapping in parallel or tertiary particles formed by three-way cohesion of the secondary particles.

Features

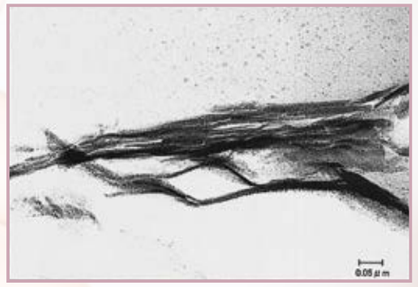
- Ultra-thin scaly silica particles with high transparency
- Primary particle is less than 0.1µm
- Odourless and harmless
- High chemical stability
- Two forms: powder and slurry dispersed in water



SUNLOVELY® (Powder Type)

Applications

- Soft focus filler for cosmetics
- Paint filler
- Release controller for fragrance and drug delivery agents
- Binder for ceramics and inorganic coating materials
- Humidity control, absorption and deodorisation binder
- Resin hybrid filler material
- Hydrophilic filler for antifoulant
- Gas barrier filler for corrosion prevention



SUNLOVELY® (SIurry Type)

Applications of SUNLOVELY® range from a filler for polymeric resins and inorganic coatings to heat and chemical resistant paint materials. It is also used in cosmetics. Optimum properties can be selected for the particular application.

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