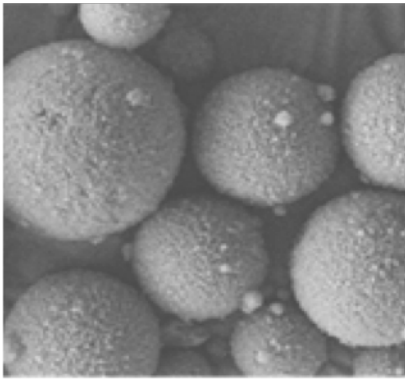


## Solesphere microsphere silica gels

Solesphere is made from silicon dioxide (SiO<sub>2</sub>), which is abundant in nature. We use a proprietary process to produce this product's spherical shape. Solesphere gels are safe and safe for the environment. They also can be used as fillers for new functional materials. They are available in a wide range of particle size (μm) to suite a variety of applications.

### Solesphere H-Series gels



Solesphere H series gels are synthetic spherical silica with low cohesiveness and high fluidity. Two types of H series gels are available: normal and high oil absorption, which has more than twice the absorption capacity. They are available in a variety of particle sizes from 3-20 μm.

These silica gels are porous, which has many advantageous characteristics. They began as functional fillers for new type resin or film and supported catalyst, but now they have been used in insect repellents, deodorants, sunscreens and cosmetics. The high oil absorption type of Solesphere has unique characteristics. For example, it is very bulky and disintegrates easily.

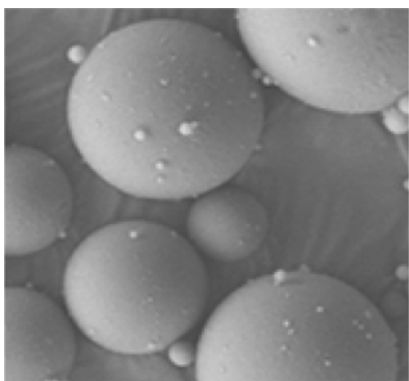
#### Normal type

		H-31	H-51	H-121	H-201
Mean particle size	μm	3	5	12	20
Specific surface area	m <sup>2</sup> /g	800	800	800	800
Pore volume	mL/g	1	1	1	1
Pore diameter	nm	5	5	5	5
Oil absorption	mL/100g	150	150	150	150

## High Oil absorption type

		H-32	H-52	H-122	H-33	H-53
Mean particle size	$\mu\text{m}$	3	5	12	3	5
Specific surface area	$\text{m}^2/\text{g}$	700	700	700	700	700
Pore volume	$\text{mL}/\text{g}$	2	2	2	2	2
Pore diameter	$\text{nm}$	10	10	10	11	11
Oil absorption	$\text{mL}/100\text{g}$	300	300	300	400	400

## Solesphere L-Series gels

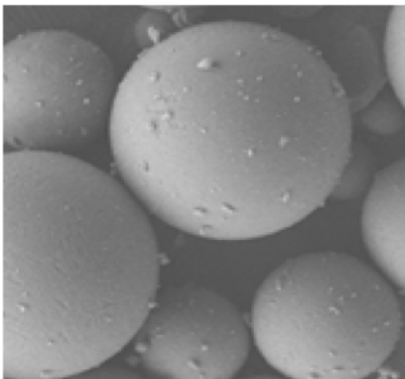


Solesphere L series gels have a lower specific surface area than H series gels. They are suitable for chemical surface modification or coating. Despite the difference of surface area, L series gels have the same oil absorption capacity as H series normal type gels. They also provide more smoothness than Solesphere E series gels by blending with other materials. Because of this, they can be used as cosmetic ingredients. The gel's porosity causes a light scattering effect, so it can be used as a matting agent. The particle size

distribution is narrow, so it is able to give a single asperity to a thin coating layer. It is also effective as a non-stick agent for film.

		L-31	L-51
Mean particle size	$\mu\text{m}$	3	5
Specific surface area	$\text{m}^2/\text{g}$	300	300
Pore volume	$\text{mL}/\text{g}$	1	1
Pore diameter	$\text{nm}$	13	13
Oil absorption	$\text{mL}/100\text{g}$	150	150

### Solesphere NP-Series gels

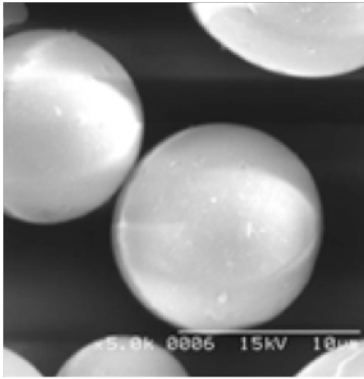


NP series gels are nonporous silicas. Because they have good hardness characteristics and high compression strength, they are used as fillers to increase resin hardness. These gels are also highly refractive, so they can be applied to transparent materials as an anti blocker. In addition, NP series gels have high heat resistance and high tolerance to temperature change. Therefore, they can add morphological stabilization to a formulation. Although they are very hard, they are safe materials because they

have no crystal component.

		NP-30	NP-100	NP-200
Mean particle size	$\mu\text{m}$	4	10	20
Specific surface area	$\text{m}^2/\text{g}$	40	50	100
Pore volume	$\text{mL}/\text{g}$	0.05	0.1	0.1
Pore diameter	$\text{nm}$	–	–	–
Oil absorption	$\text{mL}/100\text{g}$	30	35	40

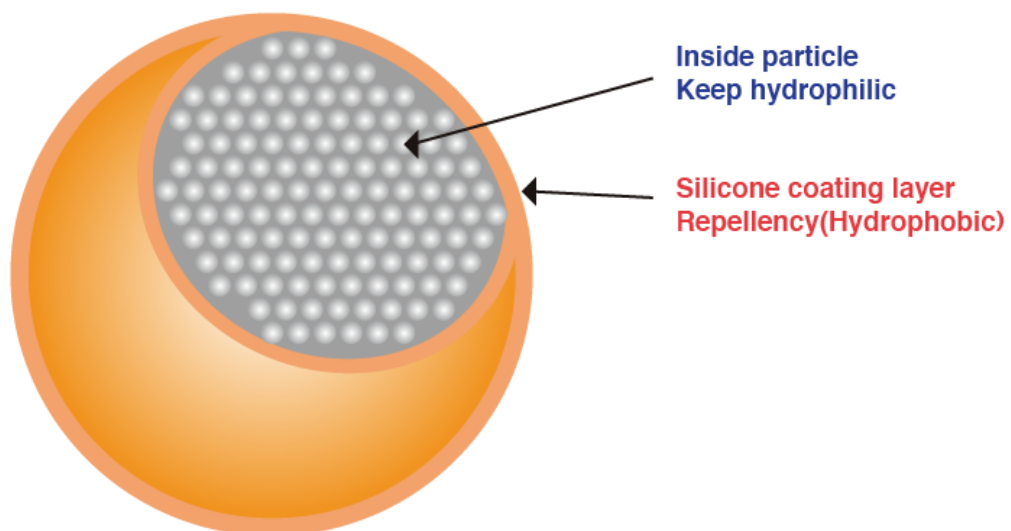
## Solesphere ET-Series gels



ET Series gels have a water repellent effect due to their innovative surface treatment technology. It is able to easily blend in W/O emulsion cream formulations. The inside porous structure was maintained underneath the surface coatings, so these gels retain their moisture absorbing function.

	Mean particle size [ $\mu\text{m}$ ]	Oil absorption [ml/100g]
H-121-ET	12	120
H-51-ET	5	120

## Model structure

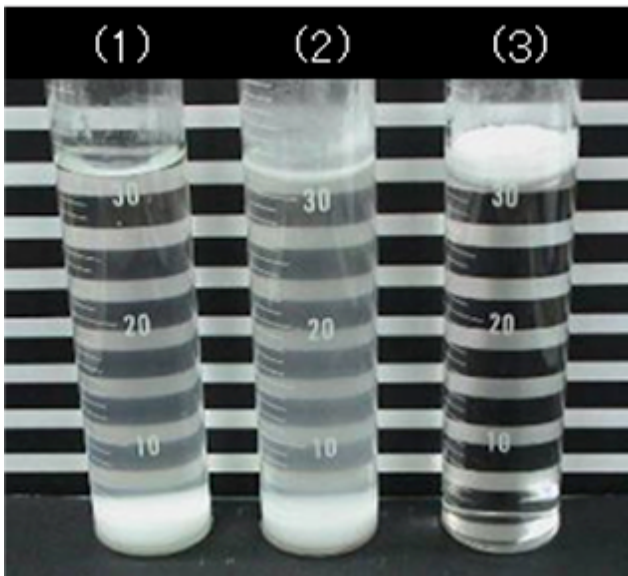


Components (Indication name)  
Silica  
Triethoxysilylethylpolydimethylsiloxylethyldimethicone  
PEG-14 Oleate

## I . Water repellent performance

[Test method]

Measured 30mL purified water in 50mL nessler tube, and added 1g test powder.  
Then observed condition.



Solesphere H-121

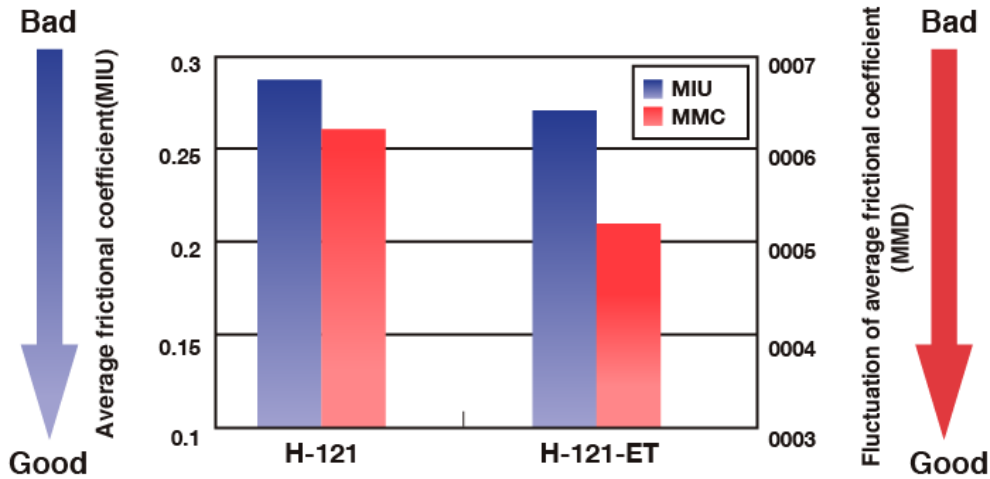
(1): Non-treated  
(2): Silicone 1% Mechanochemical  
treatment  
(3): ET product\*

\*The particles absorb water by  
hard stirring.

## II . Texture improvement

[Test method]

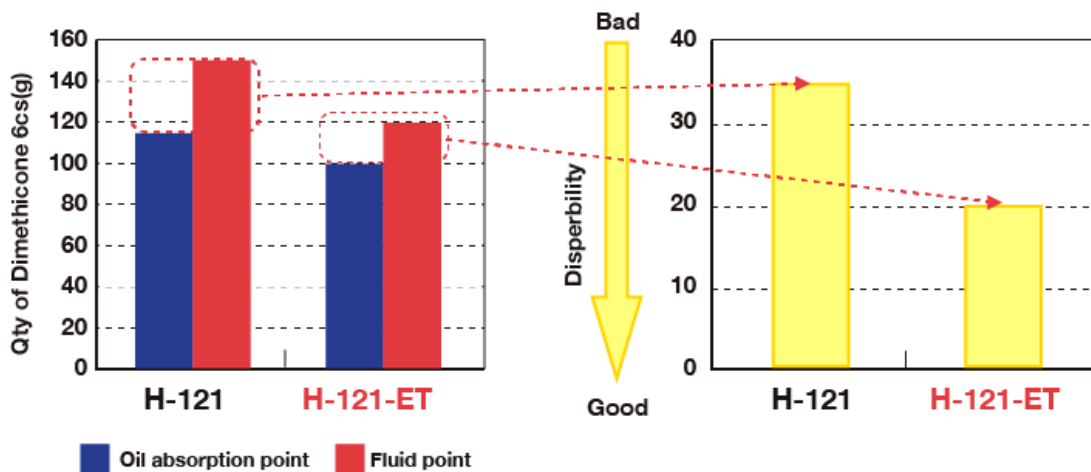
Applied 0.5mg/cm<sup>2</sup> test powder on artificial leather Supplare (made by Idemitsu Techno Fine ) ,  
and evaluated texture by KES-SE friction tester (made by Kato tech and sensor:artificial leather Supplare,load 25g) .



## III . Dispersibility to oils (Silicone 6cs)

[Test method]

Added Dimethicone 6cs in test powder gradually, and mixed by a palette knife. Where the triangular pyramid was made is the point of the oil absorption. At that time when the test powder started to fluid down from a palette knife was a fluid point, after added Dimethicone 6cs furthermore. The difference of both points is indicator of dispersibility.



#### IV . Hygroscopicity and moisture retention capability

[Test method]

Spread about 0.3g of the test sample in a petri dish thinly, and leave to stand under relative humidity from 10 to 90 % for 48 hours at 25.

After 48 hours, measured its gravity and evaluate hygroscopicity of the test sample.

