



Your Dreams, Our Challenge

# **FREQUENTLY ASKED QUESTIONS** about Solesphere™ H-52 and H-53 Silicas for Skincare



# FREQUENTLY ASKED QUESTIONS ABOUT SOLESPHERE H-52 AND H-53 SILICAS FOR SKINCARE

## Q – What are the benefits of silica gels for skincare?

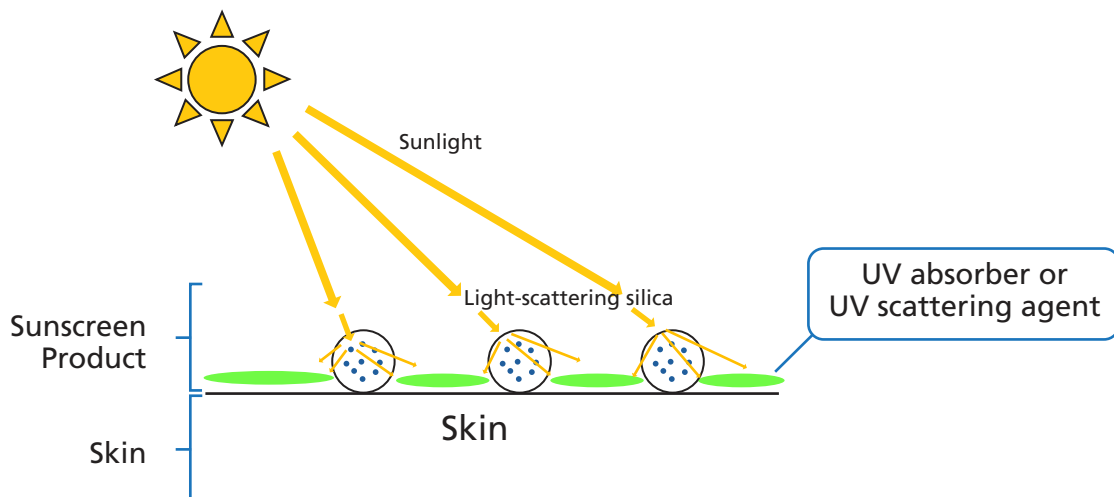
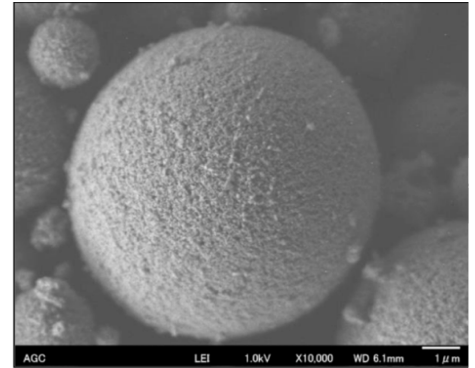
Silica gels function really well as fillers to enhance the surface smoothness and dispersibility of cosmetics and skincare products. They have a lower coefficient of friction than titanium dioxide and other popular fillers. On a molecular level, they move more freely to provide a superior tactile feel.

## Q – Why were the Solesphere H-52 and H-53 grades developed?

They are a safe and cost-effective way to boost SPF and stability of skincare products and cosmetics. A recent study by the USDA raised concerns about using chemicals like oxybenzone, avobenzone and octocrylene in sunscreens and cosmetics. The FDA suggests that these chemicals might disrupt normal hormone patterns in humans. Adding Solesphere gels makes it possible to use less of these chemicals in these formulations. Both gels work well in most formulations and help to achieve an SPF efficiency of 50 or higher.

## Q – How do they boost SPF?

The gel particles have high specific surface areas and large pores that scatter UV light. The light is scattered on the bigger multiple pores of silica first, then the scattered light goes on to the UV absorber or UV scattering agent (see image below). The more UV light that is scattered when it hits the lotion, the less light that needs to be absorbed with chemicals and active pharmaceutical ingredients (APIs). That means that adding inert Solesphere particles to a formulation that contains organic and inorganic filters enables it to achieve the desired SPF using less chemicals and APIs. In addition, formulations made with Solesphere gels are less likely to lose their SPF effectiveness over time because the gel particles don't change.

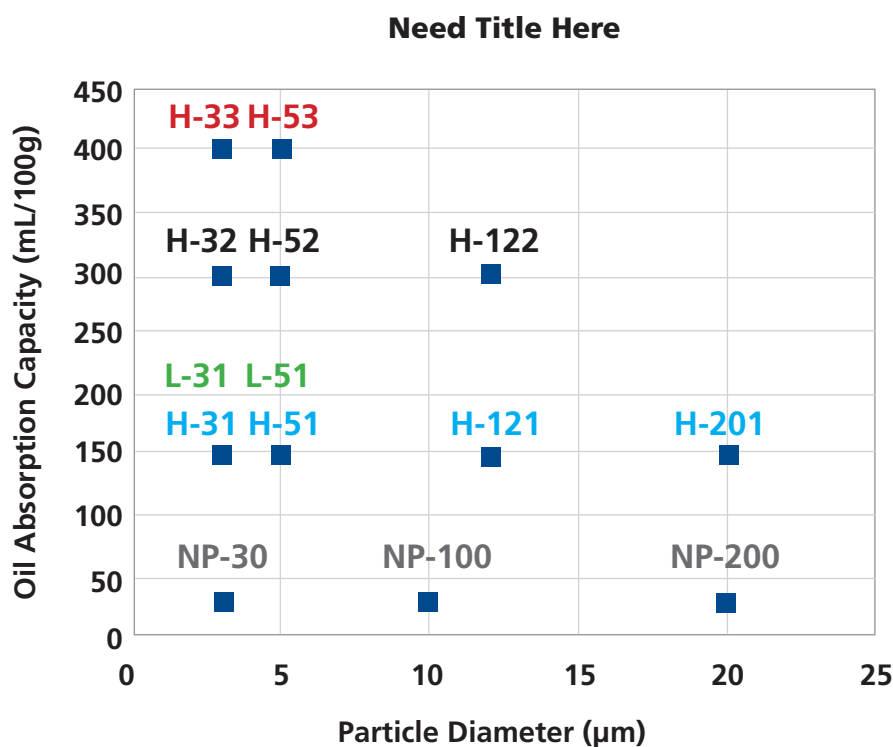


## Q – Are silica gels harmful to humans or the environment?

No. Silica is a naturally occurring mineral. Because of this, amorphous and hydrated silicas are GRAS (generally recognized as safe) ingredients for use in personal care products like makeup and sunscreen. Solesphere microspherical silica gel is amorphous, corrosion free and safe for the environment and human body.

## Q – What is the difference between Solesphere H-52 and H-53?

They have different oil absorption levels. Both grades are 5  $\mu\text{m}$  particles, but they have different pore diameters, which provides their ability to absorb oils (see chart below). Solesphere H-52 has a 10 nm pore diameter and oil absorption level of 300 mL/g, while Solesphere H-53 has an 11 nm pore diameter and an oil absorption level of 400 mL/g.



## Q – What other products can formulators use to boost SPF in skincare products?

Titanium dioxide is a UVB absorber with moderate potency. However, it can't be formulated with avobenzone and also may whiten skin. Ensulizole is a potent UVB absorber, but it is water soluble, so it is not ideal for use in sunscreen formulations. Octocrylene, homosalate and octisalate are weak UVB absorbers and won't work in the higher SPF formulations that are becoming increasingly popular.

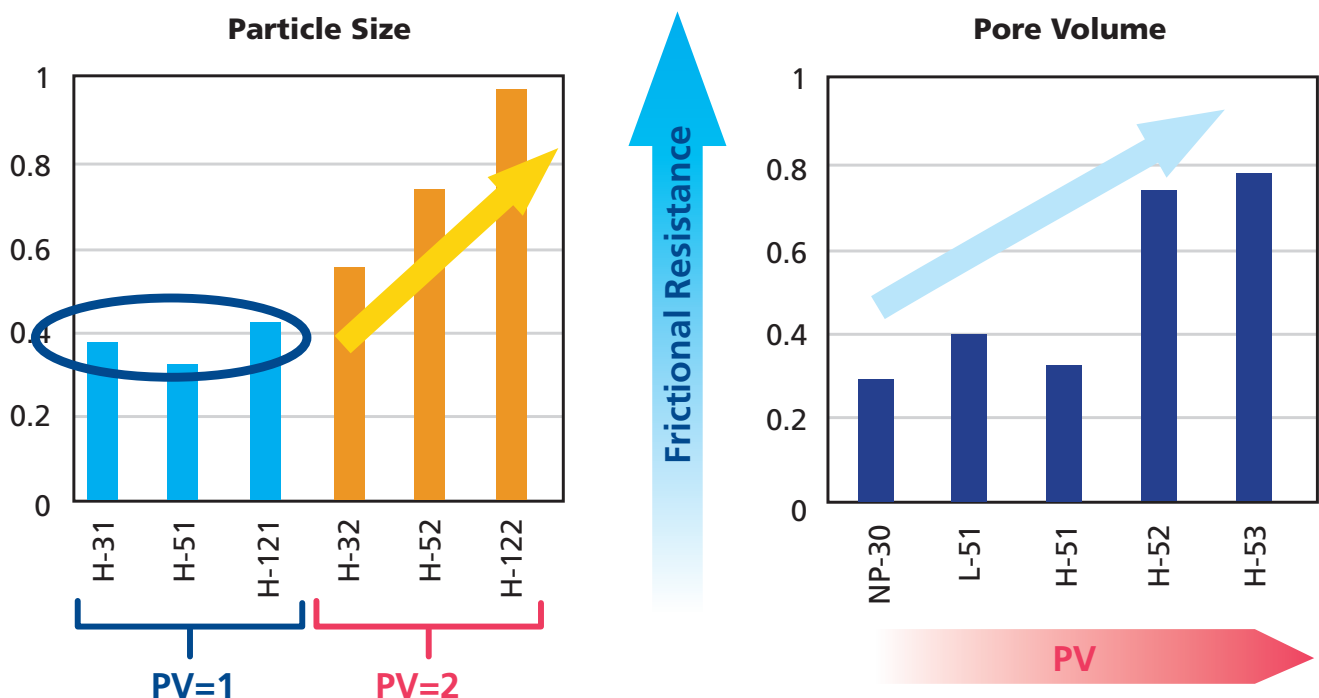
## Q – How were Solesphere gels tested?

AGC Si-Tech Company, Ltd. tests show that Solesphere microspherical silica gels significantly increase the SPF in prototypical sunscreen formulations when measured in vitro. Formulations with silica have stable SPF and viscosity.

- Adding 2% Solesphere more than doubled the SPF of formulations using inorganic UV filtering agents. These include zinc oxide (ZnO) and titanium dioxide (TiO<sub>2</sub>).
- Adding 2% Solesphere nearly tripled the SPF of formulations using a package of conventional organic UV filters. These include octocrylene, homosalate, ethylhexal salicylate, and ethylhexal methoxycinnamate.

In addition, friction resistance was tested as particle size and pore volume increased. Per below, tests showed that as particle size and pore volume increased, so did frictional resistance. For the test, a 0.5 mg/cm test powder was applied to artificial leather Supplare (made by Idemitsu Techno Fine), and the texture was evaluated with a KES-SE friction tester (made by Kato Tech) and sensor.

This means that Solesphere gels can be added to cosmetics, skincare and sunscreen formulations that contain organic and inorganic filters to boost SPF and stability. In addition, formulations made with Solesphere gels are less likely to lose their SPF effectiveness over time.



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## SUPPORTING MESSAGES

- A recent study sponsored by AGC Si-Tech Company, Ltd. shows that Solesphere microspherical silica gels significantly increase the SPF in prototypical sunscreen formulations when measured in vitro. Formulations with silica have stable SPF and viscosity.
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