RESiFA™

SOLESPHERE

Microspherical Silica for SPF Boosting

AGC

Your Dreams, Our Challenge

RESIFA™ SOLESPHERE

Microspherical Silica for SPF Boosting

RESIFA™ SOLESPHERE™ (and RESIFA™ SUNSPHERE) are highly pure microspherical, porous, silicon dioxide manufactured by AGC Si-Tech, a wholly owned subsidiary of AGC. Through our proprietary manufacturing process, microspherical silica can be manufactured with a narrow particle size distribution with particle size ranging from 3µm to 20µm. Uniform porosity throughout the particles are also achieved ranging in from 0 to 2.0 mL/g.

Applications

SOLESPHERE silica can be used in a wide variety of sunscreen formulations (O/W, W/O) and various UV actives.

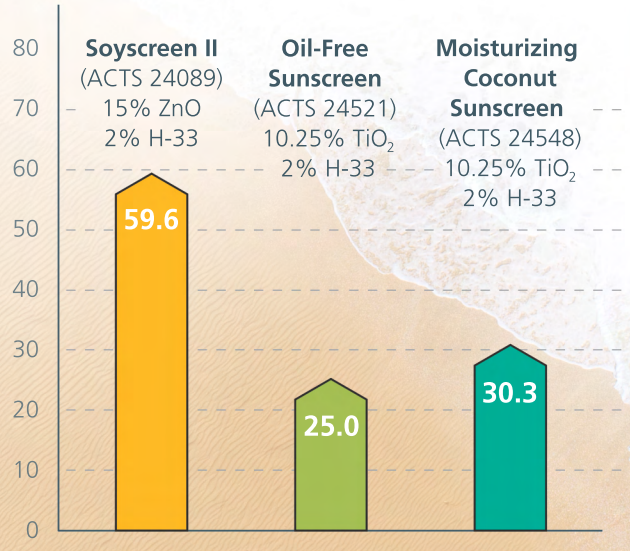
- Organic and inorganic UV actives
- O/W, W/O, anhydrous formulations
- Creams and lotions
- Lip balms, sticks
- Spray applications
- Cosmetics (daily wear)

Natural SPF Boosters

The FDA restricts the loading levels of organic and inorganic UV actives in sunscreen formulations. This can make it difficult for formulators to achieve SPF 15 rating or higher and broad spectrum.

- Adding SOLESPHERE silica to organic and inorganic sunscreen formulations makes it possible to boost SPF to the required or desired level or to be able to claim "broad spectrum" effectiveness.
- If the desired SPF levels are already achieved, the use of SOLESPHERE silica can allow for a reduction of UV actives while still meeting the desired SPF rating. This is especially important for inorganic formulations using titanium dioxide and/or zinc oxide where the spreadability and incorporation into the skin can be improved and the white appearance can be reduced by using SOLESPHERE silica.
- Reducing the UV actives in formulations promotes skin tolerance and reduces skin irritation.

In Vivo SPF



In vivo method for Moisturizing Coconut and Oil Free is ISO 24444. The method for Soyscreen II is Helio2™

How It Works

Two major mechanisms to promote SPF boosting

Film Forming and Film Thickness

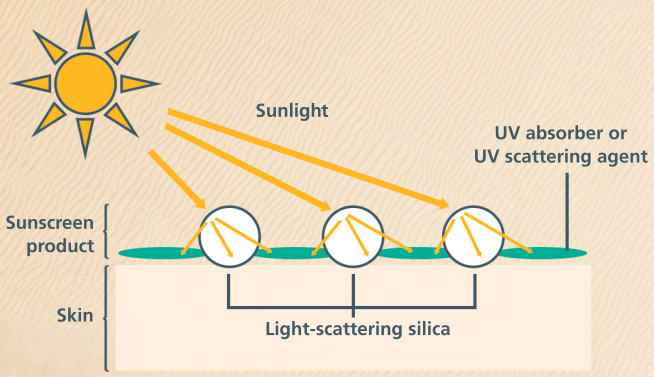
The microspherical structure of SOLESPHERE silica allows for better spreadability and distribution creating a consistent, uniform film onto the skin. This helps disperse the UV active ingredients more uniformly throughout the application process.

Film thickness is also important. Large particles lead to thicker films. SOLESPHERE particles are much larger than traditional/ conventional SPF boosting additives providing physical spacing of sunscreen actives after application to the skin.

Light Scattering

The unique, uniform structure of the silica plays a big part in creating an SPF boost. The silica particles have high specific surface areas and large pores that scatter UV light. This increases the path length of light, making reflection or absorption by organic or inorganic sunscreens more likely. The more UV light that is scattered when it hits the lotion, the less light that needs to be absorbed with UV active ingredients.

That means SOLESPHERE particles can be added to organic formulations using safer UV filters to achieve the desired SPF. In addition, SOLESPHERE silica are very stable over a wide temperature range and will not deform.



Formulation Guidelines

- Recommended loading levels 2-3%
- Add SOLESPHERE™ silica to the water phase of O/W formulations and the oil phase in W/O formulations
- SOLESPHERE silica can also be post added to the formulation
- Avoid using clay emulsifiers
- Suitable for cold and hot temperature processes

Soyscreen II (ACTS 24089)

	Trade Name	INCI Name	wt (%)
A	**Water**	Water	48.4
B	**Zemea**	Propanediol	10.0
	Tris Amino Ultra PC	Tromethamine	0.1
C	**Feruloyl Soy Glycerides**	Feruloyl Soy Glycerides	5.0
	Caprylic/Capric Triglycerides	Caprylic/Capric Triglycerides	15.0
	Span 20	Sorbitan Laurate	0.5
	CosmoSurf DDG-20	Bis-Octyldodecyl Dimer Dilinoleate/ Propanediol Copolymer	2.0
	Cithrol PGTL	Tri- (Polyglyceryl-3/Lauryl) Hydrogenated Trilinoleate	2.0
D	**SOLESPHERE H-33**	Silica	2.0
	Zinclear XP Powder	Zinc Oxide	15.0

Procedure:
1. Premix B, then add A with propeller
2. Premix C, then add D
3. Slowly, add A/B to C/D
4. Homogenize, if needed

Oil-Free Sunscreen (ACTS 24521)

	Trade Name	INCI Name	wt (%)
A	**Water**	Water	40.55
A	**AltivTM T-15**	D-Gluconic Acid	10.0
B	**Zemea**	Propanediol	30.0
B	**Velvetol H500**	Polypropanediol-8	5.0
B	**RubyBio GL**	Glycolipids	1.0
B	**Spectrastat**	Caprylhydroxamic Acid (and) Caprylyl Glycol (and) Glycerin	1.0
B	**FARMAL Xanthan 2312 TC**	Xanthan Gum	0.2
C	**MT-100WP**	Titanium Dioxide	10.0
C	**MT-100WP**	Titanium Dioxide (and) Aluminum Hydroxide (and) Stearic Acid	0.25
C	**SOLESPHERE H-33**	Silica	2.0

Procedure:
1. Premix B and add to A using axial-flow impellor mixing
2. Add C to A/B using axial-flow impellor mixing
3. Mix A/B/C with dispersion blade until uniform
4. Homogenize briefly if not glossy

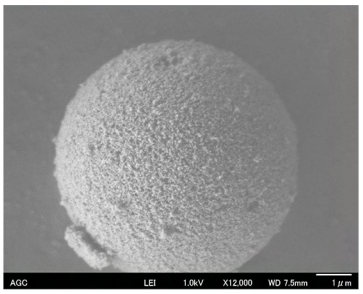
Moisturizing Coconut Sunscreen (ACTS 24548)

	Trade Name	INCI Name	wt (%)
A	**Water**	Water	44.25
B	**Zemea**	Propanediol	10.0
	RonaCare Magnesium Sulfate	Magnesium Sulfate	0.5
	Spectrastat	Caprylhydroxamic Acid (and) Caprylyl Glycol (and) Glycerin	1.0
C	**Citropol 1A**	Polycitronellol Acetate	25.0
	FeruliShield Coconut	Coconut Oil Ethyl Ferulate Esters	2.0
	Span 20	Sorbitan Laurate	1.0
	CosmoSurf DDG 20	Bis-Octyldodecyl Dimer Dilinoleate/ Propanediol Copolymer	2.0
	Cithrol PGTL	Tri- (Polyglyceryl-3/Lauryl) Hydrogenated Trilinoleate	2.0
D	**MT-150EX**	Titanium Dioxide (and) Aluminum Hydroxide (and) Stearic Acid	10.0
	MT-700Z	Titanium Dioxide (and) Aluminum Hydroxide (and) Stearic Acid	0.25
	SOLESPHERE H-33	Silica	2.0

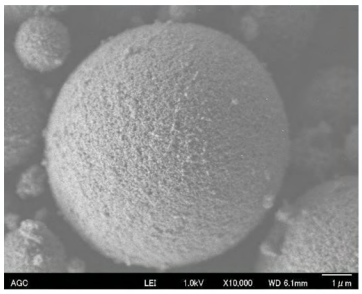
Procedure:
1. Premix B and add to A
2. Premix C
3. Add A/B to C
4. Slowly add D to A/B/C

For more information and other formulations, please visit www.resifasolesphere.com

RESIFA SOLESPHERE
H-33 and H-53 for SPF Boosting



SOLESPHERE H-33 (3 µm, 2.0 ml/g)



SOLESPHERE H-53 (5 µm, 2.0 ml/g)

Benefits

- SPF boosting with formulations using organic and/or inorganic UV actives
- Improves the spreadability and incorporation into the skin of sunscreens
- Enhances the feel and texture of sunscreens. SOLESPHERE silica can make W/O formulations feel like O/W formulations.

Product Line

SOLESPHERE	H-33	H-53	NP-100
Form/Appearance	White, fine, free flowing powder		
INCI Name	Silica		
Particle Size	3 µm	5 µm	10 µm
Surface Area	600~800 m^2/g	600~800 m^2/g	100 m^2/g
Pore Volume	2.0 mL/g	2.0 mL/g	0.1 mL/g max

- H-33 and H-53 provide significant boost in SPF to water in oil (W/O) sunscreen formulations and dramatically improve the tactile aesthetics
- NP-100 provides an additional SPF boost to W/O when combined with H-33/H-53. In addition, it improves freeze/thaw stability.

- **Natural material**
- **Coral and reef safe**
- **Non-microplastic**
- **Non-nanomaterial**

RESIFA™ SOLESPHERE

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