

Non-Nano Titanium Dioxide Sunscreen Technologies

Europe Program



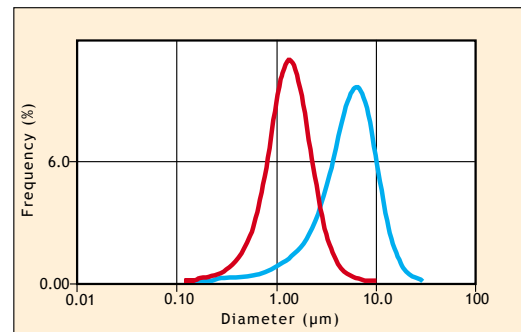
Inorganic UV filters have been manufactured during the past forty years for use in sunscreen products. They are preferred over organic UV filters because of their physical and chemical stability, as well as their non-irritating properties. In order to optimize the protection against UV light, and to minimize the scattering of visible light, Titanium Dioxide with particle sizes less than 100nm, or “nanoparticles,” have become increasingly popular. However, there are recent safety concerns surrounding “nanoparticles,” particularly skin penetration, risk of inhalation, eco-toxicity, and bioaccumulation in the human body.

In light of perceived health risks associated with “nanoparticles,” pigment producers have been challenged to develop grades with a mean particle size greater than 100nm, while maintaining adequate UV-protection and cosmetic acceptability.

Kobo offers a range of Titanium Dioxide products, where the particle sizes are greater than 100nm when measured by light scattering sizing. These non-nano TiO₂ are available coated with inorganic and organic surface treatments, and dispersed in various vehicles for easier use in formulating

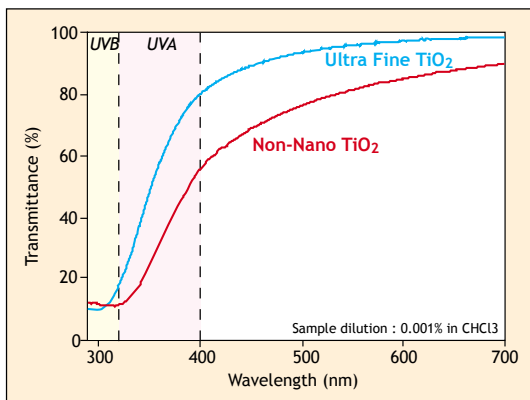
sunscreens. These products have been designed to help formulators develop sunscreen products with high SPF/PFA and minimal whitening without nanoparticles.

Particle Size of Dispersion (Non-Nano TiO₂ in an Ester)



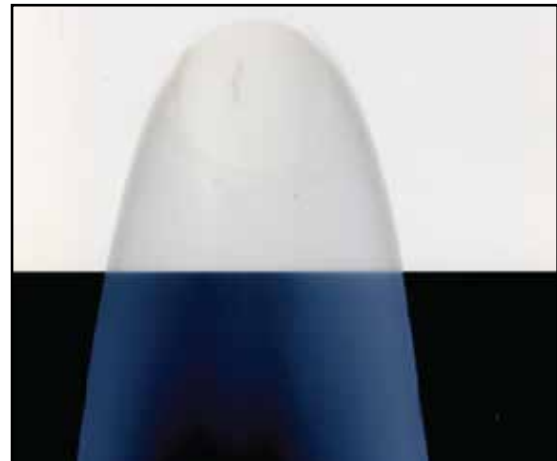
Particle size measurements of Non-Nano Titanium Dioxide (dispersed in polar-blue curves- or apolar-red curves- solvents) showing that all of the particles are above the 100nm limit.

Note: These products are considered to be non-nano materials according to Cosmetics Europe's interpretation of the definition given in Regulation (EC) No. 1223/2009.



Comparison of the transmittance curves of a Non-Nano TiO₂ (red curve) and an ultra fine grade TiO₂ (blue curve) dispersed in the same ester.

Drawdown of Dispersion (Non-Nano TiO₂ in an Ester)



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Dispersions

Carrier/ Solvent	Product Name	INCI Name	Active %	Viscosity
Esters/Oils	HBP50TMD	<i>Butyloctyl Salicylate (And) Titanium Dioxide (And) Polyhydroxystearic Acid (And) Dimethicone (And) Hydrogen Dimethicone</i>	47	Pourable
Silicones <small>New</small>	CMF640WPS	<i>Cyclopentasiloxane (And) Titanium Dioxide (And) Polyglyceryl-3 Polydimethylsiloxyethyl Dimethicone (And) Hydrated Silica (And) Dimethicone (And) Hydrogen Dimethicone</i>	37	Pourable

The method of measurement used to classify these products as Non-Nano is the Light Scattering Sizer testing method.



KSL-376A-EU

Natural Non-Nano Sunscreen



Part 1

- Deionized Water *Water* 18.95%
- Sodium Chloride - Fischer: *Sodium Chloride* 1.50%

Part 2

- Glycerin - Interchimie: *Glycerin* 4.00%
- Keltrol® CG - CP Kelco: *Xanthan Gum* 0.25%

Part 3

- Tegosoft® CT - Evonik: *Caprylic/Capric Triglycerides* 25.00%
- GC70MZCJ-G - Kobo Products: *Zinc Oxide (And) Caprylic/Capric Triglyceride (And) Jojoba Esters (And) Glyceryl Behenate/Eicosadioate* 24.00%
- TTO-NJE8 - Kobo Products: *Titanium Dioxide (And) Alumina (And) Jojoba Esters* 15.00%

Part 4

- Dehymuls® PGPH - BASF: *Polyglyceryl-2 Dipolyhydroxystearate* 4.00%
- SunBoost ATB Natural - Kobo Products: *Argania Spinosa Kernel Oil (And) Tocopheryl Acetate (And) Bisabolol* 3.00%
- MSS-500W - Kobo Products: *Silica* 2.00%
- Lipex® Shea Tris - AAK: *Shea Butter* 1.00%
- Olivem® 900 - Hallstar: *Sorbitan Olivat* 1.00%

Part 5

- AE Preserve® PCG - AE Chemie: *Phenethylalcohol (And) Caprylhydroxamic Acid (And) Glycerin* 0.30%

Manufacturing Procedure

1. Pre-mix Part 2 and add to Part 1. Heat to 80°C.
2. Pre-mix Part 3 and mix until homogeneous using a propeller. Add Part 4 to Part 3 and mix while heating to 80°C.
3. Add Parts 1 and 2 to Parts 3 and 4 slowly while propeller mixing.
4. Homogenize at 7000 rpm for 5 minutes.
5. Add Part 5 and cool to room temperature while mixing.

Description

This natural sunscreen features Kobo's Cosmos approved products GC70MZCJ-G, non-nano ZnO dispersion, and TTO-NJE8, non-nano treated TiO2. This combination offers high UV protection. SunBoost ATB Natural is a proprietary ratio of anti-oxidant, anti-irritant and anti-inflammatory agents that can boost UV protection. MSS-500W is a silica microsphere, that reduces tackiness and improves application feel.

Active Ingredients

Titanium Dioxide	11.40%
Zinc Oxide	16.10%

BROAD SPECTRUM PROTECTION

Formulation Guidelines

Estimation of Use Level for SPF/UVA-PF
 SPF Units: 2.5-3.0 SPF / % TiO2
 SPF/UVA-PF <3
 Critical Wavelength > 370nm

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Non-Nano Titanium Dioxide

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