Non-Nano Titanium Dioxide

Sunscreen Technologies

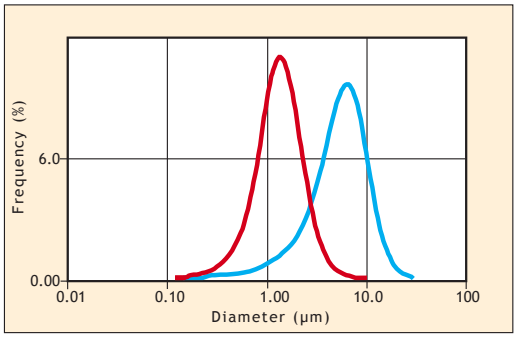
Europe Program

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.

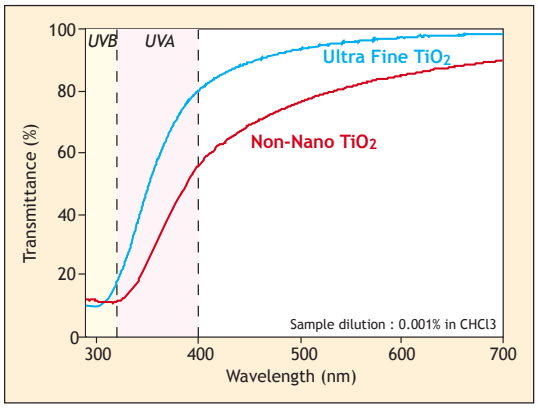
Kobo offers a range of Titanium Dioxide products, where the particle sizes are greater than 100nm when measured by light scattering sizing. These non-nano TiO_2 are available coated with inorganic and organic surface treatments, and dispersed in various vehicles for easier use in formulating sunscreens. These products have been designed to help formulators develop sunscreen products with high SPF/PFA and minimal whitening without nanoparticles.

Particle Size of Dispersion (TiO_2 TA-100 in an Ester)



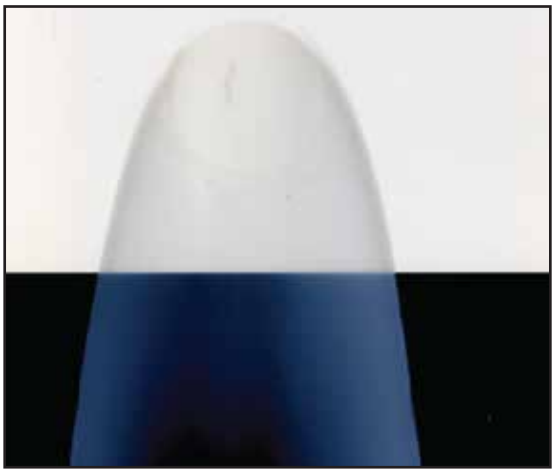
Particle size measurements of Non-Nano Titanium Dioxide (dispersed in polar-blue curves- or apolar-red curves- solvents) showing that all of the particles are above the 100nm limit.

Note: These products are considered to be non-nano materials according to Cosmetics Europe's interpretation of the definition given in Regulation 1223/2009/EC (as described in FEBEA note of July 2012).



Comparison of the transmittance curves of a Non-Nano TiO_2 (red curve) and an ultra fine grade TiO_2 (blue curve) dispersed in the same ester.

Drawdown of Dispersion (TiO_2 TA-100 in an Ester)



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Non-Nano TiO_2

Dispersions

Carrier/ Solvent	Product Name	INCI Name	Active %	Viscosity
Mixed Solvents	INTNP50TEL	Titanium Dioxide (And) Isononyl Isononanoate (And) C12-15 Alkyl Benzoate (And) Silica (And) Stearic Acid (And) Polyhydroxystearic Acid (And) Alumina	46	Paste
Esters/Oils	HBP45TEL	Butyloctyl Salicylate (And) Titanium Dioxide (And) Alumina (And) Silica (And) Stearic Acid (And) Polyhydroxystearic Acid	41	Paste
	TNP45TEL	Titanium Dioxide (And) C12-15 Alkyl Benzoate (And) Stearic Acid (And) Silica (And) Alumina (And) Polyhydroxystearic Acid	41	Paste
Natural Esters/Oils	EMP50TEL	Titanium Dioxide (And) Ethyl Macadamiate (And) Silica (And) Alumina (And) Stearic Acid (And) Polyhydroxystearic Acid	46	Paste
	GCP55TEL	Titanium Dioxide (And) Caprylic/Capric Triglyceride (And) Alumina (And) Silica (And) Polyhydroxystearic Acid	51	Paste
Volatile Non-D5	CAQP55TELJ	Titanium Dioxide (And) Coconut Alkanes (And) Alumina (And) Jojoba Esters (And) Polyhydroxystearic Acid (And) Coco-Caprylate/Caprate (And) Silica	48	Paste
	ISDMP50TEL	Titanium Dioxide (And) Dimethicone (And) Isopropyl Isostearate (And) Stearic Acid (And) Silica (And) Polyhydroxystearic Acid (And) Alumina	46	Paste

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

O/W High SPF Aerosol Sunscreen Lotion

in vivo SPF 25

Formula KSL-211C

Part 1
- Deionized Water - *Water* 54.77%
- Vegetable Glycerin - BASF: *Glycerin* 3.00%
- Xanthan Gum - Spectrum Chemical Mfg.: *Xanthan Gum* 0.20%
- Hamp-Ene Na3T - Hampshire Chem: *Trisodium EDTA* 0.10%

Part 2
- HBP45TEL - Kobo Products: *Butyloctyl Salicylate (And) Titanium Dioxide (And) Alumina (And) Silica (And) Stearic Acid (And) Polyhydroxystearic Acid* 10.00%
- TNPB80MZCM-G - Kobo Products: *Zinc Oxide (And) C12-15 Alkyl Benzoate (And) Isopropyl Myristate (And) Polyhydroxystearic Acid (And) Stearalkonium Hectorite (And) Hydrogen Dimethicone (And) Glyceryl Behenate/Eicosadioate (And) Propylene Carbonate* 6.50%
- SF1202- Momentive: *Cyclopentasiloxane* 5.00%
- SunBoost ATB™ - Kobo Products: *Argania Spinosa Kernel Oil (And) Tocopheryl Acetate (And) Bisabolol* 5.00%
- COCOATE BG - Gattefosse: *Butylene Glycol Cocoate* 3.25%
- ABIL® Wax 9801 - Evonik: *Cetyl Dimethicone* 3.00%
- MYRITOL® 331 - Vantange: *Cocoglycerides* 3.00%
- Dow Corning 556 Fluid - Dow Corning: *Phenyl Trimethicone* 2.00%
- Tamanu Oil - Pure World Botanicals: *Tamanu Oil* 2.00%
- Eumulgin® B 1 - BASF: *Ceteareth 12* 0.50%
- Pemulen™ TR-2 - Lubrizol Corporation: *Acrylates/C10-C30 Alkyl Acrylate Crosspolymer* 0.20%
- Rosemary HQ 3401 - BASF: *Rosemary (Rosmarinus Officinalis) Extract* 0.08%

Part 3
- Lexgard® Natural - Inolex Chemical Company: *Glyceryl Caprylate (And) Glyceryl Undecylenate* 1.00%

Part 4
- Eumulgin® SG -BASF: *Sodium stearoyl glutamate* 0.40%

Manufacturing Procedure
1. In a suitable stainless steel tank equipped with a lightening type propeller mixer along with side sweep action, sprinkle item 3 into item 1. Mix until homogeneous.
2. Then add items 2 and 4 in Part 1, and heat to 75°C.
3. In Part 2, mix ingredients together until uniform and heat to 70°C.
4. Add Part 2 to Part 1 under homogenization, mixing until emulsion is formed.
5. At 50°C add Part 3 to Parts 1 and 2 under propeller mixing.
6. Then add Part 4 to Parts 1, 2 and 3.
7. Switch over to sweep mixing.
8. Continue mixing and cooling product gradually until 29-30°C.
9. Part 5 Sent to American Spraytech to be filled with Propellant, (vapor tap openings 0.025" actuator 0.025" opening)

Description

Contains: 35% Aeropres AB 46 (AB-46) INCI: Propane (And) n-Butane filled at American Spraytech

This high SPF sprayable sunscreen uses physical sunscreens which are considered less irritating than organic sunscreens. This sunscreen formula uses Kobo's Zinc Oxide Dispersion, TNPB80MZCM-G and Non-Nano Titanium Dioxide Dispersion, HBP45TEL, for UVA/UVB protection. Kobo's SunBoost ATB™ is a booster to help increase the SPF/PFA values.

This formula contains 4.70% Butyloctyl Salicylate

Active Ingredient(s)
- Titanium Dioxide 4.1%
- Zinc Oxide 5.1%

Broad Spectrum Protection

Formulation Guidelines

Estimation of Use Level for SPF/UVA-PF
- SPF Units: 2.5-3.0 SPF / % TiO_2
- SPF/UVA-PF <3
- Critical Wavelength > 370nm