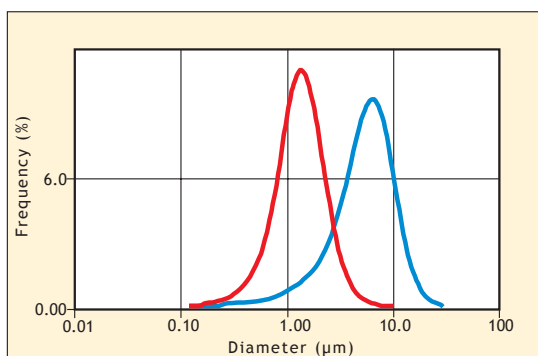


# Non-Nano Titanium Dioxide Sunscreen Technologies

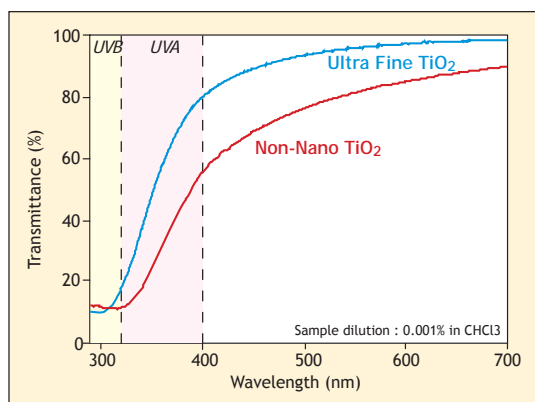
Inorganic UV filters have been manufactured during the past twenty-five years for use in sunscreen products. They are preferred over chemical sun filters because of their physical and chemical stability, as well as their non-irritating properties. In order to be transparent on the skin and effective against UV 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 particles over 100nm, while maintaining adequate UV-protection and cosmetic acceptability. Kobo offers a range of Titanium Dioxide, where the particle sizes are greater than 100nm when measured by light scattering

sizing. These Non-Nano TiO<sub>2</sub> are available coated with either organic or inorganic surface treatments, and/or dispersed in various vehicles for easier use in formulation compositions. They will help formulators develop sunscreen products with high SPF/PFA and transparency without nanoparticles.

Particle Size of Dispersion (TiO<sub>2</sub> 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.



Comparison of the transmittance curves of a Non-Nano TiO<sub>2</sub> (red curve) and an ultra fine grade TiO<sub>2</sub> (blue curve) dispersed in the same ester.

Drawdown of Dispersion (TiO<sub>2</sub> TA-100 in an Ester)



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# Non-Nano TiO<sub>2</sub>

## Powders

Product Name	Surface Treatment	Properties
MPT-154-NJE8	Alumina & Jojoba Esters	Hydrophobic
TTO-NJE8	Alumina & Jojoba Esters	Hydrophobic
TEL-100-NJE5	Jojoba Esters, Silica & Alumina	Hydrophobic
TiO <sub>2</sub> TA-100	Alumina & Silica	Hydrophilic

## Dispersions

Carrier/Solvent	Product Name	INCI Name	Active Content	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/Caprates (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.

## Non-Nano Sunscreen featuring GCP55TEL & GC70MZCJ

Formula KSL-169A

### Part 1

- Deionized Water - Water 37.63%
- Sodium Chloride - Morton Salt: Sodium Chloride 0.90%
- Allantoin - RITA Corp.: Allantoin 0.20%

### Part 2

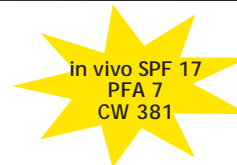
- Finsolv® TN - Finetex: C12-15 Alkyl Benzoate 20.04%
- GCP55TEL** - Kobo Products: Titanium Dioxide (And) Caprylic/Capric Triglyceride (And) Alumina (And) Silica (And) Polyhydroxystearic Acid 11.90%
- GC70MZCJ** - Kobo Products: Zinc Oxide (And) Caprylic/Capric Triglyceride (And) Jojoba Esters (And) Silica 6.62%
- ABIL® Wax 9801 - Evonik: Cetyl Dimethicone 3.00%
- ABIL® WE 09 - Evonik: Polyglyceryl-4 Isostearate (And) Cetyl PEG/PPG-10/1 Dimethicone (And) Hexyl Laurate 3.00%
- Cetiol® CC - Cognis Corp.: Dicaprylyl Carbonate 3.00%
- Floraesters® 15 - Floratech: Jojoba Esters 3.00%
- Arlacel P135 - Croda: PEG-30 Dipolyhydroxystearate 2.50%
- Cetiol® SB 45 - Cognis Corp.: Shea Butter 1.00%
- Methyl Paraben NF - International Sourcing: Methylparaben 0.15%
- Propyl Paraben NF - International Sourcing: Propylparaben 0.06%

### Part 3

- Aculyn™ 44 - Rohm & Haas: PEG-150/Decyl Alcohol/SMDI Copolymer 3.00%

### Part 4

- BPA-515** - Kobo Products: Polymethyl Methacrylate (And) Isopropyl Titanium Triisostearate 4.00%



### Manufacturing Procedure

- In a double jacketed stainless steel tank equipped with a lightening type mixer along with side sweep action, mix ingredients in Part 1 in the order listed.
- Heat Part 1 to 75°C.
- In a second double jacketed stainless steel tank equipped with a lightening type mixer heat Part 2 to 75°C.
- Add Part 1 to Part 2 very slowly with mixing using a lightening type mixer.
- Cool product slowly down to about to 45°C.
- Add Part 3 to main batch, one ingredient at a time, in the order listed.
- Switch mixing to side sweep.
- Cool emulsion further to 33°C with sweep action mixing.
- Add Part 4 under propeller.
- Homogenize at 4500 rpm for approximately 10 minutes.

### Description

This UV Balanced sunscreen uses Kobo's Non-Nano TiO<sub>2</sub> dispersion, GCP55TEL and Non-Nano ZnO dispersion, GC70MZCJ. These Non-Nano dispersions give a high SPF/UVA ratio. BPA-515 is an ITT treated sphere that gives excellent slip and non tacky drydown film on skin.

### Active Ingredient(s)

Titanium Dioxide	6.00%
Zinc Oxide	4.50%

### Broad Spectrum Protection

#### Formulation Guidelines

Estimation of Use Level for SPF/UVA-PF  
 SPF Units: 2.5-3.0 SPF / % TiO<sub>2</sub>  
 SPF/UVA-PF < 3  
 Critical Wavelength > 370nm

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