# Non-Nano $TiO_2$ Dispersions

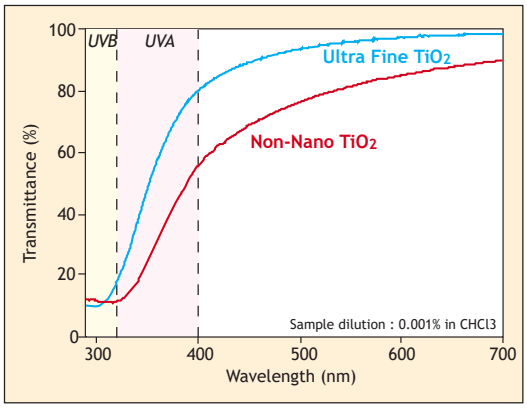
## Cosmetics Europe 2019 Interpretation

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 Non-Nano Titanium Dioxide dispersions, where the particle sizes are greater than 100nm when measured by light scattering sizing, according to the last Nano Guidance from Cosmetics Europe (Interpretation of the Definition of the Term "Nanomaterial" according to the EU Cosmetic Regulation 1223/2009, May 24, 2019).

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




*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.*

KSL-377A-EU

## Non-Nano Mineral Sunscreen

SPF 50 | PFA 17 | CW 379

**Part 1**

| | |
|---|---|
| • Deionized Water - *Water* | 36.40% |
| • **GLW70MZC** - Kobo Products: Zinc Oxide (And) Water (And) Glycerin (And) Sodium Polyacrylate (And) Cellulose Gum | 20.00% |
| • Tego® SML 20 - Evonik: *Polysorbate 20* | 2.00% |
| • Emulsiphos® - Symrise: *Potassium Cetyl Phosphate (And) Hydrogenated Palm Glycerides* | 0.50% |

**Part 2**

| | |
|---|---|
| • Butylene Glycol - Interchimie: *Butylene Glycol* | 4.00% |
| • Keltrol® CG - CP Kelco: *Xanthan Gum* | 0.30% |

**Part 3**

| | |
|---|---|
| • **HBP50TMD - Kobo Products:** *Butyloctyl Salicylate (And) Titanium Dioxide (And) Polyhydroxystearic Acid (And) Dimethicone (And) Hydrogen Dimethicone* | 10.00% |
| • Tegosoft® TN - Evonik: *C12-15 Alkyl Benzoate* | 8.00% |
| • Emulium® 22 - Gattefossé: *Tribehenin PEG-20 Esters* | 6.00% |
| • Dub Inin A - Stéarinerie-Dubois: *Isononyl Isononanoate* | 5.00% |
| • **SunBoost ATB** - Kobo Products: *Argania Spinosa Kernel Oil (And) Tocopheryl Acetate (And) Bisabolol* | 3.00% |
| • Dub Estoline - Stéarinerie-Dubois: *Ethylhexyl Polyhydroxystearate* | 1.00% |
| • Lipex® Shea Tris - AAK: *Shea Butter* | 1.00% |

**Part 4**

| | |
|---|---|
| • **TTO-NJE8** - Kobo Products: *Titanium Dioxide (And) Alumina (And) Jojoba Esters* | 2.00% |
| • Symdiol® 68 - Symrise: *1,2-Hexanediol (And) Caprylyl Glycol* | 0.80% |

**Manufacturing Procedure**

1. Combine Part 1. Pre-mix Part 2 in a side beaker and add to Part 1. Adjust pH to 7.5 using Citric Acid Solution (10%). Start heating to 80°C while prop mixing.
2. Heat Part 3 to 80°C while prop mixing
3. Add Part 3 to Parts 1 and 2 while mixing.
4. Remove batch from heat. Homogenize for 2 minutes.
5. Switch back to propeller and mix for 10-15 minutes.
6. Add Part 4 to main beaker and continue prop mixing until batch reaches room temperature.

**Description**

This Non-Nano Mineral Sunscreen Cream offers a lightweight finish with minimal whitening. This formula features Kobo's non-nano Zinc Oxide and Titanium Dioxide dispersions, GLW70MZC and HBP50TMD, and TTO-NJE8, a non-nano treated Titanium Dioxide powder. The combination of these products provides high UVA and UVB protection. SunBoost ATB, a proprietary ratio of anti-oxidant, anti-irritant and anti-inflamatory agents, helps boost UV protection.

**Active Ingredients**

| | |
|---|---|
| Zinc Oxide | 5.8% |
| Titanium Dioxide | 13.6% |

**Testing**

**SPF:** in vivo on 5 subjects
**UVA-PF:** in vivo on 3 subjects
**CW:** FDA method

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| Carrier | Product Name | INCI Name | Active % | Primary Part. Size (nm) | DLS Size (nm) | EU Compliance | Viscosity |
|---|---|---|---|---|---|---|---|
| *Esters/Oils* | TNP45TEL | *Titanium Dioxide (And) C12-15 Alkyl Benzoate (And) Stearic Acid (And) Silica (And) Alumina (And) Polyhydroxystearic Acid* | 40 | 35 | N/A | Compliant | Paste |
| | TNP45TELR | *Titanium Dioxide (And) C12-15 Alkyl Benzoate (And) Stearic Acid (And) Silica (And) Alumina (And) Polyhydroxystearic Acid (And) Iron Oxides (CI 77491)* | 40 | 35 | N/A | Compliant | Paste |
| *Natural Esters/Oils* | New NHP55STS-W | *Titanium Dioxide (And) C13-15 Alkane (And) Stearic Acid (And) Aluminum Hydroxide (And) Polyhydroxystearic Acid* | 44 | 15 | 115 | Compliant | Pourable |
| | New GCP55TJ-E | *Titanium Dioxide (And) Caprylic/Capric Triglyceride (And) Jojoba Esters (And) Polyhydroxystearic Acid (And) Stearic Acid* | 51.5 | 35 | 140 | Compliant | Paste |
| *UV Boosters* | HBP50TMD | *Butyloctyl Salicylate (And) Titanium Dioxide (And) Polyhydroxystearic Acid (And) Dimethicone (And) Hydrogen Dimethicone* | 47 | 35 | N/A | Compliant | Pourable |
| *Volatile Non-D5* | New DIM2K45SXM | *Dimethicone (And) Titanium Dioxide (And) PEG-10 Dimethicone (And) Silica (And) Hydrogen Dimethicone* | 35 | 15 | 180 | Compliant | Paste |

This chart was prepared to assist formulators using $TiO_2$ Dispersions. The information contained herein is believed to be accurate at the time of printing and represents typical values, but should not be used as a substitute for product specification sheets. The Non-Nano Dispersions listed in this flyer have been tested by light scattering method, according to the Cosmetics Europe Nano Guidance Package; Part II: Interpretation of the Definition of the Term "nanomaterial" according to the EU Cosmetic Regulation 1223/2009, published on May 24, 2019.

The following information is listed:

- Active content (%)
- Primary Particle Size (nm) of the $TiO_2$ pigment used
- Size of aggregates as measured by Dynamic Light Scattering - DLS size (nm) - for comparison; should not be utilized for labeling or notification purpose
- EU Compliance: These TiO2 comply with the conditions for Titanium Dioxide (nano) as set forth in the Annex VI to Regulation (EC) No 1223/2009
- Viscosity

We recommend that customers make their own assessment when using particle size data for the purpose of identifying nanomaterials in their finished formulations.

*Please contact our team at* ***techservice@koboproductsinc.com*** *for additional information on this subject.*

**Our dispersions are often divided into two general categories:**

1. **High Solids® Dispersions:** These are usually in paste form and have a high active $TiO_2$ loading and efficacy (up to 5 SPF units/ $TiO_2$%), which is necessary for formulating for very high SPF.
2. **High Speed™ Dispersions:** These are usually pourable and easy to incorporate into a formulation.

**US 8623386B2, WO 2009126859**

*Natural ester, wax or oil treated pigment, process for production thereof, and cosmetic made therewith*

**WO 2008067186, JP pending**

*UV protective cosmetic product incorporating titanium dioxide and transparent iron oxide*