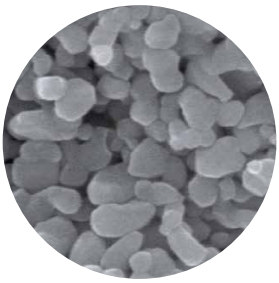
ZnO-C

A Unique Non-Nano Zinc Oxide for Sunscreen Applications

Inorganic UV filters have been manufactured during the past forty years for use in sunscreen products. They are often 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, zinc oxide with particle sizes less than 100nm, or "nanoparticles," have become increasingly popular. However, recent concerns surrounding "nanoparticles" safety have challenged pigment producers to develop grades with a mean particle size over 100nm, while maintaining adequate performance.

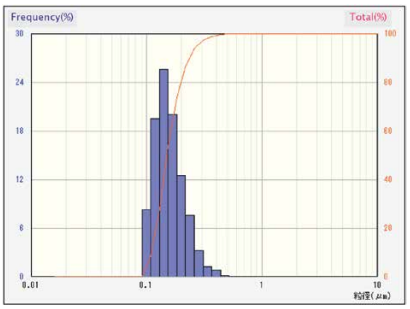
Kobo now offers a unique grade of non-nano Zinc Oxide, named ZnO-C. This zinc oxide has a primary particle size of about 265 nm and size distribution that is entirely above 100 nm, when measured by image analysis. Particle sizes of powders and dispersions made with ZnO-C are greater than 100nm when measured 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).

ZnO-C is available as a powder, surface-treated to improve its dispersibility and compatibility with cosmetic media, and as dispersions in esters, silicones or water to further increase performance. It allows formulators to develop sunscreen products with high UV protection and cosmetic acceptability without nanoparticles.



SEM image of ZnO-C

Particle Size Distribution (Image Analysis)



KSL-376A-EU

Natural Non-Nano Sunscreen

SPF 64 · PFA 20 · CW 375

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 Olivate* 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 TiO_2. 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%

Powders

Product Name	Surface Treatment	Properties
ZnO-C	None	Hydrophilic
ZnO-C-I2	Isopropyl Titanium Triisostearate	Lipophilic
ZnO-C-NJE3	Jojoba Esters	Hydrophobic
New ZnO-C-NOE4	Natural Olive Esters	Hydrophobic
ZnO-C-DMC2	Hydrogen Dimethicone	Hydrophobic
ZnO-C-DS4	Dimethicone	Hydrophobic
ZnO-C-ASG3J	Stearoyl Glutamic Acid	Hydrophobic

US 20180235855A1, WO 2007048057A3
Zinc Oxide Powder Blends, Their Production And Use

US 9949904B2
Method of Formulating Zinc Oxide Powder Blends for Balanced UVA/UVB Attenuation

US 20110150792, WO 2010068687, CN102246014B
Zinc Oxide Aqueous and Non-Aqueous Dispersions

US 8623386B2, WO 2009126859
Natural ester, wax or oil treated pigment, process for production thereof, and cosmetic made therewith

Dispersions

Carrier	Product Name	INCI Name	Active %	Viscosity
Natural Esters/Oils	GC70MZCJ-G	Zinc Oxide (And) Caprylic/Capric Triglyceride (And) Jojoba Esters (And) Glyceryl Behenate/Eicosadioate	67	Paste
	GC70MZCSG	Zinc Oxide (And) Caprylic/Capric Triglyceride (And) Stearoyl Glutamic Acid (And) Glyceryl Behenate/Eicosadioate	68	Paste
	New JOSP80MZCOE	Zinc Oxide (And) Simmondsia Chinensis (Jojoba) Seed Oil (And) Polyhydroxystearic Acid (And) Hydrogenated Olive Oil Stearyl Esters	76	Paste
	JOP80MZCJ	Zinc Oxide (And) Simmondsia Chinensis (Jojoba) Seed Oil (And) Polyhydroxystearic Acid (And) Jojoba Esters	77	Paste
Silicones	CMX80MZCM	Zinc Oxide (And) Cyclopentasiloxane (And) Dimethicone (And) PEG/PPG-18/18 Dimethicone (And) Hydrogen Dimethicone	78	Paste
UV Boosters	HBP75MZCM	Zinc Oxide (And) Butyloctyl Salicylate (And) Polyhydroxystearic Acid (And) Hydrogen Dimethicone (And) Glyceryl Behenate/Eicosadioate	73	Paste
	TNSS75MZCM	Zinc Oxide (And) Ethylhexyl Methoxycrylene (And) C12-15 Alkyl Benzoate (And) Polyhydroxystearic Acid (And) Hydrogen Dimethicone	73	Paste
Volatile Non-D5	DIM2FH75MZCM	Zinc Oxide (And) Dimethicone (And) Isononyl Isononanoate (And) Polyglyceryl-6 Polyricinoleate (And) PEG-10 Dimethicone (And) Hydrogen Dimethicone	73	Pourable
	New DIM2X75MZCM	Zinc Oxide (And) Dimethicone (And) PEG/PPG-18/18 Dimethicone (And) Hydrogen Dimethicone	73	Pourable
	MTMX80MZCM	Zinc Oxide (And) Methyl Trimethicone (And) Dimethicone (And) PEG/PPG-18/18 Dimethicone (And) Hydrogen Dimethicone	78	Paste
Aqueous	GLW70MZC	Zinc Oxide (And) Water (And) Glycerin (And) Sodium Polyacrylate (And) Cellulose Gum	70	Paste

COSMOS APPROVED

C *Raw material approved by Ecocert in accordance with the Cosmos Standard*

CE *Raw material approved by Ecocert in accordance with the Cosmos and Ecocert Standards*

CP *Raw material approved by Ecocert in accordance with the Cosmos Standards (w/ petrochemical)*

This chart was prepared to assist formulators using ZnO-C Powders and 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 Powders and 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.
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 ZnO loading and efficacy.
2. **High Speed™ Dispersions:** These are usually pourable and easy to incorporate into a formulation.