

Non-Nano Zinc Oxide

Sunscreen Technologies

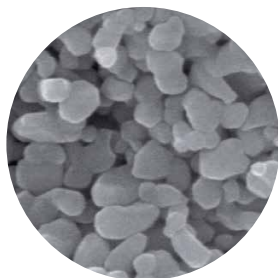


Inorganic UV filters have been manufactured during the past forty years for use in sunscreen products. They are preferred over organic UV filters because of their physical and chemical stability, as well as their non-irritating properties. In order to optimize the protection against UV light, and to minimize the scattering of visible light, zinc oxide 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 over 100nm, while maintaining adequate UV-protection and cosmetic acceptability.

Kobo offers a grade of Zinc Oxide, where the primary particle size is greater than 100nm when measured by image analysis. This non-nano ZnO is available coated with either organic or inorganic surface treatments, and also dispersed in various vehicles for easier use in formulations. They will help formulators develop sunscreen products with broad spectrum protection without nanoparticles.

SEM image of treated ZnO-C (30 kX magnification, 15 kV accelerating voltage) 800 nm



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.

Kobo Non-Nano Patent Information:

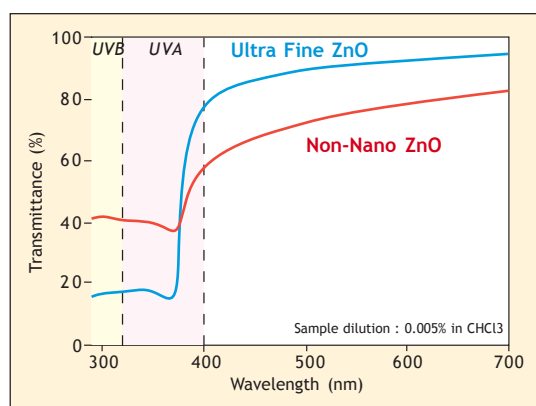
Patent # US 9949905 Zinc Oxide Powder Blends, Their Production And Use

Patent # US 9949904 method of formulating ZnO powder blends for balanced UVA/UVB attenuation

Patent China # ZL 200980149776.7

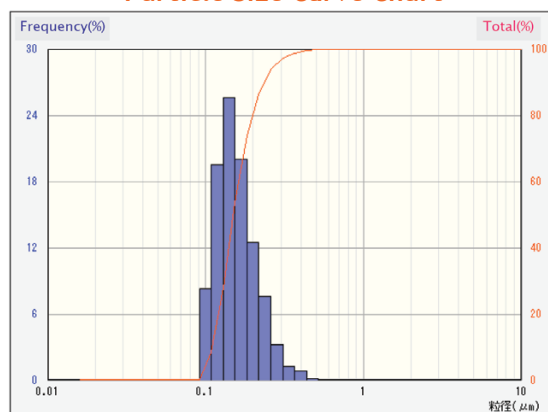
Patent Pending # WO 2010/068687

U.S. Patent Application # 12/331,593 for Zinc Oxide Aqueous and Non-Aqueous Dispersions including its making and use in sun care product



Comparison of the transmittance curves of Non-Nano ZnO, ZnO-C (red curve) and an ultra fine grade Zinc Oxide (blue curve) in dispersions.

Particle Size Curve Chart



In Vitro Test Results of Formulated Zinc Oxides

	ZnO-350 (attenuation grade)	ZnO-C
SPF	28.6	24.4
UVA Ratio	0.80	0.80

* Data from Sumitomo Osaka Cement

KOBO

Technical Literature ref NonNanoZnO-003 - October 1, 2018

USA - New Jersey
+1 (908) 757-0033

FRANCE - Labège
+33 (0)5-62-88-77-40

BRASIL - São Paulo
+55 (11) 5062-0634

www.koboproducts.com

Powders

Product Name	Surface Treatment	Properties
ZnO-C+	None	Hydrophilic
ZnO-C-12	Isopropyl Titanium Triisostearate	Lipophilic
ZnO-C-NJE3+	Jojoba Esters	Hydrophobic
ZnO-C-DMC2	Hydrogen Dimethicone	Hydrophobic
ZnO-C-DS4	Dimethicone	Hydrophobic
New ZnO-C-ASG3J+++	Stearoyl Glutamic Acid	Hydrophobic

Note: NJE Treatment
 Patent # US 8623386 B2
 Natural Ester, Wax or Oil Treated Pigment,
 Process for Production Thereof
 and Cosmetic Made Therewith

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



+++ Raw material approved by Ecocert in accordance with the Cosmos Standard



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



The method of measurement used to classify these products as Non-Nano is the Image Analysis method.

Dispersions

Carrier/Solvent	Product Name	INCI Name	Active %	Viscosity
Esters/Oils	GC70MZCJ-G+	Zinc Oxide (And) Caprylic/Capric Triglyceride (And) Jojoba Esters (And) Glyceryl Behenate/Eicosadioate	67	Paste
	New GC70MZCSG++	Zinc Oxide (And) Caprylic/Capric Triglyceride (And) Stearoyl Glutamic Acid (And) Glyceryl Behenate/Eicosadioate	68	Paste
	HBP75MZCM	Zinc Oxide (And) Butyloctyl Salicylate (And) Polyhydroxystearic Acid (And) Hydrogen Dimethicone (And) Glyceryl Behenate/Eicosadioate	73	Paste
	TNPB80MZCM-G	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	79	Paste
	New TNSS75MZCM	Zinc Oxide (And) Ethylhexyl Methoxycrylene (And) C12-15 Alkyl Benzoate (And) Polyhydroxystearic Acid (And) Hydrogen Dimethicone	72	Paste
Natural Esters/Oils	JOP80MZCJ+	Zinc Oxide (And) Simmondsia Chinensis (Jojoba) Seed Oil (And) Polyhydroxystearic Acid (And) Jojoba Esters	78	Paste
Silicones	CMX80MZCM	Zinc Oxide (And) Cyclopentasiloxane (And) Dimethicone (And) PEG/PPG-18/18 Dimethicone (And) Hydrogen Dimethicone	78	Paste
Volatile Non-D5	DIM2FH75MZCM	Zinc Oxide (And) Dimethicone (And) Isononyl Isononanoate (And) Polyglyceryl-6 Polyricinoleate (And) PEG-10 Dimethicone (And) Hydrogen Dimethicone	74	Pourable
	DM2X80MZCM	Zinc Oxide (And) Trisiloxane (And) Dimethicone (And) PEG/PPG-18/18 Dimethicone (And) Hydrogen Dimethicone	78	Paste
	MTMX80MZCM	Zinc Oxide (And) Methyl Trimethicone (And) Dimethicone (And) PEG/PPG-18/18 Dimethicone (And) Hydrogen Dimethicone	78	Paste
Water/Glycols	GLW70MZC	Zinc Oxide (And) Water (And) Glycerin (And) Sodium Polyacrylate (And) Cellulose Gum	70	Paste



KSL-336 Sunscreen Stick for Babies



Part 1

- GCO50XZJ - Kobo Products: Zinc Oxide (And) Caprylic/Capric Triglyceride (And) Sorbitan Olivatate (And) Jojoba Esters 27.00%
- GCP55TJ - Kobo Products: Titanium Dioxide (And) Caprylic/Capric Triglyceride (And) Jojoba Esters (And) Polyhydroxystearic Acid 18.00%
- JOS10M5 - Kobo Products: Simmondsia Chinensis (Jojoba) Seed Oil (And) Silica 10.00%
- Ozokerite Wax White SP 1020P - Strahl & Pitsch: Ozokerite 7.00%
- ZNO-C-NJE3 - Kobo Products: Zinc Oxide (And) Jojoba Esters 5.20%
- Candelilla Wax MK-2 - Strahl & Pitsch: Euphorbia Cerifera (Candelilla) Wax 5.00%
- Cocoa Butter USP DEODORIZED - Jeen International: Cocoa Butter 5.00%
- JOJOBA OIL - Vantage: Simmondsia Chinensis (Jojoba) Seed Oil 4.80%
- MINERAL OIL CARNATION - Ruger Chemical: Mineral Oil 4.50%
- LexFeel® 7 - Inolex: Neopentyl Glycol Diheptanoate 4.00%
- CELLULOBEADS D-10 - Daito/Kobo Products: Cellulose 3.00%
- MANGO BUTTER - RITA: Mangifera Indica (Mango) Seed Butter 3.00%
- Shea Butter - Cognis Corp: Shea Butter 2.00%
- Lipocol® C - Vantage: Cetyl Alcohol 1.50%

Manufacturing Procedure

1. In main beaker, add Part 1, heat to 80°C and mix until homogeneous.
2. Pour into components at 65-70°C.

Description

This sunscreen stick for babies features JOS10M5, fumed silica gellant in Jojoba Oil, to help give structure to the stick. Natural materials, Titanium Dioxide dispersion GCP55TJ, Zinc Oxide dispersion GCO50XZJ and Zinc Oxide powder ZnO-C-NJE3, help give SPF to the formula. Natural microsphere, CELLULOBEADS D-10 is a hydrophilic sphere that can help retain water and give cushion to the formula.

Active Ingredient

Titanium Dioxide	9.41%
Zinc Oxide	17.83%

Testing

SPF: in vivo on 3 subjects
 CW: FDA method

BROAD SPECTRUM PROTECTION

Formulation Guidelines

Estimation of Use Level for SPF/UVA-PF
 SPF Units: 0.8 SPF / % ZnO
 SPF/UVA-PF <3
 Critical Wavelength > 370nm

KOBO

Non-Nano Zinc Oxide

www.koboproducts.com