Non-Nano ZnO Dispersions

Cosmetics Europe 2019 Interpretation



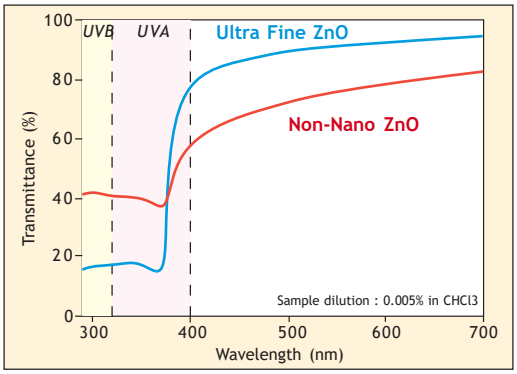
Inorganic UV filters have been manufactured during the past forty years for use in sunscreen products. They are preferred over organic UV filters because of their physical and chemical stability, as well as their non-irritating properties. In order to optimize the protection against UV light, and to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

Kobo offers a range of Non-Nano Zinc Oxide 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.

Kobo also offers a unique Non-Nano grade, ZnO-C, with a primary particle size distribution curve above 100nm as measured with Image Analysis. This ZnO-C also complies with Cosmetics Europe interpretation for non-nano material (see separate flyer).



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

KSL-359E

Natural Zinc Oxide Balm

SPF 46 CW 370

Part 1

- **JOSP55XZJ** - Kobo Products: *Zinc Oxide (And) Simmondsia Chinensis (Jojoba) Seed Oil (And) Polyhydroxystearic Acid (And) Jojoba Esters* 25.00%
- **GCP45XZJ** - Kobo Products: *Caprylic/Capric Triglyceride (And) Zinc Oxide (And) Polyhydroxystearic Acid (And) Jojoba Esters* 24.80%
- Protachem™ CTG - Protameen: *Caprylic/Capric Triglyceride* 18.89%
- **MSS-500W** - Kobo Products: *Silica* 6.00%
- **SunBoost ATB Natural** - Kobo Products: *Argania Spinosa Kernel Oil (And) Tocopheryl Acetate (And) Bisabolol* 5.00%
- **MSS-500/H** - Kobo Products: *Silica* 2.00%
- **SILICA SHELLS** - Kobo Products: *Silica* 0.75%

Part 2

- **FLORITE R** - Tomita/Kobo Products: *Calcium Silicate* 0.75%

Part 3

- **Plandool™-LG1** - Nippon/Kobo Products: *Phytosteryl/Behenyl/Octyldodecyl Lauroyl Glutamate* 12.00%
- **Plandool™-LG3** - Nippon/Kobo Products: *Phytosteryl/Behenyl/Octyldodecyl Lauroyl Glutamate* 3.00%
- **MAKIGREEN VELVET WAX** - Daito/Kobo Products: *Vegetable Oil (And) Oryza Sativa (Rice) Bran Oil (And) Oryza Sativa (Rice) Bran Wax (And) Rhus Succedanea Fruit Wax (And) Helianthus Annuus (Sunflower) Seed Oil* 1.75%

Part 4

- **CE-181668** - Custom Essence: *Amyl Cinnamic Aldehyde* 0.06%

Manufacturing Procedure

1. With moderate propeller mixing, heat Part 1 to 70-75°C. Mix well until all is uniform.
2. Add Part 2 to Part 1 and continue mixing for 20 minutes and until the batch is smooth and uniform.
3. Add Parts 3 and 4, one at a time, with moderate propeller mixing, maintain temp @ 70-75 and mix for 20 minutes.
4. Ambient cool while propeller mixing at medium speed. Drop batch at 60-65°C.

NOTE: Product can be reworked without change in rheology (reheated and repoured)

Description

This soft white, anhydrous Zinc Oxide Balm offers minimal whitening to the skin and leaves a powdery, non-greasy after feel. Kobo dispersions JOSP55XZJ and GCP45XZJ provide broad spectrum UVA/UVB SPF46 protection. SunBoost ATB Natural is a proprietary ratio of natural ingredients that boosts SPF efficacy. Plandool™-LG1 and Plandool™-LG3 provide skin barrier moisture protection and waterproofing properties. MAKIGREEN VELVET WAX provides body to the formula and gives a matte appearance on skin. MSS-500W and MSS-500/H provide both slip to the formula and mattifying properties. SILICA SHELLS and FLORITE R are excellent oil absorbers, even at low percentages.

Active Ingredients

Zinc Oxide 23.66%

Testing

SPF: in vivo on 5 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	TNP65MZS	*Zinc Oxide (And) C12-15 Alkyl Benzoate (And) Polyhydroxystearic Acid (And) Triethoxycaprylylsilane*	61	15-35	221	Compliant	Pourable
	COP50MZ	*Zinc Oxide (And) Ricinus Communis (Castor) Seed Oil (And) Polyhydroxystearic Acid (And) Isopropyl Titanium Triisostearate*	48	15-35	210	-	Pourable
	INH73MZ	*Zinc Oxide (And) Isononyl Isononanoate (And) Polyglyceryl-6 Polyricinoleate (And) Isopropyl Titanium Triisostearate*	70	15-35	200	-	Paste
	INP70ZSI	*Zinc Oxide (And) Isononyl Isononanoate (And) Polyhydroxystearic Acid (And) Triethoxycaprylylsilane*	67	20-30	N/A	Compliant	Pourable
	TNP70MZ	*Zinc Oxide (And) C12-15 Alkyl Benzoate (And) Polyhydroxystearic Acid (And) Isopropyl Titanium Triisostearate*	67	20-30	200	-	Pourable
	OPP60ZSI	*Zinc Oxide (And) Ethylhexyl Palmitate (And) Polyhydroxystearic Acid (And) Triethoxycaprylylsilane*	58	20-30	173	Compliant	Pourable
Natural Esters/Oils	CO55MZJ	*Zinc Oxide (And) Ricinus Communis (Castor) Seed Oil (And) Jojoba Esters*	52	15-35	292	Compliant	Paste
	SO60MZJ	*Zinc Oxide (And) Helianthus Annuus (Sunflower) Seed Oil (And) Jojoba Esters*	57	15-35	371	Compliant	Paste
	GCP45XZJ	*Caprylic/Capric Triglyceride (And) Zinc Oxide (And) Polyhydroxystearic Acid (And) Jojoba Esters*	42	20-30	155	Compliant	Pourable
	JOSP55XZJ	*Zinc Oxide (And) Simmondsia Chinensis (Jojoba) Seed Oil (And) Polyhydroxystearic Acid (And) Jojoba Esters*	52	20-30	200	Compliant	Paste
	New JOSP65ZCJ	*Zinc Oxide (And) Simmondsia Chinensis (Jojoba) Seed Oil (And) Polyhydroxystearic Acid (And) Jojoba Esters*	61	60	225	Compliant	Paste
Silicones	CM3K65FZS	*Zinc Oxide (And) Cyclopentasiloxane (And) PEG-10 Dimethicone (And) Triethoxycaprylylsilane*	62	60	228	Compliant	Paste
UV Boosters	TNSS60MZSI	*Zinc Oxide (And) Ethylhexyl Methoxycrylene (And) C12-15 Alkyl Benzoate (And) Polyhydroxystearic Acid (And) Triethoxycaprylylsilane*	57	35	171	Compliant	Paste
	HBQP75FZS	*Zinc Oxide (And) Butyloctyl Salicylate (And) Polyhydroxystearic Acid (And) Triethoxycaprylylsilane*	72	60	212	Compliant	Pourable
	HBTN65HP1	*Zinc Oxide (And) Butyloctyl Salicylate (And) C12-15 Alkyl Benzoate (And) Triethoxycaprylylsilane*	62	60-100	N/A	Compliant	Paste

This chart was prepared to assist formulators using ZnO 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 ZnO 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 ZnO comply with the conditions for Zinc Oxide (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 ZnO loading and efficacy.
2. **High Speed™ Dispersions:** These are usually pourable and easy to incorporate into a formulation.

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 8623386B2, WO 2009126859, JP 8506995
Natural ester, wax or oil treated pigment, process for production thereof, and cosmetic made therewith