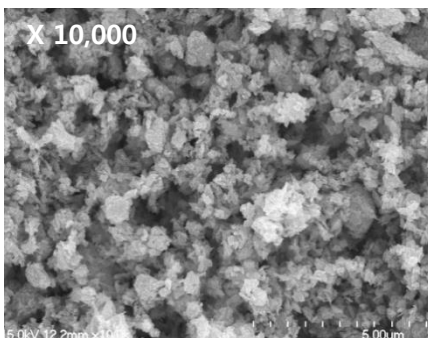


# Zinc Oxide Powder & Dispersion

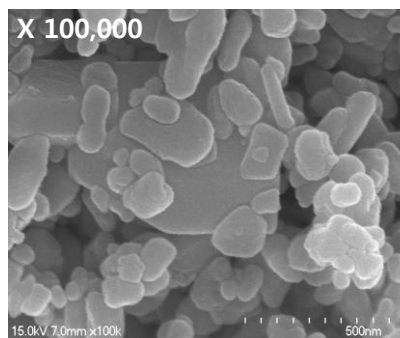
# Nano & Non-Nano Zinc Oxides, for UVA protection

		Surface treatment	Crystal size (nm)	Surface area (m <sup>2</sup> /g)	Remarks
N a n o	SUNZNO-NAS	Alkyl Silane	40	19~23	AS coated ZnO, Counter type of product "Z"
	SUNZNO-NCO	Hydrogen Dimethicone	35	21~28	The most compatible with Silicone Oils The lowest viscosity of ZnO dispersion
	SUNZNO-AS	Alkyl Silane	80	10~15	Standard
N o n  N a n o	SUNZNO	none	150	n.a.	Non-Nano, ECOCERT for O/W sun care
	SUNZNO-SA	Stearic Acid	150	n.a.	Non-Nano, ECOCERT for W/O sun care ZnO 95% Stearic Acid 5%

SUNZnO-NAS



SUNZnO-SA



# Zinc Oxide Dispersion Overview

*New in 2014*

*New in 2014*

	<b>SUNCLEAR -Z50M</b>	<b>SUNCLEAR -Z60CO</b>	<b>ZD60-CO</b>	<b>ZD60-AB</b>	<b>ZD60-BOS</b>
Carrier	D5	D5	D5	Alkyl Benzoate	Butyl Octyl Salicylate
Net ZnO %	47%	57%	57%	57%	57%
ZnO coating	Hydrogen Dimethicone	Hydrogen Dimethicone	Hydrogen Dimethicone	Hydrogen Dimethicone	Hydrogen Dimethicone
Dispersing agent	PEG-10 Dimethicone	PEG-9 polydimethyl siloxyethyl dimethicone	PEG-10 Dimethicone	Polyhydroxy Stearic Acid	Polyhydroxy Stearic Acid
Remarks	Most Transparent	Light Texture	PEG10 is cheaper, so best Price		

# Zinc Oxide is Safe & Transparent UVA filter

## ***Benefits***

### **(1) UVA protection**

FDA Monograph Sunscreen Ingredients	Amount of Ray Protection	
	UVA	UVB
Aminobenzoic acid (PABA)	○	●
Avobenzene	●	◐
Cinoxate	◐	●
Dioxybenzone	◑	●
Ecamsule	●	◐
Homosalate	○	●
Menthyl anthranilate	◑	●
Octocrylene	◐	●
Octyl methoxycinnamate	◐	●
Octyl salicylate	○	●
Oxybenzone	◑	●
Padimate O	○	●
Phenylbenzimidazole	○	●
Sulisobenzene	◑	●
Titanium dioxide	◑	●
Trolamine salicylate	○	●
Zinc Oxide	●	●

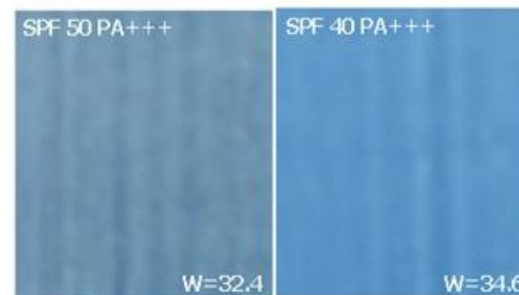
- **Zinc oxide is the closest thing** to a total "**broad-spectrum sunblock**" on the market today.
- It uniformly covers from 290 to 380 nm, thus protecting against UVB and most of the UVA spectrum.
- **No other sunscreen ingredient provides broader protection.**

### **(2) Minimized skin irritation**

- "Zinc oxide is a physical block that is not absorbed, so it does not cause any allergic reactions. This is especially important to look for if you have sensitive skin or are using sunscreens on a daily basis."
- And unlike many chemical sunscreen agents, zinc oxide is never irritating. In fact, it is recognized by the Food and Drug Administration as a Category I skin protectant, meaning that it is safe for compromised or environmentally challenged skin.

- Zinc oxide has over a 300-year history of safety, with no known adverse reactions (which is why it is often used to treat babies). Now, in its micro-fine form, it is ideal for use in sunscreens and daily moisturizers.

### **(3) Transparent formula**



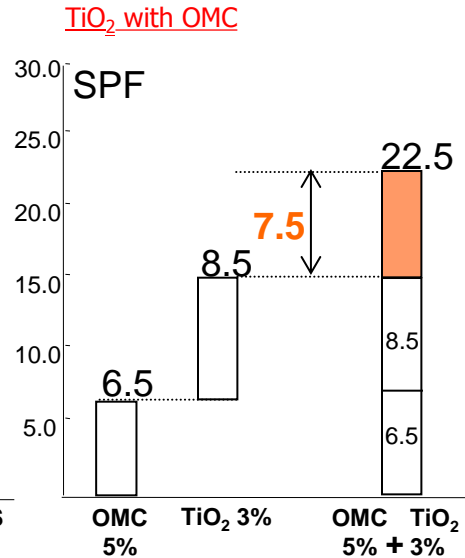
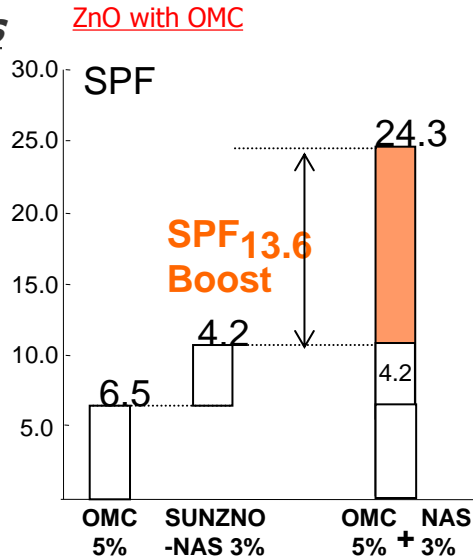
# FAQ about Zinc Oxide



## Questions

### Q1. SPF is the half of TiO<sub>2</sub>

A. Yes it is. But ZnO has great synergy with OMC. Thus the SPF of 3% ZnO and 5% OMC would be comparable to the SPF of 3% TiO<sub>2</sub> and 5% OMC.



Although ZnO would have lower SPF than TiO<sub>2</sub> by themselves, ZnO shows greater SPF boost when used together with OMC compared to TiO<sub>2</sub> with OMC.

Zinc Oxide has higher SPF boost when used together with OMC as compared to TiO<sub>2</sub>

### Q2. Not stable in O/W formula

A. Generally ZnO is considered not stable in O/W formulation. However, if zinc oxide is well surface treated, almost there is no problem.

A common caution in formulating a ZnO-containing product is to avoid or to minimize the use of anionic emulsifier or thickener such as carbomers. At pH values < 6, the solubility of zinc oxide increases and migration from the oil phase to water phase is observed.

For this reason, ZnO is usually incorporated into the oil phase of the formulation. Moreover, these problems can be minimized or eliminated by various means. Use of an optimized predispersion maintains the ZnO in a finely dispersed form in the oil phase. In W/O emulsions, such dispersion techniques are sufficient to eliminate migration and efficacy of ZnO. ZnO can also be coated with hydrophobic materials in order to reduce migration.

### Q3. Price too expensive as compared to TiO<sub>2</sub>

As SUNJIN chemical applies one step coating process for surface treated Zinc Oxide, zinc oxides from SUNJIN are very price competitive. SUNJIN tries to match the price level of Zinc Oxide comparable to the price of micro-fine TiO<sub>2</sub>.

