

ADD ZING **TO PAINTS & POLYMERS** **FUNCTIONALIZED ZINC OXIDE**

(F-ZnO) is a multifunctional ingredient that works as a transparent broad band UV blocker and also as an anti-microbial agent. Tata Chemical's F-ZnO stands apart from bulk ZnO because of its fine powder form, that has a higher surface area and higher absorption cross-section of UV-rays at lower dosage. This ensures preservation of colour and gloss in paints and polymers.



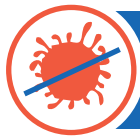
Good things come in small packages

Benefits



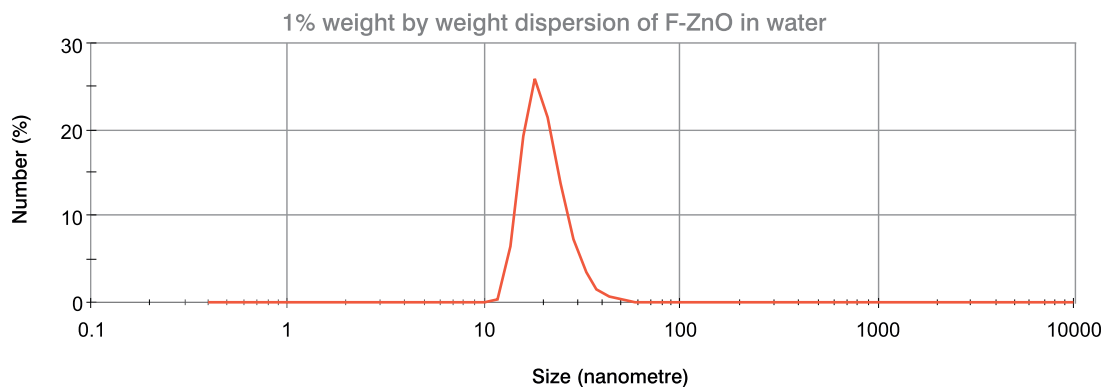
Transparent broad band UV blocker that blocks UVA (400 - 320nm), UVB (320 - 280nm) & UVC (280 - 200nm)

Disperses well in water, solvents and glycols. This leads to easy usage and lesser dosage of the material for delivering the required properties



Acts as a broad spectrum anti-fungal and anti-bacterial agent

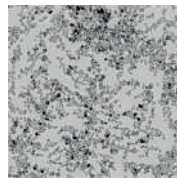
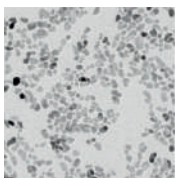
Particle Size Distribution



Small is beautiful

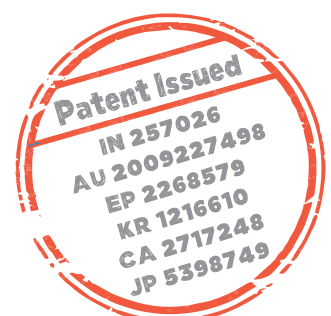
Physical Characteristics

- Mineral Name- Zincite, syn Chinese White, Zinc White
- Crystal State & Morphology- Crystalline and Spherical
- Band Gap- 3.36 eV
- Primary Particle Size- 20nm (By Transmission Electron Microscopy)



TEM micrograph

- Transparency- >95% in visible spectrum (800nm - 400nm)



Paint the right picture

Applications

PAINTS that are used in:



- Solid pigmented monocoats
- Wood coating lacquers
- Clear topcoats
- Hygienic exterior paints
- Marine paints

POLYMERS that go in:



- Agricultural films
- Food protection films
- Packaging films
- Raffia tapes/sacks
- PVC pipes
- Plastics having exterior exposure

UV blocking in Paints

Prevents sunlight from fading away painted walls. A small dosage of TCL's F-ZnO shows high level of colour retention and gloss retention.



QUV testing data for 1000 hours exposure

Sample	Material	Dosage %(w/w)	HLS %(w/w)	Colour Value(ΔE)	Gloss Retention
Tata Chemicals	ZnO	0.2 - 0.5	0.2 - 0.5	1.2 - 1.4	>92
Competitor 1	ZnO	0.1	0.6	2.5 - 3.2	>85
Competitor 2	Organic	0.8	0.4	3.5 - 4.0	>85

The painted surface also achieved a scratch hardness of 3300 g force

F-ZnO provides high scratch hardness, helping paints to resist scratches.

UV blocking in Pigments

Pigment decomposition leads to loss of colour strength. Addition of TCL's F-ZnO helps preserve colour from UV radiation exposure.

Xenon Arc Testing done for 4100 hours on red pigment in full tone

Sample	Material	Dosage %(w/w)	Colour Retention
Tata Chemicals	ZnO	0.2 - 0.4	1.75 - 1.9



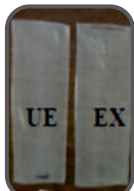
Similar results obtained for other pigments

When red pigment in full tone was exposed to this condition,
it had a $\Delta E = 2.5 - 2.75$

UV blocking in Polymers

Addition of F-ZnO to polyethylene films makes them more durable and reduces the chances of cracking, thus delaying degradation of the polymer.

ASTM G 154 testing (Exposure done at SGS)

		Control - Blank		0.2% ZnO + 0.4% HALS		0.4% ZnO + 0.4% HALS	
500 hrs UVB 313nm Exposure		Before (UE)	After (EX)	Before (UE)	After (EX)	Before (UE)	After (EX)
Thickness (Micron)		145	Crack	150	150	180	180
Tensile Strength (kg/cm ²)	MD	115	Crack	102	126	104	122
	TD	146	Crack	98	123	109	122
Elongation (%)	MD	406	Crack	220	24	338	94
	TD	524	Crack	294	30	524	18
Samples		 Control - Blank		 0.2% ZnO + 0.4% HALS		 0.4% ZnO + 0.4% HALS	

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