Your first source solution for Optical Brightener

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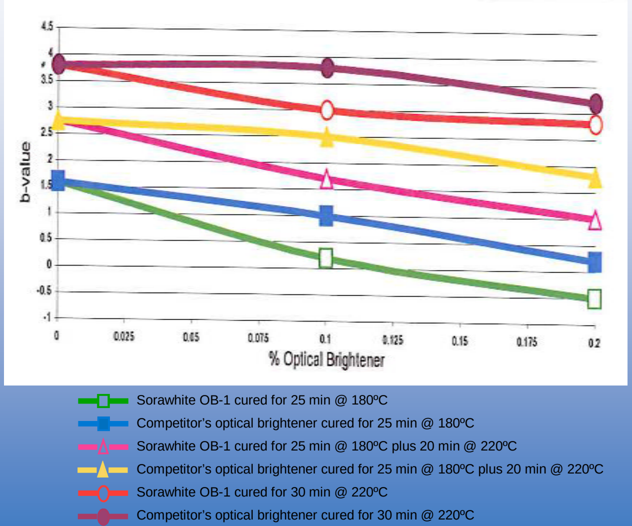
Sorawhite OB-1 has a unique chemical structure that provides excellent brightening, good thermal stability, and compatibility in powder coating systems. Optical whiteners function by absorbing ultraviolet radiation and re-emitting blue light. The emitted blue light will reduce the yellow color of a polymer and provide a whiter-than-white appearance.

In this technical tip, interior, white, powder coatings were evaluated comparing Sorawhite OB-1 to a competitor's optical brightener. The results listed below show the advantages of using Sorawhite OB-1. These advantages are believed to be due to the unique chemical structure of Sorawhite OB-1.

Sorawhite OB-1 is very effective, only 0.1% is required to significantly improve whitening and lower yellowing, compared to 0.2% of a leading competitor's optical brightener. Sorawhite OB-1 is more effective against over-baking with less color degradation.

All of these advantages are seen in Figure 1.

Figure 1: Color Measurement on Powder Coatings Samples After Curing. Optical brightener blended in the formulation before extrusion.



Notes

1. The lower the b value, the less yellow and whiter the appearance (optical brightening).
2. The higher the b value, the greater the yellowing and the less whiter the appearance (reduced optical brightening).
3. b values were measured using a Luci 100 colorimeter instrument.

Table 1: Powder Coating Formulations
Optical brightener blended in the formulation before extrusion

Formulation	Grams				
Albester 2090 carboxyl polyester resin[a]	352.4	351.4	351.4	350.4	350.4
Sorawhite OB-1[b]	0.0	1.0	0.0	2.0	0.0
Competitor's optical brightener	0.0	0.0	1.0	0.0	2.0
NPES 903 epoxy resin[c]	235.0	235.0	235.0	235.0	235.0
FLUIDEP F630 flow agent[d]	12.6	12.6	12.6	12.6	12.6
KRONOS 2160 TiO_2 pigment[e]	290.0	290.0	290.0	290.0	290.0
BLANC FIX micronized $BaSO_4$[f]	105.0	105.0	105.0	105.0	105.0
BENZOIN degassing agent[g]	5.0	5.0	5.0	5.0	5.0
Total	1000.0	1000.0	1000.0	1000.0	1000.0
% Optical brightener by weight	0.0	0.1	0.1	0.2	0.2

[a]Hexion Specialty, [b]First Source Worldwide, [c]nan Ya, [d]Comiel, [e]Kronos, [f]Schahtleben Chemie, [g]Merck

Table 2: Extruder Conditions

Temperature B[a]	20ºC
Temperature C[b]	90ºC
Reading temperature 1	52ºC
Reading temperature 2	100ºC
Reading temperature 3	108ºC
Feed[c]	50
RPM	400
Absorption (torque)	80%

[a,b]Temperature points on laboratory double screw extruder, [c]Quantity of material added to the extruder, scale = 1-500, feed rate adjusted depending on: system viscosity, torque, and temperature

Notes

1. The optical brighteners were blended into the powder coating formulation along with the other additives and then extruded. The extruder used was APV model MPC/V30.
2. The powder coating samples were cured for either 25 minutes @ 180ºC (standard curing conditions), 25 minutes @ 180ºC plus 20 minutes @ 220ºC (to simulate over-baking), or 30 minutes @ 220ºC (to simulate severe over-baking).
3. Coating thickness was approximately 90 microns.