A Study on the Development of Dual Side Printable Blackout Screen

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1. INTRODUCTION

Fabric products including one-side printed and dual side coated products for interior have used in the current markets. But one side printed products do not work on the blackout effect and dual side coated products do not get various design required by customers and simply have blackout function due to the limitation of the coating agent.

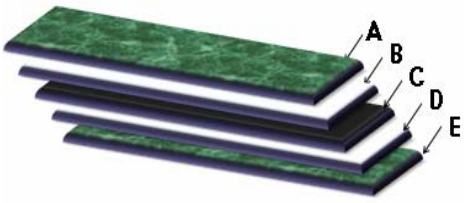
Therefore, the objective of our study was to develop a blackout sheet, where the images desired by a customer can be printed on both sides to exhibit diverse effects while forming eco-friendly coating layers that produce the blackout effect, exhibit the feel of the fabric and have the ink-absorbent property.

2. EXPERIMENTAL

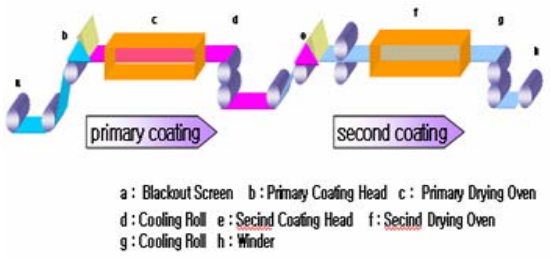
[1] Development of a high-light Weight and Thin Fabric for work on the Blackout Effect

To work on the blackout effect high light weight and thin stitch that have polyester fiber warp and dope-dyed fiber weft was developed then applied satin passed by desizing, scouring and dried for 20 minutes at 180℃

[2] The Purpose of Coating agent for Pre-Treatment



A, E: Ink-absorbent layers
B, D: Functional coating layers
C : Blackout layers
<Structure of Dual Side Printable Blackout Screen>



<Coating Process on Pre-treatment>

① Composition process of coating complex on the flame-retardant finish

∗ 18~23% of p-type flame retardant
→ Padding
→ dry at 190℃

Composition of Primary Functional Coating Resin	Composition of Secondary Functional Coating Resin
P.V.A(10%) 40-50%	P.V.A(10%) 40-50%
E.V.A 5-10%	E.V.A 5-10%
Deep-color agent 1-3%	Deep-color agent 1-3%
Water 27-39%	Water 27-39%
SiO_2 etc. 10-15%	SiO_2 etc. 10-15%

Viscosity (cps)	Coating Speed (y/min)	Chamber Temperature (℃)	Coating Frequency
700-1,000	50	140-150	Front 2 Back 2

② Composition and process of coating complex anti-bacterial finish

Composition of Primary Functional Coating Resin	Composition of Secondary Functional Coating Resin
P.V.A 40-50%	P.V.A 40-50%
E.V.A 5 -10%	E.V.A 5 -10%
Deep-color agent 1-3%	Deep-color agent 1-3%
Water 27-39%	Water 27-39%
SiO_2 etc. 10-15%	SiO_2 etc. 10-15%
Anti-bacterial agent 10-12%	

Viscosity (cps)	Coating Speed (y/min)	Chamber Temperature (℃)	Coating Frequency
2,000-2,300	50	140-150	Front 2 Back 2

[3] Test Method

① Blackout function test: Measurement by A method of day light blocking test(KS K 0819)
② Flame-resistance test: Management by micro burner method base on law enforcement ordinance about fire safety management of facilities.
③ Anti-bacterial property test: Anti-bacterial property test of fabric correspond to KS K 0693-2001 method
④ Color fastness test on sun light : Measurement by ISO 105 B02-199 method

3. RESULT AND DISCUSSION

[1] Performance evaluation of the dual side printable blackout screen show 99.99% sun light shield effect on the applied satin fabric produced by using polyester and dope-dyed fiber.

[2] The flame-retardation performance on development of coating agent for pre-treatment was passed as result of padding process with p-type flame-retardant and dried at over 190℃ and coating treatment process. Anti-bacterial property is confirmed that has the effect of 99.9% anti-bacterial performance by complex treating anti-bacterial agent whit ink-absorbent layer coating agent in primary coating process.

[3] During the secondary coating process, P.V.A., E.V.A., and a deep-color agent etc. were coating treatment on the fabric to create ink-absorbent layers on both sides. The resulting test showed leveling of brilliant colors and 4~5th degree of color fastness of sun light.

Therefore, through the coating complex for the new fabric we developed a Dual-side printable blackout paper manufacturing technology that minimizes air contamination, produces high yield and simplifies the production process with fewer number of coatings

4. CONCLUSIONS

The new technology is an improvement over the existing banner techniques which do not provide the blackout effect or dual-side printing. We developed a blackout screen that can be printed dual sides and provides diverse visual designs unlike existing blackout screen of simple designs by developing the efficient, economic and eco-friendly coating conditions that enable flame-retardation and anti-bacterial performances, which are basic requirements of blackout screen products.