TRANSFILMER

The Introduction of Polymer Dispersed Liquid Crystal Switchable Film, Specification, and Optical Testing Data

Introduction

Transfilmer is a revolutionary PDLC switchable film. IRISFILM is the first to be able to coat liquid crystals onto polyesters, with re-usable special silicone adhesive, making the installation of PDLC films easier than ever!

- Transfilmer is available in white and black colors, and becomes clear when switched ON.
- Transfilmer can be applied onto any type of glass directly. Change of glass or lamination between glasses is NOT required.
- Transfilmer have passed our heat testing under 75°C for 1,000 hours.
- Due to Liquid Crystals, Transfilmer works great with projectors, under both opaque and clear mode. Not only it will enhance the color and light of projectors, it will also appear to be more bright but not harsh to the eyes. Under the clear mode, the image will look like a flooding 3D effect.
- Transfilmer can be cut into any customized shape or size.

Major Functions

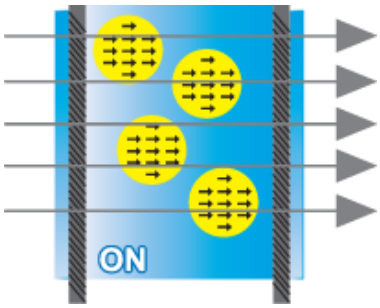
There are many functions this film is able to do, we suggest three major functions (markets) for the use of this film:

1. Building Materials Industry: For privacy purposes. To be used as curtains on windows or glass walls.

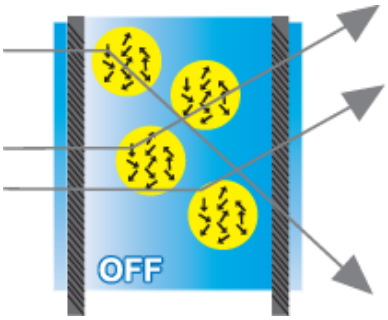
2. Energy Saving Materials: Let's go green! With Transfilmer installed onto any regular glass, the ability of the film to block heat, views, maintain visible light, is even better than Low-e glasses. Furthermore, normal glasses are recyclable, but Low-e glasses or any other metallized or colored glasses are not recyclable.

3. Multimedia Materials Industry: How about turning those building walls, glass store fronts, merchandise display windows...etc. into a commercial wall / TV at night? Traditional LED commercial TV's are too bright, and requires a very high energy-consumption cooling system to prevent overheat of the system and the TV, but not with Transfilmer with a projector! Furthermore, with a simple sensor installed, you can turn your projector screen into a touch screen panel or TV!

How Transfilmer Works



When Transfilmer is switched on, the electric field effects the high polymer liquid crystals to arrange in order, letting visible lights to go through the film, and hence the film will appear to be clear.



While Transfilmer is under the off mode, the liquid crystal elements are disorganized and cannot allow any visible light to go through the film, and thus it will appear to be opaque white or black.

Basic Information

- Storage Temperature: -40˚C ~ 80˚C.
- Operating Temperature: -40˚C ~ 70˚C.
- Transfer speed
  Off (Opaque) → On (Clear) about 0.02 second.
  On (Clear) → Off (Opaque) about 0.1 second.
- Continuous turned on time: 50,000+ hours.
- Switch times: 3,000,000+ times.
- Driving Power:
  Black film: 65 ± 5 Volts.
  White film: 75 ± 5 Volts.
- The curve of Transfilmer should be no less than 130˚.

Security Requirements

- The resistance between the Transfilmer ground connector and parts needing ground contact should be no higher than 0.1Ω.
- Earth Leakage Current of Transfilmer should not excess 0.25mA.

- Under normal conditions, Transfilmer should work under a working voltage of 65V, and frequency 50Hz, and voltage fluctuation is no higher than 10V.

Surface and Installation Properties of Transfilmer

In order to protect Transfilmer, this product adopts anti-fraying material, together with its anti-fraying processing, it can effectively protect the film from scratching and fraying, and it has passed ASTM D3363-74, the surface abrasion test carried out by American Society for Testing and Materials.

The entire thickness is only 0.7mm, together with the special optical processing technology, which can effectively eliminate more than 99% of outside ultraviolet and heat radiation (about 65%), and because it is very thin, its existence is hardly noticeable.

Owing to special surface coating technology, it is electrostatic and dust preventable, which forms its effective dust-prevention coating.

- **Anti-fraying**
  the surface adopts special hardening treatment, which is anti-fraying and anti-scratching, and has passed ASTM D3363-74 test, the surface hardness is 3H, after a 100 round of polishing under 500gm of CS-10 grinding wheel, the surface can consume 0.7 mg.
- **Anti-fouling /fingerprint prevention**
  Smart film is oil / dirt resistant.
- **99.9% UV resistance coating**
  Specially treated coating may effectively prevent outside ultraviolet, reduce harm to skin and eyes.
- **Easy installation (Direct Application)**
  Thickness of the product is 0.7mm, adopting high-transparent sticking type silica gel, having static electricity adherence function which can automatically adhere to glass surface, reusable, blister resistant and easy for installation, leave no remnants and fingerprints, may not affect the film penetrability.
- **Lamination process**
  Although our products can be applied directly to surfaces, there are still many areas where the films must be laminated between glasses. In this case, we can supply the film without adhesive and scratch resistance coating. PVB or EVA is strongly suggested for lamination.

Spectral Statistic Table

Transmission Rate (Visible Spectrum Range Between 400~700nm)

Usable Environment of Transfilmer							
Outdoor				Indoor			
ON (Transparent)		OFF (Opaque)		ON (Transparent)		OFF (Opaque)	
DL	VL	DL	VL	DL	VL	DL	VL
53.5%	60.5%	1.3%	53.2%	71.0%	81.6%	1.6%	65%

DL: Directional Light

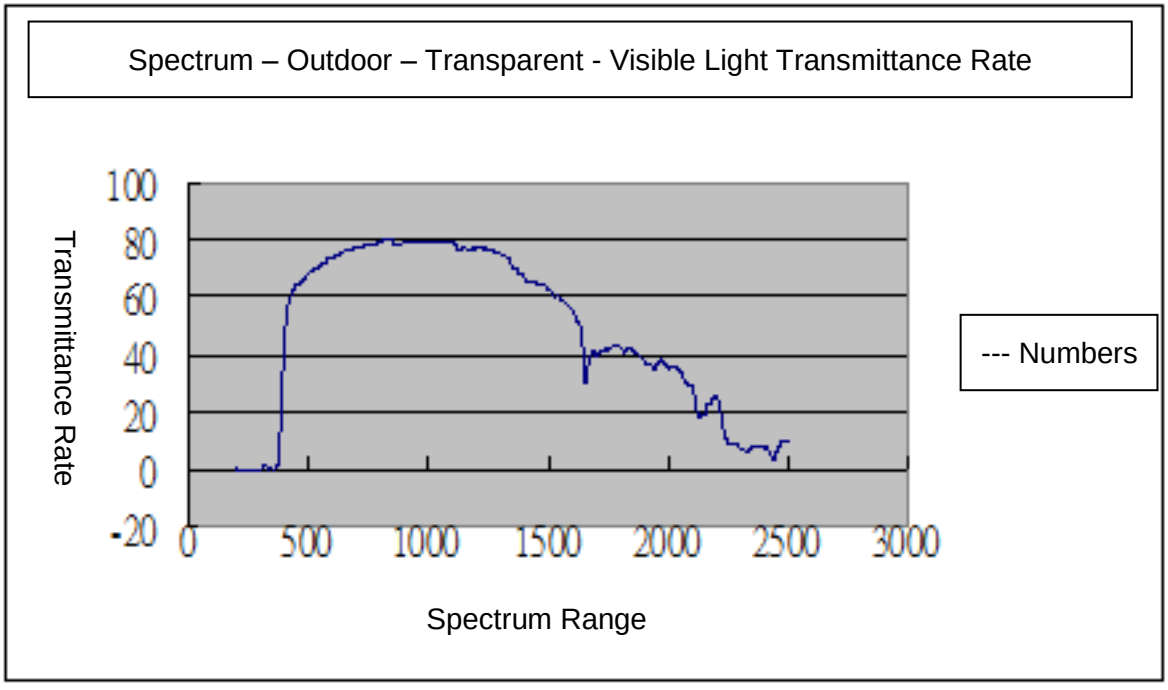
VL: Visible Light

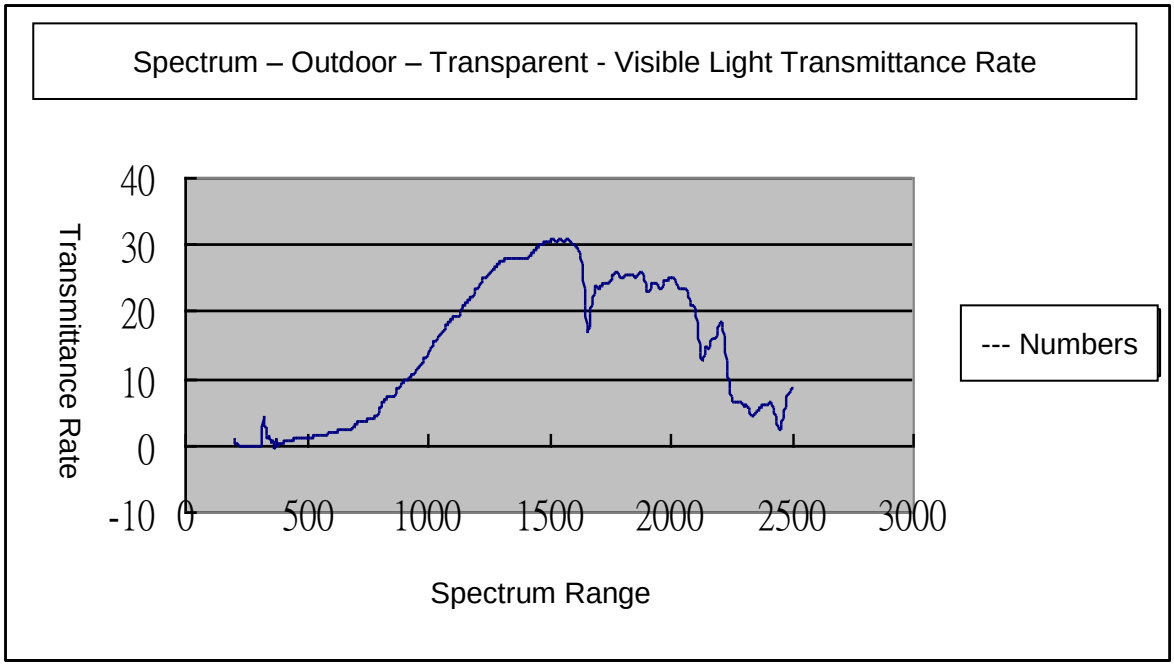
Test Center: National Taipei University of Technology

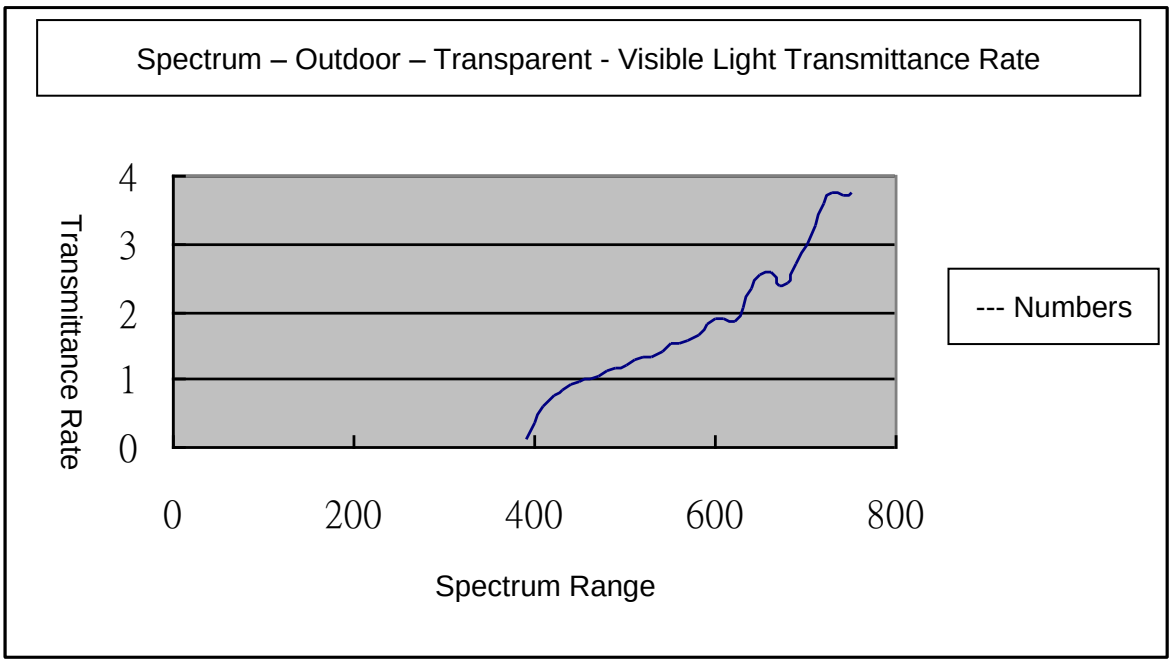
Optical Testing Data

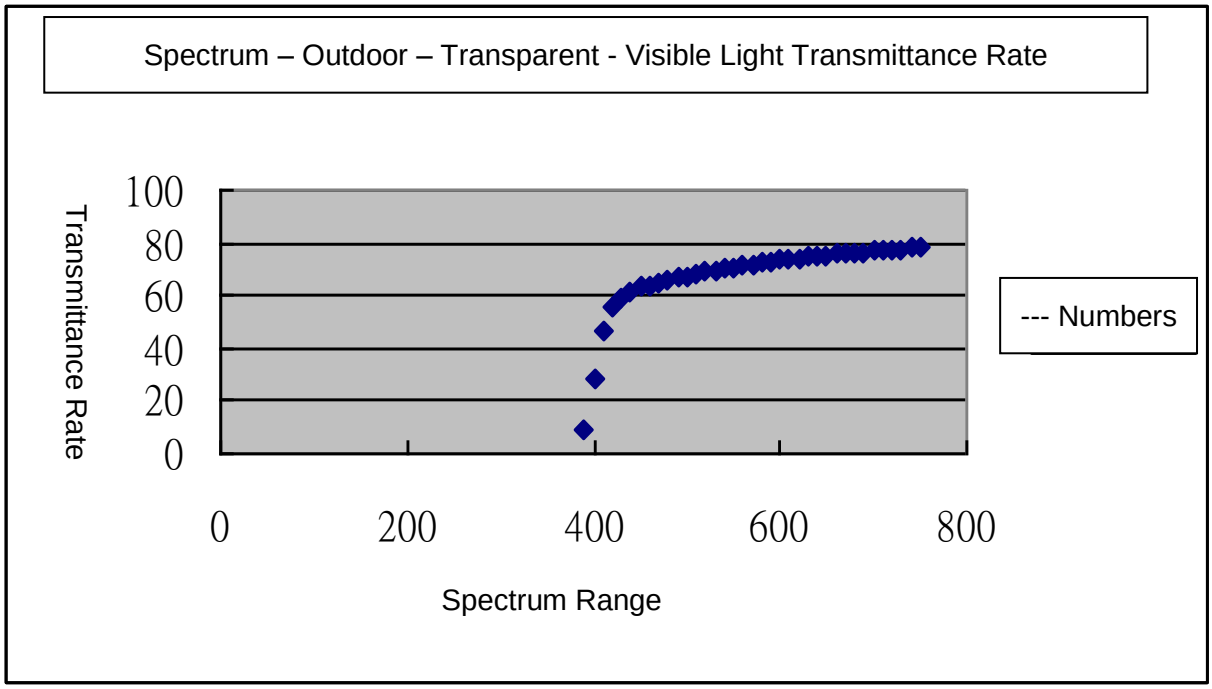
Sample Data	(ISO9050-2003/D65 10°)							
	Haze	TL	TE	TUV	TIR	L	a	b
Transfilmer White	14.81	75.84	74.70	22.84	77.73	89.66	0.30	4.45
Transfilmer Black	11.89	21.39	17.02	12.50	12.14	53.58	-1.54	-5.41

Spectral Charts




Spectrum – Outdoor – Transparent - Visible Light Transmittance Rate
Transmittance Rate
40
30
20
10
0
-10
0
500
1000
1500
2000
2500
3000
Spectrum Range
--- Numbers


Spectrum – Outdoor – Transparent - Visible Light Transmittance Rate
Transmittance Rate
4
3
2
1
0
0
200
400
600
800
Spectrum Range
--- Numbers


Spectrum – Outdoor – Transparent - Visible Light Transmittance Rate
Transmittance Rate
100
80
60
40
20
0
0
200
400
600
800
Spectrum Range
--- Numbers