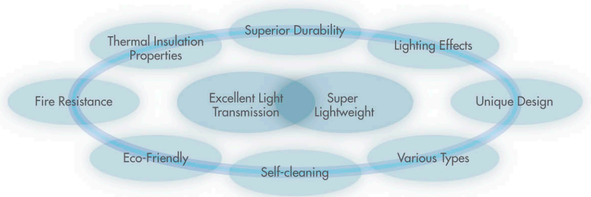
What is ETFE Film?

The new generation material which goes beyond glass.

ETFE (Ethylene Tetrafluoroethylene) film is durable, and highly transparent. In addition, this is very lightweight in comparison to glass structures, so there is no danger associated with glass should the film break.
Traditionally ETFE film has been used in agricultural applications such as greenhouses. Recently ETFE film has proven it' s worth in the architectural sector as well, this revolutionary material is the next generation of architecture for fabrics. Nothing can match ETFE for its impact or presence when you want a structure that stands out from the crowd.

Advantages of ETFE Film Structures



Structural Systems of ETFE Film Structures

Single layered type

ETFE films are reinforced with wire cables or light weight steel or aluminum to maintain shape and stability. This type is suitable for a small structures such as shelters, panels and so on.

Air cushion - Double & triple layered type

Like a balloon, this structure is formed by sending air between 2 or 3 layers of film. This is structurally stable and appropriate for various applications while improving thermal insulation. Ventilation facilities are necessary to maintain the shape of the structure.

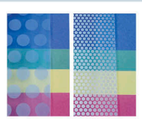
Various Types of ETFE Film

Type		NJ	HJ	PT	WT	BT	UVC
		Transparent	Matte	Print (PT 12)	White	Blue	UV cut
Transmittance [%]	Visible light (380~780nm)	90.5	91.7	63.2	40.5	80.3	87.3
	Ultra violet (300~380nm)	83.5	88.2	58.2	1.0	75.4	36.9
	Sun light (300~2100nm)	91.9	90.4	63.7	50.1	86.9	88.9

* Thickness variation is available 100, 150, 200, 250μm for each type.
* Print type is available in a variety of patterns. Light transmittance is changed by the pattern.
* Above values are under the condition of: t=200μm. (Measured by Taiyo Kogyo Corporation on JIS R 3106: 1998, not guaranteed.)

Options are;

Print type variation
Customer color
Gravure roll printing
TiO_2 photocatalytic coating


Print type variation


Gravure roll printing

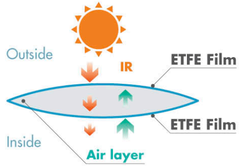

Customer color

Performances of ETFE Film

Type	100NJ	150NJ	200NJ	250NJ	Test method
Thickness [μm]	100±5	150±8	200±10	250±13	DIN-53370
Weight [g/m²]	175±9	262±13	350±17	437±22	ISO-2286-2
Tensile strength at break [MPa]	50 min.				DIN-EN-ISO-527-3
Tensile strain at break [%]	350 min.				DIN-EN-ISO-527-3
Tensile strength at 10% strain [MPa]	18 min.				DIN-EN-ISO-527-3
Tear strength [N/mm]	400 min.				DIN-EN-ISO-1875-3
Flame proof	Flame-Proof Class 1				JIS A 1332
	B-1 passed				DIN 4102-1
	VTM-0	VTM-0	V-2	V-0	UL94VTM / UL94V

* Above values are quotation from a technical document issued by AGC, not guaranteed.

Thermal insulation properties of ETFE Film structures



U-value (W/m²K)

ETFE Film	Double layered (200NJ+A300+200NJ)	2.6
	Triple layered (200NJ+A300+200NJ+A300+200NJ)	1.7
Glass	Double-glazed (FL6+A12+FL6)	2.9
	Double-glazed (Low-E6+A12+FL6)	1.8

ETFE film insulation properties are as effective as glass.

A Comparison of ETFE Film and Glass Structure

		ETFE Film *1			Glass *2	
		Single layer	Double layered	Triple layered	Single layer	Double-glazed
Composition		200NJ	200NJ +A300+ 200NJ	200NJ +A300+ 200NJ +A300+ 200NJ	FL6	FL6+A12+FL6
Weight[kg/m²]		0.35	0.70	1.05	15.0	30.0
Transmittance	Visible light [%]	90.5	82.4	75.4	88.9	79.6
	Ultra violet [%]	83.5	71.5	62.3	61.4	45.5
U-value[w/m²K]		5.8	2.6	1.7	5.9	2.9

*1 The values are calculated based on the measured value of single layer film, not guaranteed.
*2 The values are quotation from a technical document issued by AGC, not guaranteed.

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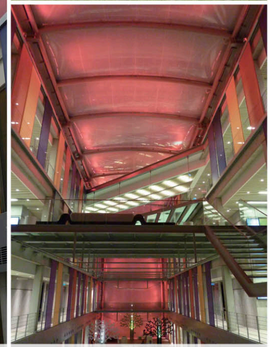
The Next Generation Of Architecture

ETFE Film Structure

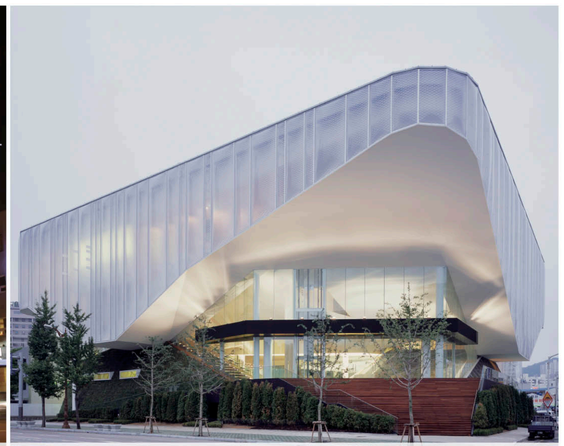


A.Yapi Kredi Bank

B.Sahara Star Hotel, Mumbai

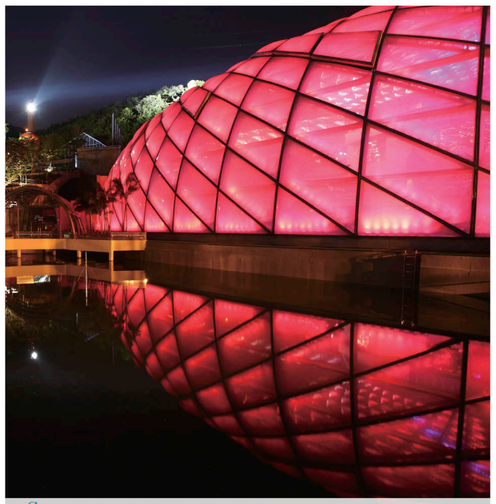
C.Shenyang Yuanda, Entrance Gate

D.Kum-Ho Model House



E.GS Xi model house ETFE

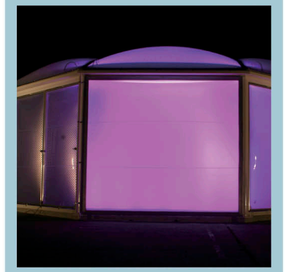
F.Nantong Park Bon-Garden Greenhouse



G.Shenzhen Ocean Park, Indoor Water Park

H.Aoyama Great Brits 2005, Air Cabin

LED illumination



A.Yapi Kredi Bank

- Client : Yapi Kredi Bank
- Architect : Teget, Istanbul
- Location : Istanbul, Turkey

B.Sahara Star Hotel, Mumbai

- Client : Sahara Star Hotel
- Architect :
- Location : Mumbai, India

C.Shenyang Yuanda, Entrance Gate

- Client : Shenyang Yuanda Aluminum Industry Eng Co. Ltd.
- Engineering : Shanghai Taiyo Kogyo Co., Ltd.
- Location : Liaoning, Shenyang, China

D.Kum-Ho Model House

- Client : Kumho Cons.
- Architect : Unsangdong
- Location : Seoul, Korea

E.GS Xi model house ETFE

- Client : GS Construction
- Architect : Mass Studies
- Location : Busan, Korea

F.Nantong Park Bon-Garden Greenhouse

- Client : Nantong Municipal Engineering Construction Management Company
- Architect : NanJing Design Institute of Agriculture Co., Ltd
- Location : Jiangsu, Nantong, China

G.Shenzhen Ocean Park, Indoor Water Park

- Client : Shenzhen OCT Co., Ltd.
- Architect : Center for Engineering Design and Research Under the General Equipment Department
- Location : Shenzhen, China

H.Aoyama Great Brits 2005, Air Cabin

- Client : British Council
- Architect : Yukiharu Takematsu + E.P.A.
- Location : Tokyo, Japan