



Aboshi-minami Park, Sumo Ring(Japan)  
Architect:R Urban Architects GC:Hamada Co., Ltd.



New World Park(Malaysia)  
Architect:RSP Akitek Sdn Bhd GC:Hexagon Tower Sdn Bhd



Busan Bando Model House(Korea)  
Architect: Design Tomorrow INC  
GC: Bando Engineering and Construction Company Ltd.

## PIAJ (Photocatalysis Industry Association of Japan) mark

MakMax photocatalytic tents are PIAJ certified products. PIAJ mark is given only to the products confirmed to have specific photocatalytic characteristics. MakMax photocatalytic tents are registered as 2009-0005 ~ 0008, 0012, 0013. For further details, please see MakMax website:

[www.makmax.com/business/tio2.html](http://www.makmax.com/business/tio2.html)

Further information of PIAJ: <http://www.piaj.gr.jp/roller/en/>

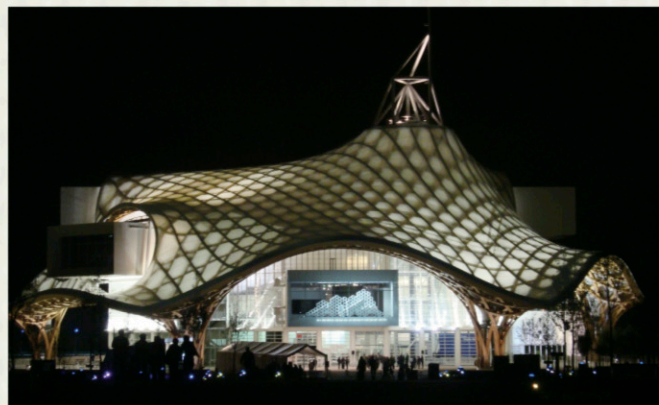
**MakMax**

Global Network ... Japan, USA, Mexico, Brazil, Germany, UAE, Australia, India, China, Taiwan, Korea, Thailand, Singapore

**TAIYO KOGYO CORPORATION**  
2-33-16, Ikejiri, Setagaya-ku, Tokyo 154-0001, Japan



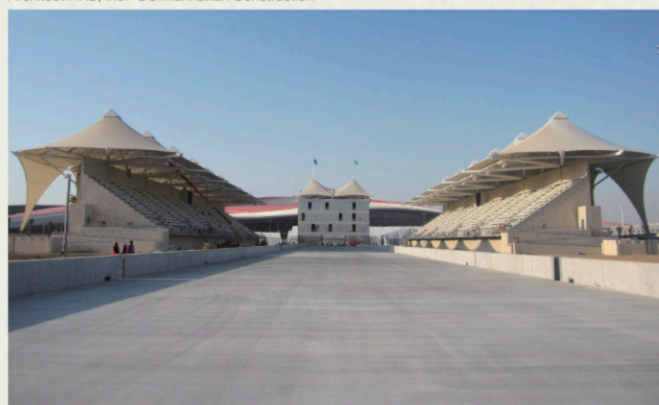
Regular Member of  
Photocatalysis Industry Association of Japan



Centre Pompidou Metz(France)  
Architect:Shigeru Ban Architects Europe & Jean de Gastines GC:Demathieu & Bard

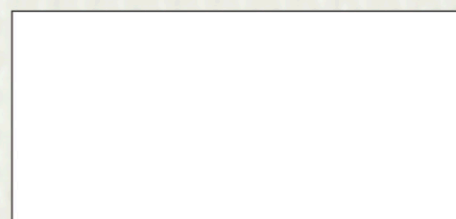


Dallas Cowboys Stadium(USA)  
Architect:HKS, Inc. GC:Manhattan Construction



YAS Marina Circuit(UAE)  
Architect:TILKE GC:Taiko Middle East

Fabric type	PVC/PES, PVC/Glass fiber		PTFE/Glass fiber
Products	SCC125/200/325, CMX220/270	SST140	FGT600/800-TFB
Mark	 登録: 2009-0007 セルフクリーニング Photocatalysis Industry Association of Japan Registration: 2009-0007 Self-Cleaning	 登録: 2009-0008 セルフクリーニング Photocatalysis Industry Association of Japan Registration: 2009-0008 Self-Cleaning	 登録: 2009-0013 セルフクリーニング Photocatalysis Industry Association of Japan Registration: 2009-0013 Self-Cleaning



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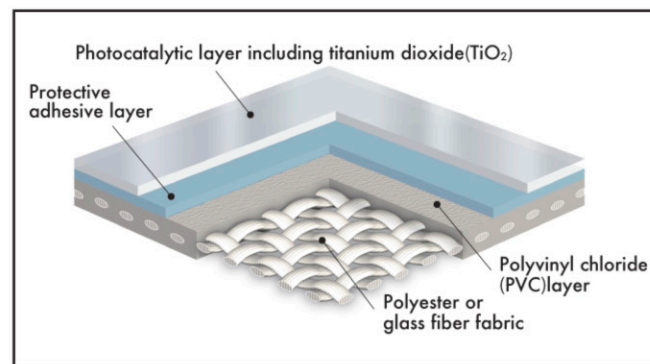
## TiO<sub>2</sub> Photocatalytic Membrane



Photocatalytic  
Membrane

# TiO<sub>2</sub> Photocatalytic Membrane

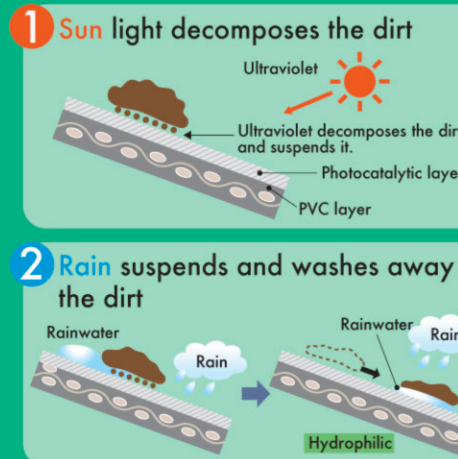
## PVC coated fabric with TiO<sub>2</sub>



PVC-coated fabric with TiO<sub>2</sub> is a combination of standard base cloth material coated in PVC, with TiO<sub>2</sub> photocatalytic treatment added to the fabric surface. Due to the oxidation decomposition and highly hydrophilic nature caused by the TiO<sub>2</sub>, dirt can be easily washed off. As this photocatalytic coating lasts as long as the membrane life, the fabric structure will always appear clean and new. Also, its high heat reflectivity avoids solar heat gain inside the building or structure. There are variations of strength and light transmission. Custom-ordered colors are also available. Light reflectance and transmission are changed by the color.

### Self-cleaning

The self-cleaning effect of the PVC-coated fabric with TiO<sub>2</sub> begins with decomposition. The surface layer of the photocatalytic membrane decomposes organic matter (dirt etc.) under the sun's UV rays. This process allows for easy removal of the dirt with hydrophilicity.



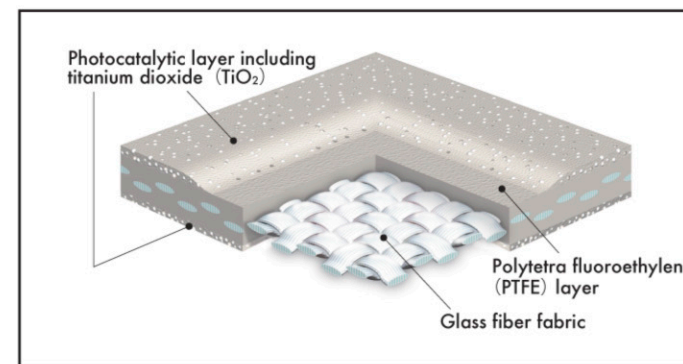
### Exposure Test

#### PVC-coated fabric

Period: 2000 Jun. - 2002 Jun  
Location: Osaka  
Tested by R&D, Taiyo Kogyo

		Non-TiO <sub>2</sub>	With-TiO <sub>2</sub>
2 years color difference (*1)	45°	21.2	2.7
	90°	21.4	3.9

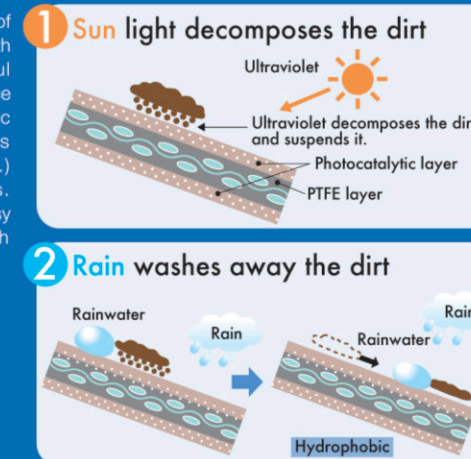
## PTFE coated fabric with TiO<sub>2</sub>



PTFE-coated fabric with TiO<sub>2</sub> is a combination of standard base cloth material coated in PTFE, with TiO<sub>2</sub> photocatalytic treatment added to the fabric surface. It demonstrates PTFE membrane's own strength and light transmission while removing dirt and contaminants by oxidation decomposition, the result of a photocatalytic action. The antifouling property also works on the vertical surface where traditional fabrics often show dirt and contaminants. The TiO<sub>2</sub> Photocatalytic effect lasts as long as the membrane life. This product with NO<sub>x</sub> removal performance is also available.

### Self-cleaning

The self-cleaning process of the PTFE-coated fabric with TiO<sub>2</sub> begins with powerful decomposition. The surface layer of the photocatalytic membrane decomposes organic matter (dirt etc.) under the sun's UV rays. This process allows for easy removal of the dirt with occasional precipitations.



### Exposure Test

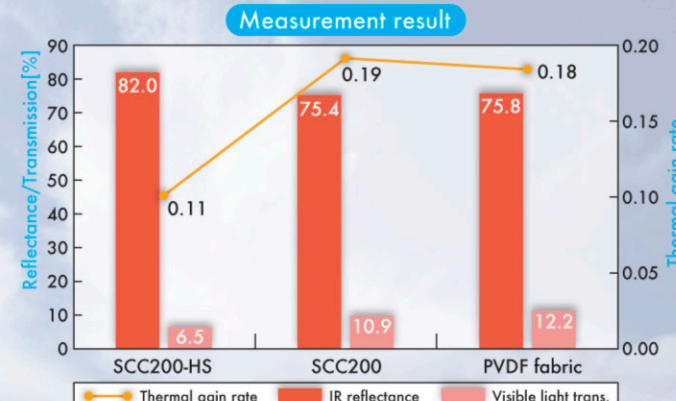
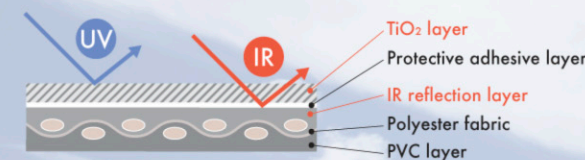
#### PTFE-coated fabric

Period: 2000 Jun. - 2002 Jun  
Location: Osaka  
Tested by R&D, Taiyo Kogyo

		Non-TiO <sub>2</sub>	With-TiO <sub>2</sub>
2 years color difference (*1)	45°	6.9	1.1
	90°	11.5	1.4

### SCC-HS...heat shield type

SCC-HS fabrics has a higher infrared reflectance, and therefore has a lower thermal gain rate. Our experiments show that the room temperature decreases by up to 5.1°C during summer time with SCC-HS, compared to the traditional membrane material. A high level of UV reflectance can delay the deterioration of fabric coatings and improve weather resistance.



### NO<sub>x</sub> Reduction (FGT800-TFB actual measurement result in JAPAN)

Decomposes Nitrogen oxide (NO<sub>x</sub>) contained in fuel exhaust and other sources, providing significantly purified air.

Results of NO <sub>x</sub> reduction on photocatalytic membrane(*2) structures based on JIS R 1701-1(2004) tests(*3)	NO <sub>x</sub> removal volume per hour utilizing PTFE-coated fabric with TiO <sub>2</sub> of 1000m <sup>2</sup> .
NO <sub>x</sub> removal volume = 0.55(μmol/50cm <sup>2</sup> ·5h)	0.66g/1000m <sup>2</sup> ·h

(\*2)In case of fabric: FGT800-TFB(PTFE/Glass fiber-TiO<sub>2</sub> · 0.8mm Thickness) (\*3)JIS R 1701-1 (2004) is equivalent to ISO 22197 (2007).

Gross Vehicle Mass	NO <sub>x</sub> Emission Factor(g/km)	NO <sub>x</sub> discharge (g/vehicle/hr)	NO <sub>x</sub> removal volume per 1000m <sup>2</sup> in terms of the number of vehicles
Truck/Bus(1.7~3.5t)	0.018	0.409	1.6 vehicles
Car(~1.7t)	0.013	0.295	2.2 vehicles
NOTE: Based on low-emission vehicles with levels 75% lower than the 2005 standard under the approval system of Ministry of Land, Infrastructure, Transport and Tourism/Japan			Removal performance is based on the capability to remove NO <sub>x</sub> being emitted during an hour drive at an average speed of 10 · 15mode(22.7km/h).

## New Products

### ETFE film with TiO<sub>2</sub>

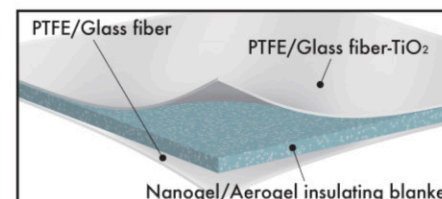
ETFE film is a new membrane product; this highly translucent film is used for various purposes including green houses and indoor sports facilities. Because of this light transmission performance facilities can save on artificial lighting costs. ETFE is very flexible in design, making it ideal for architectural facades and features. MakMax also offers the TiO<sub>2</sub> coating on ETFE film, remaining the clean appearance and the material's characteristics.



Exposure test is currently underway

**TENSOTHERM™**  
INSULATED TRANSLUCENT MEMBRANE ROOFING SYSTEM MADE WITH nanogel

Tensotherm™ is a MakMax original heat insulating fabric. This revolutionary product is developed by Birdair, Cabot Corporation and Geiger Engineers. This extremely efficient insulator uses Nanogel® blanket sandwiched between layers of PTFE/glass fiber fabric. By adding the TiO<sub>2</sub> coating to the outer layers of PTFE the membrane remains clean and the high reflection rate is maintained.



(\*1) Color difference is a quantitative difference between two colors (difference in reflection ratio) and shown as ΔE. The smaller number means higher self-cleaning effect. Above values are experimental results, not guaranteed.

### NOTE:

#### NOTE:1

Even with self-cleaning surfaces, dirt can be buildup when the deposition of dirt is faster than the decomposition speed of the membrane whose ability depends on both the activity of the photocatalyst and the amount of light reaching the surface. If there is an overwhelming buildup, light is unable to reach the TiO<sub>2</sub> surface, thus making it impossible for the reaction to occur. Before attempting to implement a photocatalytic system, therefore, it is important to assess the amount of available UV light versus the actual amounts of dirt and grime in the environment. Although inorganic matter such as sand, rust, metal dust, salt etc. cannot be directly decomposed by photocatalytic reaction, it can easily be washed off.

#### NOTE:2

To wash the membrane, wipe the surface down with a soft household sponge. If there is dirt that is caused by soot, smoke or exhaust gas, wet the sponge and apply a very small amount of diluted detergent, wipe down the dirty areas, then wash the membrane down with an ample amount of water until no trace of detergent is detected. As for any other dirt, please consult us first before cleaning the surface.