

PVC accomplishments



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.

PTFE accomplishments



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: Taiyo Middle East

TiO₂ Photocatalytic Membrane

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

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



www.makmax.com

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

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Regular Member of
Photocatalysis Industry Association of Japan

Fabric type	PVC/PES, PVC/Glass fiber	PTFE/Glass fiber	
Products	SCC125/200/325, CMX220/270	SST140	FGT600/800-TFB
Mark			
	Photocatalysis Industry Association of Japan Registration: 2009-0007 Self-Cleaning	Photocatalysis Industry Association of Japan Registration: 2009-0008 Self-Cleaning	Photocatalysis Industry Association of Japan Registration: 2009-0013 Self-Cleaning

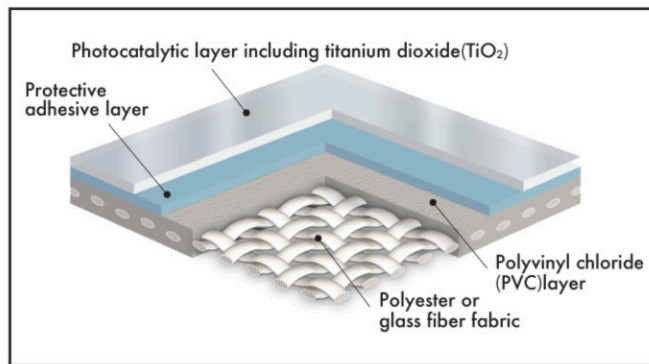


Photocatalytic Membrane

TiO₂ Photocatalytic Membrane



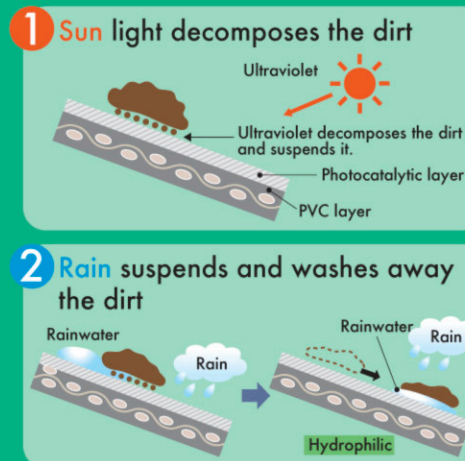
PVC coated fabric with TiO₂



PVC-coated fabric with TiO₂ is a combination of standard base cloth material coated in PVC, with TiO₂ photocatalytic treatment added to the fabric surface. Due to the oxidation decomposition and highly hydrophilic nature caused by the TiO₂, 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 TiO₂ 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.



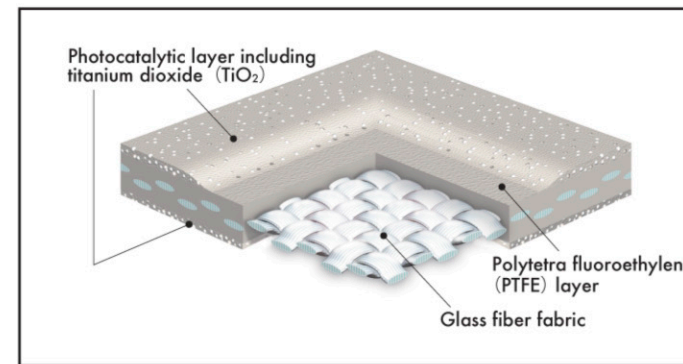
Exposure Test

PVC-coated fabric

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

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

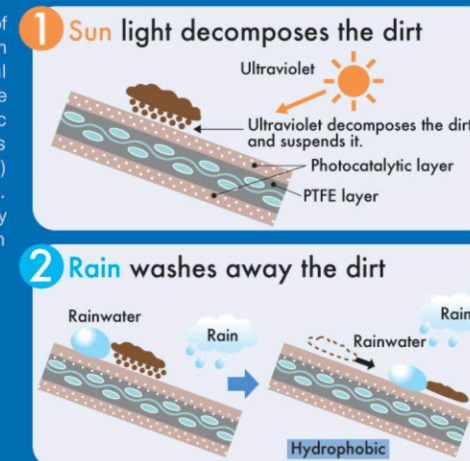
PTFE coated fabric with TiO₂



PTFE-coated fabric with TiO₂ is a combination of standard base cloth material coated in PTFE, with TiO₂ 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 TiO₂ Photocatalytic effect lasts as long as the membrane life. This product with NO_x removal performance is also available.

Self-cleaning

The self-cleaning process of the PTFE-coated fabric with TiO₂ 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

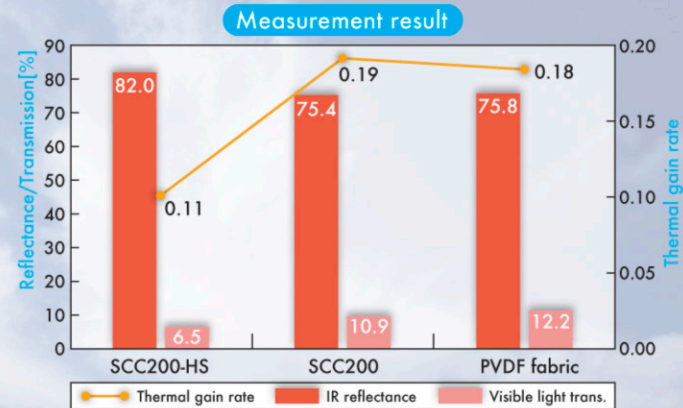
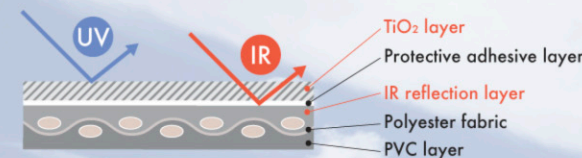
PTFE-coated fabric

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

		Non-TiO ₂	With-TiO ₂
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_x Reduction (FGT800-TFB actual measurement result in JAPAN)

Decomposes Nitrogen oxide (NO_x) contained in fuel exhaust and other sources, providing significantly purified air.

Results of NO_x reduction on photocatalytic membrane(*2) structures based on JIS R 1701-1(2004) tests(*3)
NO_x removal volume = 0.55(μmol/50cm²·5h) → **NO_x removal volume per hour utilizing PTFE-coated fabric with TiO₂ of 1000m². 0.66g/1000m²·h**

(*2)In case of fabric: FGT800-TFB(PTFE/Glass fiber-TiO₂ · 0.8mm Thickness) (*3)JIS R 1701-1 (2004) is equivalent to ISO 22197 (2007).

Gross Vehicle Mass	NO _x Emission Factor(g/km)	NO _x discharge (g/vehicle/hr)	NO _x removal volume per 1000m ² 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_x being emitted during an hour drive at an average speed of 10 · 15mode(22.7km/h).

New Products

ETFE film with TiO₂

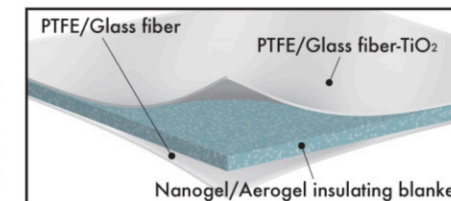
ETFE film is a new membrane product; this highly translucent film is used for various purposes including green houses and indoor sports facilities. Because of this light transmission performance facilities can save on artificial lighting costs. ETFE is very flexible in design, making it ideal for architectural facades and features. MakMax also offers the TiO₂ coating on ETFE film, remaining the clean appearance and the material's characteristics.



Exposure test is currently underway



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 TiO₂ 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 TiO₂ 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.