Allianz Arena, Munich

Fluon® ETFE FILM

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Fluon® ETFE Film ENG/5-2014

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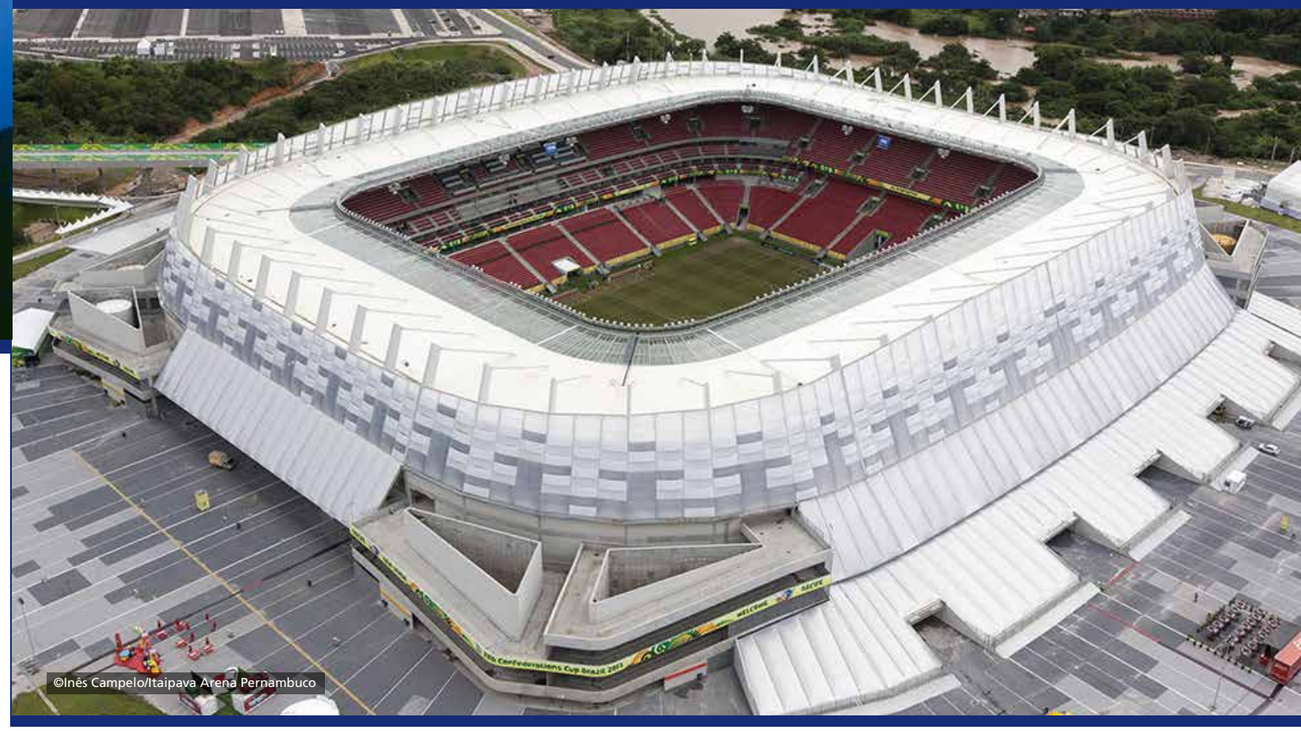


Fluon® ETFE FILM

Advanced Fluoropolymer Film

www.agcce.com

Fluon® ETFE FILM

Allianz Arena, Munich

Itaipava Arena Pernambuco, Recife

Fluon®ETFE FILM is a high-performance film made from AGC's own ETFE resin. A unique film-forming method is used to produce films between 12µm and 250µm thick.

The film has excellent heat and chemical resistance, anti-stick properties, electrical properties and long-term weatherability; properties typically associated with fluoropolymers.

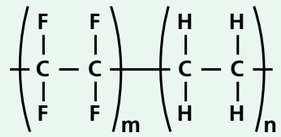
Due to its exceptional durability, transparency and antifouling properties Fluon®ETFE FILM is used in a wide range of applications such as mould release film for electronic components, interior design, outdoor architectural applications, solar cells, greenhouses and a whole host of other innovative areas.

AGC is proud to have supplied Fluon®ETFE FILM for various sports and entertainment stadia around the world, including Munich's Allianz Arena, the SSE Hydro Arena in Glasgow, and Brazil's Itaipava Arena Pernambuco, located in Recife. This multi-use stadium was built to host matches during the 2014 FIFA World Cup Brazil™. Approximately 25,000 square meters of AGC's 0.25 mm-thick Fluon®ETFE FILM was used across the arena's entire exterior façade.

The prestigious Forsyth Barr multi-purpose sports and entertainment stadium Dunedin, New Zealand hosted matches during the Rugby World Cup and is another Fluon® ETFE project of note. It is the only permanently covered natural turf stadium in the world.

Finally, the giant transparent tent, known as the 'Khan Shatyr' (The Royal Marquee) is a major Fluon® ETFE FILM project located in Kazakhstan. The interior is home to shopping and entertainment venues including market squares and cobbled streets, a boating river, shopping centre, mini golf and indoor beach resort. In total the building covers an area larger than 10 football stadia.

Fluon® ETFE, a thermoplastic fluoropolymer developed by AGC, is the raw material used to produce Fluon® ETFE FILM. It is an ethylene-tetrafluoroethylene copolymer. Fluon® ETFE has good mechanical properties and mouldability and can be extruded, injection moulded and blow moulded. Fluon® ETFE has excellent characteristics that make it suitable for many kinds of applications.



High-performance fluoropolymer film for a wide range of applications

Safety and heat resistance

Fluon® ETFE FILM meets UL94VTM-0 and is suitable for use within the wide temperature range of -200°C to 200°C .

Chemical resistance

Fluon® ETFE FILM is highly resistant to most chemicals and solvents.

Weatherability

Fluon® ETFE FILM is resistant to ultraviolet light and is suitable for long-term use outdoors. Film subjected to a 16000-hour accelerated weathering test (comparable to over 30 years' exposure) showed no signs of deterioration.

Light transmittance

Fluon® ETFE FILM has excellent light transmittance making it ideal for use as a protective film for solar cells, greenhouses, roofing and architectural facades.

Anti-stick properties

Fluon® ETFE FILM possesses excellent anti-stick and antifouling characteristics as well as excellent release properties.

Electrical properties

Fluon® ETFE FILM exhibits high dielectric strength even in its thinnest form. It has a low dielectric constant and dielectric loss tangent over a wide frequency range.

Electronics

Fluon® ETFE FILM's anti-stick properties and resistance to temperatures over 200°C make it suitable for use as a release film for printed circuit boards and electronic components.

Roofing and architectural facades

Fluon® ETFE FILM is used in many modern architectural constructions. Examples include the World Cup Allianz Arena football stadium in Munich, Germany and the National Stadium and the National Aquatics Centre in Beijing.

Interior finishing

Fluon® ETFE FILM is used indoors in both commercial and residential buildings to give a wipe-clean and heat-resistant surface.

Photovoltaics

Fluon® ETFE FILM provides long-term protection for photovoltaics. It has excellent weatherability with good mechanical properties and light transmittance. Its flexibility makes it ideal for use on curved surfaces.

F-CLEAN® film for greenhouses

F-CLEAN® is ETFE film developed especially for greenhouses. It has high light transmittance and weatherability, plus other features required for greenhouses, including UV-control and a unique anti-dripping treatment technology.

• Contact us:

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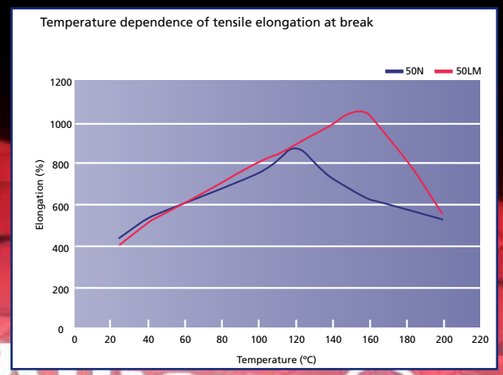
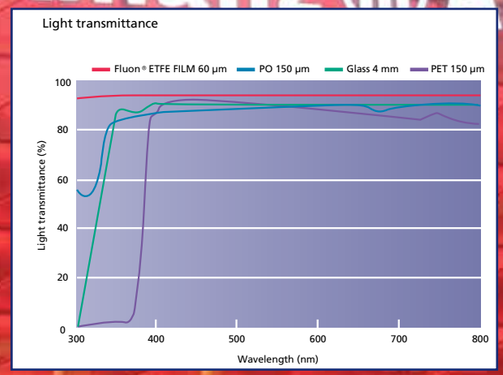
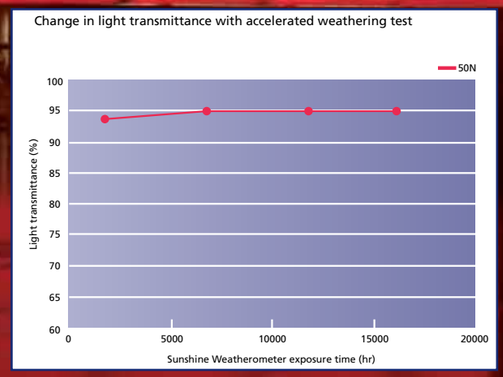
Electronic Applications

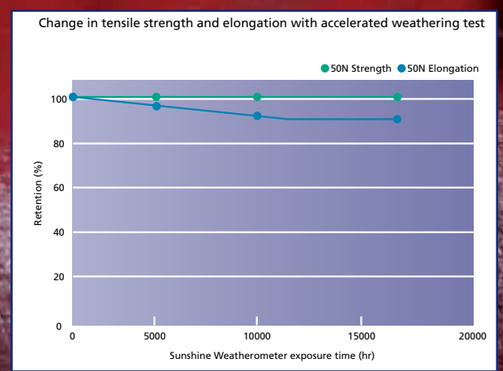
Forsyth Barr stadium, Dunedin


Commercial greenhouses









General properties

	Item	Unit	Test	Method
Physical properties	Specific gravity	-	ASTM D792	1.75
	Tensile strength at break	MPa	JIS K7127	>39
	Tensile elongation at break	%	JIS K7127	200-510
Thermal properties	Melting point	°C	-	260
	Linear thermal expansion coefficient	10^{-5}/°C	ASTM D696	9.4
	Flammability	-	UL	94VTM-0*
	Continuous service temperature	°C	-	150-180
Chemical properties	Water absorption (23°C, 24 hr)	%	ASTM D570	0.03
	Chemical resistance	-	ASTM D543	Excellent
Electrical properties	Volume resistivity	U • cm	ASTM D257	10^{17}
	Dielectric constant (23°C, IMHz)	-	ASTM D150	2.6
	Dielectric tangent	-	ASTM D150	
	60Hz			0.0006
	IKHz			0.0008
	IMHz			0.005
	IGHz			0.01
	Breakdown voltage	kV/0.1mm	ASTM D149	12
	Arc resistance	sec	ASTM D495	120

Chemical resistance

	Elongation retention	Strength retention
NOHI0%	Excellent	Excellent
HCl 35%	Excellent	Excellent
Xylene	Excellent	Excellent
Toluene	Excellent	Excellent

50N: 1 week immersion test

Grades

Thickness (µm)	Grade	Width (mm)	Surface treatment	Roll length (m)
12	N	1200	S	1000
25	N	1250	NT	1000
40	N	1250	NT	500
50	N	1250	NT	500
100	N	1250	NT	250
200	NJ	1600	NT	125
250	NJ	1600	NT	100
21	GS	1220	NT	1000
25	MW	1250	NT	1000
50	HK (KN)	1250	NT	530
50	MW	1250	NT	530
50	LM	1300	NT	510

Grades
N Natural (clear)
NJ Natural (clear, thick)
GS Grey
MW Double sided matt (clear)
HK Matt on outside of roll (clear)
KN Matt on inside of roll (clear)
LM Natural (clear, low melting point)

Surface treatment
NT No treatment
S Single side corona treatment