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Titolo generale della ricerca:



PERCORSI E GESTIONE DELLE INFORMAZIONI TECNICHE PER LA PROMOZIONE E IL CONTROLLO DELL'INNOVAZIONE NEI MATERIALI E NEL PROGETTO DI ARCHITETTURA

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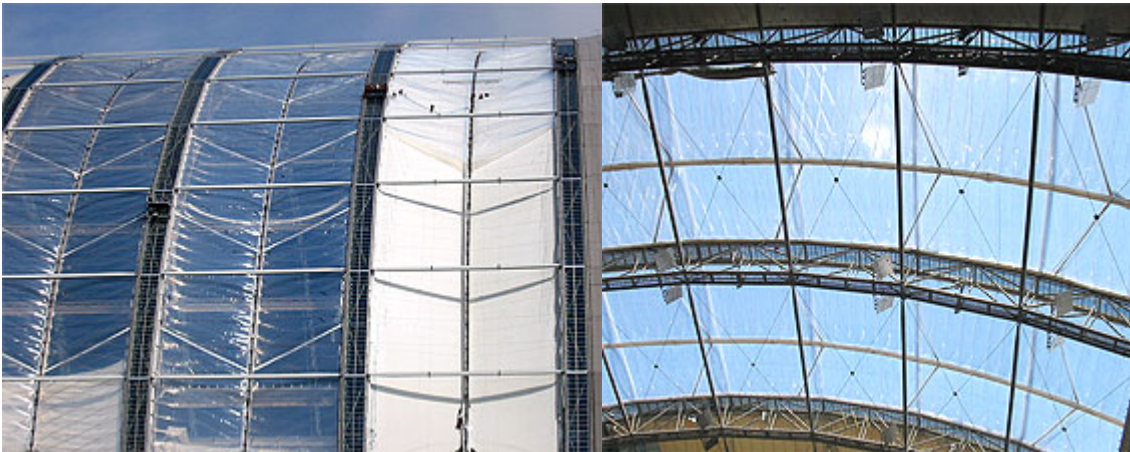
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SELEZIONE DI SCHEDE TECNICHE DAI PRINCIPALI PRODUTTORI

I dati pubblicati nelle schede sono stati forniti dalle aziende e sono indicativi. Per una corretta e più aggiornata informazione si consiglia il contatto diretto con i loro uffici commerciali.

Modern architecture is hard to imagine without use of transparent structures for fa-cades and roofs. Besides glass structures, innovative structures made of ETFE foil are increasingly gaining significance. They are being used primarily in the fields of:

- Swimming baths and water parks
- Shopping malls and atriums
- Zoo facilities and rain forest houses
- Trade show and event halls



ETFE is the fluoropolymer-material ethylene tetrafluoroethylene which is used in structural membrane constructions in thicknesses from 0.05 to 0.25 mm.

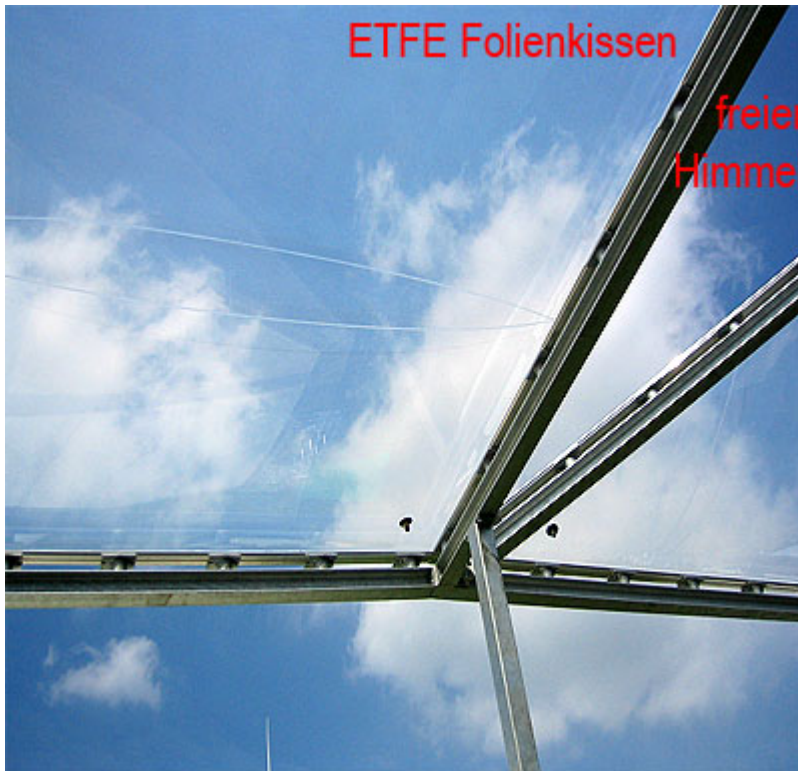
The designs made of ETFE foil usually are pneumatically pre-tensioned, i.e., the form of two- or multilayer air cushions (so-called pneus) are maintained by permanent air support. The span of the individual cushions can be 4.5 metres without any further support structure being required. With an additional cable net reinforcement, also much wider spans are possible. The support air supply and the control system largely can be automated. By means of individual concepts, the optimum design can be developed for each individual project.



Due to the low surface weight of the cushions, support structure designs can be very fragile and light. The cushions are stretched over wide roof and facade surfaces onto the support structures made of wood, steel or aluminium by means of aluminium frames.

In particular, the following properties make building with ETFE pneus so popular:

- particularly high transparency of approx. 90 % in the visible wavelength range (from 400 - 700 nm/UV)



- high UV-A (100%) and UV-B (50%) transparency - ideal for the growth of plants and in the leisure/bath sector (natural tanning just like in the open air at any time of the year). The harmful UV-C share is filtered out completely.
- good heat-insulation properties: U-values depending on the number of foil layers

U-value:	2 foil layers (1 air cell)	2,95 W/m ² K
U-value:	3 foil layers (2 air cell)	1,96 W/m ² K
U-value:	4 foil layers (3 air cell)	1,47 W/m ² K
U-value:	5 foil layers (4 air cell)	1,18 W/m ² K

- g-value ranges between 0.05 and 0.85 depending on the structure and orientation of the pneus
- low weight of the foil cushions (depending on the cushion structure, approx. 500 - 800 g/squ.m) making possible lighter and less expensive substructures
- very good mechanical properties: high resistance to tear/tear propagation and hail resistance

Properties of ET foils		Value	Unit	Method of Testing
Tensile strength	longitudinally	>40	N/mm ²	DIN EN ISO 527-1
	crosswise	>40		
Percent elongation of failure	longitudinally	>300	%	DIN EN ISO 527-1
	crosswise	>300		
10% tension	longitudinally	>20	N/mm ²	DIN EN ISO 527-1

Tear propagation	longitudinally	>300	N/mm ²	DIN 53363 on trapezoidal body
	crosswise	>300		
Density		1,75	g/cm ³	DIN 53479
Melting Range		270 ± 10	°C	DSC 16° K/min
Tolerance		≤ 50µm: ±3µ > 50µm: ±5% from standard value	µm	DIN 53370

- flame-proof in accordance with fire classification B1 according to DIN 4102 - ETFE foils burn without forming drops. In case of fire, the foil dissolves and a ventilation hole forms as a vent.
- low maintenance costs since the material has a self-cleaning effect due to the anti-adhesive surface - dirt and dust particles can hardly adhere to the surface and are washed off by rain. Also the formation of algae is prevented.
- additional interesting design possibilities by imprints, e.g., for shading without additional structures
- moveable designs are possible
- high rate of recycleability
- long service life of at least 25 to 35 years
- cost savings of approx. 30 - 50 % compared to conventional transparent roof de-signs