



retfect
INNOVATIVE COVER SOLUTION



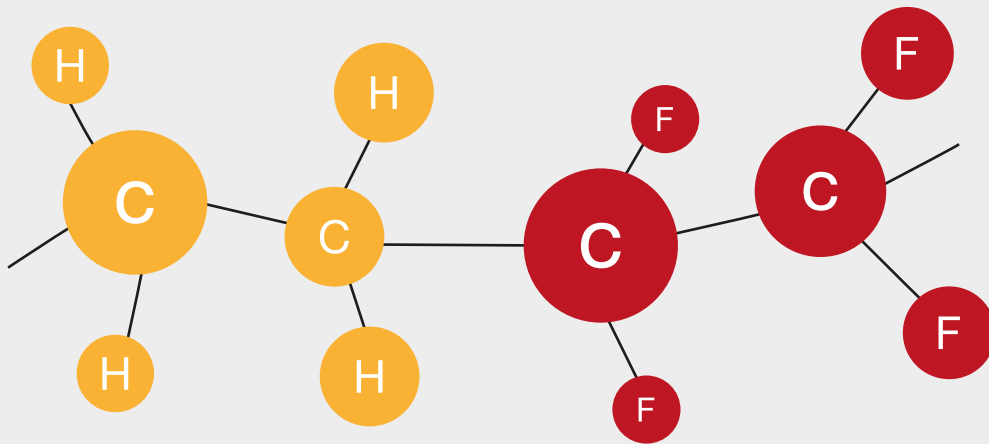


PRODUCER: P.A.T.I spa ITALY

Trade name: ETFECT (Natural transparent)

Product: ETFE (Ethylene-TetraFluoro Ethylene)

CHEMICAL and PHYSICAL CHARACTERISTIC



ETFECT is ETFE film performed by PATI

Ethylene tetrafluoroethylene (ETFE) is a fluorine-based plastic resin, designed to have high corrosion resistance and strength over a wide temperature range.

Due to its high performances in mechanical, optical and long life features, ETFECT is a film designed for architectural application:

- It's life time under solar radiation is evaluated in more than 20 years
- Its low surface tension characterizes really good self-cleaning property
- Excellent performances in terms of visible and UV light transmission
- Excellent performances in mechanical behaviour
- Excellent performances in fire resistance
- Totally recyclable and respecting the Kyoto treat it doesn't contain any toxic or pollution substance

PRODUCTION ISSUES

Max width of extruded film: 2000 mm (other widths upon request).

Thicknesses: from 50 up to 300 micron thickness tolerance point to point is within 5%.

Length of rolls: depending by the thicknss.

The ETFE architecture film is winded on carton cores with inside diameter of 6 inches, and suspended on plastic shoulders.

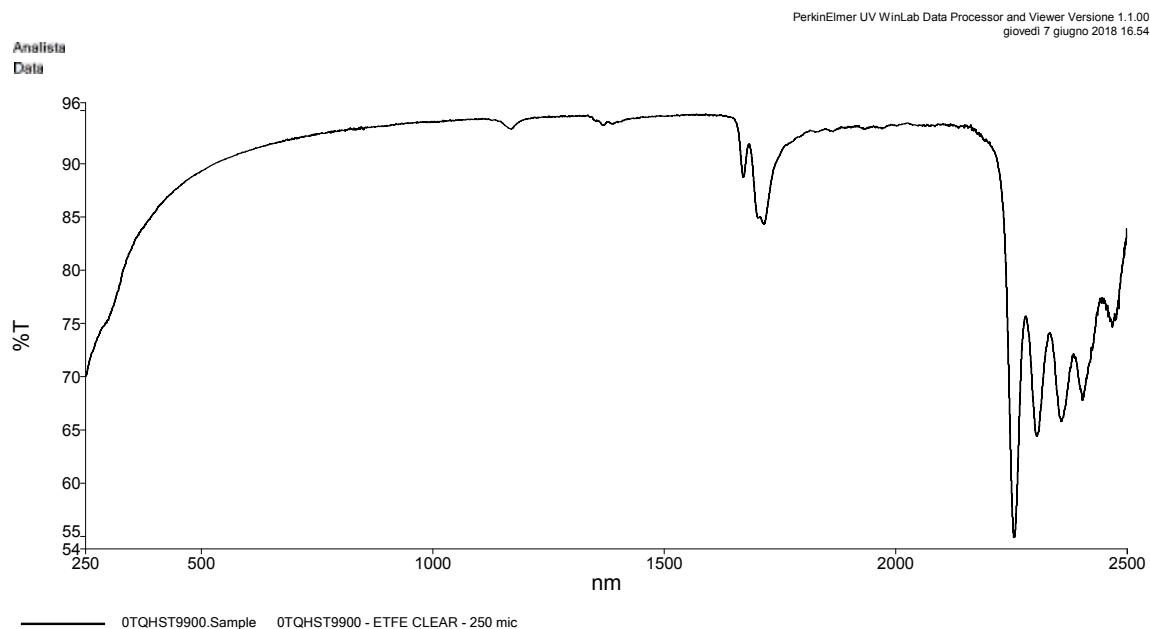
The whole roll length is controlled by means of a double camera system detecting eventual defects of a size exceeding 1 mm, and a report is then emitted indicating the point of the existing defect.

TECHNICAL SPECIFICATIONS

Dimensional Properties	Units	Technical data	Method	Typical values
Nominal thickness	micron	250	ISO 4593	251,3
Width	m	.	ISO 4592	-
Average thickness-tolerance vs nominal	%	+5	ISO 4593	0,5 %
Minimum thickness measured	%	-10		- 2,4 %
Mechanical properties	Units	Technical data	Method	Typical values
Tensile strength at break MD	MPa	>40	EN ISO 527-3	49
Tensile strength at break TD	MPa	>40		49
Tensile strain at break MD	%	>300		380
Tensile strain at break TD	%	>300		370
Yield stress (10%)	MPa	>20		22
Tensile Modulus	MPa	>950		955
Trouser tear method TD	N/mm	>400	DIN 53363	474
Creep test MD	%	0,5	8.6 EN 13206	-
Dart drop test	cN	na	Int.Method (IO 82.4002)	-
Optical Properties	Units	Technical data	Method	Typical values
Visible transmittance (380:780 nm)	%	>88	EN 2155-5	90,4%
Solar heat gain factor (300:2500 nm)	%	na	EN 2155-9	-
Colour opacity	%	na	X-RITE	-
Other Properties	Units	Technical data	Method	Typical values
Surface Tension	dyne/cm	na	Geometric	-
Surface weight (theoretical)	g/m2	438	Int.method DIN 4102 B1 ASTM E108 A	
Fire classification				

The mechanical datas are obtained with a ZWICK & ROELL dynamometer in std. Laboratory conditions.

Values of Solar Heat Gain Factor or Visible Light Transmission can be adjusted according to design specification, by regulation of the additives and pigments Master Batches feed to the extruder by means of a gravimetric feeding system whose precision is 0,1%.





PRINTED

Printig it is based on Aluminium flake disperse on water resistant resin and guarantee up to 72h of immersion without loss of adhesion after adhesive tape peeling test.

Pattern, shape of printed elements and percentage of printed area can be according to customer request, provided the engraving of the cylinder.

The most used patterns are on round silver dots, because of the silver reflectance to solar radiation, percentage of printed area is evaluated to fulfill with Heat Solar Gain Factor request.

PATI printing process derives from a specific research; color tonality and adhesive tape peeling resistance has been tested after XENON accelerated weathering exposure under full sunlight spectrum Arc lamps

50 W/sqmt, (UNI EN ISO 4892-2) for more than 3000 hours, the change of color is negligible.

For welding purposes print can be easily removed using Ethyl Alcohol or Methyl Ethyl Ketone.

In any case the printed layer shall be placed at the inner side of the roof or facade in order to be protected from wind, sand and accidental events.

ARCHITECTURAL INSTALLATIONS

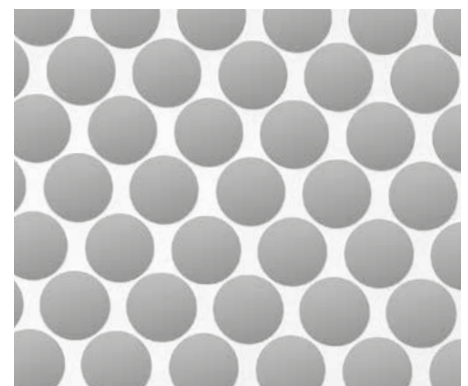
a) Multiple layers air inflated cushions: this solution allows to reduce the "U value", or Global Heat Exchange Coefficient. Indicative values are as follows:

- 1) Single layer = 6,0:6,2 W/sqmt/°K (lower values for pigmented or printed film)
- 2) Two layers = 2,58:2,80 W/sqmt/°K (lower values for pigmented or printed films)
- 3) Three layers = 1,67:1,83 W/sqmt/°K (lower values for pigmented or printed films)

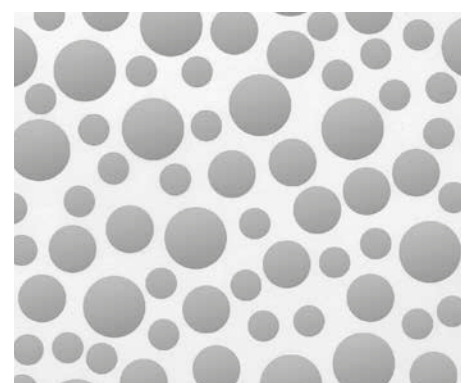
b) Single layer: this solution is considered as a tensostructure, and a system of steel cables has to be engineered to stabilize the film against wind and accidental loads.



WHITE DOTS



SILVER DOTS



SILVER DOTS

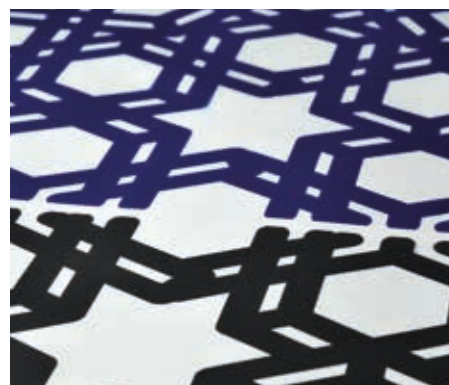


PRESTIGE

The digital printing is obtained by means of a ink-jet plotter and can be realized on multiple colors and shapes according to customer drawing. The relevant shape has to be provided on software (PDF, JPEG or Vectorial) suitable to be transferred to the plotter.

Generated by a research, particular inks have been formulated, in order to obtain excellent results in terms of architectural realizations.

Effect Prestige has been installed since 2013 in several Europe areas, USA and even Australia.





PACKAGING

Rolls are each one protected by a bubble LDPE film, packed suspended on plastic shoulders and delivered in wooden cranes suitably treated, stamped and certified for sanitation.

MANIPULATION

The ETfect sheet shall be carefully moved, not dragged on the round to avoid scratches and loss of the printing. Take care that fast movements can generate electrostatic charges on the material surface which can held to printing losses and to sparks.

INSTALLATION

As far as the mechanical resistance is concerned, the installation shall be made in order to avoid possible alternate swinging induced by wind which can produce cracks and fragile breaks on the bending zones.

INSPECTION CERTIFICATE

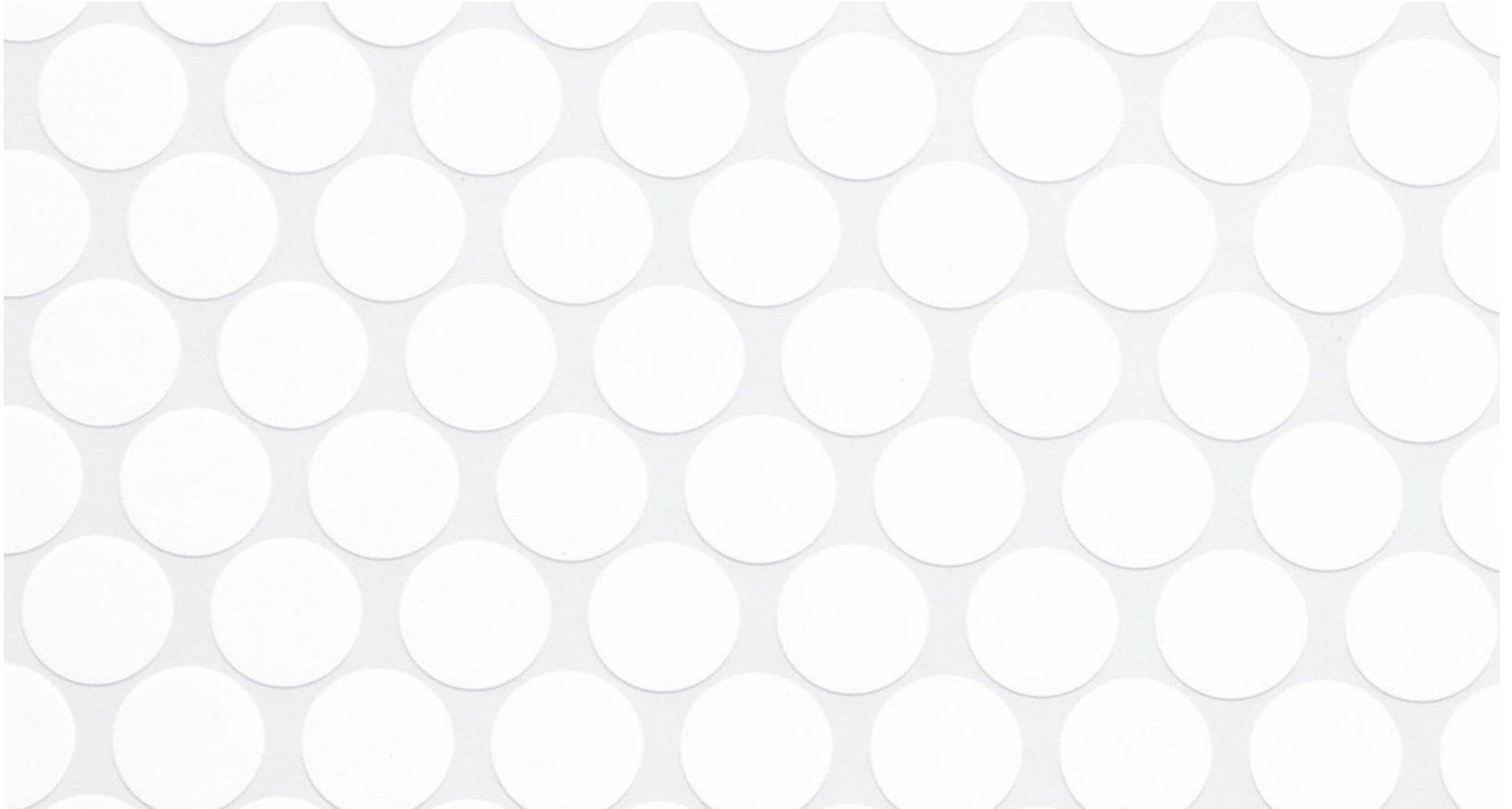
Each production lot will be inspected in internal laboratory for:

- a) Mechanical uniaxial characteristics by means of a Zwick&Roell dynamometer
- b) Optical and radiometric properties by means of a Perkin Elmer spectrophotometer.
- c) Each roll can be provided with the map of eventual defects exceeding 0,8 sqmm.
- d) Each roll can be provided with the synoptic of thickness measure and tolerance

WARRANTIES

ETfect film exposure life to solar radiation is still unknown, as the first installations of middle 80's are still existing, so a real warranty cannot be given, but an expected life of more than 20 years is considered realistic.





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