Architen ETFE System

Three Layer ETFE Cushions

A beautifully engineered, lightweight building alternative to glazing.

1.9 W/m²K
Overall U-value

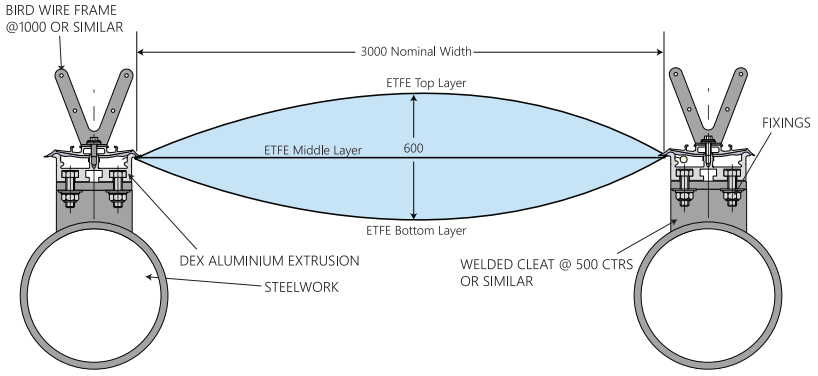
Up to 75%
Light transmission

Approx. 1%
Of the weight of glass

Up to 4 m
Typical panel width

Typical cushion section

Dimensions in mm



U-value calculation

Outer membrane	R_{se} = 0.04 m²K/W
Air chambers (<500 mm)	$R_{1–3}$ = 0.18 m²K/W
Inner membrane	R_{si} = 0.13 m²K/W
Total resistance R_T	$R_{se} + \Sigma(R_{1–3}) + R_{si}$
	0.04 + (2 × 0.18) + 0.13
	= 0.53 m²K/W
U-value	$U = 1 / R_T = 1 / 0.53$

Overall U-value **1.9 W/m²K**

ETFE foil 100–300 micron

Mass per unit area	175–525 g/m²
Tensile strength	55 MPa
Tensile strength @ 10% strain	23 MPa
Elongation at break	550%
Tear resistance	400 N/mm
Opacity	3–10%
Sample width	15 mm
Sample length	100 mm
Test speed	200 mm/min

About ETFE cushions

A three layer cushion adds a middle layer of ETFE foil, dividing the cushion into two air chambers. This improves the U-value to 1.9 W/m²K while keeping light transmission of up to 75%, giving a balance of insulation and daylight for roofs and atria, at approximately 1% of the weight of glass.

Cushions are kept inflated by an Air Handling Unit (AHU), which maintains a pressure of around 250–300 Pa and uses under 60 W in normal operation (100 W maximum). The middle layer can be printed and moved by varying the pressure in each chamber, so shading can be adjusted to suit the sun (Architen Intelligent Printing). Panel widths are typically up to 4 m, while lengths are unlimited.

Other configurations available

Single layer	5.9 W/m²K
2 layer cushions	2.9 W/m²K
4 layer cushions	1.4 W/m²K

How to specify

Product	Architen ETFE Cushion System
System manufacturer	Architen Landrell Manufacturing Limited
Size	As per architect's drawings
Fabric	ETFE foil
Configuration	3 layer ETFE cushions
Outer membrane	ETFE foil (fritted)
Middle & inner layers	ETFE foil (clear)
U-value	1.9 W/m²K