



## USER GUIDE

Aerfly® is a closed-cell panel, 100% recyclable, PVC-free, perfectly suited for lightweight composite structures subject to high mechanical stress.

Aerfly® offers an exceptional lightness x stiffness ratio, the result of a manufacturing technology unique in the world and developed by the Aerpanel group. The panels are manufactured entirely in Europe in an ISO 9001 certified factory.

It is used in industrial applications for structural arrangement and reduction (camping-cars, boats, light furniture, offices) and also in the interior and exterior visual communication sectors (billboards, POS, material for creative work).



## TECHNICAL DATA

GENERAL PROPERTIES	VALUES			UNITS	STANDARD
Density	100			kg/m <sup>3</sup>	
Maximum squareness deviation	5			mm/1 m	
Thickness Tolerance	10 +/- 0,2	15 +/- 0,3	20 +/- 0,3	mm	
Surface mass	1	1,5	2	kg/m <sup>2</sup>	
Long-term water absorption by total immersion	<0,7			Vol. %	EN 12087
Reaction to fire	F			Euro class	EN 13501-1

MECHANICAL PROPERTIES	VALUES			UNITS	STANDARD
Compressive strength (10% deformation)	585	720	1050	kPa	ISO 844
Max bending strength MD (Machine Direction) MT (Cross Direction)	5.3 1.6	3.8 1.6	3.7 2.1	MPa	ISO 178
Elasticity module MD (Machine Direction) MT (Cross Direction)	254 61	130 63	66 50	MPa	ISO 178

THERMAL PROPERTIES	VALUES			UNITS	STANDARD
Thermal conductivity – l	0.036			W/mK	EN 12667
Thermal resistance – R	0.28	0.41	0.55	M2.K/W	
Maximum service temperature	75			°C	



## CHEMICAL RESISTANCE

The panel has good resistance to diluted acids, aqueous saline solutions, alkalis. It is attacked by oxidizing or nitric acids. The panel swells and dissolves under the action of chemical agents such as acetone, isopropanol, benzene, toluene, chloroform, methylene chloride, trichloroethylene, carbon tetrachloride, gasolines, insecticides.

We recommend carrying out a compatibility test with the chemical agents used on a small area.

## COMBUSTION

Core XPS designed without CFC – Compared to polyurethane, polystyrene does not produce hydrocyanic acid when it burns. HCN is an acid that is extremely harmful to health and the environment even in small quantities. Polystyrene also produces 5 times less carbon monoxide emissions. Test report 761/07 according to standard VDA 75 202-3 A1-3, conducted by the Central Laboratory of the Police Prefecture.

Phthalate content < 0.01 mg/kg – Result obtained by gas chromatography.



## VERTICALITY TEST

The panels withstand the verticality test at room temperature well. The panels are 1.80m high, 60 and 100 cm wide, 10 and 15 mm thick. Using Wedge feet.

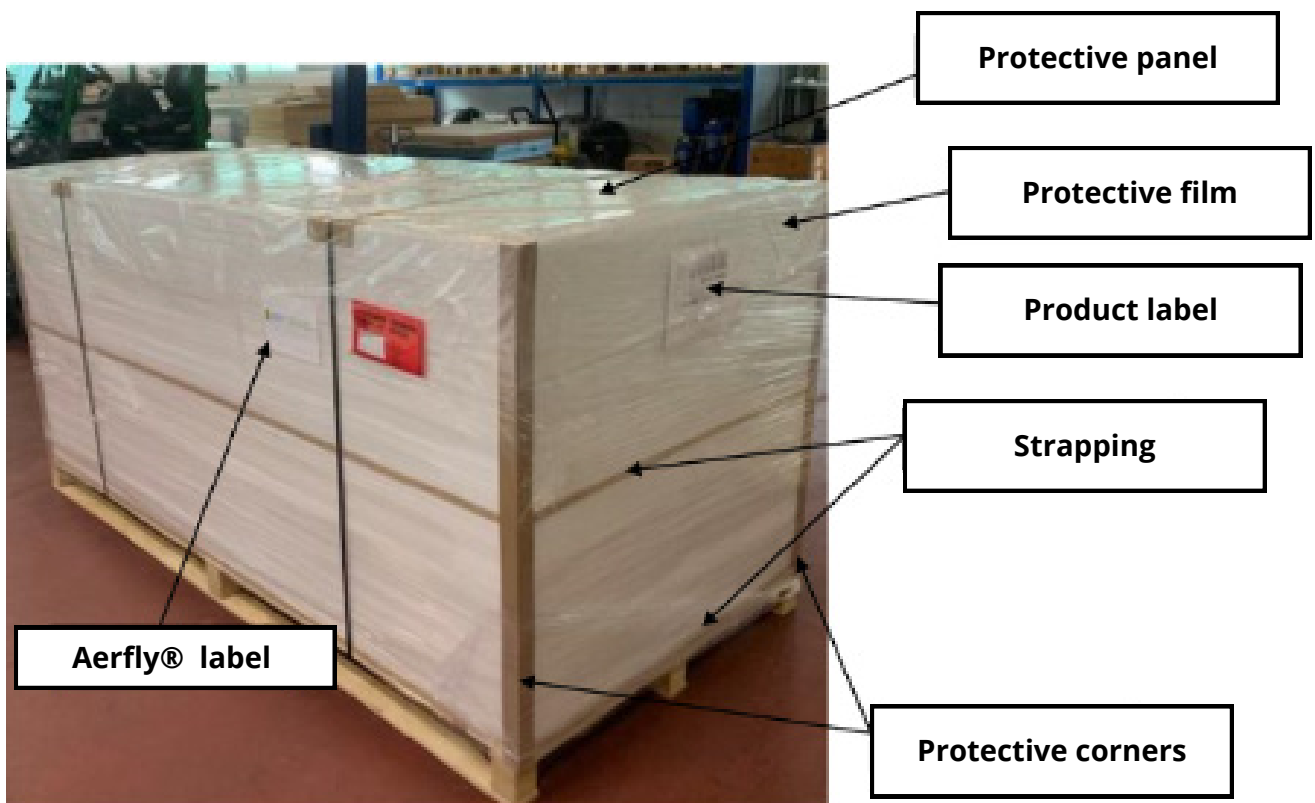
After 1 month, the top of the 60cm wide panels had only moved a maximum of 16mm (angle <math><0.5^\circ</math>). In width of 1m, this value is divided by 2.



## CONDITIONS OF USE

### PANEL PACKAGING

On pallet with protective angles at the corners, protection plates and clamping plates, protective film, identification label.



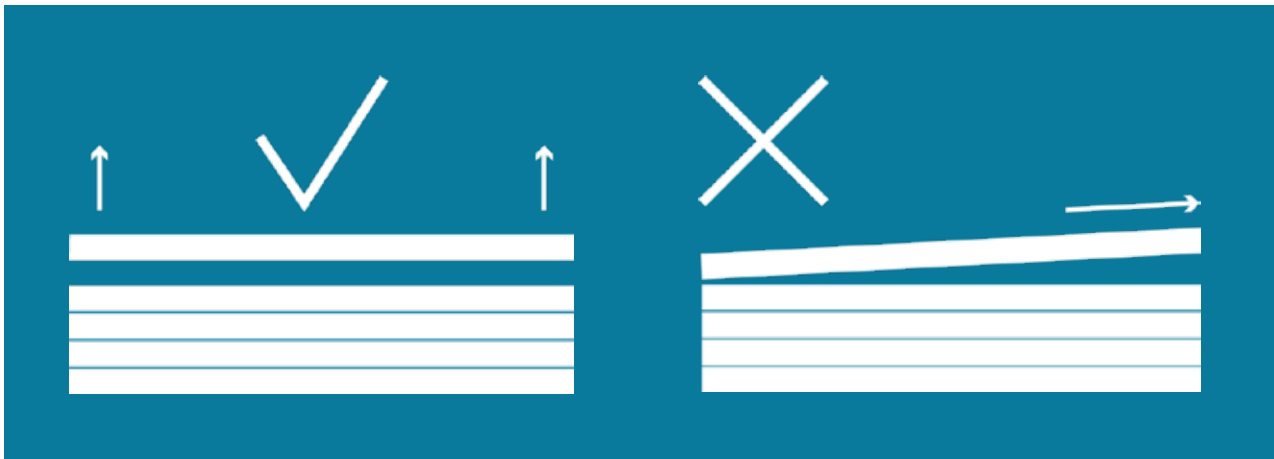
### STORAGE

We recommend storing these panels flat, in a dry place, ideally between 15 and 25°C. Before use, leave to rest for 24 hours in the processing room.

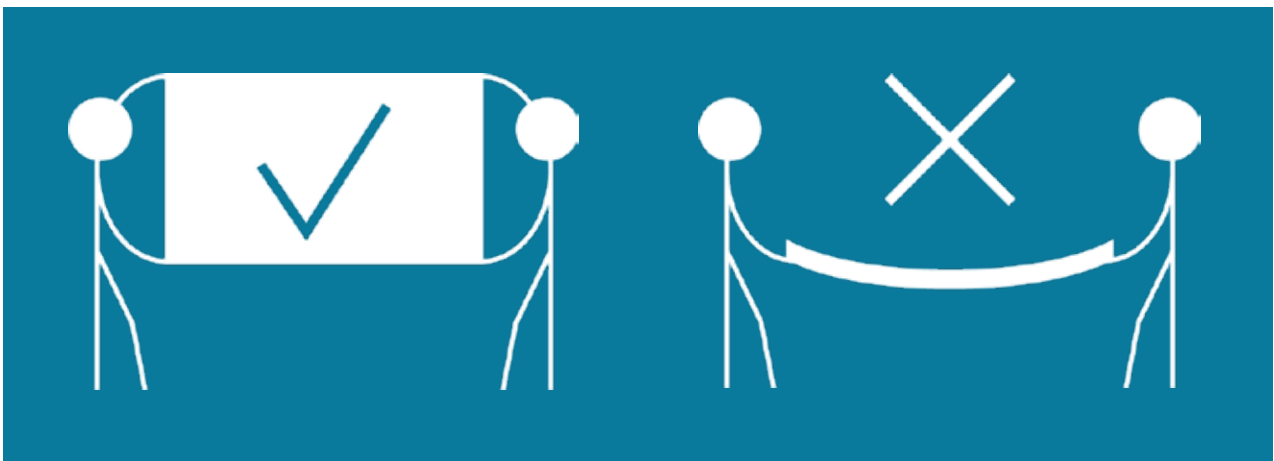


### HANDLING

Do not slide the panels on top of each other (risk of scratches), but lift them.



Long length: carry vertically

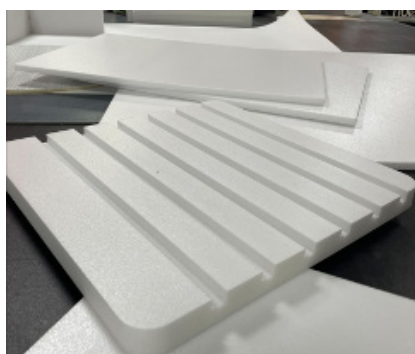


## PROCESSING

### CUTOUT

Several cutting tools can be used –  
Here are some examples of indicative settings.

	THICKNESS	TOOL		SPEED
Cutter	10–20 mm			
Cutting table	10–20 mm	Pneumatic Oscillation Cutting Tool	Lame Z21 Zund	70 mm/s
Hot wire	10–20 mm	Wire diameter Stopping time between 2 directions Advance speed		0.25 mm 2000 ms 90 mm/mn
Circular saw	10–20 mm	Blade diameter Rotation speed Carriage feed Scoring cutting depth		520 mm 72 teeth 3600 RPM 140 m/mn 1–2 mm
Milling	10–20 mm	Rotation speed		2000 – 2500 RPM
Ultrasound	10–20 mm	Frequency		20 kHz
Laser	10 mm	50–60 W		40–50 mm/s
	15 mm	BRM Laser (150 W)	70% power – 2 blowing bars	20 mm/s
	15 mm	Flux (40 W)	15% power – without blowing	12 m/s



MILLING



ZUND CUTOUT



LASER CUTTING



### ADHESIVES

Several adhesives allow the Aerfly® panel to be laminated with different coatings. This list is not exhaustive.

We advise you to carry out a test on a small surface because the adhesive, the application and pressing process as well as the nature of the support are involved.



Materials to laminate on Aerfly®	FAMILY OF ADHESIVES			
	Hot melt EVA	Hot melt PU	Polychloroprene	latex
Paper	Yes	No	No	No
Polystyrene	Yes	No	No	No
Carton	Yes	No	No	No
HPL (High Pressure Laminates)	No	Yes	Yes	No
CPL (Continuous Pressed Laminates)	No	Yes	No	No
PP (polypropylene)	No	Yes	No	No
PVC (polyvinyl chloride)	No	Yes	No	No
Fibers	No	No	No	Yes

Application of adhesive films on the panel surfaces. Apply the film well to avoid leaving bubbles.

On the edge of the panels, it is possible to apply edges, smooth the surface of the edge of the panels using MS polymer putty.



### DRILLING – SCREWING

Using wood drill bits, you can drill holes in the panel – Use a slow rotation speed. Most wood screws can be used. The best panel fixing results are obtained with screws with a large thread depth.

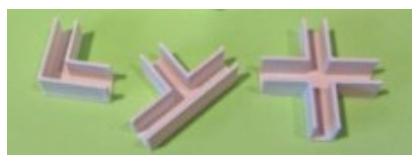
Tests were carried out with different screws and dowels.

BRAND – REF. OF THE SCREW	SCREW SHAPE	AXIAL BREAKOUT FORCE OBTAINED
EJOT EPPsys D 15.5 x12.5		371 N
Würst -DIN7981 -C-H2-4.2x38		110 N

With anchor systems fixed by friction welding.

BRAND – REF. ANKLE	ANKLE SHAPE	AXIAL BREAKOUT FORCE OBTAINED
EJOT® RSD 35 (Ø12x16)		302 N

Possibility of using assembly systems for furniture (inserts, connectors, clips, etc.) or manufacturing them using 3D printing.



FOAMWERKS –CLIPS



IMPRESSION 3D





## PAINT

Solvent and water based spray paints : tests carried out successfully with Belton and Molotow spray paints. Acrylic marker: tests with Molotow one4all markers – good resistance outdoors.

## DIGITAL PRINTING

### 1- UV LED Ink – Printing tests were carried out on the following machines:

- Canon Arizona 135GT
- Agfa Anapurna RTR3200i LED
- Agfa Tauro (150 DPI print file)
- Jetrix UV
- Vanguard VK300D-HS
- Mimaki JFX200

### 2- Water-based Latex inks – Printing tests with 3 to 6 passes – drying from 40 to 80°C depending on speed:

- HP R1000



## VISUAL QUALITY CONTROL

### PRODUCTION PROCESS

- AERFLY material is directly extruded from the extrusion machine.
- Out quality control is extremely strict on dimmensional tolerances
- However, light extrusion traces can appear as it is part of the process. This doesn't impact on printing quality.
- here below are few examples of our acceptance criterias.

### EXAMPLES OF QUALITY CONTROL

**DARK BANDS VISIBLE TO THE NAKED EYE AT A DISTANCE OF 1 METRE**



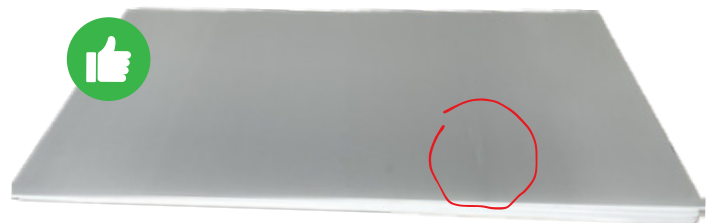
**ASLIGHTLY VISIBLE STRIP ON THE SIDE**



**LIGHT AND DARK BANDS BARELY PERCEPTIBLE AT A DISTANCE OF 1 METRE**



**ASMALL ISOLATED TRACK WITHOUT RELIEF OR DRAG MARKS**



## ENVIRONMENTAL DATA

### POLYSTYRENE INFORMATION

- Expanded polystyrene (XPS): 3% materials, 97% air.
- Inert (C<sub>8</sub>H<sub>8</sub>) molecule: very stable carbon chain polymer composed of carbon and hydrogen.
- It is naturally white and does not require any chemical agents to whiten it
- It has always been used for food contact
- PS is inert to humidity and does not dissolve in water
- Expansion gases (Butane) do not impact the ozone layer
- It is used as insulation to save energy consumption

### COMPARISON OF RECYCLABLE SINGLE MATERIAL PANELS

	POLYSTYRENE FOAM PANEL AERFLY®	PANEL BASED ON PAPER & CARDBOARD
Water	Almost zero consumption 1 kg of plastic requires between 1 to 2 liters of water	Considerable consumption 1 kg of cardboard requires between 60 to 400 liters of water
wood	No consumption	2 to 3 tonnes of wood for 1 tonne of paper Between 1.44 kg and 2.16 kg of wood for 1 m2
Chemistry	1 molecule, inert Food contact	Chlorinated Additives (Bleaching)
Sustainability	100% waterproof Resistant to humid environments No degradation over time	Deformation and under the effect of humidity

**Polystyrene is very easily recycled up to 20 cycles.**



## RECYCLING THE MATERIAL

### GRINDING



### REGRANULATION

The material is injected into an extruder, which melts the polymer and filters out impurities. The extruded material is extracted in the form of pellets.





### TRACEABILITY

Each recycling cycle is assigned a reference number which guarantees the traceability and quality of the recycled material. The information traced is: the origins of the material, the recycling date, the Melt Flow Index (MFI) of the material, the machine parameters, the big bag number.



### RETURN TO CUSTOMER

Recycled polystyrene is ready to be processed again as a virgin raw material. Big bags of recycled material are resold to XPS processors or used in our own production.

