



**Tested**  
in partnership  
with K.U. Leuven  
Passiefhuis-Platform  
Fraunhofer WKI

# Airtight construction boards with vapour barrier

For low-energy and passive buildings



# 100% airtight...

## Your guarantee for a sustainable, energy-saving home

**Whether structural panels are fitted on the inside or outside of a building, it is generally agreed that walls should be vapour-permeable from the inside outwards.**

In other words, the finish on the inside should have more of a vapour barrier than the finish on the outside. This allows moisture that migrates from inside the house through the vapour barrier in the insulation to be easily transported outside.

This also means that any moisture left by the construction process in the wooden board material used, or moisture that penetrated the building envelope during construction, is able to dry out.

**The airtightness of the building envelope is a second crucial factor for getting the best performance from the large amount of insulation installed and the balanced ventilation system.**

This is because non-airtight cracks allow warm air from indoors to escape and cold air from outside to get inside the building, causing draughts. To prevent this from happening, it is vital for the entire building envelope to be as airtight as possible. This can be achieved by means of an air barrier (which usually acts as a vapour barrier as well) or by sealing the seams of airtight interior panels. The second method is usually preferred, because it tackles air tightness, vapour tightness and structural demands all at once, using a single panel. The chance of damage during construction is also smaller.

The airtightness of a home can be tested with a blower door test in accordance with the EN 13829 standard.

## Thermal bridges

**Thermal bridges are places in a wall with a U-value different to the U-value of the rest of the wall, i.e. places where the insulation is less thick or where a supporting beam cuts through the insulation, or transitional areas between different construction elements.**

If a thermal bridge or transitional area is well constructed, it will not influence the heat insulation of the home.

**Poorly implemented thermal bridges can, however, lead to the growth of mould and loss of heat, both in traditional homes and timber-frame construction.**

The thermal bridge aspect is most critical in low-energy and passive homes. The fact that they are well insulated means that small heat losses constitute a greater percentage of heat loss than in less well-insulated homes, irrespective of how they are built.



Measurements by the Department of Building Physics at the K.U. Leuven have demonstrated that OSB boards alone are not always airtight. If the board manufacturer cannot provide a guarantee of airtightness, you will need to bear in mind that a significant amount of air is likely to escape through the panels themselves.

A **blower door test** allows the airtightness of the panels to be tested by sticking an airtight film to the wall. If the film swells up, the panels are not sufficiently airtight which means that there is a significant loss of air through the panels.

Without airtight panelling, sealing the seams will not be enough to achieve a good n50 value and you are at risk of not being able to get your home certified as a passive house.



“Industrially applied surface finish for panel material that is always guaranteed to be airtight”



TopFinish:  
your airtightness guarantee

## Airtightness: a little extra effort that immediately proves its value!

### Passive house certification

For passive house certification, an n50 value of 0.6/h or less is required. A “blower-door test” is required to obtain passive house certification.

### EPB

The EPB is the Flemish energy performance and indoor climate standard. Measuring the airtightness of a home can mean a huge increase in E-points for determining your home’s energy efficiency in the EPB report.

EPB software uses a default airtightness value of 12 m<sup>3</sup>/m<sup>2</sup>/h. Well-built traditional homes easily get a value of 2 to 3.

An airtightness measurement for a home with airtight panelling can quickly lead to savings of 8 to 10 E-points.

### Energy bill

An airtight building envelope means that no heat is lost through cracks and crevices. This means that your heating system can be smaller in size and that energy loss will be limited. **This will lead to noticeably lower energy bills.**

If your home is also well insulated, you will not have far to go to create a low-energy or passive home.

### Living comfort

An airtight building envelope stops cold air from getting into the home. This means that you will no longer feel cold draughts around the windows and in corners.

**What is the result? Increased comfort in your home and a more constant air temperature throughout the house.**

## Durelis StormBlock (P5)

Durelis StormBlock is an MUF-glued construction board with a TopFinish surface. The unique composition of the Durelis StormBlock means that swelling and linear expansion in conditions with high atmospheric humidity are kept to a minimum. This board is suitable for applications in service class 2 (limited temperature and atmospheric humidity) and biological hazard classes 1 and 2 of EN Standard 335-3.



Moisture resistant

		OSB/3			Durelis StormBlock (P5) Durelis VapourBlock				
Characteristics	Testing method	Unit	Thickness (mm)			Thickness (mm)			
			6 - 10	>10 and >18	18 - 25	6 - 13	>13 - 20	>20 - 25	
PHYSICAL CONSTRUCTION CHARACTERISTICS	Bending strength in the length	EN 310	N/mm <sup>2</sup>	22.0	20.0	18.0	18.0	16.0	14.0
	<b>Bending strength in the width</b>	EN 310	N/mm <sup>2</sup>	11.0	10.0	8.0	<b>18.0</b>	<b>16.0</b>	<b>14.0</b>
	Bending stiffness in the length	EN 310	N/mm <sup>2</sup>	3500	3500	3500	2550	2400	2150
	<b>Bending stiffness in the width</b>	EN 310	N/mm <sup>2</sup>	1400	1400	1400	<b>2550</b>	<b>2400</b>	<b>2150</b>
	<b>Internal bond</b>	EN 319	N/mm <sup>2</sup>	0.34	0.32	0.30	<b>0.45</b>	<b>0.45</b>	<b>0.40</b>
DURABILITY UNDER MOIST CONDITIONS	Swelling in thickness/24 hours	EN 317	%	15.0	15.0	15.0	<b>11.0</b>	<b>10.0</b>	<b>10.0</b>
	Internal bond after cyclic test EN 321-option 1	EN 321	N/mm <sup>2</sup>	0.18	0.15	0.13	<b>0.25</b>	<b>0.22</b>	<b>0.20</b>
	Swelling in thickness after cyclic test EN 321- option 1	EN 321	%	-	-	-	<b>11</b>	<b>11</b>	<b>10</b>
MECHANICAL RESISTANCE	Air tightness (V <sub>50</sub> value) Durelis StormBlock	EN 13829	m <sup>3</sup> /m <sup>2</sup> / h/Pa	15mm = 0.0098 18mm = 0.0049			15mm = <b>0.0025</b>		
	Air tightness (V <sub>50</sub> value) Durelis VapourBlock	EN 13829	m <sup>3</sup> /m <sup>2</sup> / h/Pa	15mm = 0.0098 18mm = 0.0049			15mm = <b>0.0010</b>		
	Water vapour permeability (μ-dry) Durelis StormBlock	EN 13986	-	50			50		
	Water vapour permeability (μ-dry) Durelis VapourBlock	EN 13986	-	50			185	240	240
	Water vapour resistance value Durelis StormBlock	EN 13986	m	0.75 (15mm)			0.65 (13mm)		0.75 (15mm)
	Water vapour resistance value Durelis VapourBlock	EN 13986	m	0.75 (15mm)			2.41 (13mm)		3.60 (15mm)
	Ambient sound insulation (600kg/m <sup>3</sup>  1-3kHz)	EN 13986	dB	27.4 (18mm)			27.4 (18mm)		
	Sound absorption coefficient	EN 13986	-	250-500 Hz: 0.10 1000-2000 Hz: 0.25			250-500 Hz: 0.10 1000-2000 Hz: 0.25		
	Thermal conductivity coefficient	EN 13986	W/mK	0.13			0.13		
	Reaction to fire class	EN 13501-1	-	D-s2, d0   D <sub>1</sub> -s1			D-s2, d0   D <sub>1</sub> -s1		
Formaldehyde emissions	EN 120	gr/100gr	E1: < 8			E1: < 8			

## HydroFlam StormBlock (P5)

Reaction to fire class B,s2-d0 (EN13501-1)

HydroFlam StormBlock is an MUF-glued, fire-retardant construction board ideally suited for structural applications in damp spaces. The board exhibits minimal expansion and swelling under the influence of high atmospheric humidity. HydroFlam StormBlock has strong fire-resistant properties (European classification B-s2, d0). Fires in this board go out by themselves and the board does not continue to glow after the source of heat has been taken away. What is more, Hydroflam StormBlock retains its mechanical strength for a long time in the event of a fire. Hydroflam StormBlock can be used in both service classes 1 and 2 (limitations in terms of temperature and atmospheric humidity), and is suitable for biological hazard classes 1 and 2 of EN Standard 335-3. Protection against direct contact with water is required.



Fire-retardant



Moisture resistant

## BioSpan StormBlock (P5)

'E0': Formaldehyde emissions equal to those of natural wood.

BioSpan StormBlock is an MUF-glued, moisture-resistant construction board for structural applications in wood construction. The unique composition of BioSpan StormBlock means that swelling and linear expansion in conditions with high atmospheric humidity are kept to a minimum.

The boards are easy to mill and have an exceptionally low formaldehyde content, comparable with that of natural wood (<2 mg/100g dry matter). This board is suitable for applications in service class 2 (limited temperature and atmospheric humidity) and biological hazard classes 1 and 2 of EN Standard 335-3.



Moisture resistant

## ... Structural, moisture resistant, fire- retardant, ecological...

Under the name SpanoTech, UNILIN is bringing together innovative ecological products and professional, technical advice for builders. The range consists of technical board material designed especially for low-energy homes, wooden constructions or timber frame constructions.

SpanoTech is introducing **VapourBlock**, the first vapour barrier applied in advance with a  $\mu$ -value of 240. This vapour barrier is industrially applied and guarantees a constant  $\mu$ -value over its entire surface. This differentiates it from traditional wooden panelling material whose  $\mu$ -value is only ever an average. Such panels have both vapour-tight areas and other areas that are highly vapour permeable.

The heat-treated **TopFinish** surface means that SpanoTech construction boards are guaranteed to be airtight ( $\dot{v}_{50} < 0.002 \text{ m}^3/\text{m}^2/\text{h}/\text{Pa}$ ). The increased concentration of natural paraffin in the surface ensures high moisture resistance. This means that the boards can be temporarily exposed to the rain.



**TopFinish:**  
guaranteed airtight

### Recycled wood

**UNILIN uses up to 80% recycled wood in the production of its structural construction boards.**

This wood is broken up and thoroughly purified, after which it can be reused to make high-quality construction boards. Wood that is too polluted for use is separated out and burned in our bio-power station. The green energy generated is used to help power our production.

Most SpanoTech construction boards are **CE certified P5**. This means that they are suitable for load-bearing use in damp environments (climate classes 1 and 2). These construction boards are in the same class as OSB/3 and multiplex according to the EN 636-2 standard and are suitable for the same applications (Flemish Scientific and Technical Centre for the Building Industry).

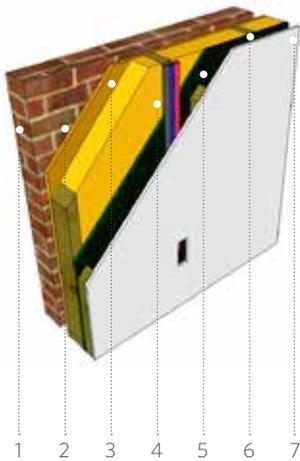


The VaporBlock treatment is also available for **BioSpan boards, recognised by VIBE**. These boards are CE certified P5 and have natural formaldehyde emissions lower than those of untreated wood ('E0'). This makes these boards particularly suitable for the construction of airtight panelling for indoor areas.



... but still vapour permeable!

### Vapour permeable For structural indoor use



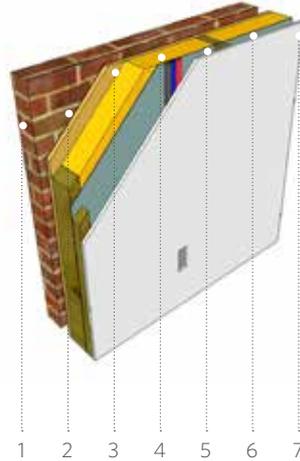
#### Legend

1. Masonry of outer wall
2. Ventilated cavity
3. Vapour-permeable wood fibreboard (FiberTech Top/RWH)
4. Frame with insulation (FiberTech Flex)
5. Structural vapour barrier construction board (Durelis VapourBlock)
6. Cable cavity (with insulation) (FiberTech Flex)
7. Interior finish (ClicWall)

#### Application

Vapour-permeable construction – with a structural board on the inside of the house – is increasingly becoming the standard method. It offers the advantage of incorporating the air barrier, vapour barrier and structural reinforcement into a single board. The open frame can be finished on the outside with vapour-permeable wood fibreboard and then filled in with the insulation.

### Vapour permeable For structural outdoor use



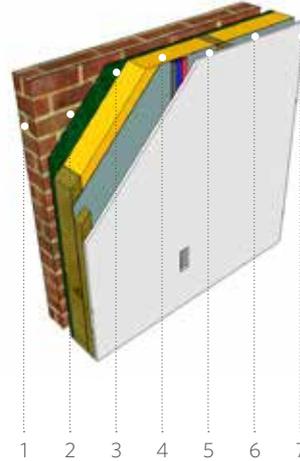
#### Legend

1. Masonry of outer wall
2. Ventilated cavity
3. Structural vapour-permeable construction board (Durelis VapourBlock)
4. Frame with insulation (FiberTech Flex)
5. Vapour barrier
6. Cable cavity (with insulation) (FiberTech Flex)
7. Interior finish (ClicWall)

#### Application

Vapour-permeable construction – with structural, vapour-permeable panelling on the outside of the house – is mainly used in prefab frame construction, where the house is delivered windproof and airtight and the contractor insulates and seals the frame.

### Vapourtight



#### Legend

1. Masonry of outer wall
2. Ventilated cavity
3. Structural vapour barrier construction board (Durelis StormBlock)
4. Frame with insulation (FiberTech Flex)
5. Moisture-regulating vapour barrier
6. Cable cavity (with insulation) (FiberTech Flex)
7. Interior finish (ClicWall)

#### Application

Vapourtight construction is mainly used in parts of buildings where the exterior finish is completely vapourtight. Typical examples include flat roofs with bitumen or EPDM seals, facades and sloping roofs with a zinc finish. Special attention must be paid here to the moisture-regulating vapour barrier on the inside.

## Exterior finish

The insulated wooden frame forms the structural basis of the house. This means that any finish can be chosen for the facade.

Facade	Thickness (mm)	Main features
Masonry	140	Wall ties, ventilated cavity
Wooden slats	70	Durability of wood + substructure
Panelling materials	60	Durability of substructure
Stone veneer	70	Can be applied to supporting board or insulation
Outdoor plasterwork	50-120	Can be applied to supporting board or insulation
Roof tiles/slates	40-80	Water-repellent roof lining required
Zinc	40	Vapourtight walls
Sandwich panels	40-120	Vapourtight walls if using aluminium

Exterior masonry with ventilated cavities, wooden slats, panelling materials and insulated rendering systems are possible.

Ensure that the exterior frame finish is always compatible with the specific finishing materials used.

When using an open-seam finish for the facade, the exterior frame finish must always be water-repellent and UV stable.

Cavities must in most cases be very well ventilated to avoid condensation and mould growth.



## Interior finish

Once all the cables have been hidden in the cable cavity, it can be finished with any traditional material: MDF, laminated

ClicWall panels, plasterboard, support panels with tiles, solid wood, natural stone, cork, vinyl, wallpaper etc.



## Floor finish

Floors can be made of load-bearing wooden beams and fitted with a wooden board material, although it is also possible to have combined wood and concrete floors or solid concrete floors. Wooden floors usually have a floating cement screed with extra reinforcement separated from the wooden load-bearing floor with a layer of acoustic foil insulation. This method provides enhanced acoustic comfort to the wooden floors while at the same time increasing their thermal mass.

Floors of this type can be finished with any of the usual materials: parquet, laminate flooring, tiles, natural stone, vinyl etc.



## Sealing the seams

Since airtight boards are used, it will of course be necessary to make an airtight seal along the seams as well. Joints with vapour barriers and guard films also need an airtight seal. Only use airtight sealing tapes intended for the application in question to do this. These tapes contain special glues that continue to guarantee airtightness for decades.



## Joints with windows and doors

Windows and doors are usually built into a multiplex frame with an airtight seal. In turn, this frame is built into the window or door opening

that is filled up with foam, after which it can be sealed onto the airtight panelling.



## Joists with floors and interior walls

Special attention must be paid to making the transitions between different construction elements airtight. Usually guard films are used to make it easier to seal the frame after installation. Guard films can be found, for example,

in the joints between the first and second floor (where the upper floor is laid), where interior walls meet exterior walls and on ridge beams. These guard films can easily be sealed to the panels afterwards.



## UNILIN, division panels

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UNILIN, division panels is part of the UNILIN Group. Since we were established in 1960, we have grown to become an international player offering solutions for the construction, furniture and interiors sectors.

UNILIN is synonymous with (r)evolution. Thanks to continuous investments in design, technologies, research and development, our divisions have grown to become top players in their fields.

Through a strong vertical integration, from tree to finished product, with creativity as a motor and innovation as a driving force, we develop solutions tailored to your needs.

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