




Most
energy-efficient
product combination
(see page 20)

Construct

High quality wood products
for energy conscious & innovative
construction



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Building energy-conscious & innovative

Airtight, fire safe and insulating structures

UNILIN division panels offers construction professionals a wide range of high-quality building products.

These products can be used, amongst other places, in roofs, walls, floors, and concrete formwork.

We are your address for:

- **Structural panels** (page 4)
- **Structural beams** (page 14)
- **Wood fibre insulation** (page 15)
- **Concrete formwork** (page 24)



Most energy-efficient product combination (see page 20)

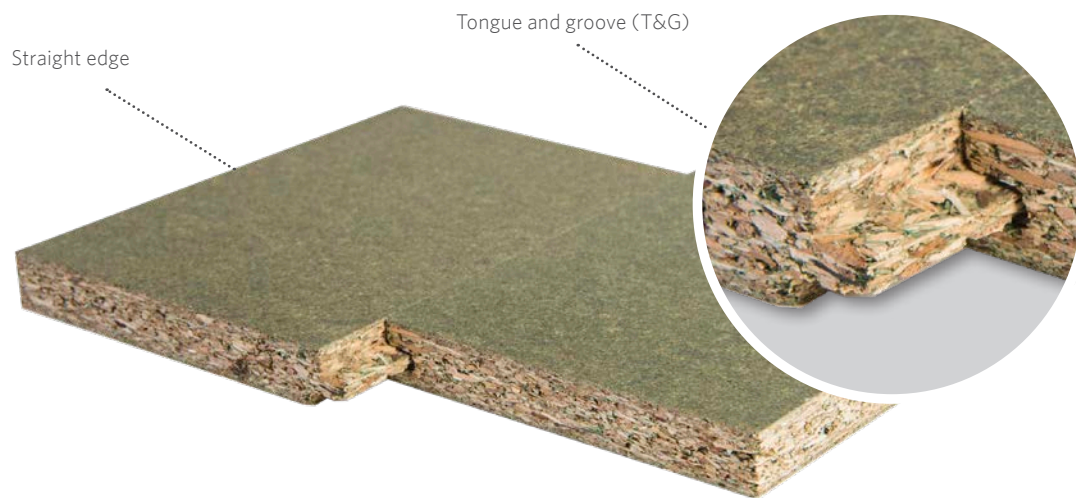
Our panels, beams and wood fibre insulation materials are used to obtain airtight, fireproof, permeable and insulating building solutions:

- Reduce cold bridges.
- Reduce thermal and energy losses.

1. Structural panels

Durelis (CE:P5)

Premium moisture-resistant construction board



STANDARD FEATURES



Increased airtightness
- v_{50} value: $0.0026 \text{ m}^3/\text{m}^2 \cdot \text{h} \cdot \text{Pa}$



Structural and racking board
- Increased screw withdrawal strength
- Bi-directional strength and stiffness



Moisture-resistant
- Less susceptible to swelling (EN317)



Ecological construction board



Smooth surface
- Easy paintable

POSSIBLE FINISHES



Extremely airtight (see page 7)
- Durelis Vapourblock



Sanded



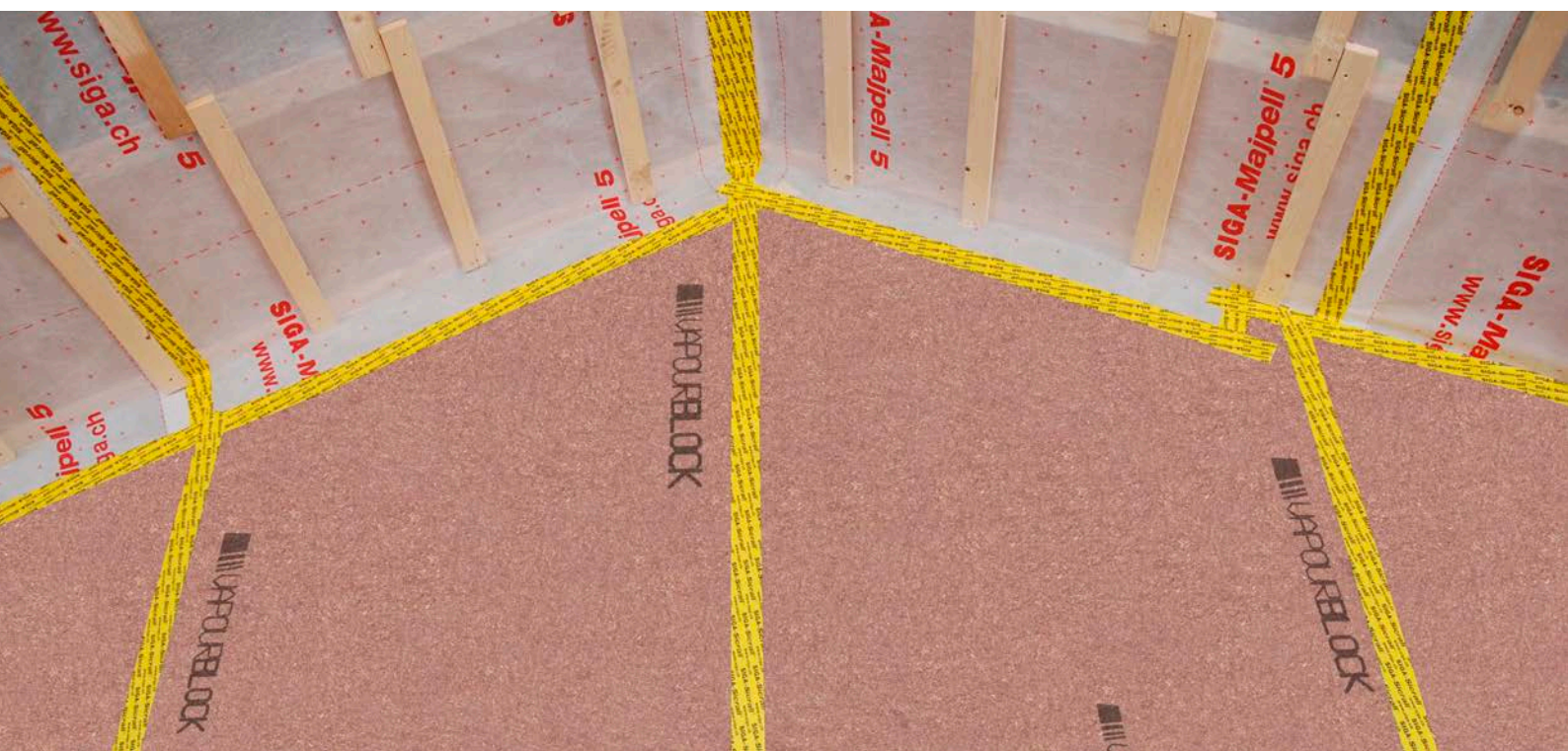
Tongue & Groove



Tecto White
- White lacquered finish

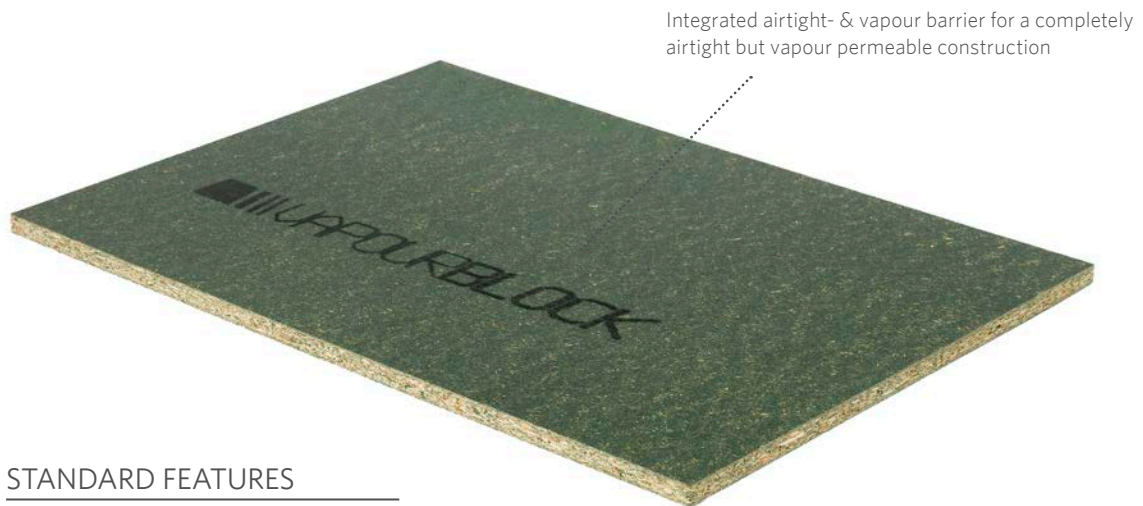


Tecto Prime
- Paintable primer coating



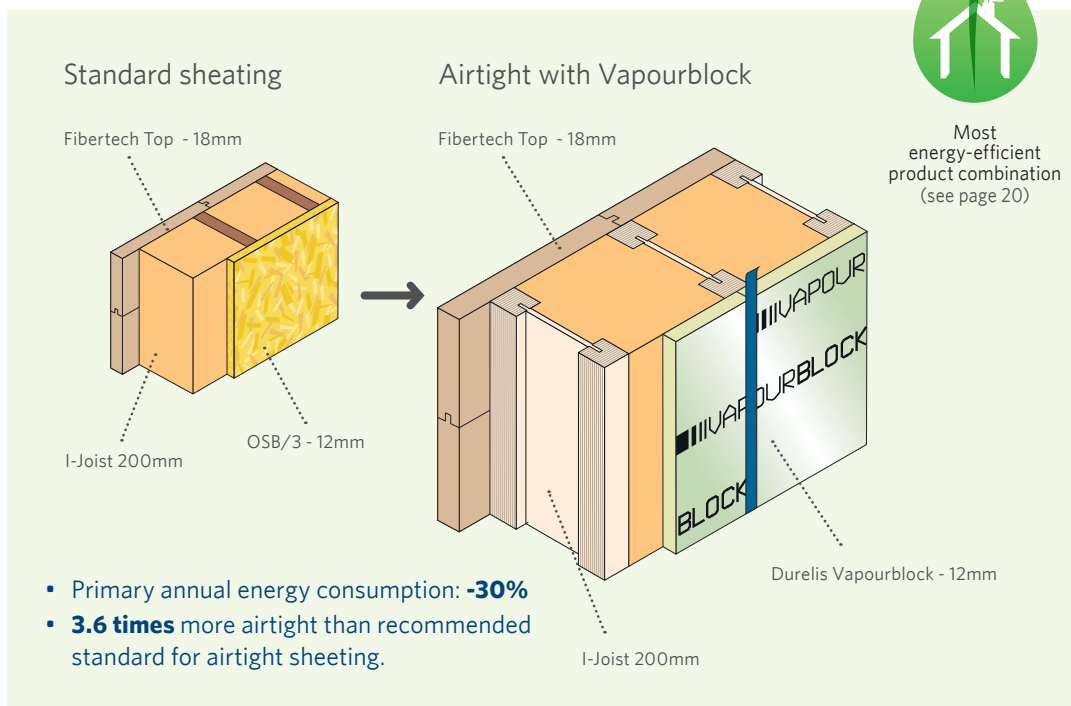
Durelis Vapourblock

Extremely airtight with integrated vapour barrier



STANDARD FEATURES

- Extremely airtight coating:
 \dot{V}_{50} value: $< 0.001 \text{ m}^3/\text{m}^2 \cdot \text{h} \cdot \text{Pa}$
- No extra airtight & vapour barrier needed for vapour permeable construction
- Reduced risk of cracks and air leaks in foils



Most
energy-efficient
product combination
(see page 20)

- Primary annual energy consumption: **-30%**
- **3.6 times** more airtight than recommended standard for airtight sheathing.

Hydroflam

Fire retardant construction board



STANDARD FEATURES



Fire retardant Durelis

- Fire retardant and moisture resistant P5



Fire reaction class B-s₂, d₀

- No contribution to the spread of fire



Fire resistant constructions

- Reduced charring rate



Increased airtightness

- v₅₀ value: 0.0026 m³/m².h.Pa

POSSIBLE FINISHES



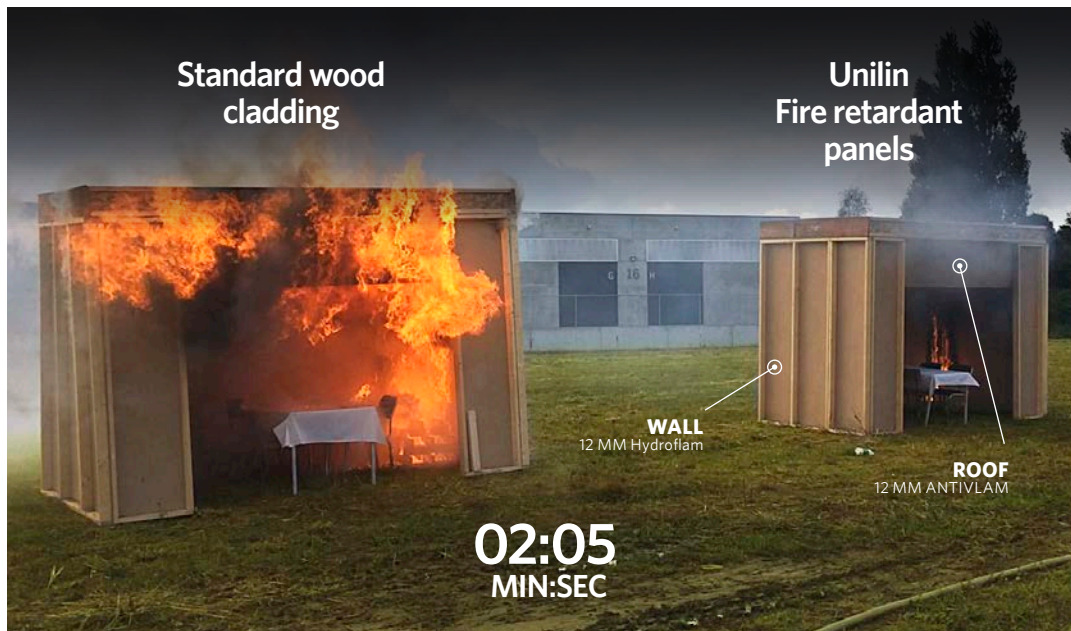
Sanded



Tongue & Groove



Limited fire spread and fire reaction



Fire safety is essential! During fire, every second counts for a safe evacuation. Unilin fire retardant panels throughout treated to slow the spreading of fire.

The release of flammable gases is reduced so there is a limited contribution to flashover. This greatly reduces the (nominal) **charring rate** of the panel from 0.90 mm/min (standard) to **0.50 - 0.55 mm/min**.

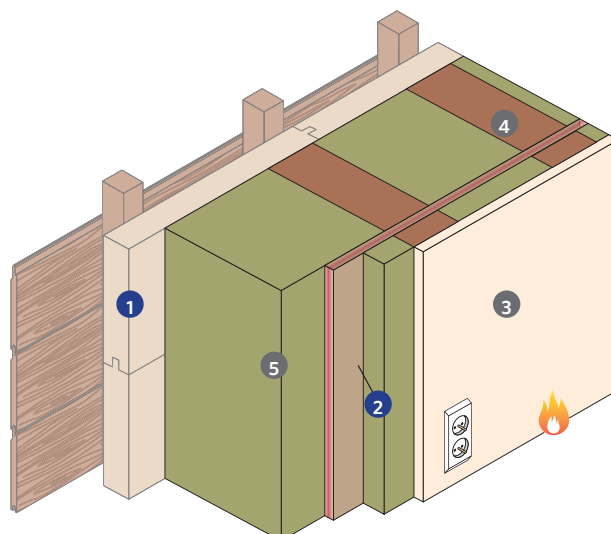
FIRE TEST 

Cost-effective and fire retardant timber frame wall (REI 60)

STANDARD FEATURES

- 60 minutes structural fire resistant
- Insulating - U value 0.22 to 0.24 W/m²K
- Very compact - 21 cm
- High loading - 3 to 5 levels
- Choice of external cladding

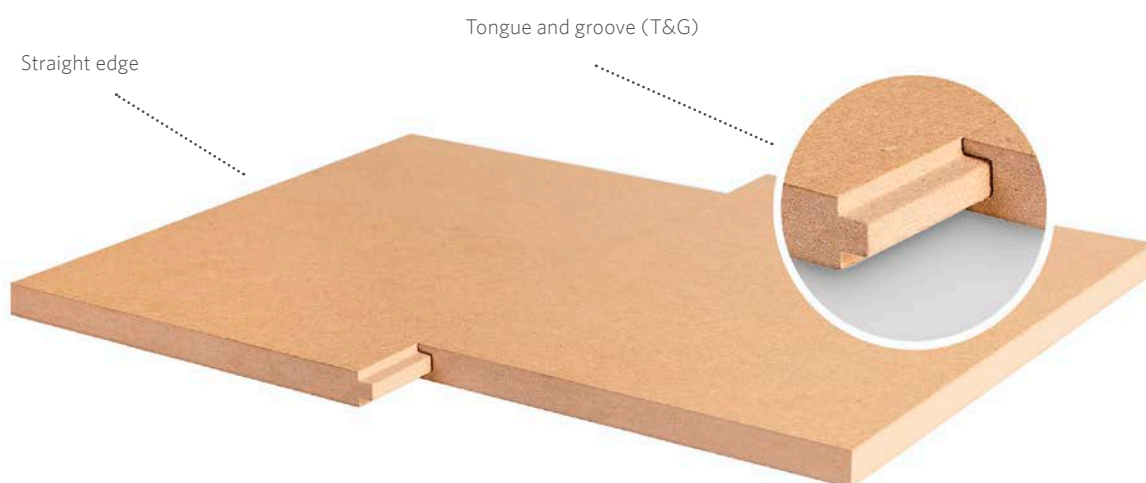
- 1 Fibertech Top - 18 mm
- 2 Hydroflam - 12 mm
- 3 Fermacell panel - 12,5 mm
- 4 Timber beams - 45 mm x 140 mm
- 5 Rockwool fibre insulation





RWH (CE: MDF.RWH)

Vapour permeable racking panel,
or used as rigid underlay



STANDARD FEATURES



MDF.RWH product class

- High processability
- Vapour-permeable wood fibre structure



Racking panel or rigid underlay

- Racking panel for walls
- Rigid underlay for pitched roofs of walls



Extremely vapour permeable

- Accelerated drying
- Reduced risk of condensation



Thermal insulating

- Reduced thermal conductivity λ



Moisture-resistant

- Use in humid environment

POSSIBLE FINISHES



Tongue & Groove

2. Structural panels product comparison



Strength and stiffness

Thickness (mm)

Bending strength (characteristic) - major axis (N/mm²)

Bending strength (characteristic) - minor axis (N/mm²)

Stiffness modulus (E-modulus) - major axis (N/mm²)

Stiffness modulus (E-modulus) - minor axis (N/mm²)

Swelling 24h immersion (%) EN317

- Durelis, Hydroflam & RWH have bi-directional strength and stiffness properties, independent of direction. There is no weak axis.



Airtightness

Airtightness v_{50} (m³/ m².h.Pa)*

Number of times more airtight than recommended standard for airtight sheeting.

- Durelis & Hydroflam have an increased airtightness **as standard**.
- Vapourblock**-finish is **extremely airtight**, ideal for energy neutral or passive constructions.



Vapour permeability

Vapour permeability μ (-)

Vapour permeability Sd (m)

- Unilin panel on exterior side: Durelis, Hydroflam and RWH are very vapour permeable. Water vapour and construction moisture can vent quickly.
- Unilin panel on interior side: **Vapourblock = Airtight with integrated vapour barrier**.



Fire safety

Fire reaction class **

Nominal charring rate β (mm/min) **

- Hydroflam has a limited contribution to fire spreading (class B) and a slower combustion.



Insulating capacity

Thermal conductivity λ (W/m.K)

- RWH** has a better thermal insulating capacity (low conductivity) than chipboard or OSB.

* Values based on Leuven University test reports for Unilin board material and "Air permeability requirements for air barrier materials in passive houses - J.Langemans" for OSB3.

** Fire reaction class according to EN13986:2004, or own certificate, :2004, combustion speed according to EN1995-1-2 and internal tests.

Moisture resistant chipboard P5 (EN312)				Fire retardant and moisture resistant chipboard P5 (EN312)	MDF.RWH (EN622-5)	
Durelis (unsanded)		Durelis Vapourblock		Hydroflam (unsanded)	RWH	OSB/3 (EN300)
12	15	12	15	12	16	12 - 15
18	16	18	16	18	14	20
18	16	18	16	18	14	10
2,550	2,400	2,550	2,400	2,550	1,600	3,500
2,550	2,400	2,550	2,400	2,550	1,600	1,400
11	10	11	10	11	15	15

±0,00588	±0,0026	±0,000506	±0,000308	±0,00588	-	0.001-0.01
0,3	0,7	3,6	5,8	0,3	-	

50	50	510	510	50	20	30-170 (WTCB)
0.6	0.75	6,1	7,6	0.6	0.32	0.36 - 2.55

- **Panel placed on exterior side:** board must be **vapour permeable (low Sd value)**, for venting water vapour and construction moisture. The more vapour permeable, the better vapour and moisture dry out.
- **Panel placed on interior side:** the cladding must be vapour permeable, but must slow the vapour transport from the inside to the outside (**vapour barrier**) to prevent condensation and mould. This is avoided by a minimum: **Sd value interior sheeting > 5 x Sd value exterior sheeting.**

D-s ₂ ,d ₀	D-s ₂ ,d ₀	D-s ₂ ,d ₀	D-s ₂ ,d ₀	B-s₂,d₀	D-s ₂ ,d ₀	D-s ₂ ,d ₀
0.9	0.9	0.9	0.9	0.50 - 0.55	-	0.9

0.14	0.14	0.14	0.14	0.14	0.10	0.13
------	------	------	------	------	-------------	------

3. Structural beams

I-Joist

Light and extremely strong



STANDARD FEATURES

- Bridging large spans
- Reduced thermal bridges
- 50% lighter than solid wood

POSSIBLE FINISHES

- Optional wood fibre pre-insulation
- Optionally cut to size

Traditional beams

Fibertech Top - 18mm

OSB/3 - 12mm

Solid wood beams - 200 mm

➔

I-Joist profiles

Fibertech Top - 18mm

I-Joist - 200mm

Most energy-efficient product combination (see page 20)

- Heat loss (U value): -17%
- Reduced thermal bridges

LVL-R

Support beam with large load bearing capacity

STANDARD FEATURES

- High stiffness and strength
- Constant mechanical and physical properties
- Straight and more fire safe than traditional construction wood



4. Wood fibre insulation

Fibertech Top

Roof sheathing or insulation protection



Tongue and groove (T&G)

STANDARD FEATURES

- Wood fibre board
- Roof sheathing or **exterior wall**
- Vapour permeable
- **Moisture resistant**

Fibertech Flex

Natural and ecological

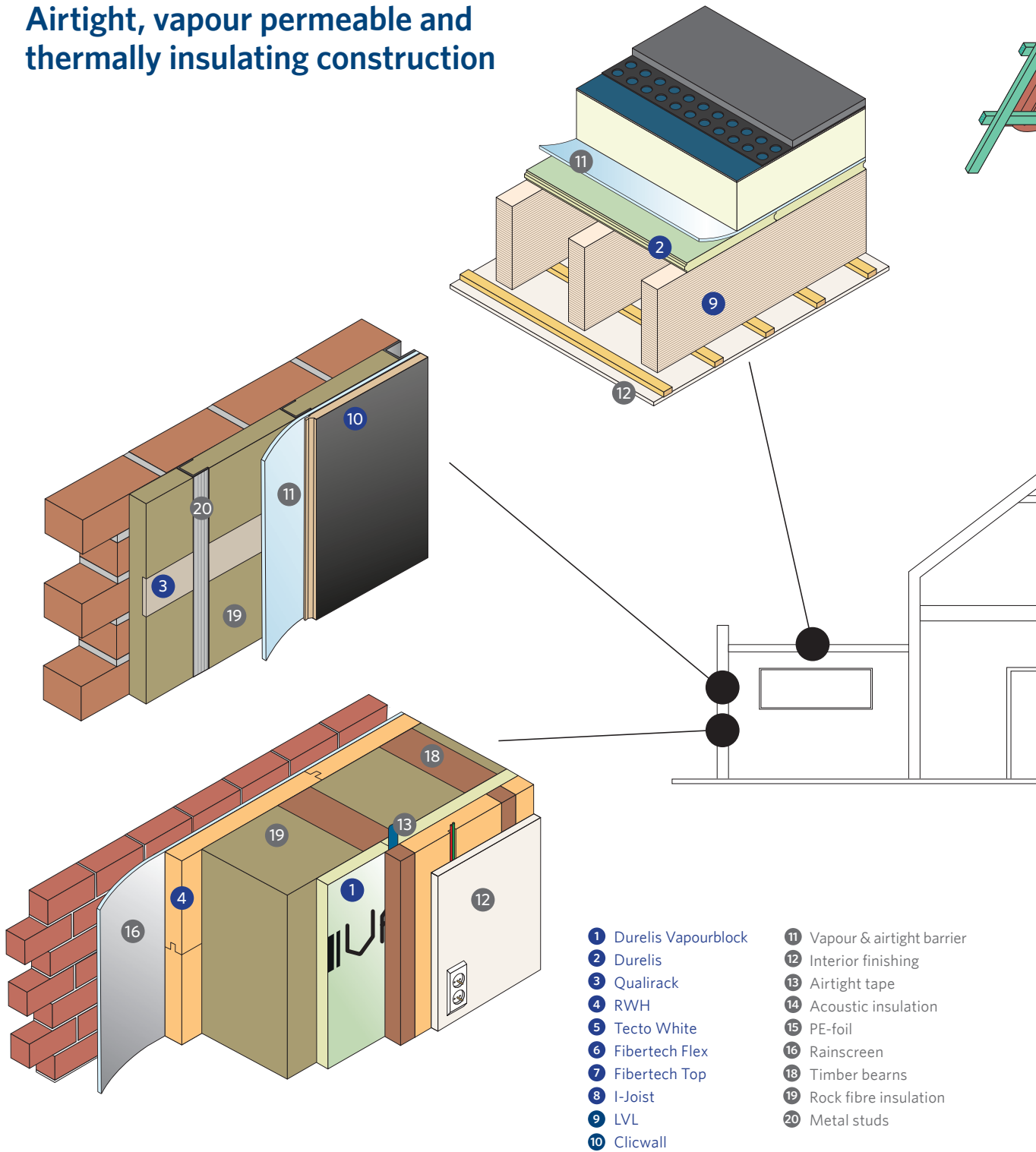


STANDARD FEATURES

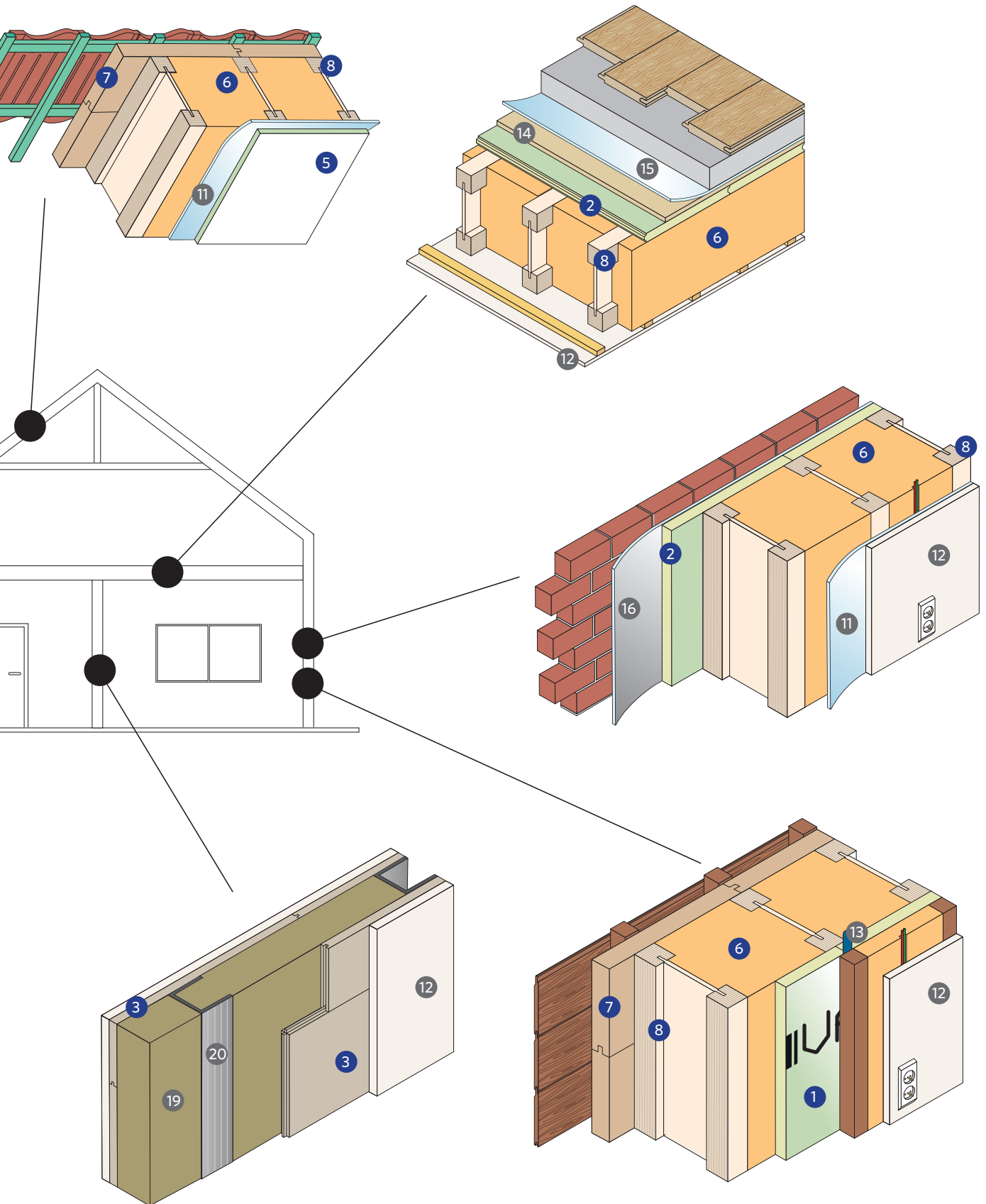
- Flexible insulation dimensions
- Very diffusion permeable
- Thermally insulating
- High **heat capacity**

5. The ideal product combination

Airtight, vapour permeable and thermally insulating construction

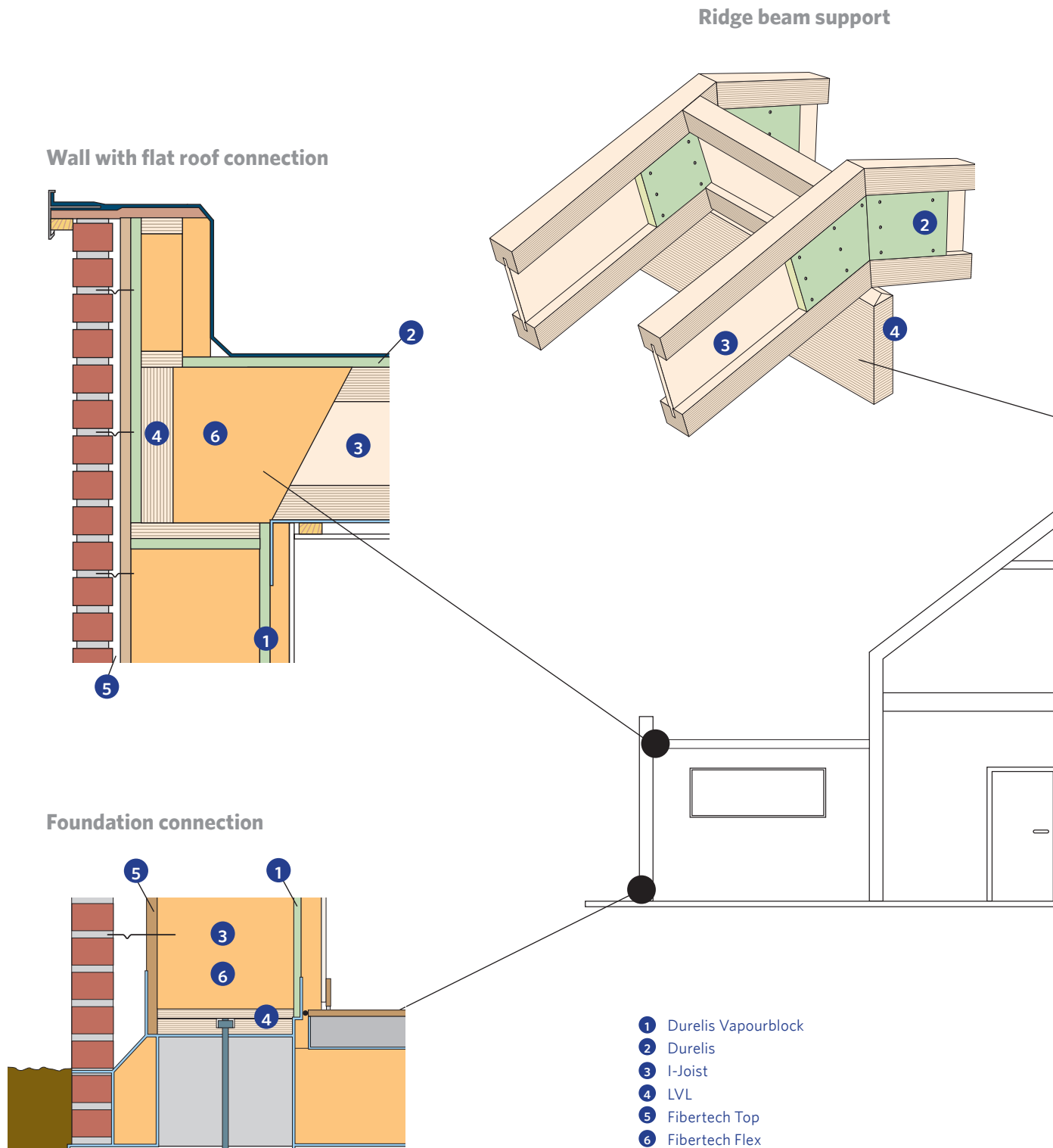


- 1 Durelis Vapourblock
- 2 Durelis
- 3 Qualirack
- 4 RWH
- 5 Tecto White
- 6 Fibertech Flex
- 7 Fibertech Top
- 8 I-Joist
- 9 LVL
- 10 Clicwall
- 11 Vapour & airtight barrier
- 12 Interior finishing
- 13 Airtight tape
- 14 Acoustic insulation
- 15 PE-foil
- 16 Rainscreen
- 18 Timber beams
- 19 Rock fibre insulation
- 20 Metal studs

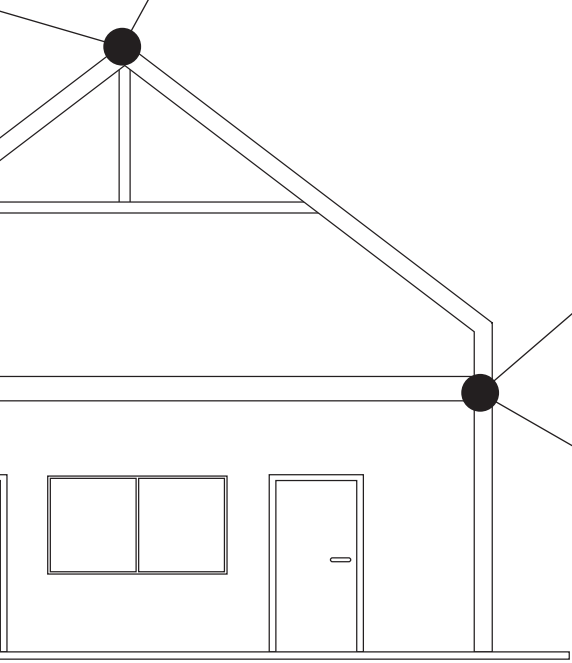
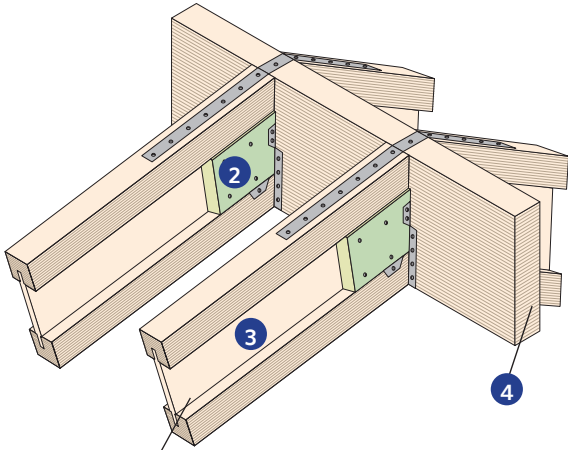


6. Construction details

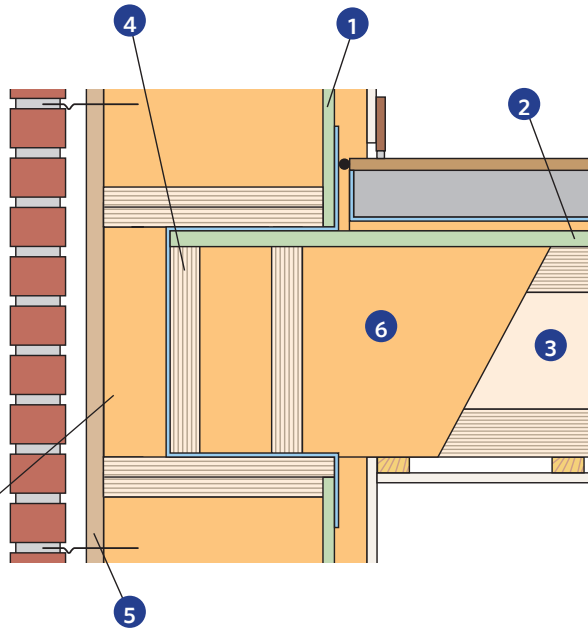
Attention for your project right down to the details



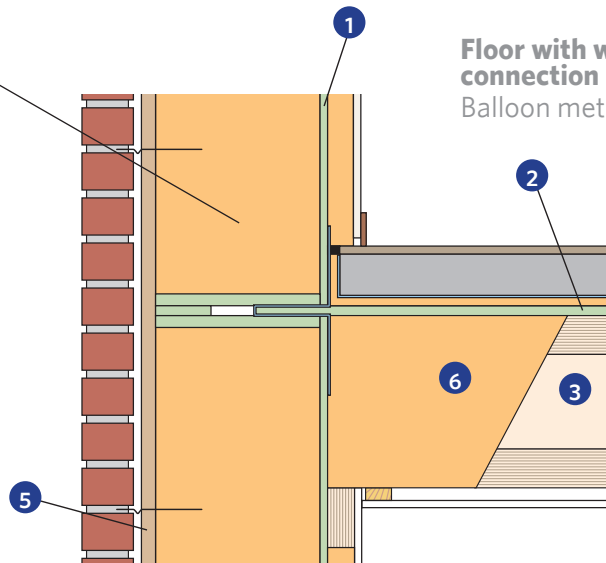
Ridge beam connection



Floor with wall connection Platform method



Floor with wall connection Balloon method





7. The most sustainable product combination for your construction project

Building energy-efficient is the future. To promote this, energy performance regulations have been created for every construction and renovation project. These requirements are regularly tightened to achieve the level of “nearly zero energy consuming”.

The main pillars in energy efficient construction are air tightness and insulation:

- **Airtight construction:** Airtightness is essential. The energy loss through air leaks and non-airtight board material can increase quickly. Airtightness is expressed in $m^3/m^2 \cdot h \cdot Pa$.
- **Insulating capacity:** Energy waste is avoided by optimal insulation and limiting thermal bridges. Thermal insulation is expressed in $W/m^2 \cdot K$.

Building energy-efficient with UNILIN division panels

Unilin Panels has a large range that supports low energy and energy efficient construction.

- **Airtight board material** creates an airtight barrier. This reduces the energy consumption for heating or cooling because the air losses are reduced.
- **I-Joist profiles** in combination with wood fibre insulation ensure an optimal insulating capacity and reduced heat losses.

Impact on construction of Durelis, Vapourblock and I-Joist

Unilin is an innovator in the field of energy-efficient products.

To demonstrate the importance of these products, a theoretical study of sustainability was carried out by an approved engineering consultancy.

The purpose of the study was **to identify the most cost effective combination of board material, beams and insulation in one residential model**. In addition to being energy efficient, our products are also cost efficient.

In the theoretical study we compared the effect of different wall compositions on:

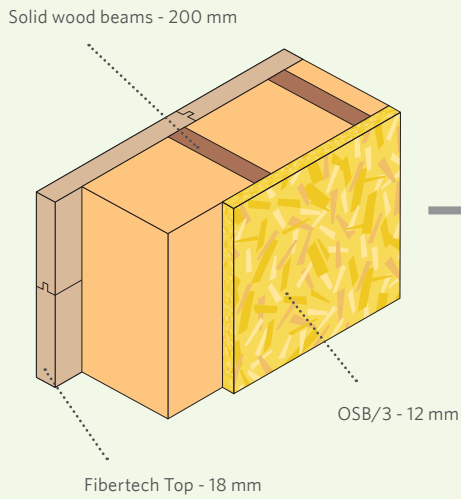
- **Primary annual energy consumption:** what is the effect of Unilin products on the primary annual energy consumption. The less consumption, the lower the energy cost.
- **U value:** the heat transfer coefficient shows the amount of heat lost through the construction. The lower the U value, the better the project is insulated.

How was the study done?

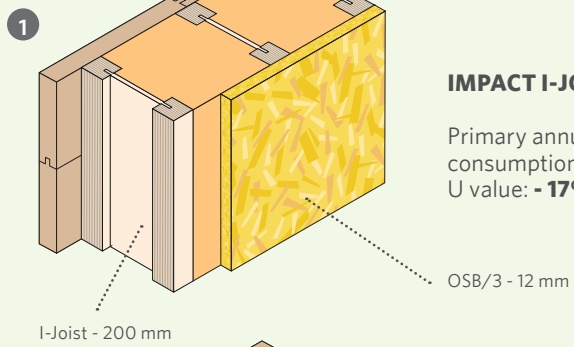
Because air tightness and insulation are mainly of importance in the outer shell of a project, the external walls of the model were examined and the remaining parts kept constant.

In total, 1,485 different combinations of materials in the outer shell were compared with one another in this theoretical model.

BASIC WALL CONSTRUCTION
Theoretical residential model



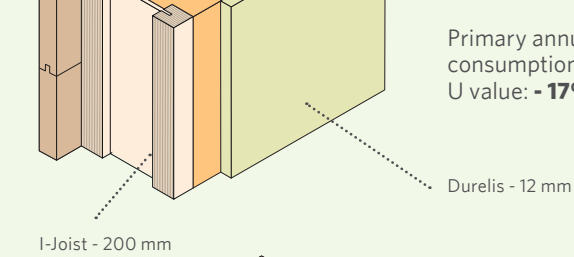
1 **ADVANTAGE over BASIC WALL**



IMPACT I-JOIST

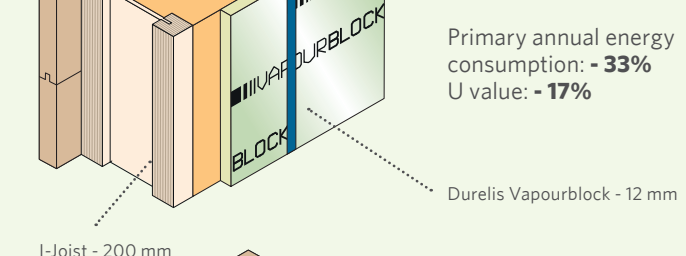
Primary annual energy consumption: - **4%**
U value: - **17%**

2 **IMPACT DURELIS and I-JOIST**

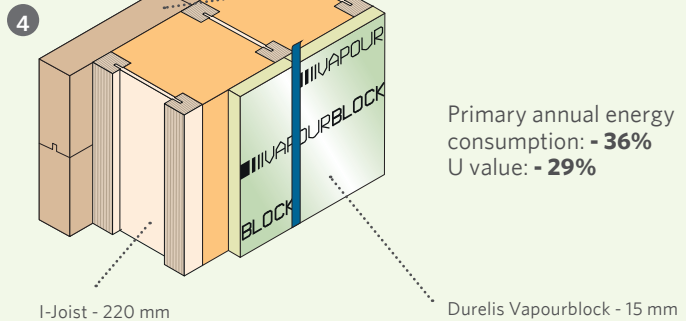


Primary annual energy consumption: - **19%**
U value: - **17%**

3 **IMPACT DURELIS Vapourblock and I-JOIST**



Primary annual energy consumption: - **33%**
U value: - **17%**



Primary annual energy consumption: - **36%**
U value: - **29%**

Conclusion

The Unilin airtight panels and the I-Joist profiles have a major impact on the annual primary energy consumption and energy score of your project. This lowers energy costs and enables the value of your project to be increased.

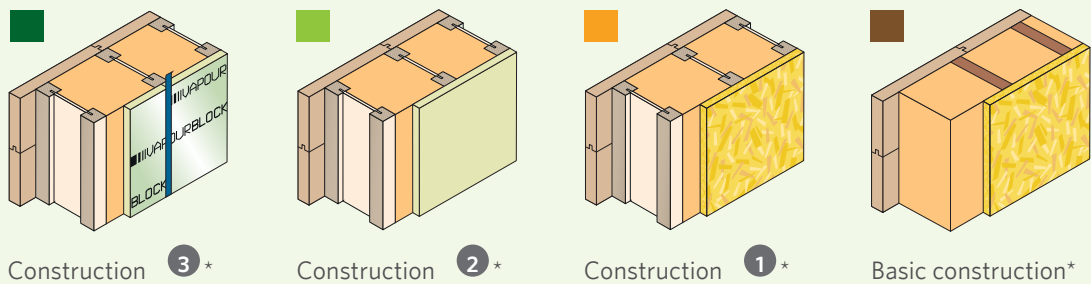
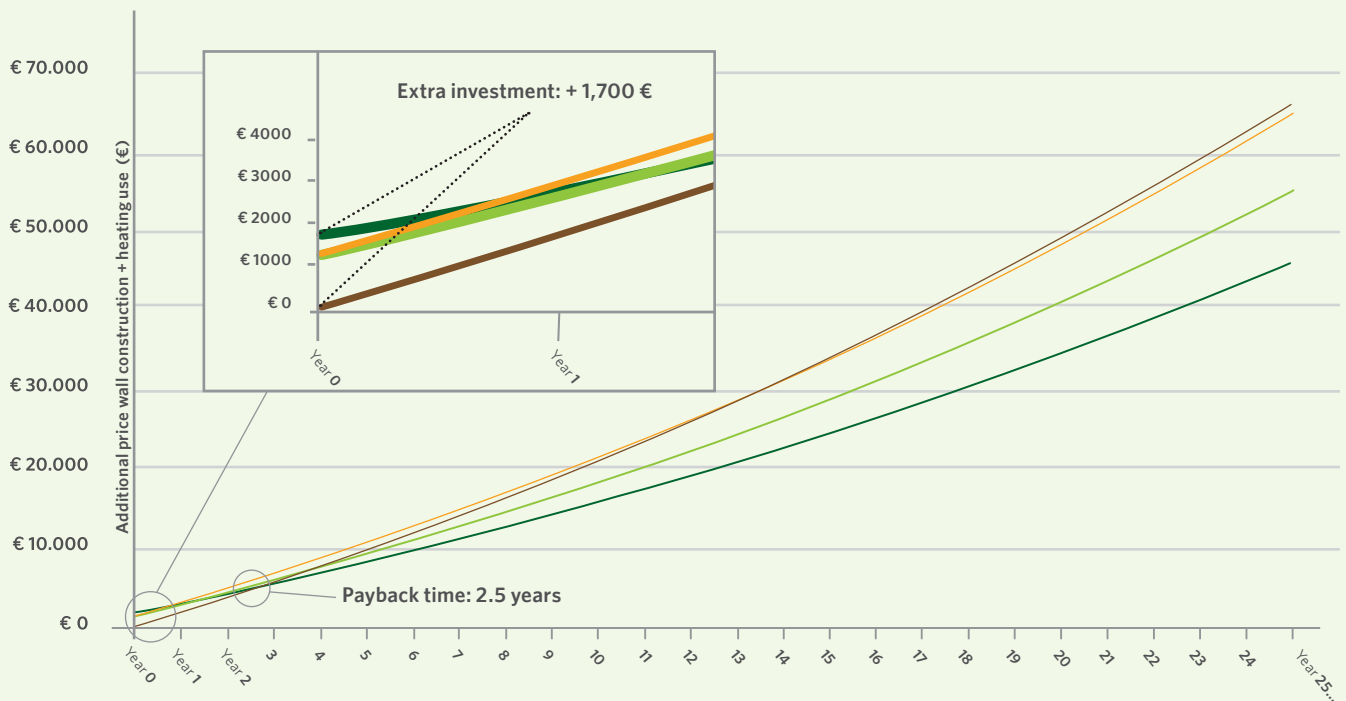


Time to recover your investment

Construction materials have their cost. The selection is best done carefully. Airtight and insulated construction is an investment that increases the value of your project but mainly pays for itself due to its energy efficiency.

To quantify this the payback time was calculated in the study for the residential model by comparing the cost price and the annual heating costs per wall assembly.

- | | | |
|-------------------------------|-----------------------|-------------------------|
| ■ Durelis Vapourblock (12 mm) | - I-Joist (200 mm) | - Fibertech Top (18 mm) |
| ■ Durelis (12 mm) | - I-Joist (200 mm) | - Fibertech Top (18 mm) |
| ■ OSB (12 mm) | - I-Joist (200 mm) | - Fibertech Top (18 mm) |
| ■ OSB (12 mm) | - Solid wood (200 mm) | - Fibertech Top (18 mm) |



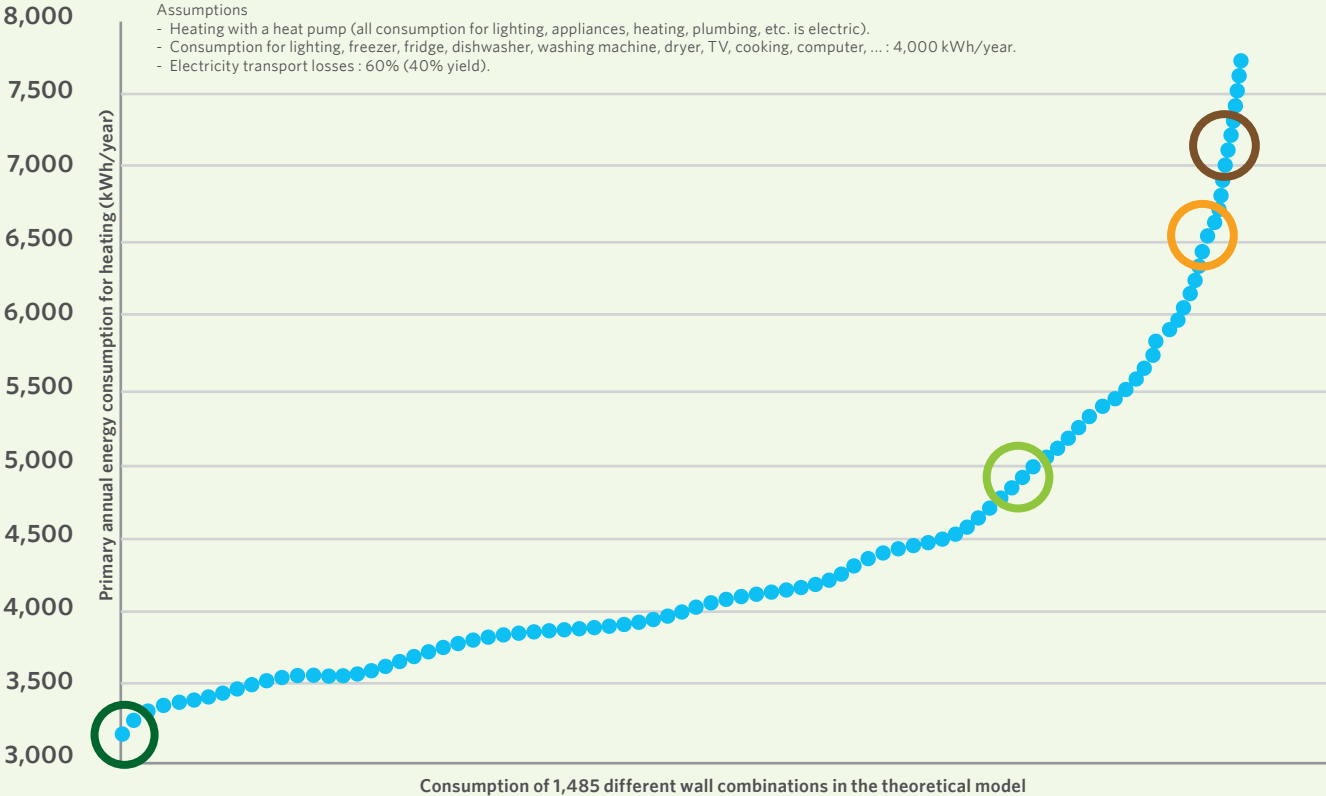
* Construction composition, see page 21

Primary annual energy consumption

The primary annual energy consumption for heating was examined for 1,485 different wall combinations in the residential theoretical model. How much primary energy is used each year for heating.

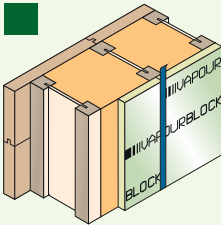
The lower this consumption, the more energy efficient the project:

- Low energy cost
- Added value for your creation



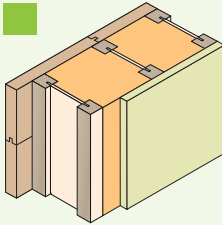
Primary annual energy consumption for heating:

3,038 kWh/year.



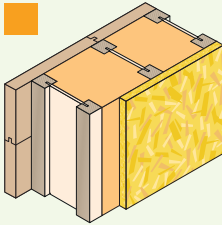
Construction 3 *

4,946 kWh/year



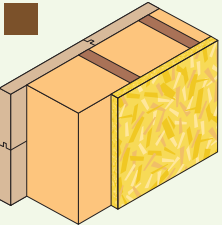
Construction 2 *

6,569 kWh/year



Construction 1 *

7,035 kWh/year



Basic construction*

Conclusion

The primary annual energy consumption is significantly lower with Unilin airtight board material and I-Joist profiles. This means the investment is quickly recovered. After this payback time, the yield grows exponentially and major savings are made on energy.

8. Concrete formwork

High quality, cost effective, a smooth result, flexible dimensions and attractive pricing.

MELAMINE



- Highest concrete quality
- 2-sided **smooth and resistant** protective layer
- **Reduces cavities** in the concrete surface
- **The least colour difference** in the concrete surface

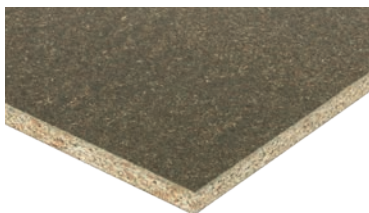
STRUCTURAL P5

Betonspan Plus

NON-STRUCTURAL P3

Betonspan

LACQUERED



- UV **acrylic lacquer**
- Surface **resistant** to construction chemicals
- Very **easy to clean and remove formwork**
- **Fewer concrete flakes**

STRUCTURAL P5

Betonforce

- **EDGE COATING**

Reduced swelling due to air humidity during storage

NON-STRUCTURAL P3

Acryspan

- lacquered on one or both sides

RAW



- **Traditional applications**
- **Non-architectonic** concrete surfaces

STRUCTURAL P5

Durelis

NON-STRUCTURAL P3

Hydrohis WRB

How a Unilin customer uses the concrete formwork panels for a high quality result.

1. Applications:

The concrete formwork panels are typically used in simple and traditional formwork modules. Applications with low material costs, limited repetition and minimal loads.

2. Installation:

The panels are integrated into modules, nailed or screwed from outside to inside without having to drill into the surface. After this, formwork removal oil is sprayed on the panels.

3. Finish:

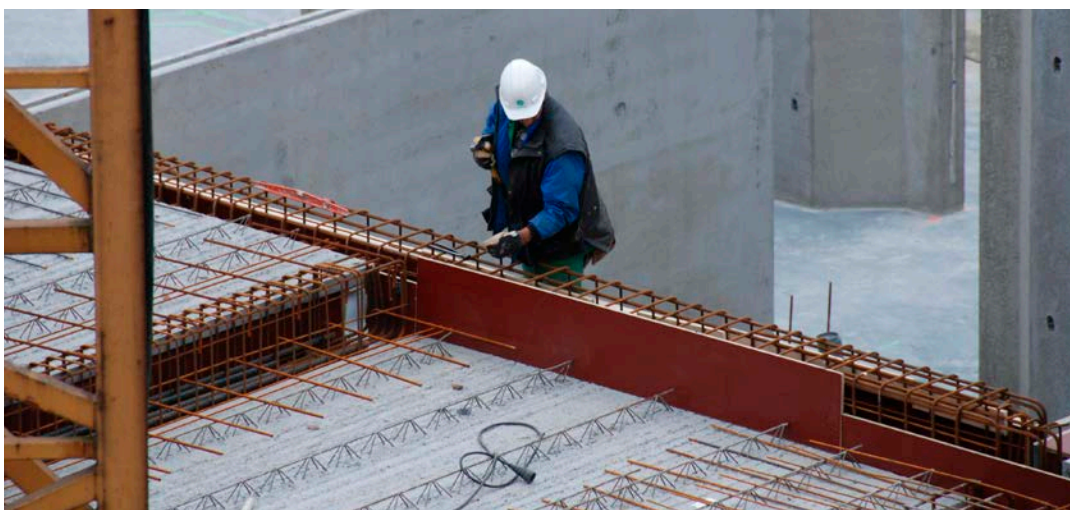
Any penetrations through the panel are sealed with silicone or polyester filler. Rough and sawn edges are sealed with a waterproofing sealant (e.g. acrylic paint).

4. Disassembly:

The panels must be cleaned and dried before they are stacked. Damaged panels are not reused.

5. Storage:

The panels are stored in a dry environment and covered with a tarpaulin or plastic covering.



9. References

UNILIN, division panels, panel materials are used in many public buildings, commercial projects and residential projects.

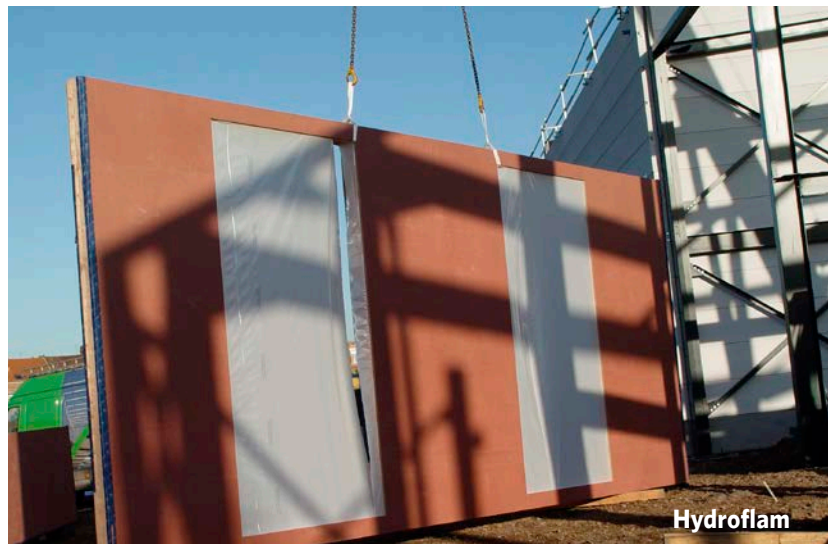
At www.unilinpanels.com is an overview of some of our brightest references.



AcrySpan



Durelis



Hydroflam



Durelis Vapourblock



Durelis TG



Tecto White



Fibertech Top



Durelis



I-Joist

UNILIN, division panels

UNILIN, division panels, part of the UNILIN group, has been supplying innovative wood solutions for construction and interior projects since 1960. Our chipboard, MDF, HDF, HPL and melamine boards find their way into commercial outlets in wood and building materials, industrial processors and DIY chains worldwide.

We develop solutions tailored to your needs with creativity as our engine and innovation as our driving force. In addition, we continuously invest in product design and new technologies. That makes us today a leading international player and a lasting partner in our industry.

Our 1,300 employees give their best every day in our production facilities in Belgium and France. Together we produce 2.1 million m³ of panel material every year.