

SEE THE LIGHT

The sustainable building conference for professionals

GEARING UP FOR 2020

13 NOV 2015

Exports
by Coillte

Did you know that **90%** of pallets used to export Irish goods are made from Coillte logs? On top of the fact that we export **95%** of our panel products, you can certainly say that we're doing our bit to support Irish exports.

Coillte. Trees are just the start of it.



Supporting Irish exports
throughout the globe.

Natural resources, responsibly managed.
www.coillte.ie



Passivhaus Building Solutions Using Innovative Irish Wood Panels

David Murray
Innovation Manager
Coillte Panel Products

See the Light 2015

Every solution requires a problem!

"Every problem might not have a solution right now but don't forget that every solution was once a problem."

Shift to a Low Carbon and Sustainable EU Economy will drive increased demand

EU Directives force member states to comply

EU Directive on Renewable Energy (2009)

Curtails fibre supply and underpins higher market prices

Competitors fibre costs catch Up (ref Poyry)

Curtails new MDF/OSB capacity in Western Europe



EU Energy Performance of Buildings Directive (2013)

"Nearly Zero Energy" Buildings by 2020

Increasing demand for sustainable buildings

Increasing demand for Offsite Construction

Increasing demand for MDF / OSB



EU Timber Regulation (2013)

Prevent illegal wood being placed onto the market in the EU

Increasing Demand for Certified Wood Products

Increased opportunities for plywood substitution



The mark of responsible forestry



EU Construction Products Regulation (2013)

Mandatory CE marking of product performance

Increases environmental transparency for wood panel trade ie. IMPORTS

Increasing demand for low emission products





The Problem Opportunity!

“We started finding increasing evidence of OSB₃ failure in the timber frame extension of this house”

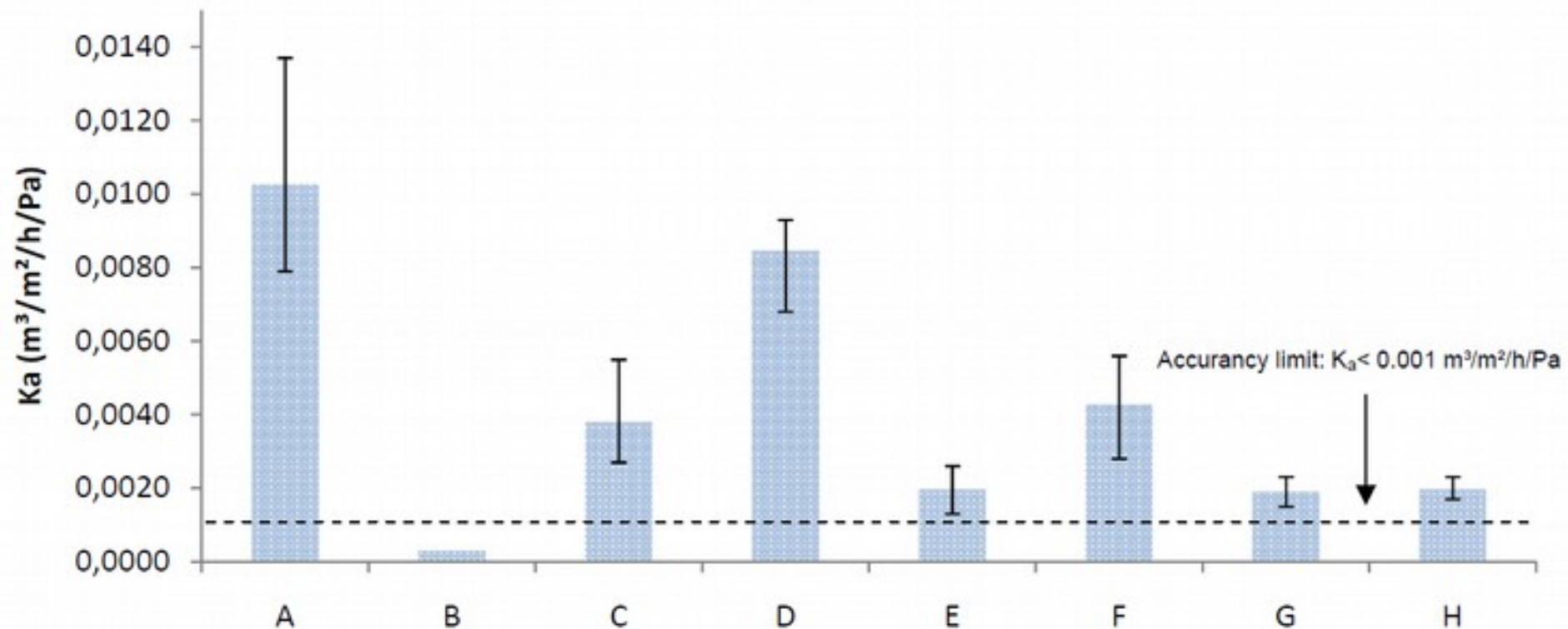


**Numerous
other similar
site ‘balloon’
tests**



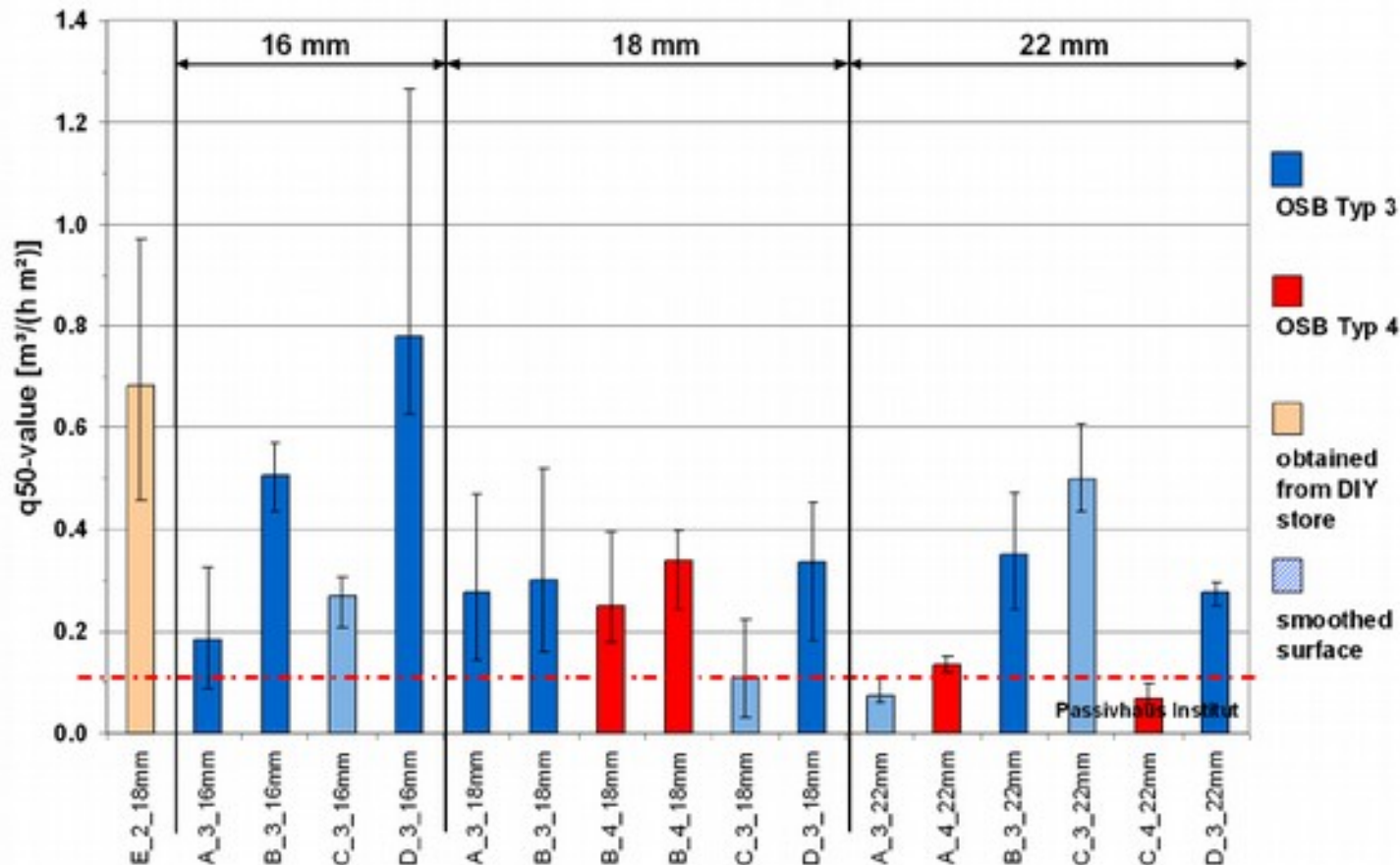
State of the art research: Air Permeability

- **Air permeability of OSB by Leuven University**
 - **Recommended air permeance limit:**
 $0.0018 \text{ m}^3/\text{m}^2/\text{h}/\text{Pa}$ (or $0.09 \text{ m}^3/\text{m}^2/\text{h}$ at 50Pa)



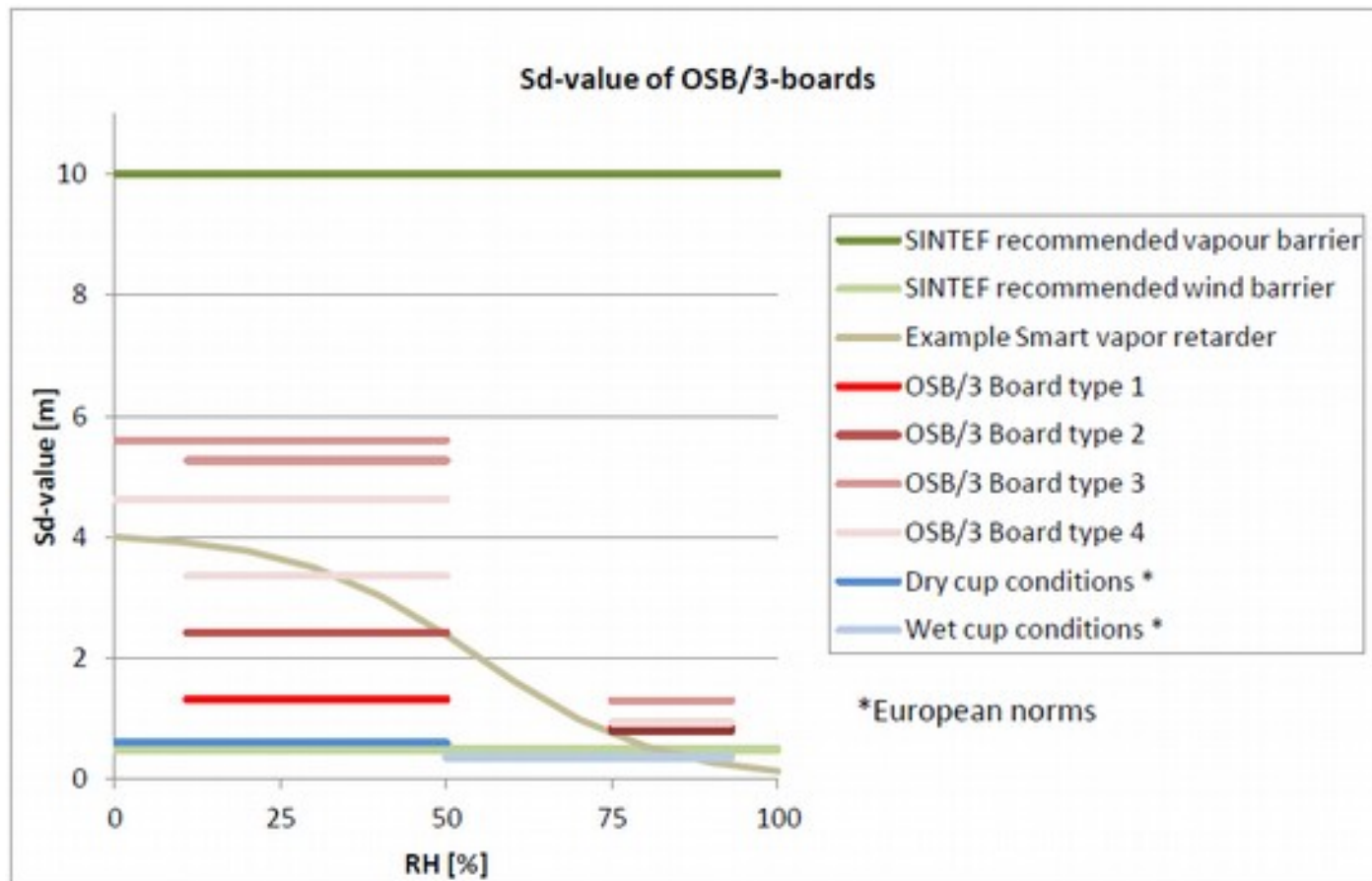
State of the art research: Air Permeability

- Air permeability of OSB by Passive House institute
 - Target q_{50} -value: $0.1 \text{ m}^3/\text{m}^2/\text{h} @ 50\text{Pa}$.
 - In a typical house the OSB can represent 40% of n_{50} -value!



State of the art research: Vapour Resistance

- Water vapour resistance of OSB by SINTEF
 - Validate suitability by hygrothermal modelling



Innovation is not new (to us)!

Medite Products

- Medite Vent 
- Medite Tricoya Extreme 
- FR Eco (NAF) 
- Trade 
- Exterior
- Premier
- Moisture Resistant
- Flame Retardant
- Lite & Ultralite
- Ecologique
- Flooring Quality

SmartPly Products

- VapAirTight 
- Flame Retardant OSB 
- DryBacker 
- Toughply 
- Site Protect Plus 
- Site Protect 
- OSB2
- OSB3
- T&G

R&D Capabilities – Pilot scale panels



Lab blender for trialling new resins, waxes and additives.



Lab press produces high quality R&D panels and early stage prototypes.



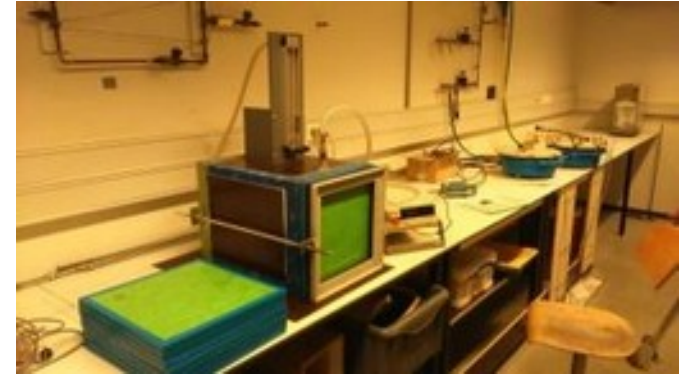
R&D Capabilities – UV Coating



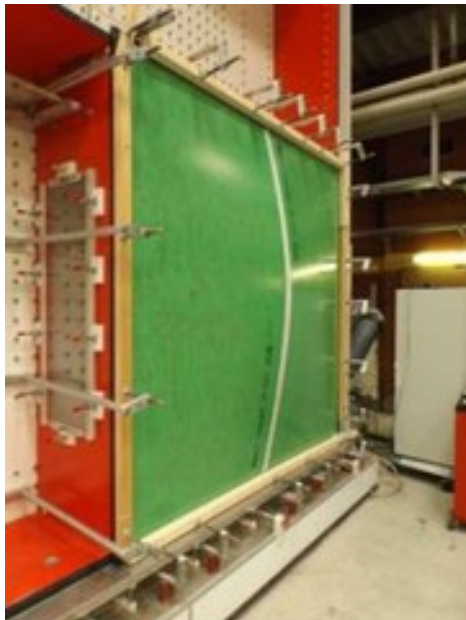
Developing UV coating expertise



In-house coating trials



Developing building physics expertise



Developing strategic partnerships with leading testing institutes

coillte
panel products



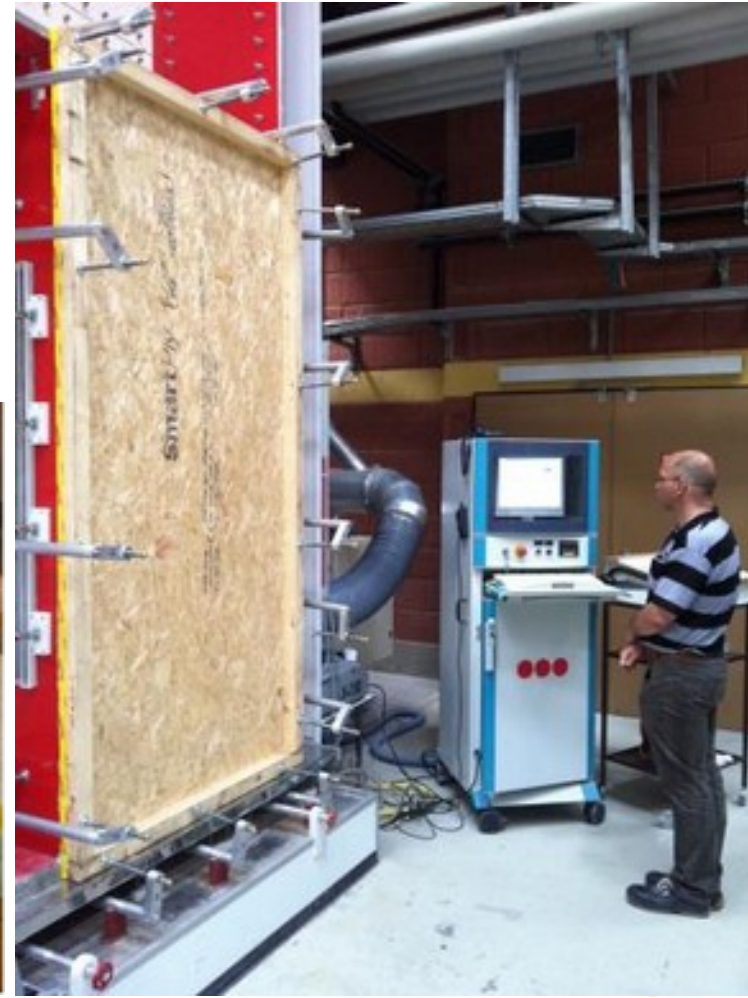
Developing new value-add panel products!

SmartPly

Product testing: Physical properties of panels

Depending on the use of the panel

- Physical tests:
 - Air permeability
 - Water vapour diffusion
 - Reaction to Fire
 - Formaldehyde release



Product testing: Structural performance tests

Depending on the use of the panel

- **Structural tests:**
 - Tension & Compression
 - Shear and bending
 - Fixing properties
 - Racking and impact resistance
 - Floor/Roof tests



It's all in the name..!

SmartPly® VapAirTight



Vapour tight layer

Airtight layer

Physical Properties

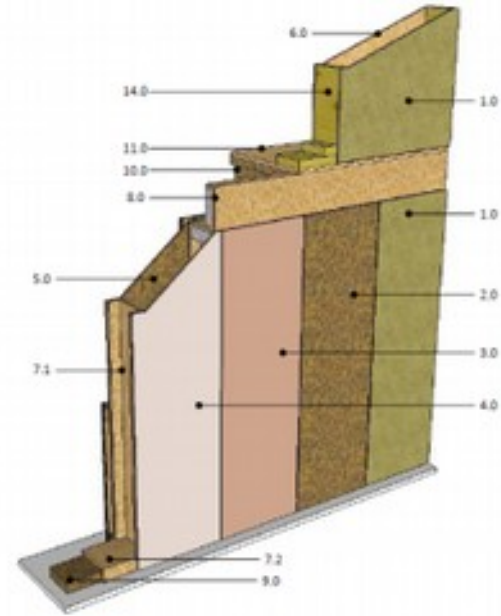
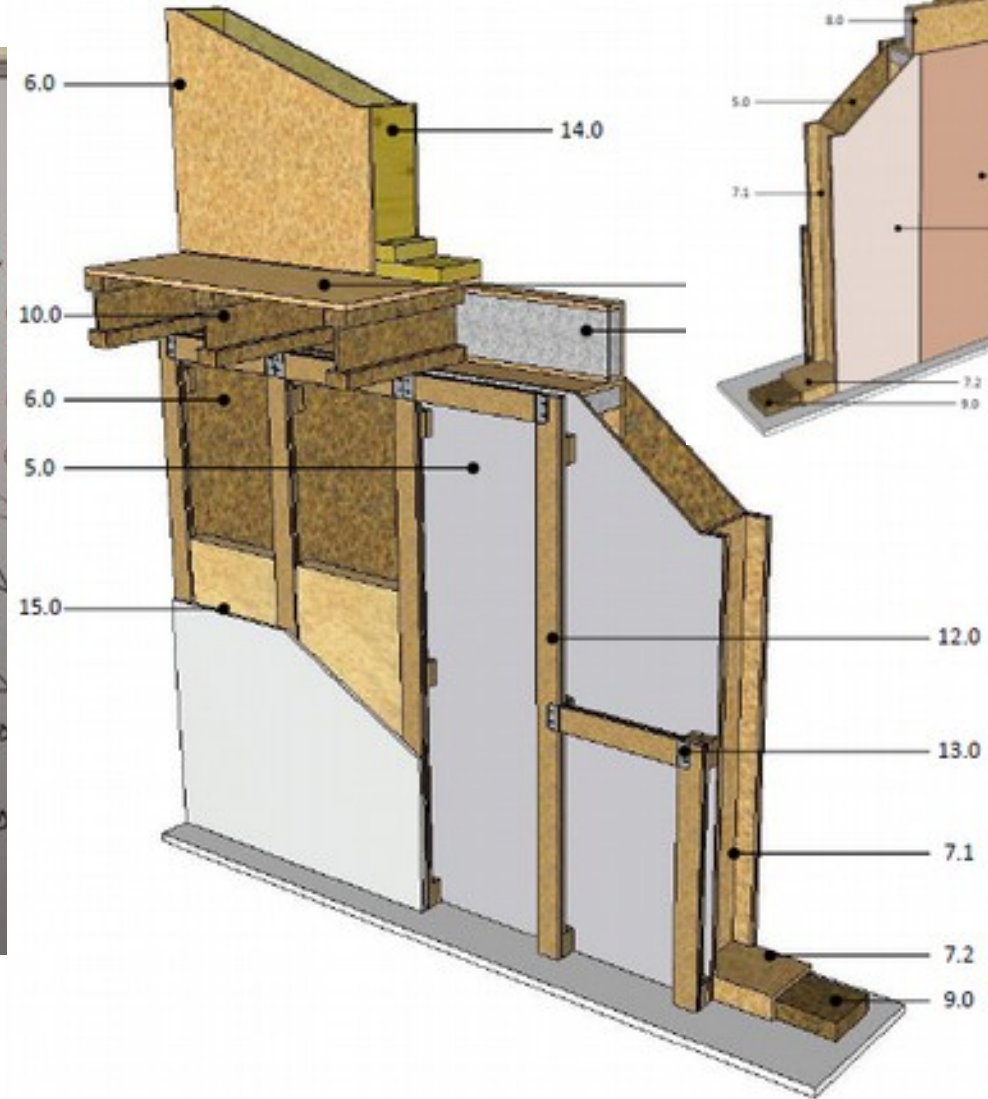
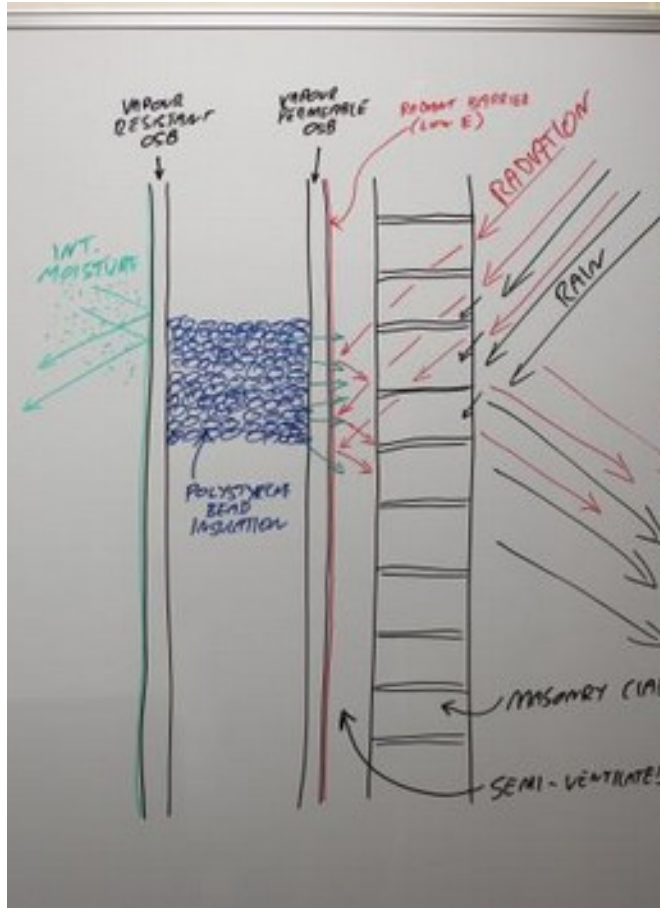
PROPERTY		UNITS	STANDARD	VALUES
Thickness		mm	EN 324	12.5
Density		kg/m ³	EN 323	620
Moisture content		%	EN 322	4-9
Release of formaldehyde]		Class	EN 13986	E1
Thermal conductivity		W/m.K	EN 13986	0.13
Water vapour diffusion factor ()	dry cup	–	EN 12572	560±80
	wet cup			200±40
Equivalent air layer thickness (sd)	dry cup	m	EN 12572	7.0±1.0
	wet cup			2.5±1.0
Air permeability @ 50Pa		m ³ /m ² /hPa	–	<0.001
Air permeability coefficient @ 50Pa		m ³ /(h.m ²)	EN 12114	<0.005
Air permeability of air tightness system @ 50Pa				
SmartPly VapAirTight and specialty airtight tapes		m ³ /h/m ²	EN 13141	0.17

CPP sustainable building solutions

■ Key Design Features:

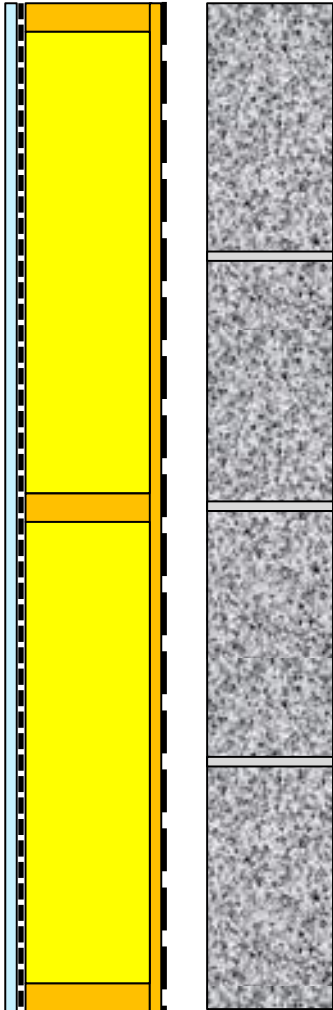
- Vapour diffusion open wall assembly
- Airtight & vapourtight inner sheathing
- Breathable outer sheathing
- High structural racking strength in both panels
- Wood panels replace membranes
- Data to enable hygrothermal modelling
- Products interchangeable in different designs
 - Open panel designs
 - Closed panels designs
 - Hybrid systems
 - Roof systems

Concept development



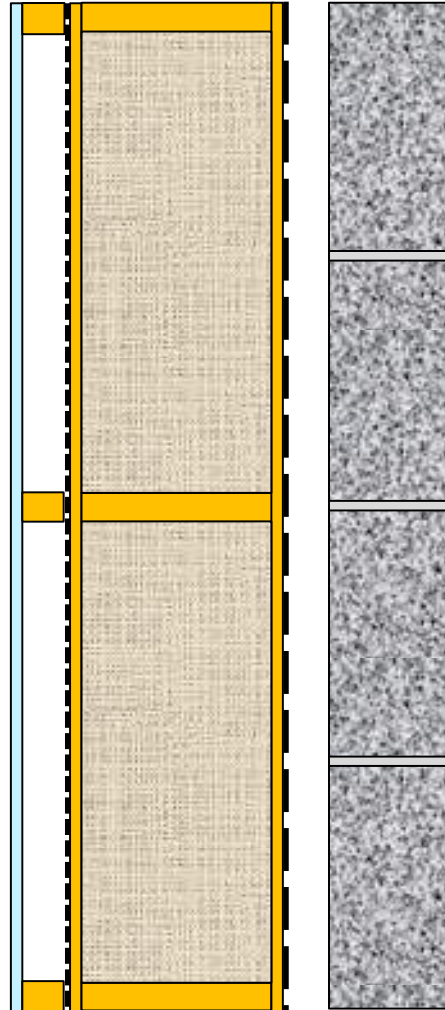
Timber frame wall (R)evolution!

~0.45-0.35 W/(m²K)



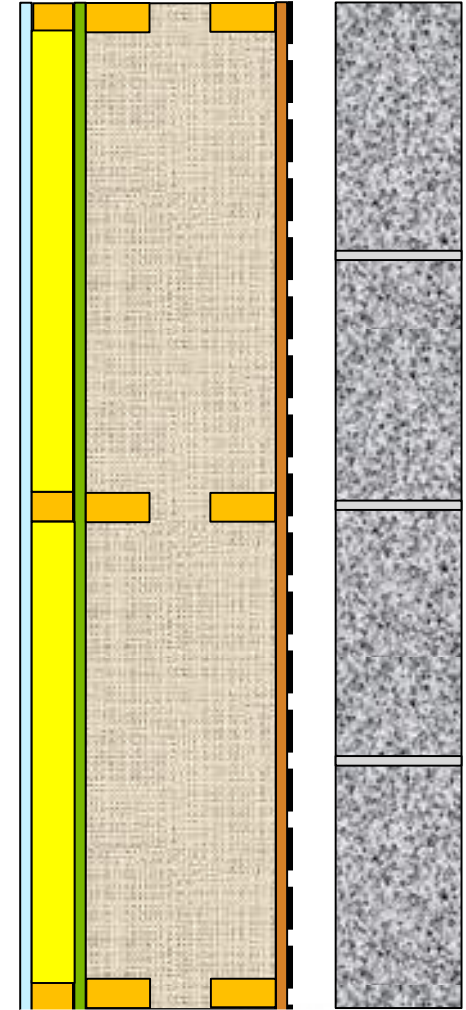
Open panel

~0.27-0.21 W/(m²K)



Closed panel

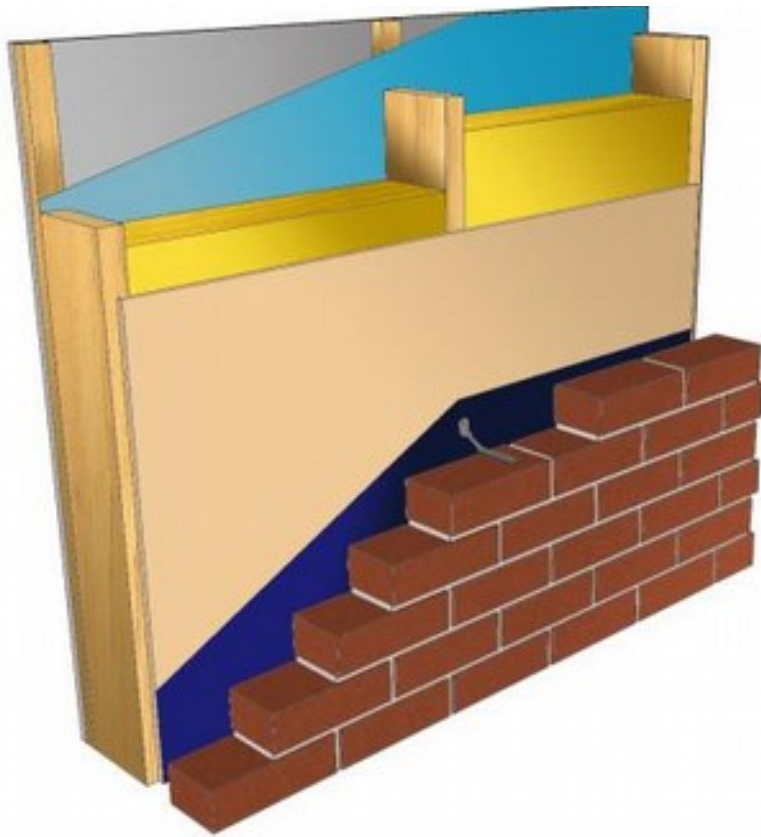
~0.15-0.10 W/(m²K)



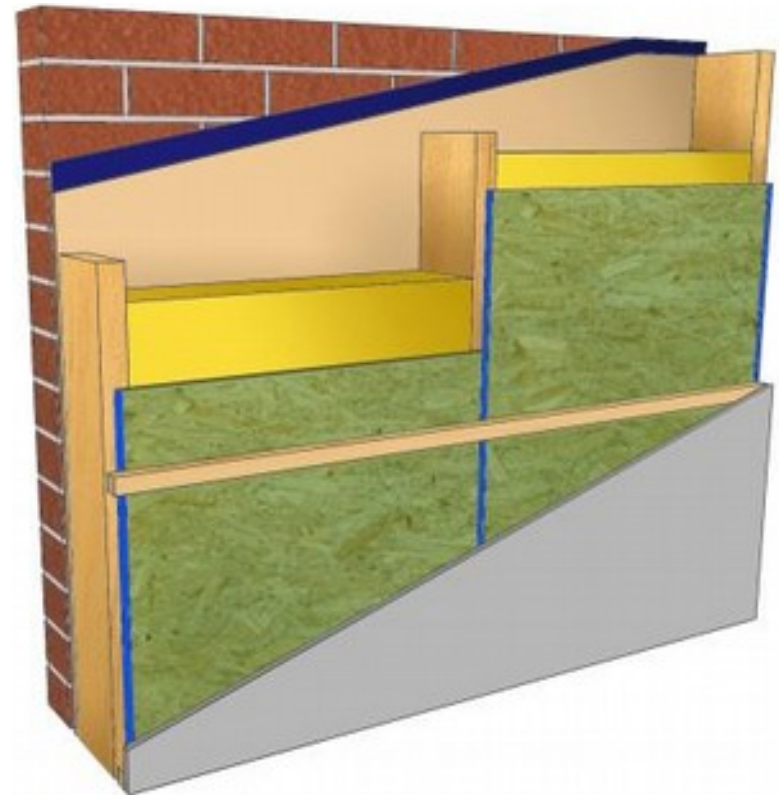
Passive wall

Building envelope solutions for OSC

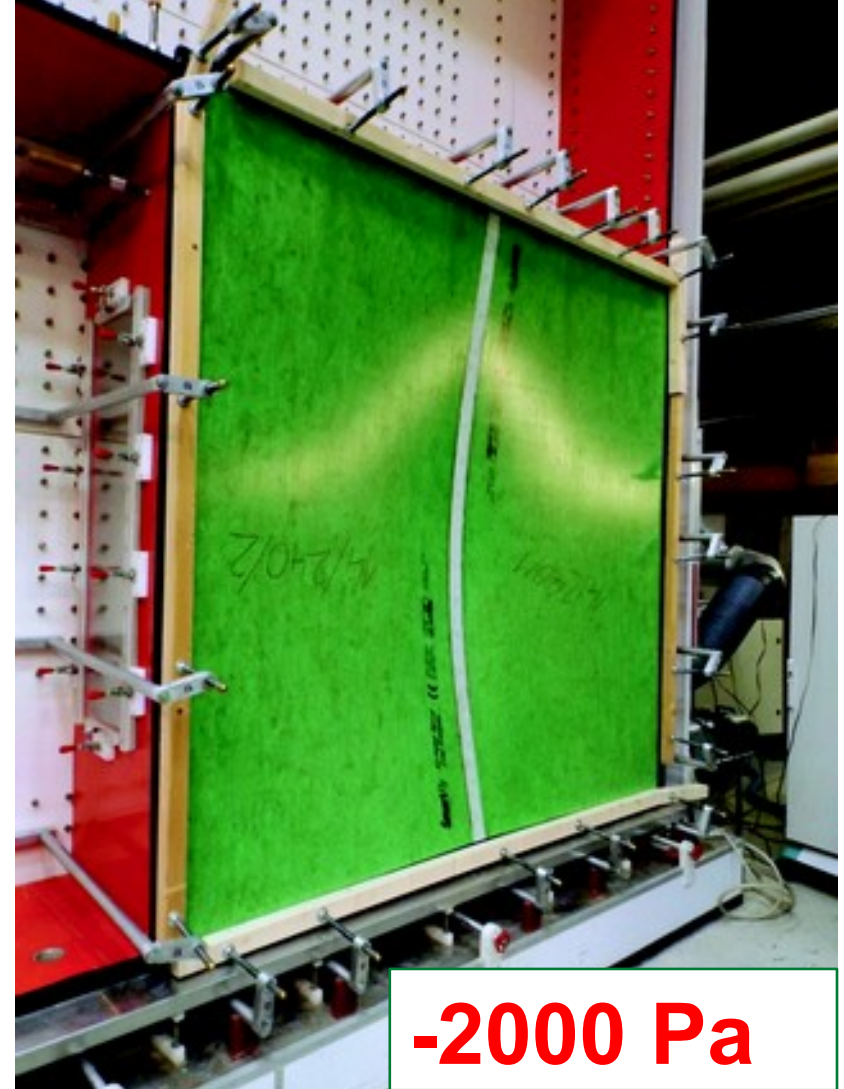
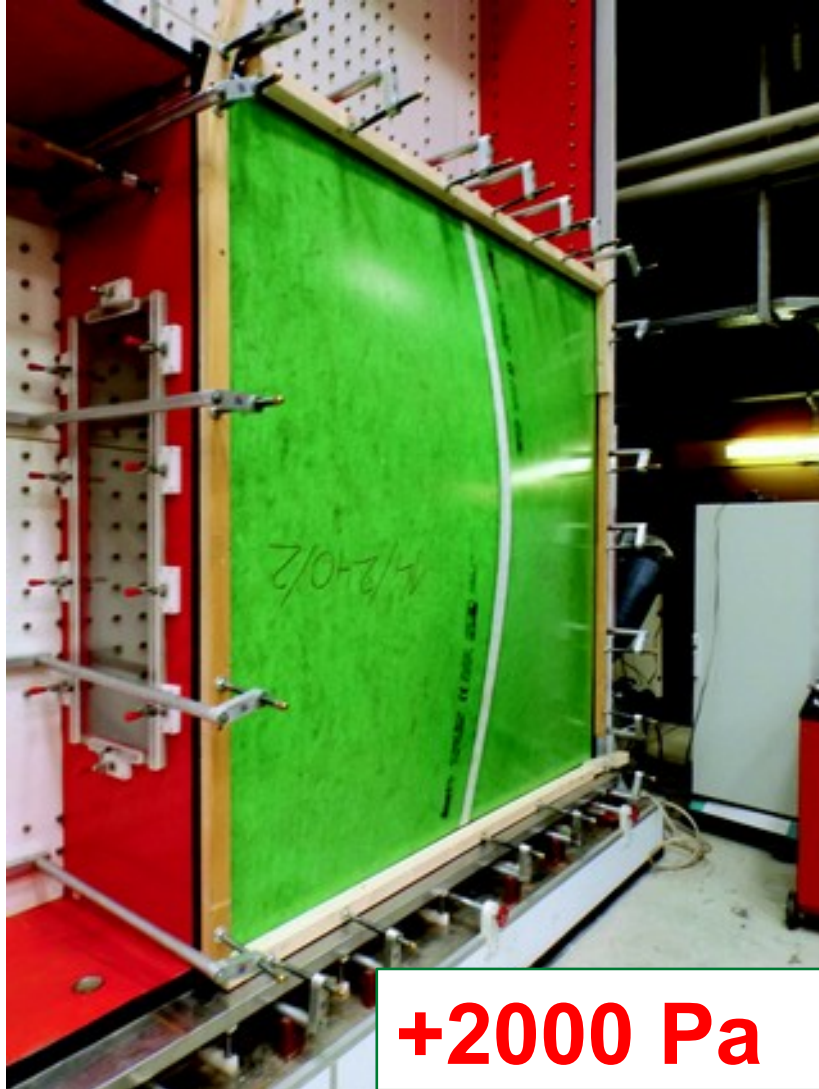
Open panel



Closed panel



Prototype testing (and what a test!)



Prototype validation

Airtightness result: 0.09ach@50Pa
(Passivhaus Standard: 0.6ach@50Pa)



Prototype validation



Passivhaus accredited

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IPHA | Passipedia | Passive House Conference | Profess



Passive House
Institute

The independent institute for outstanding energy efficiency in building

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Airtightness

Materials for creating airtight layers (addresses of manufacturers)

Airtight OSB:

Coillte Panel Products, Anchor Boulevard, Dartford DA2 8QH UK
Tel: 0044(0)1322 424900 (UK), 0031(0)475 399740 (NL), 00353(0)51 (IRL)

Email info@coillte.com
www.smartply.com



Airtightness measurement for an OSB panel

The OSB panel „SmartPly VapAirTight“, manufactured by SmartPly Europe, was tested for airtightness at the Passive House Institute.

The manufacturer provided 9 samples (315 x 305 x 12.5 mm) to be tested. The edges of each sample were coated with a sealing compound to reduce the influence of the small size of the board. The test was carried out for 6 of the samples.

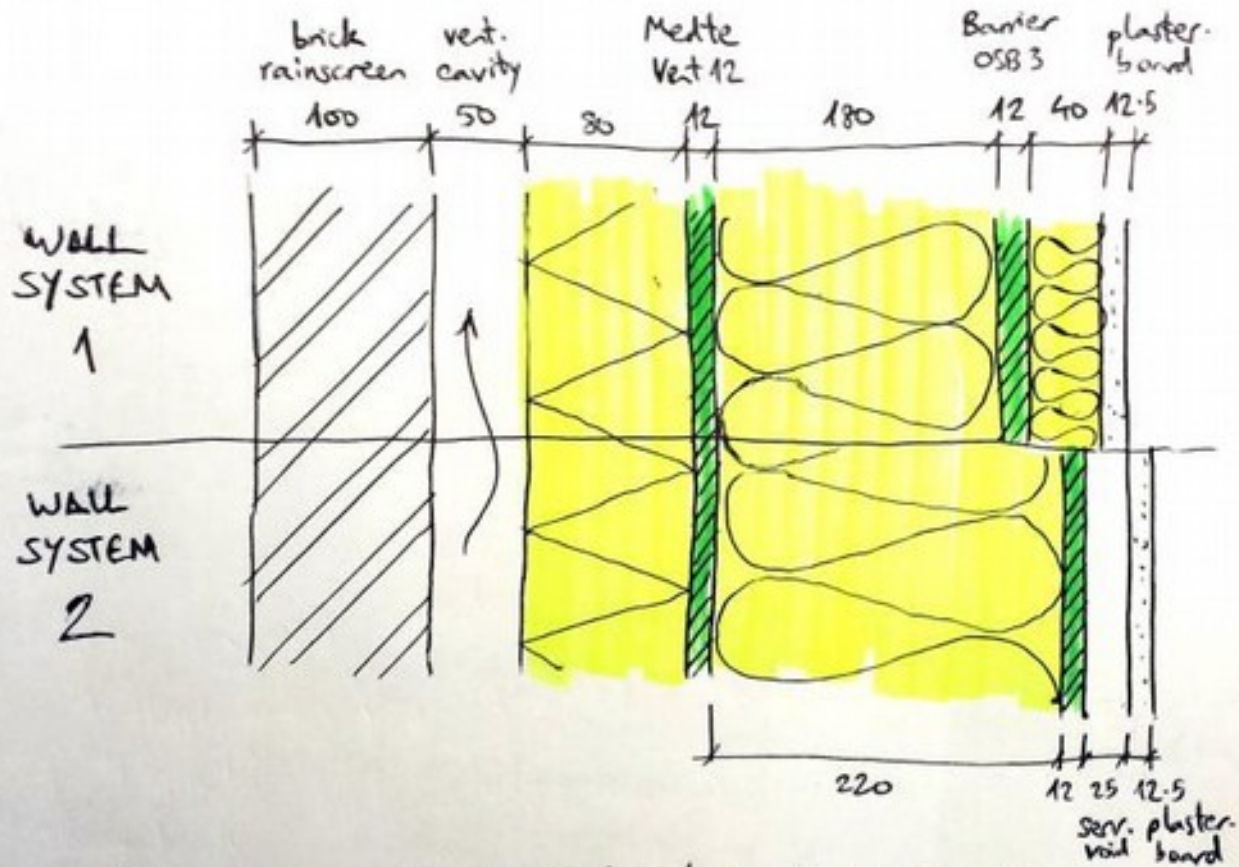
The area of the OSB which remained inside a 200 x 200 mm sealing gasket was tested. Measurement of the leakage volume flow took place at pressures between 300 and 1000 Pa in order to obtain sufficiently high flow rates. Positive and negative pressure measurements were carried out for each sample. The leakage of the test set-up itself was measured regularly using a completely airtight board and the result was subtracted from the measured values as an offset. Evaluation of the leakage volume flows took place with a standardised pressure of 50 Pa. After subtraction of the offset value the leakage volume flow was divided by the area of the board in order to obtain the q_{50} -value. The approach was following EN 14112.

Measurement result:

$q_{50} < 0,03 \text{ m}^3/\text{h}/\text{m}^2$



Hygrothermal modelling of wall systems

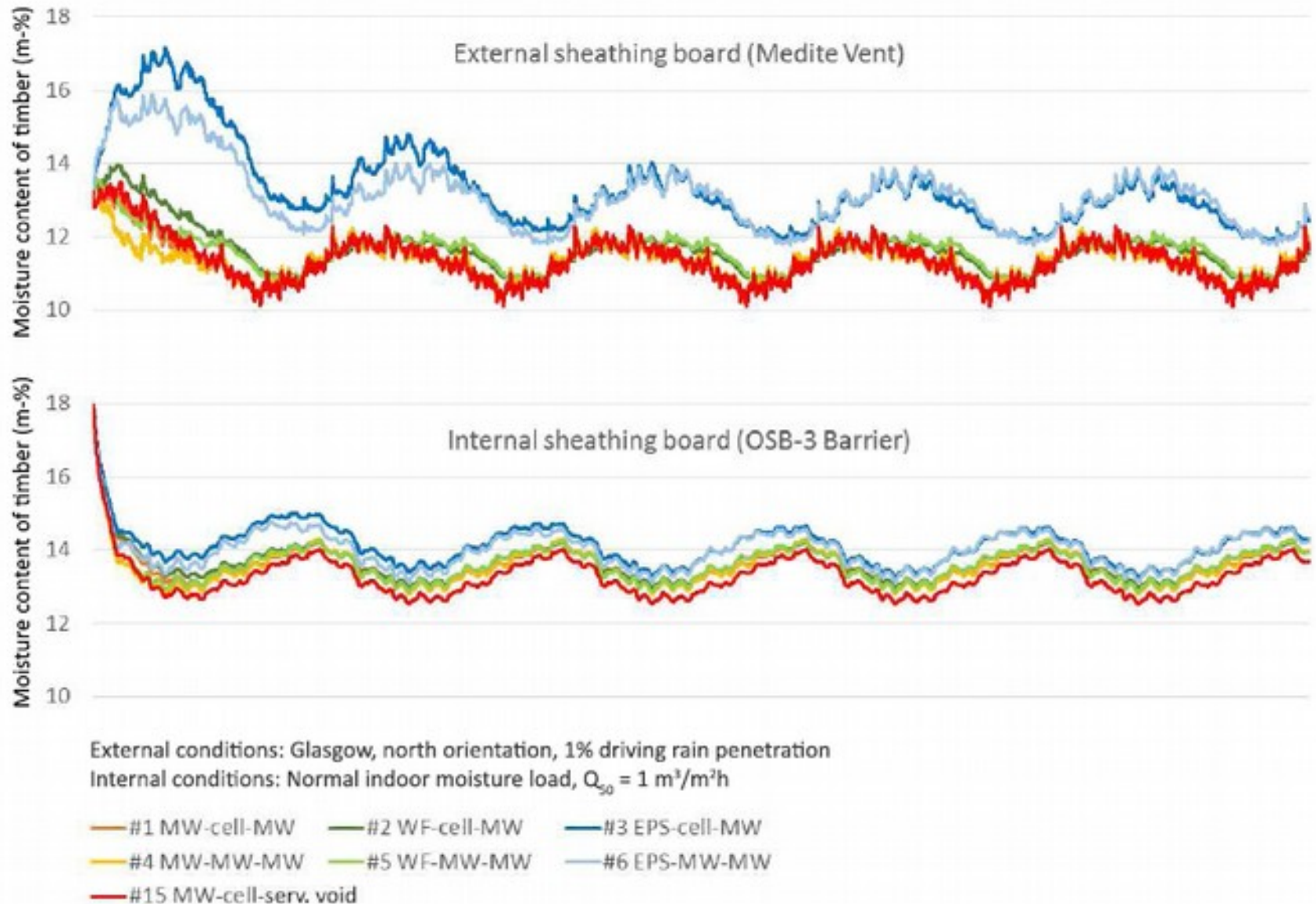


All elements are generic except int. + ext. sheathing boards

All insulants assumed $\lambda = 0.04 \text{ W/mK}$

OSB3 Barrier coated board simulated as one material (not board + membrane)

Hygrothermal modelling of wall systems



Building envelope solutions = lower cost

300mmx600mm selected natural slate on 25x44mm treated battens on 25x44mm treated cross battens with breathable membrane o.e.a.a. (all joints taped and sealed to building to form wind tight envelope around eaves and barge) on 90mm rigid insulation ($\lambda=0.040\text{W/mK}$) on 12mm Medite Vent ($\lambda=0.010\text{W/mK}$) on 180mm rafter with 180mm quilt insulation ($\lambda=0.040\text{W/mK}$) on Smartply VapAirTight ($\lambda=0.013\text{W/mK}$) on 25mm Service Cavity on 12.5mm Plasterboard ($\lambda=0.021\text{W/mK}$)

15mm SmartPly OSB3 Fixed to Vergo

Passive House Standard	Boundary Conditions
	20% & 0.13 mK/W
	20% & 0.10 mK/W
	-4% & 0.10 mK/W
	-10% & 0.13 mK/W
	20% & 0.17 mK/W

OUTSIDE
-10°C

INSIDE
20°C

Joints Adequately Sealed with Approved Sealing Tape

12.5mm Plasterboard ($\lambda=0.021\text{W/mK}$)

40mm Insulated Cavity ($\lambda=0.040\text{W/mK}$) + Timber Stud ($\lambda=0.13\text{W/mK}$) Bridged Layer 17.5%

12.5mm Smartply VapAirTight acts as Air Barrier ($\lambda=0.013\text{W/mK}$)

180mm Insulation ($\lambda=0.040\text{W/mK}$) + Stud Timber Frame ($\lambda=0.13\text{W/mK}$) Bridged Layer=17.5%

12mm Medite Vent ($\lambda=0.010\text{W/mK}$)

80mm External Insulation ($\lambda=0.040\text{W/mK}$)

Optional 44x44mm Timber Battens in Ventilated Cavity as required

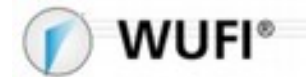
Optional Breather Membrane as required

Optional Cladding as required

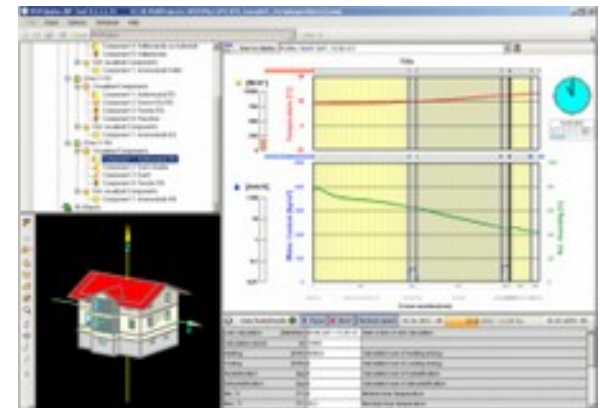
$U_1 = 0.15\text{W/m}^2\text{K}$

$U_2 = 0.15\text{W/m}^2\text{K}$

How?



WUFI Passive



Coming soon... CPP Products in WUFI!

WUFI - Database Materials

Source: Fraunhofer IBP - Holzkirchen, Germany

Catalog: All Catalogs

Sort: Name

Name	Den. [kg/m³]	Por. [%]	H. Cap. [µg/kg]	Ther Cond [W/mK]	Diff Res Fac. [-]
HOMATHERM USD-Q11 protect	135	0.9	2100	0.038	2.1
INTELLO	115	0.066	2500	2.4	26000
Interior Plaster (Gypsum Plaster)	850	0.65	850	0.2	8.3
ISOCELL Zellulosedämmstoff	50	0.95	2110	0.037	1.8
isofloc L	50	0.95	2150	0.037	1.2
ISOVER GIV Integra ZKF - 032	32.5	0.95	840	0.032	1
ISOVER GIV Integra ZKF - 035	21	0.95	840	0.035	1
ISOVER GIV Integra ZSF - 032	30	0.95	840	0.032	1
ISOVER INTEGRA AP Supra - 035	115	0.95	840	0.035	1
ISOVER ULTIMATE Klemmiz - 035	25.2	0.95	1000	0.035	1
ISOVER ULTIMATE Kontur FSP - 032	40	0.95	1030	0.031	1
ISOVER VACUPAD Kontur VVP 007	171	0.95	1050	0.009	100000
ISOVER Vario KM Duplex	83	0.111	1800	1	4000
ISOVER Vario UltraSafe	130	0.001	2300	2.3	27000
KLH Massivholz	423	0.7	1500	0.12	300
Knauf Add S 2.0 / Add R 2.0 auf SM700	1900	0.231	850	0.7	216
Knauf Add S 2.0 / Add R 2.0 auf SM700 Pro	1900	0.231	850	0.7	216
Knauf Corni S 2.0 auf SM700	1800	0.269	850	0.7	215
Knauf Corni S 2.0 auf SM700 mit Quarzgrund	1800	0.269	850	0.7	215
Knauf Corni S 2.0 auf SM700 Pro	1800	0.269	850	0.7	215
Knauf Diamant 12.5 mm	1009	0.743	850	0.3	11.2
Knauf Diamant 18.0 mm	1023	0.753	850	0.3	7.6
Knauf Holofo 2.0 auf SM700	1400	0.472	850	0.54	29

Info Text

Manufacturer: Knauf Gips KG
Am Bahnhof 7
D-97346 Igthen
www.knauf.de

Thickn. [m]: 0.002

Hygrothermal Functions

Moisture Storage Function

Liquid Transport Coefficient, Suction

Liquid Transport Coefficient, Redistribution

Water Vapour Diffusion Resistance Factor, moisture-dep

Thermal Conductivity, moisture-dependent

Thermal Conductivity, temperature-dependent

Enthalpy, temperature-dependent

Approximate

No.	RH [-]	Water Content [kg/m³]
1	0.0	0.0
2	0.65	5.9
3	0.8	8.1
4	0.93	13.2
5	0.95	14.3
6	0.99	24.6
7	0.995	30.9
8	0.999	51.3

Water Content [kg/m³]

Relative Humidity [-]

We've got you covered!



The key to success?



How to specify CPP products!

The image is a composite of two screenshots. The top screenshot shows the SmartPly website with a wooden background. The header includes the SmartPly logo, navigation links (ABOUT US, PRODUCTS, APPLICATIONS, STOCKISTS, DOWNLOADS, DESIGN SUPPORT, CONTACT US), and a search bar. A green button labeled '+ NBS Clauses' is visible. The 'Downloads' section is active, showing 'Compliance' and 'Literature' tabs. Under 'Literature', there are two download options: 'SmartPly VapAirTight DOP' and 'VapAirTight Datasheet', each with a 'Download' button. The bottom screenshot shows a Twitter post from Passivhaus-Plus (@PassHaus) with the text 'Airtightness barrier in place. #smartply #vapairtightboard with airtight taped joints. Great product..'. The tweet includes a photo of a green SmartPly VapAirTight board with a white circular vent and a 'Follow us on twitter' button.

SmartPly®
The Smart OSB Answer to Plywood

colice medite SmartPly EXTREME

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Downloads

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Follow

Airtightness barrier in place.
#smartply #vapairtightboard with airtight
taped joints. Great product..

Compliance

Literature

SmartPly VapAirTight
DOP

Download

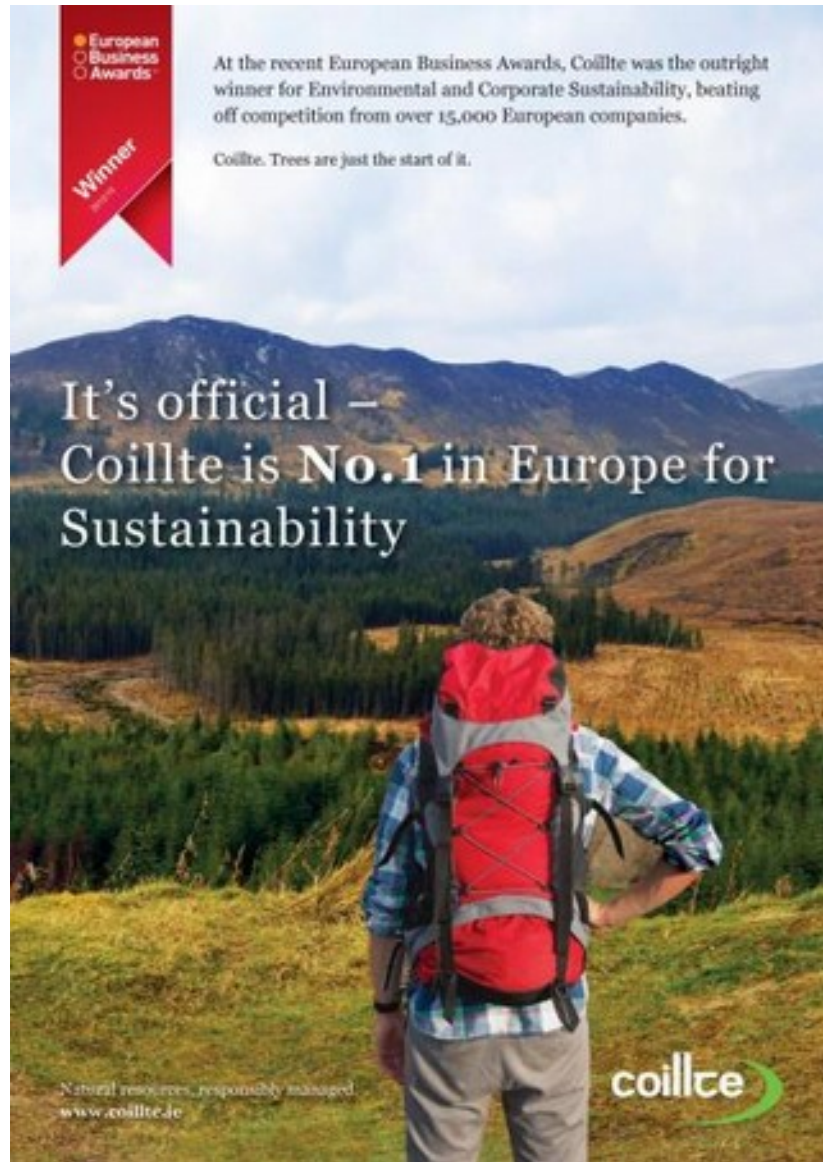
VapAirTight Datasheet

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twitter

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A fully sustainable offering...



European Business Awards Winner

At the recent European Business Awards, Coillte was the outright winner for Environmental and Corporate Sustainability, beating off competition from over 15,000 European companies.

Coillte. Trees are just the start of it.

It's official –
Coillte is **No.1** in Europe for Sustainability

Natural resources, responsibly managed.
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Our Purpose

Enriching lives locally, nationally and globally through innovative and sustainable management of natural resources.

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