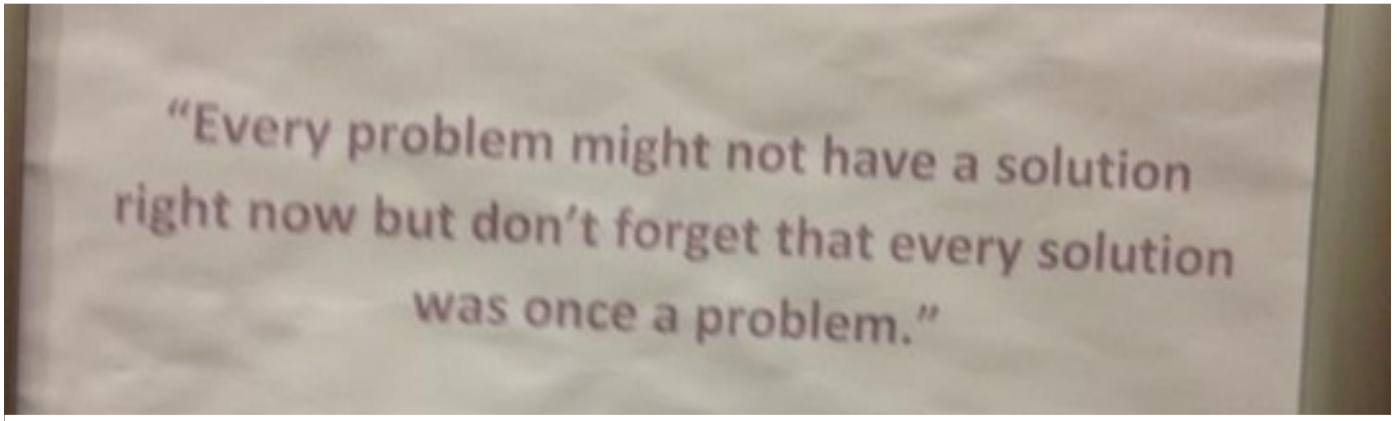

SEE THE LIGHT
The sustainable building conference for professionals
GEARING UP FOR 2020
13 NOV 2015

Passivhaus Building Solutions Using Innovative Irish Wood Panels

David Murray
Innovation Manager
Coillte Panel Products

See the Light 2015

Every solution requires a problem!



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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

Certified Passive House – Passive House Institute

THE GREEN DEAL

BER A1

dena – Deutsche Energie-Agentur

Effizienzhaus

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

FSC www.fsc.org FSC® C089427 – The mark of responsible forestry

PEFC – Promoting Sustainable Forest Management – www.pefc.org

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

LCA

CARB 2 COMPLIANT

LEED – Leadership in Energy and Environmental Design – GREEN BUILDING

AgBB

AFFSET


OSB leaks

The ~~Problem~~ Opportunity!

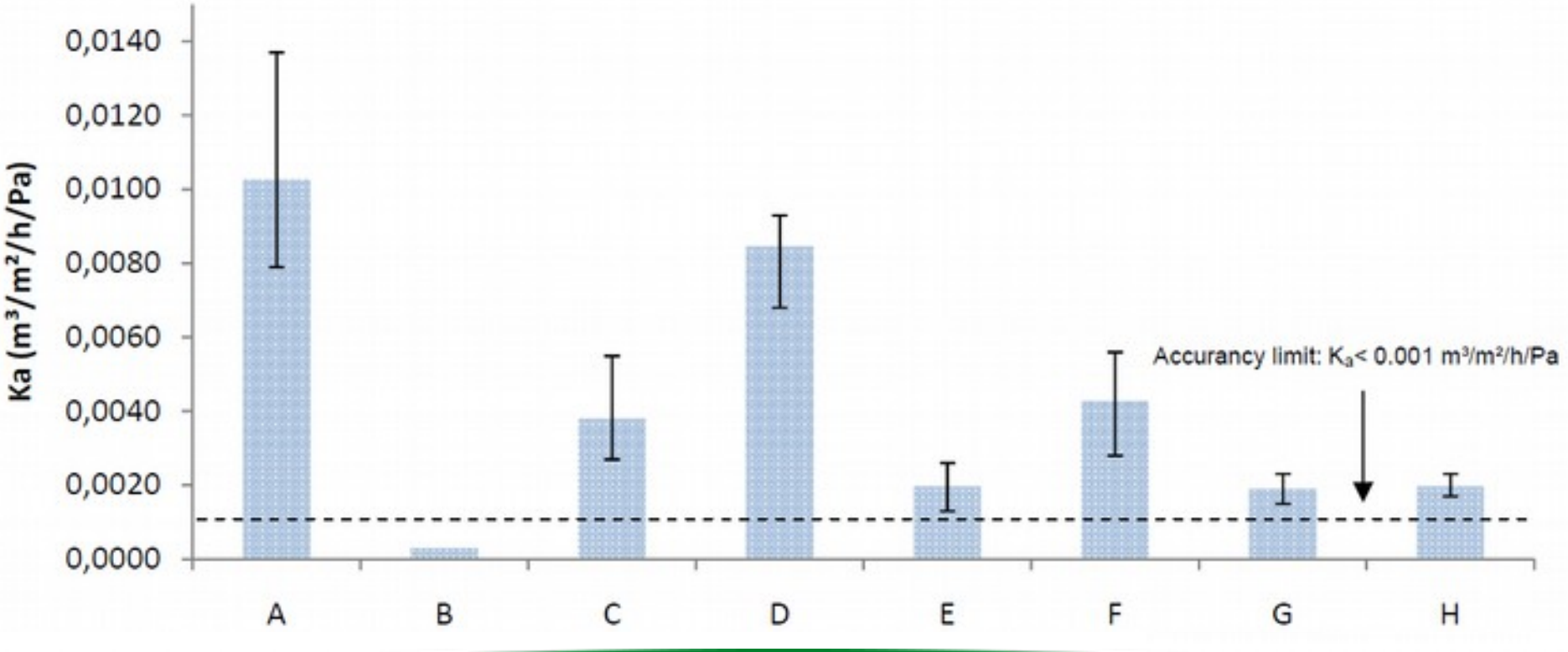
“We started finding increasing evidence of OSB3 failure in the timber frame extension of this house”

Numerous other similar site ‘balloon’ tests

State of the art research: Air Permeability

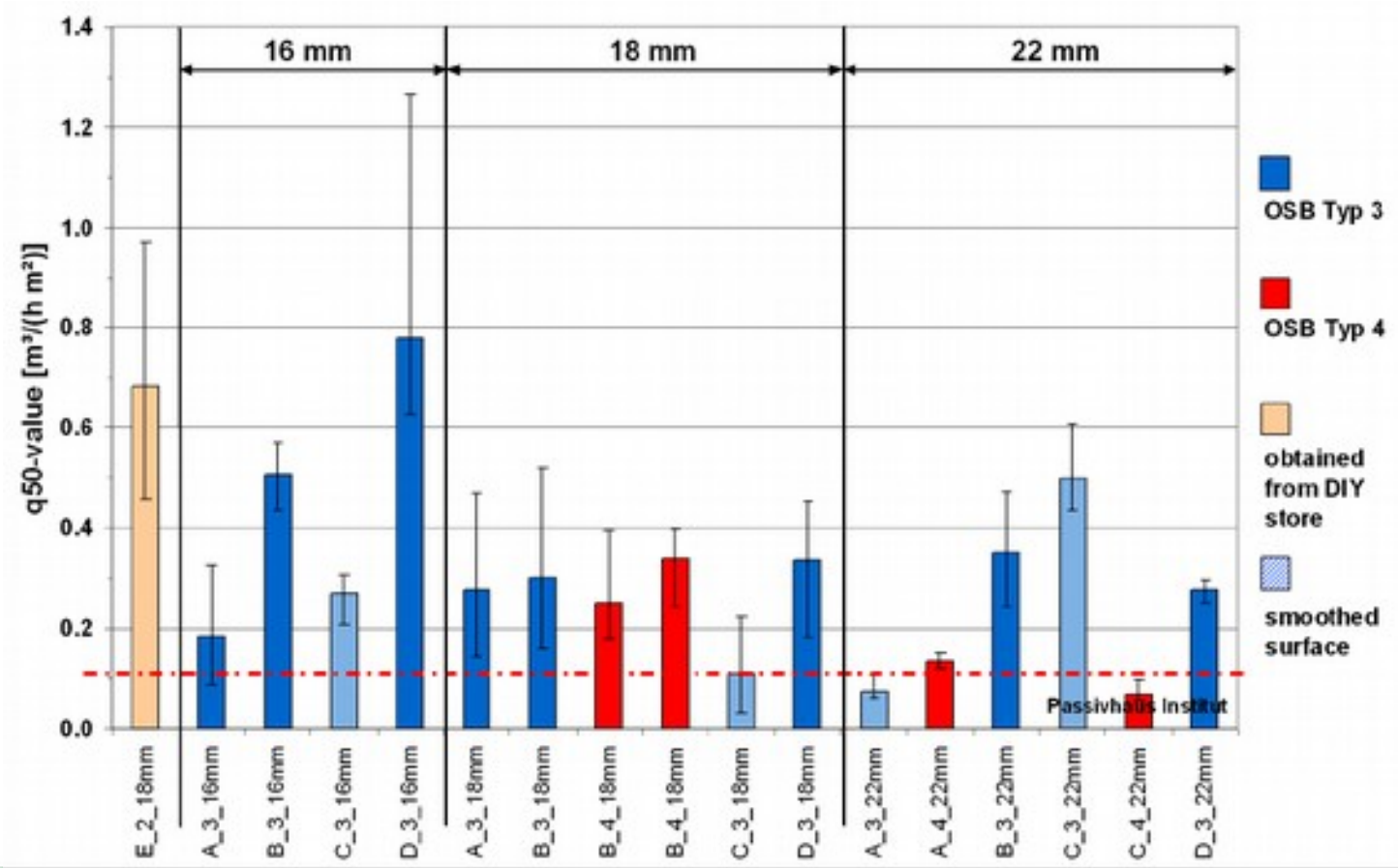
- **Air permeability of OSB by Leuven University**
  - **Recommended air permeance limit:**

    0.0018 $m^3/m^2/h/Pa$ (or 0.09 $m^3/m^2/h$ at 50Pa)



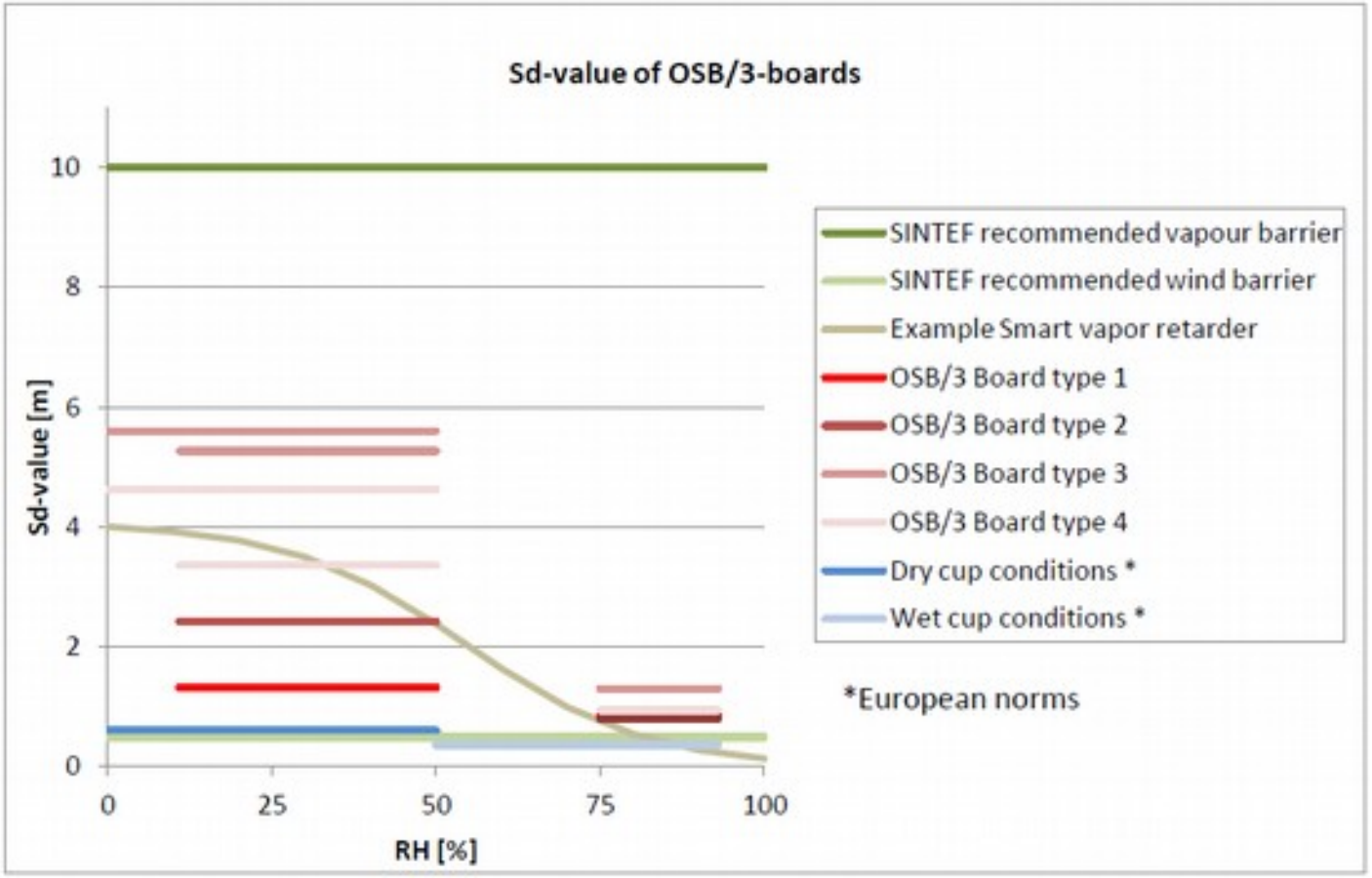
State of the art research: Air Permeability

- **Air permeability of OSB by Passive House institute**
  - Target q_{50}–value: 0.1 $m^3/m^2/h$ @50Pa.
  - 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 NEW
- Medite Tricoya Extreme NEW
- FR Eco (NAF) NEW
- Trade NEW
- Exterior
- Premier
- Moisture Resistant
- Flame Retardant
- Lite & Ultralite
- Ecologique
- Flooring Quality

SmartPly Products

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

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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.

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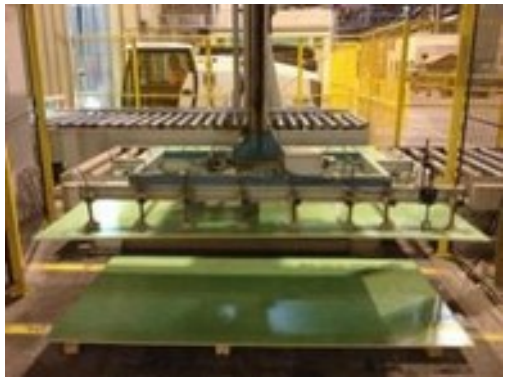
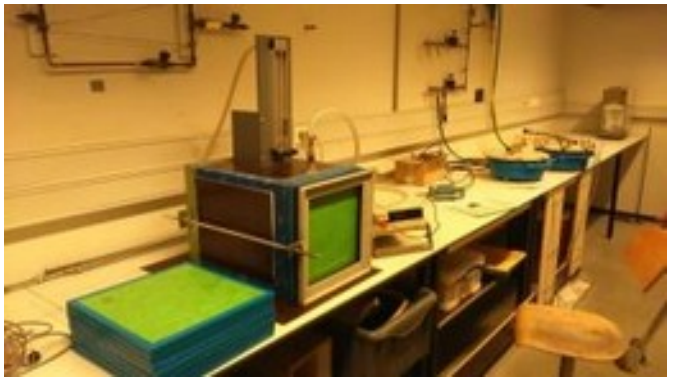
R&D Capabilities – UV Coating

Developing UV coating expertise

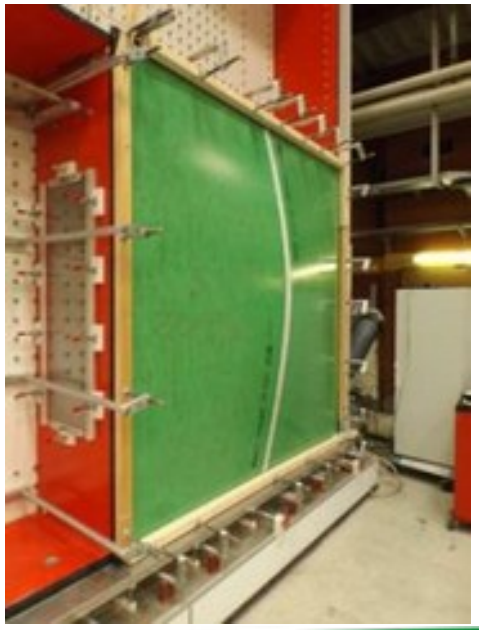


In-house coating trials



Developing building physics expertise

Developing strategic partnerships with leading testing institutes



Developing new value-add panel products!

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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

Physical Properties

PROPERTY		UNITS	STANDARD	VALUES
Thickness		mm	EN 324	12.5
Density		kg/m³	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		m³/m²/h/Pa	–	<0.001
Air permeability coefficient @ 50Pa		m³/(h.m²)	EN 12114	<0.005
Air permeability of air tightness system @ 50Pa SmartPly VapAirTight and specialty airtight tapes		m³/h/m²	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

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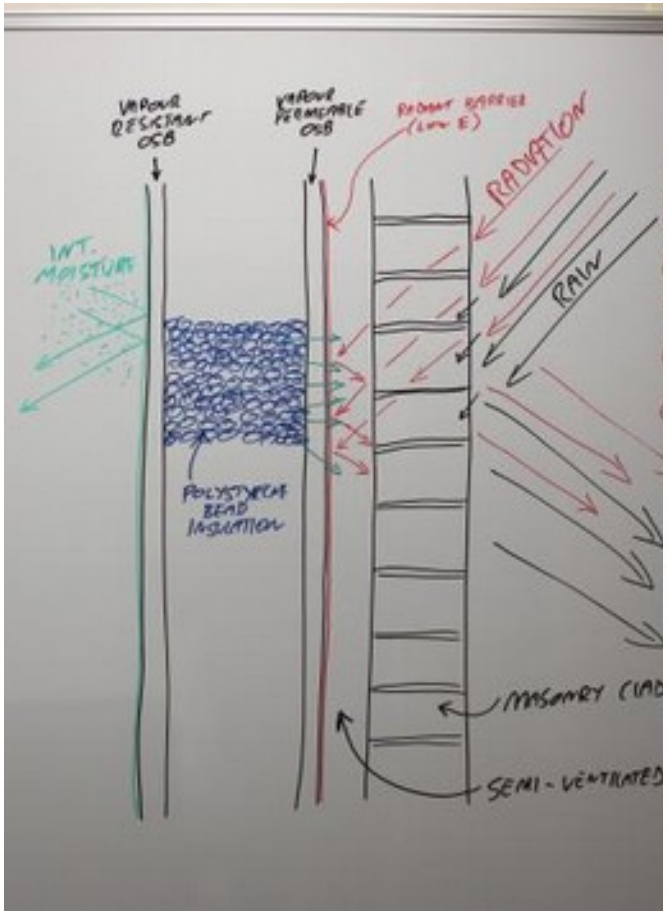
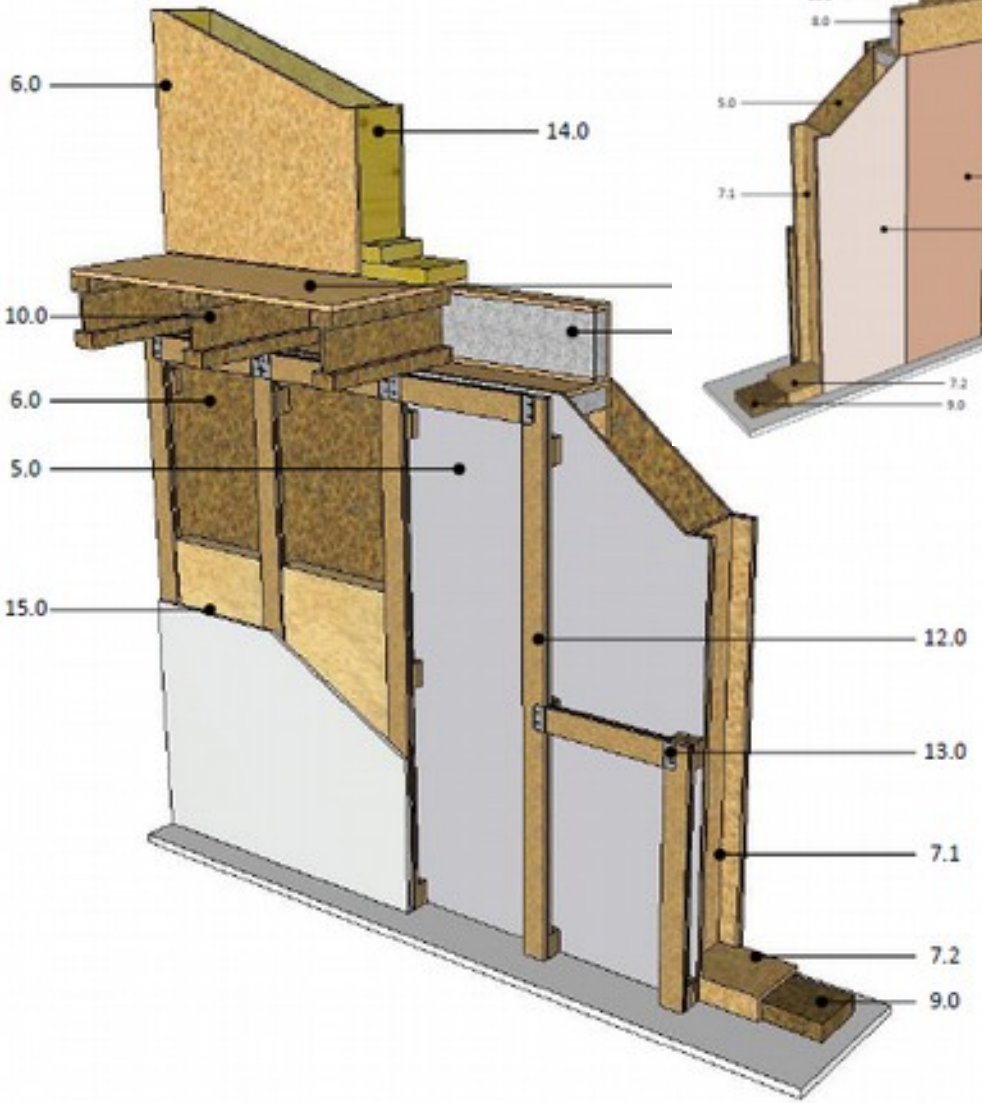
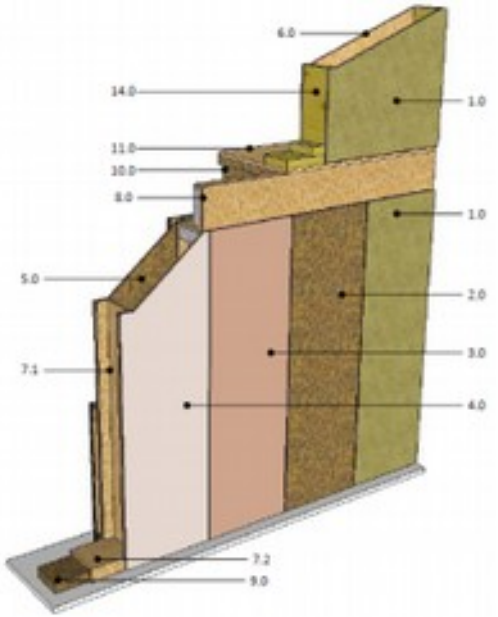
Concept development

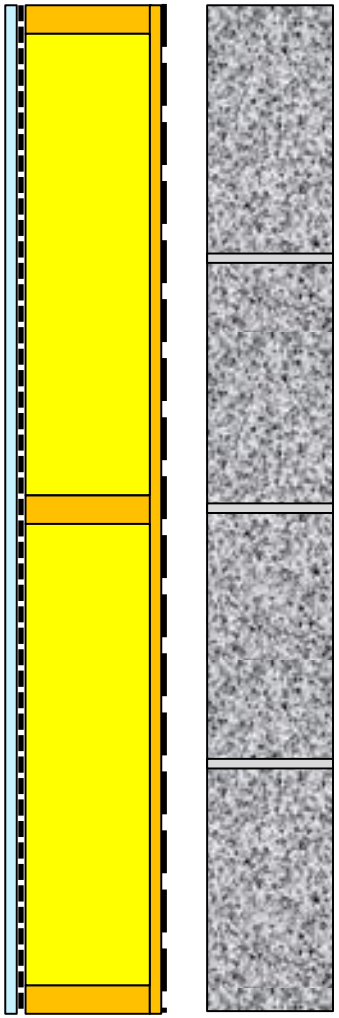






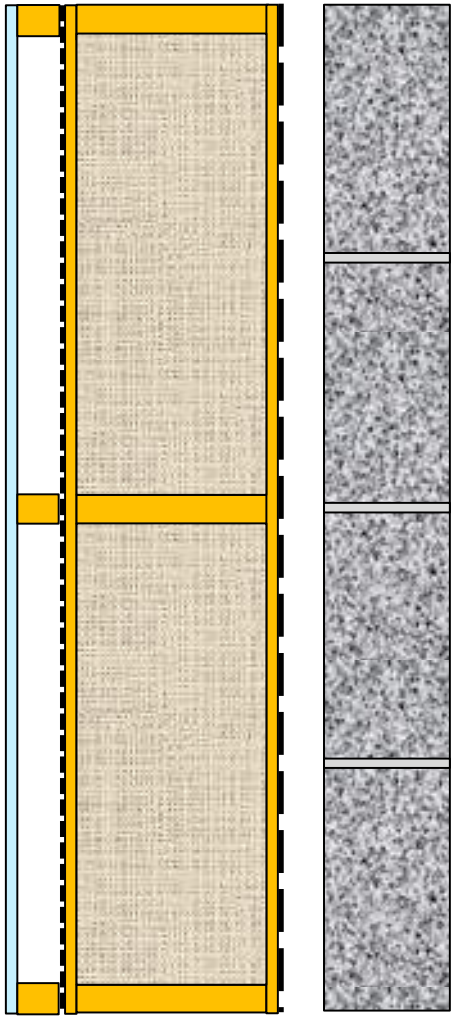
Timber frame wall (R)evolution!

~0.45-0.35 W/(m²K)



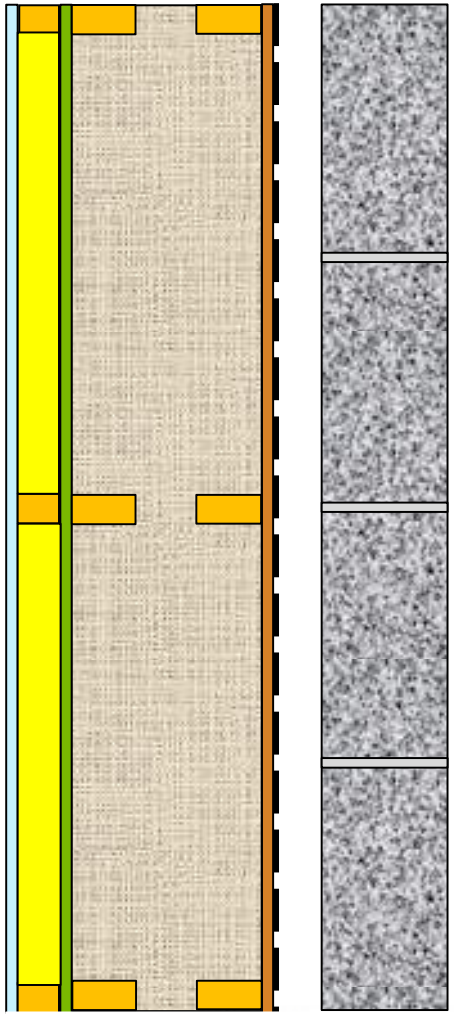
Open panel

~0.27-0.21 W/(m²K)



Closed panel

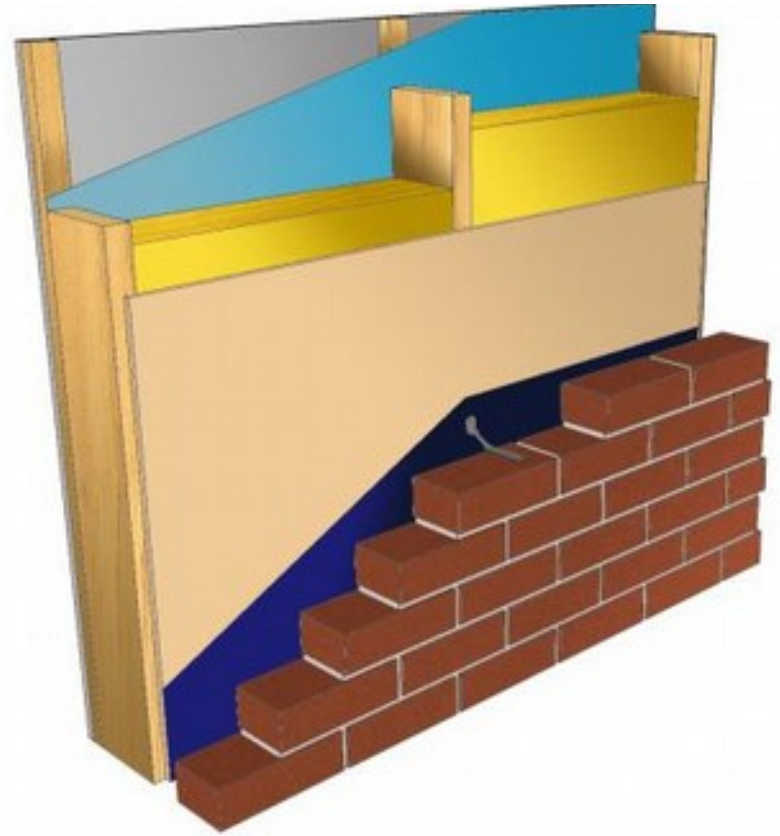
~0.15-0.10 W/(m²K)



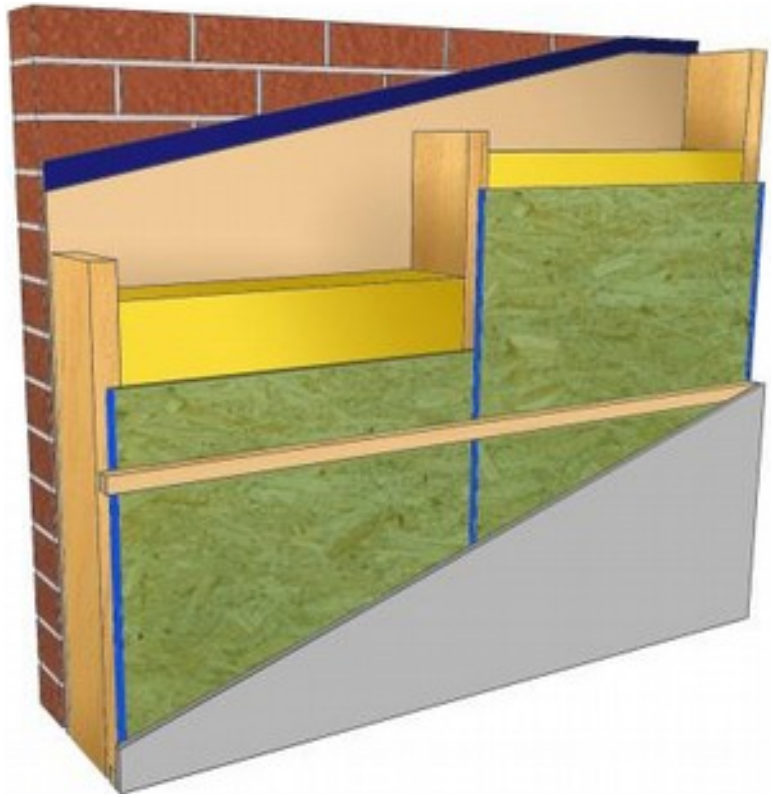
Passive wall

Building envelope solutions for OSC

Open panel



Closed panel



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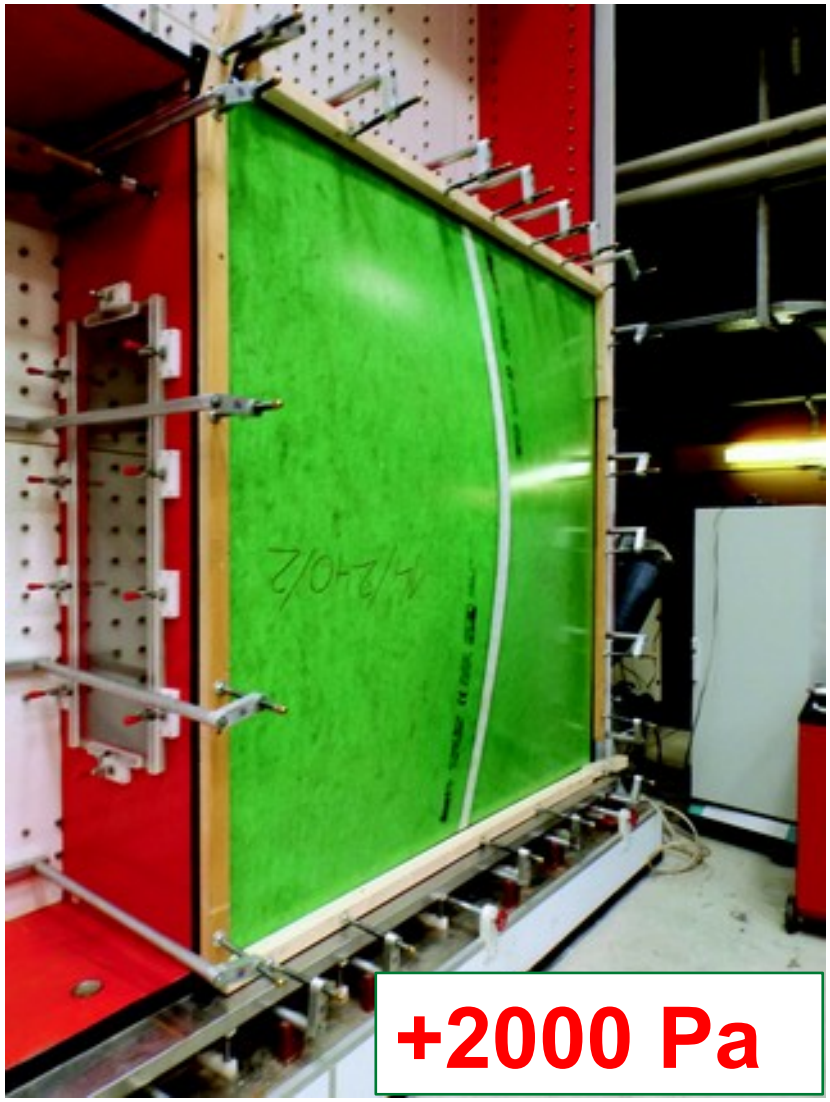
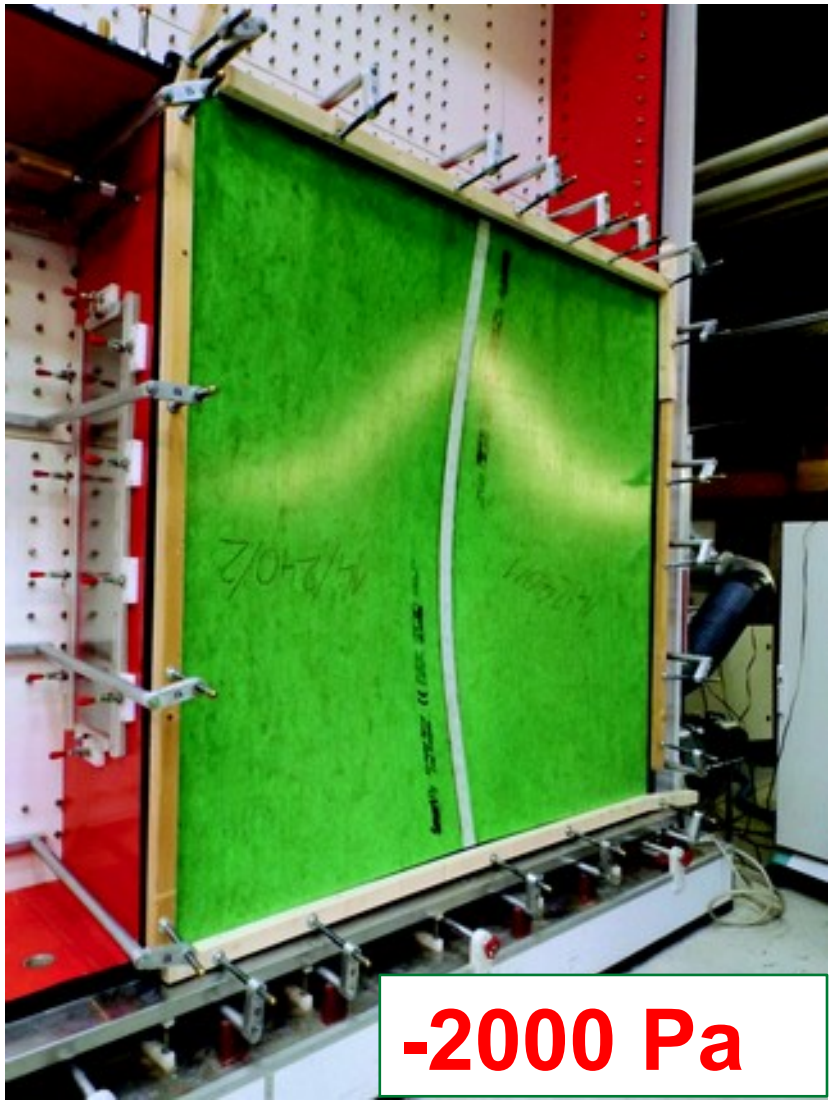
Prototype testing (and what a test!)

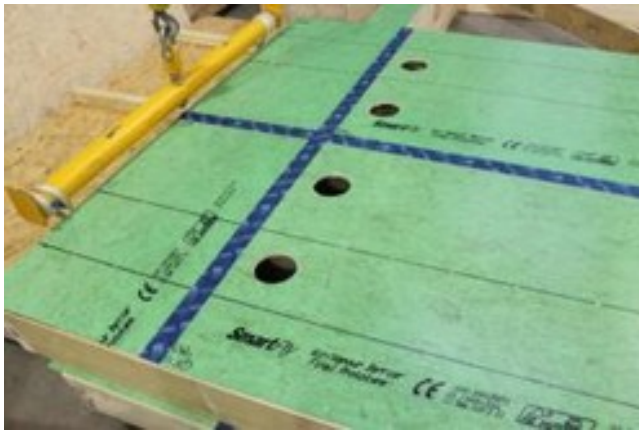




Prototype validation

Airtightness result: 0.09ach@50Pa

(Passivhaus Standard: 0.6ach@50Pa)



Prototype validation

Passivhaus accredited

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Fax +49 (0)6151 82699-11

E-Mail: mail@passiv.de
Internet: www.passiv.de

Passive House Institute

Airtightness

Materials for creating airtight layers (addresses of manufacturer

Airtight OSB:

Coillte Panel Products, Anchor Boulevard, Dartford DA2 6QH 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:

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

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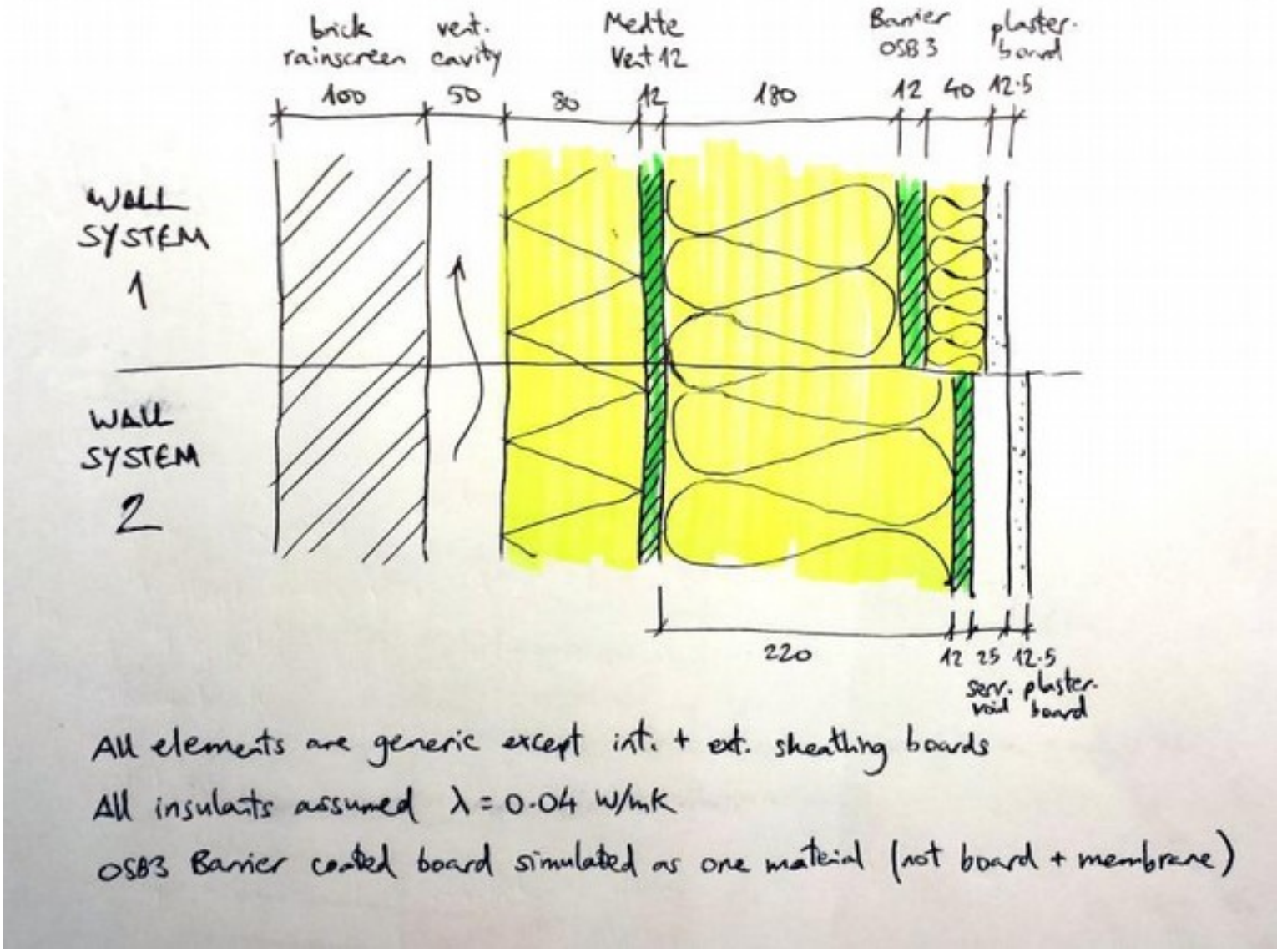
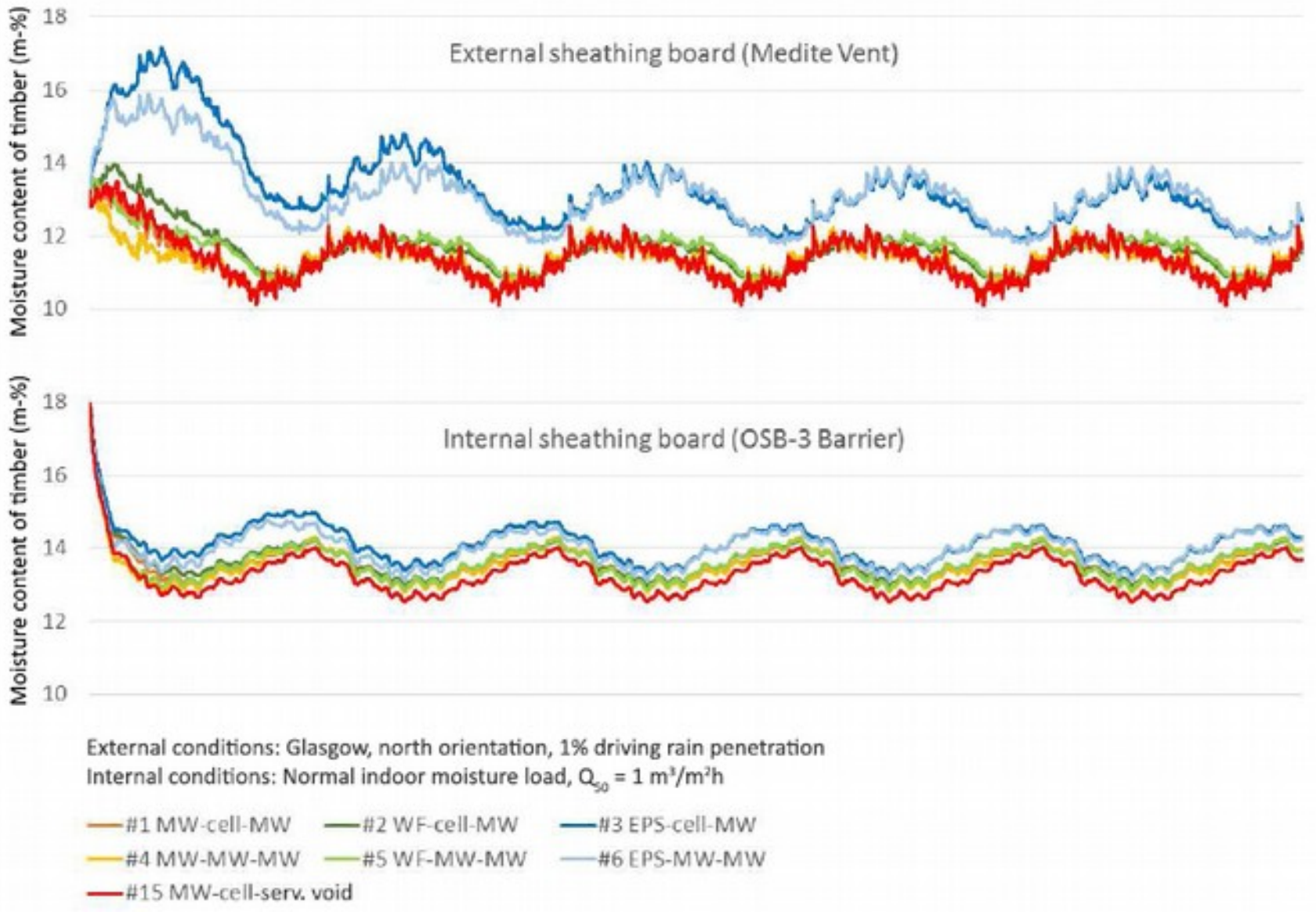
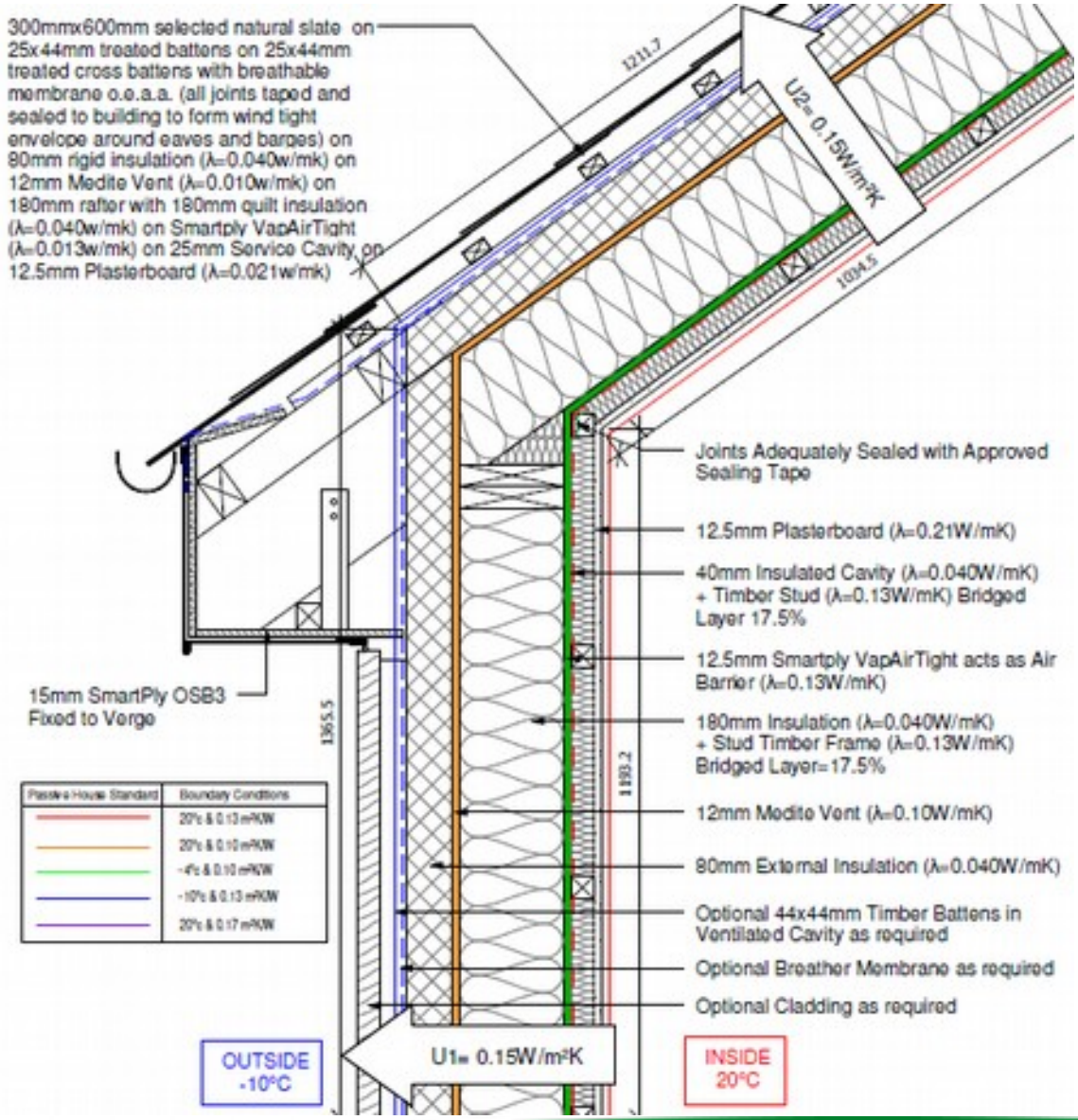
Hygrothermal modelling of wall systems



Hygrothermal modelling of wall systems



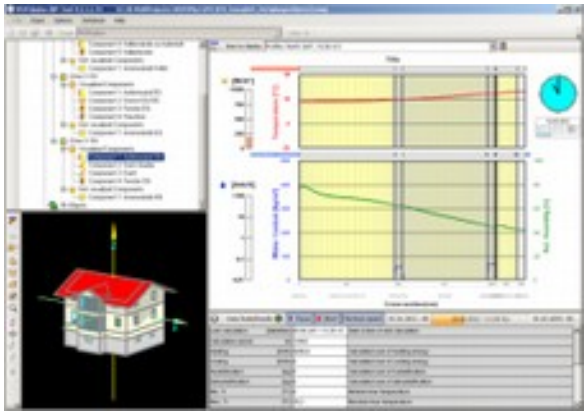
Building envelope solutions = lower cost



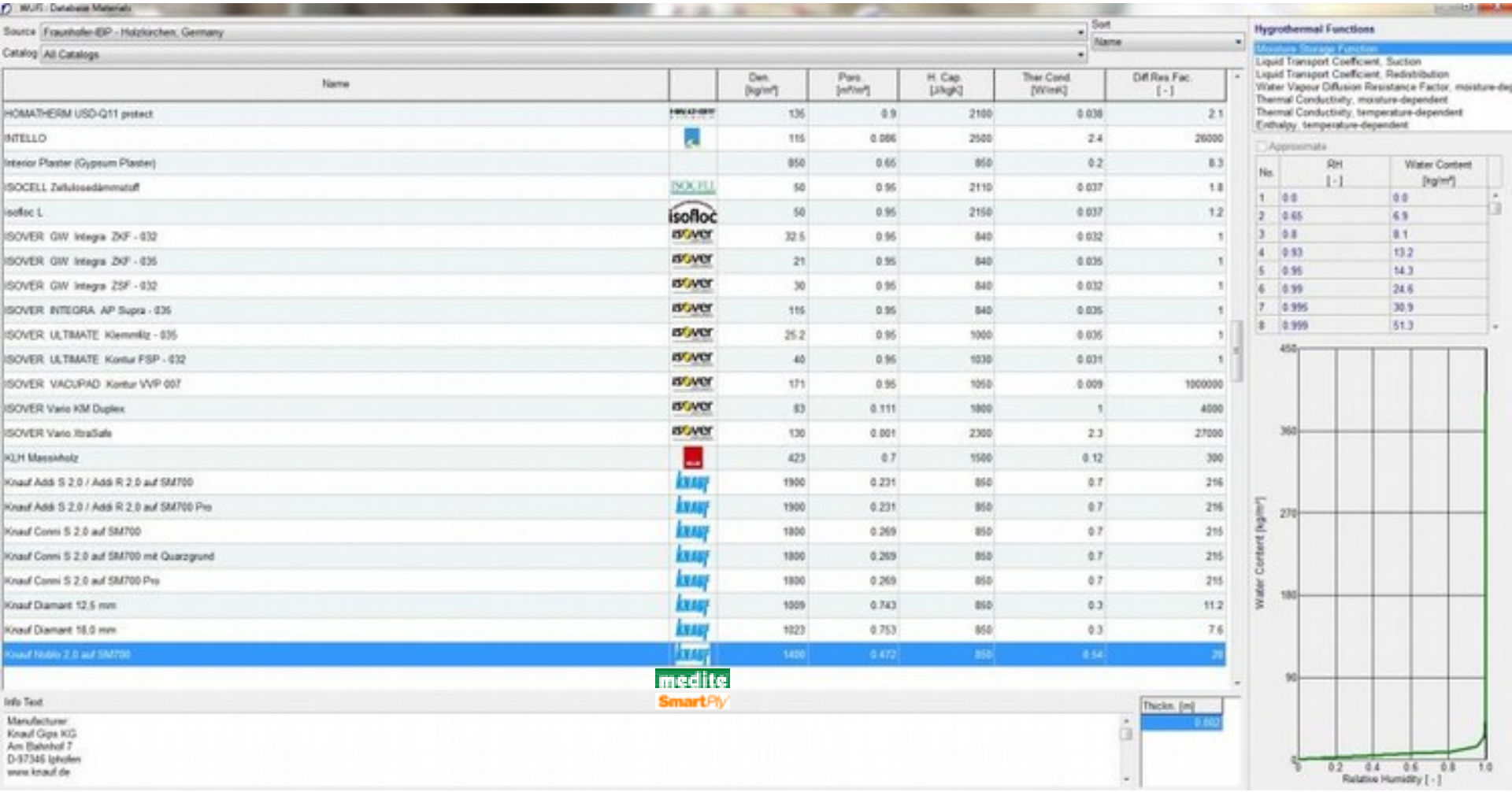
How?

WUFI®

WUFI Passive



Coming soon… CPP Products in WUFI!



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We've got you covered!

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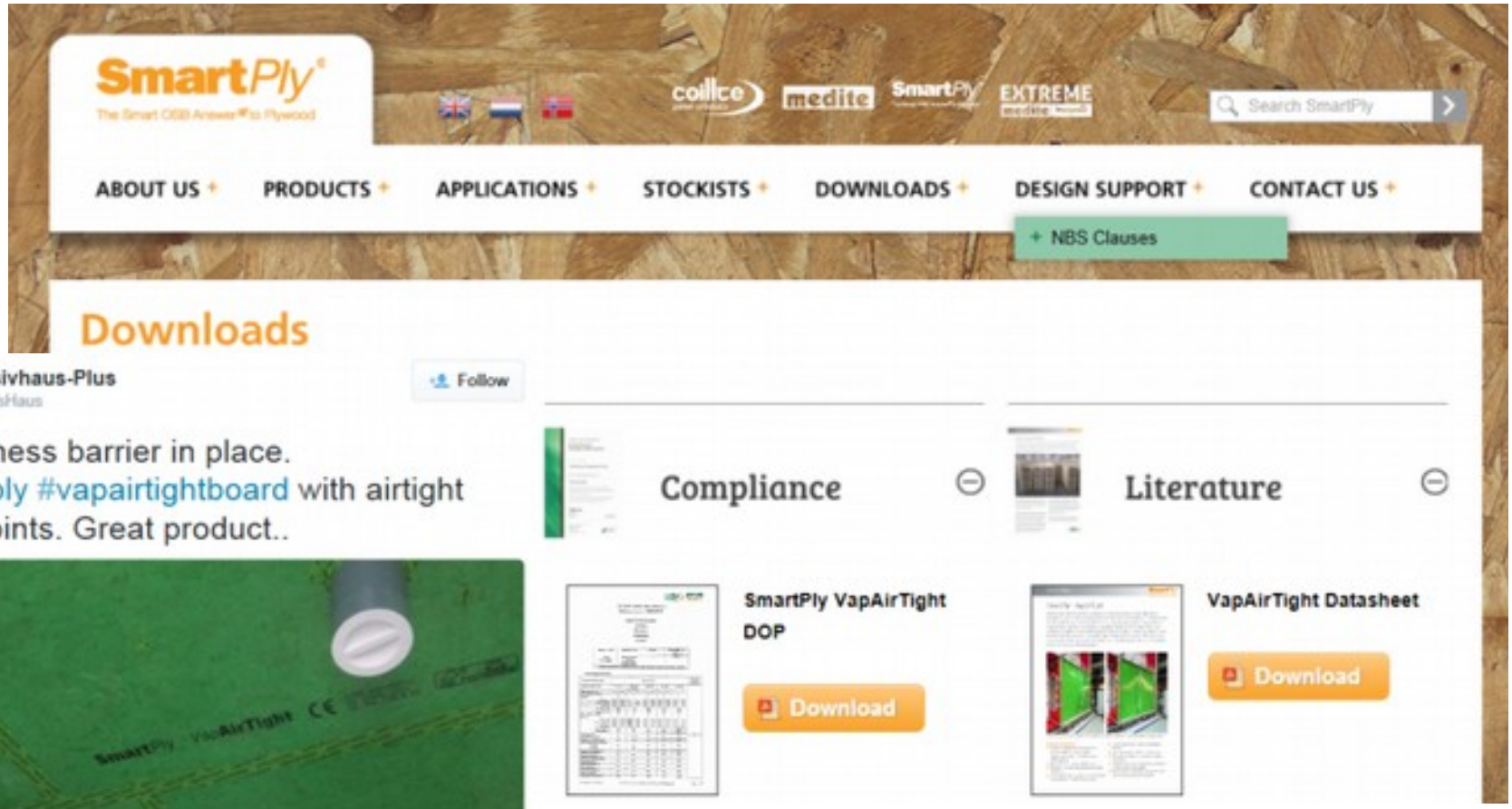
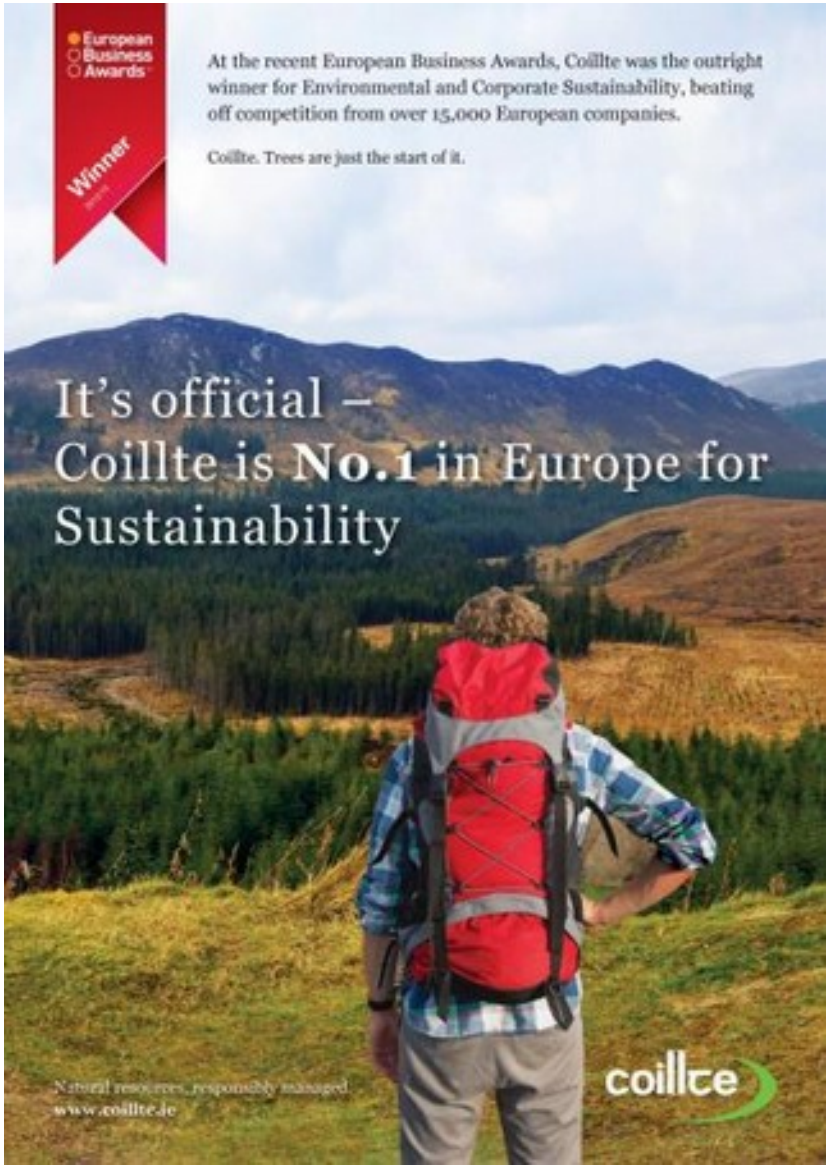
The key to success?

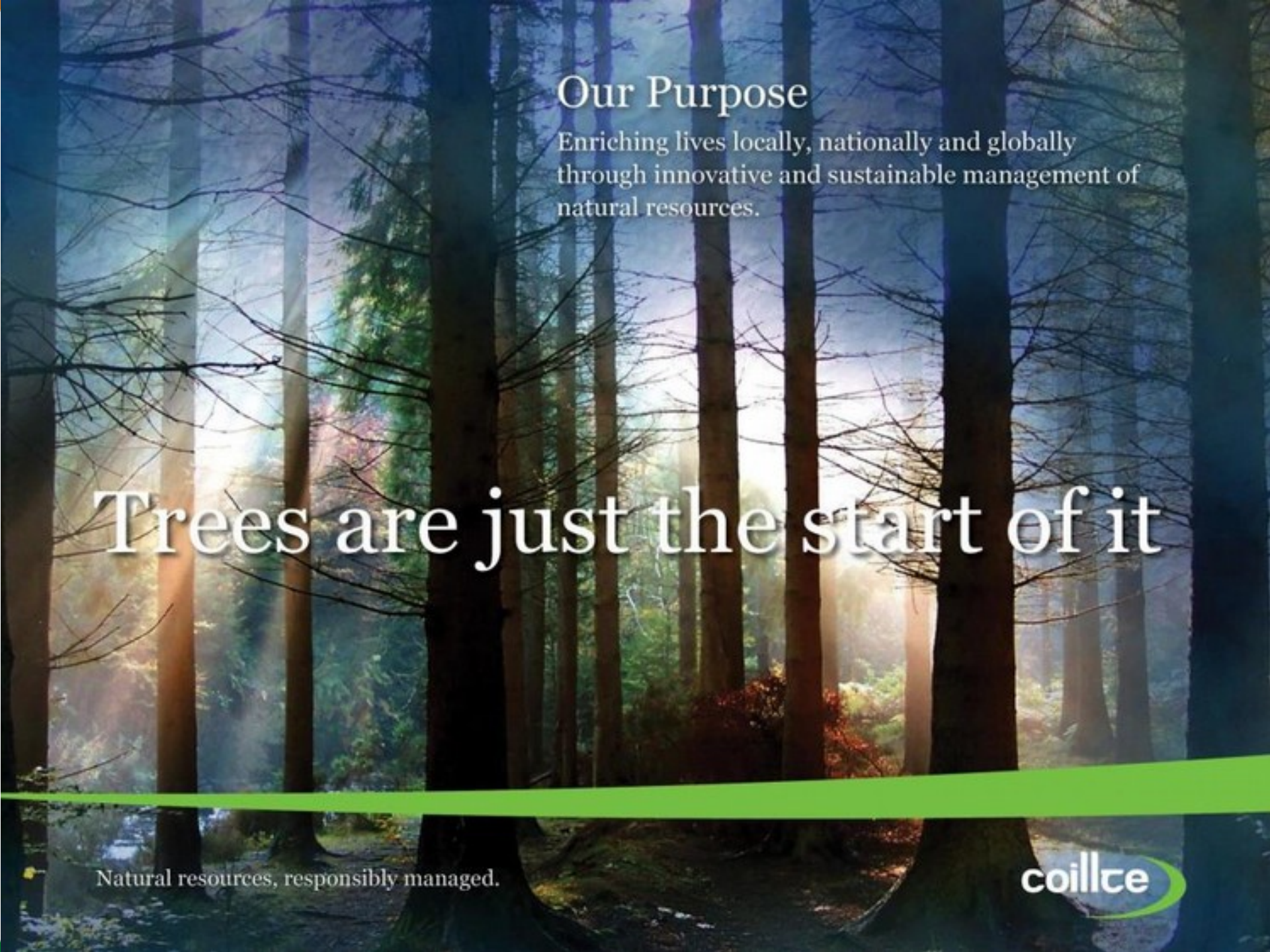
How to specify CPP products!



Or talk to us…!

A fully sustainable offering…




Our Purpose
Enriching lives locally, nationally and globally through innovative and sustainable management of natural resources.
Trees are just the start of it
Natural resources, responsibly managed.
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