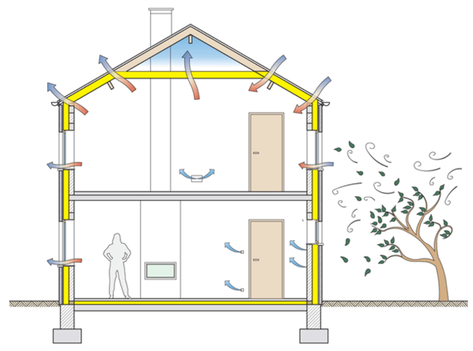
Ecodesign of a “vapour and air barrier membrane – insulator” system, following a cradle-to-cradle approach – ATISOL C2C



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Presentation

Buildings account for 40% of the total energy consumption of the European Union. This sector is growing, as its energy demands. The construction sector is also one of the most important contributors of waste generated at the EU level (up to one third).

The European directive on the energy efficiency of buildings requires the members to put on the market solutions for insulation of buildings that are simple, effective and lasting, but also respectful of the environment and of the users.

As part of the improvement of energy performance of buildings, the **ATISOL C2C** project aims to develop **a complete solution “insulation + vapour barrier + coating”, with the lowest environmental impact on its whole life cycle.** This solution includes a **renewable and recyclable ecodesigned vapour/air barrier.** It can be used both in new construction in timber or during renovation. The constructive system will be validated in both existing buildings and new construction.

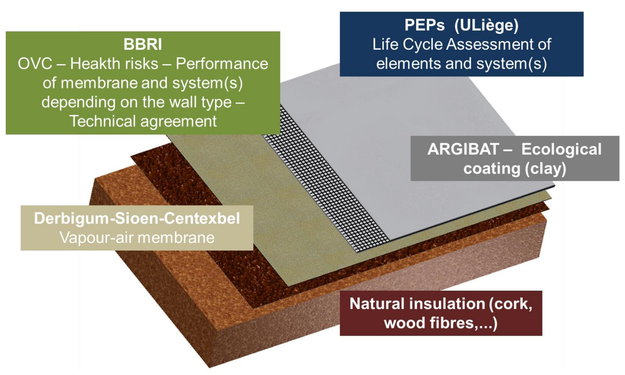
Context

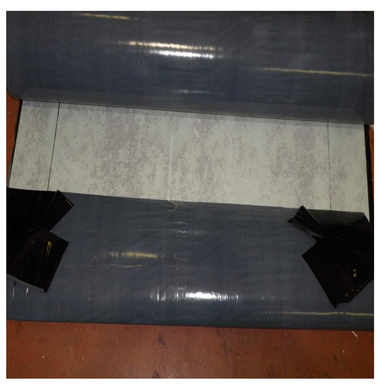
- ✓ Low energy consumption house → thermal insulation & effective ventilation
- ✓ Necessity of vapour/air barrier between insulation and inside to reduce losses
- ✓ Implementation of insulation system combined with vapour barriers presents 3 major problems:
  - important time for placing
  - random durability in time (tapes junction, adhesion to wall,...)
  - low disassembly and re-use level
- ✓ Market:
  - Renovation: Belgium 3 Mm^2 - France 40 Mm^2
  - New wood constructions: Belgium 3 Mm^2 - France 25 Mm^2

ATISOL C2C response

- ✓ Simplicity in terms of materials: integration of a vegetal self-adhesive binder to the spunbond reinforcement of the membrane (from renewable resources)
- ✓ Application on different wall coverings
- ✓ Easier implementation due to self-adhesive characteristics both on common surfaces (walls, roofs, ceilings) and to the level of details such as corners or junctions
- ✓ The offer is completed by a natural top coating (e.g. clay coating)
- ✓ Dismantling at the end-of-life of the building and recovering of the various elements with valuation in a cradle-to-cradle perspective
- ✓ Starting point/reference: **Derbiskin® → optimisation of formulation, design, reinforcing spunbond support, characteristics, and environmental impacts**

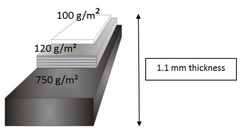
Project objectives ≤ 2.5 €/m^2

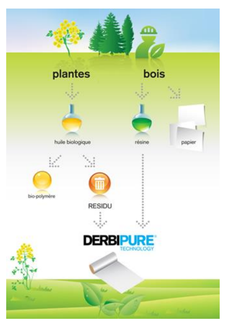




State of the art (after 6 months) ⇒ *in progress*

- ✓ Total thickness: 1.1 mm ⇒ *final goal: 1 mm*
- ✓ **Membrane:**
  - acrylic coating ⇒ *not necessary ?*
  - polyester spunbond reinforcing membrane ⇒ *to be replaced by renewable raw matter*
  - self-adhesive binder based on vegetal oil ⇒ *improvement of formula, characterisation, adhesive properties,...*
  - ⇒ *membrane processing*
  - ⇒ *membrane properties (tightness, adhesion,...)*
  - ⇒ *coating application and resistance tests*
  - Data collection for LCA ⇒ *inventory and LCA*





Properties of Derbiskin®

- ✓ Self-adhesive vegetal blend reinforced by a coated non-woven polyester
- ✓ Durability of performances and suitable for the whole envelope of the building - thanks to the unique Derbigum Technology (adapted evolution for indoor application of the patented vegetal waterproofing Derbipure®)
- ✓ Can be used on any support
- ✓ Self-repairing (e.g. nail holes)
- ✓ Quick and simple application due to self-adhesiveness and conception
- ✓ Reduced costs (1 product for all applications – no tapes)
- ✓ Sustainable, C2C certified
- ✓ Can be directly plastered
- ✓ 100% recyclable

Technical characteristics of Derbiskin®

	Test method	Expression of result	Values	Units
Air permeability	EN 12114 – Version 2000		0.05	$m^3/h\ m^2$
Vapour diffusion (Sd)	EN 1931	MLV	> 25	m
Tensile strength L/T	EN 12311-1	MDV (+/-20%)	500/300	N/50mm
Tear Resistance L/T	EN 13310-1	MLV	≥ 100	N

Project and Partnership

- ✓ **4 years project** - started on September 1st 2016, ~2.7 M€
- ✓ **2 phases**
  - 25 months Industrial Research → GO/NO GO
  - 23 months Experimental Development
- ✓ **Industrial Research: optimisation of Derbiskin®**
  WP0 & WP12 – Coordination & Communication: Derbigum
  WP1 - Membrane design: Derbigum, Centexbel, BBRI, ULiège-PEPs
  WP2 - Renewable spunbond reinforcing support: Sioen
  WP3 - Life cycle assessment: ULiège-PEPs
  WP4 - Self-adhesive binder: Derbigum, BBRI, ULiège-PEPs
  WP5 - Lab scale membrane processing: Centexbel
  WP6 - Characterisation: BBRI

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