

NATURALLY HIGH  
PERFORMANCE  
INSULATION



# Rigid insulation panel from hemp

*Building a climate-neutral Europe with natural bio-based construction materials*

29 January 2019, Brussels, BEL



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# Company presentation

**CAVAC Biomatériaux (France) :**  
**A complete hemp chain “from field to site”, unique in Europe !**



# A complete hemp chain “from field to site”, unique in Europe !

- **Hemp and flax cultivator**
- **Transformer : Production of hemp and flax fibers (and shiv)**
- **Producer of bio-based insulation panels**
- **Member of the ISOBIO Project**





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# Cavac objectives in ISOBIO projet:

- Context of development

Straw

Hemp fibre  
20-25%wt



Hemp Shiv  
**55-60%wt**



Hemp fines  
15-20%wt



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## Building applications



© Isabelle Duffaure-Gallais/Le Moniteur - Projection



equalization screed



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**New application**  
Rigid insulating panel  
from hemp shiv ?

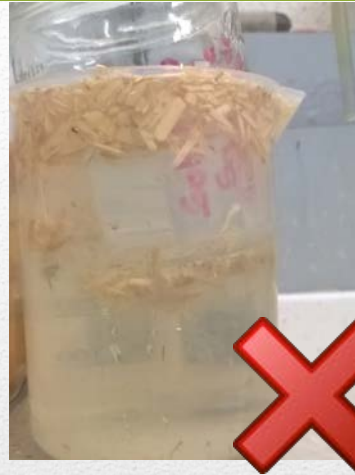


**Zero waste  
policy !**



# Development with ISOBIO

- Beginning of ISOBIO



Research on **biobased binder formulation** to bind the hemp shiv.

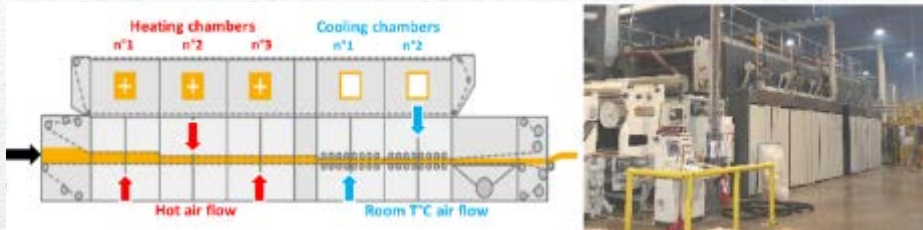
Research on the **manufacturing tools and production process**.





# Development with ISOBIO

- Several production trials on different industrial tools



Industrial testing on a continuous thermopressing line





# Development with ISOBIO



**2 m x 4 m hemp shiv panel  
were cut to final size**

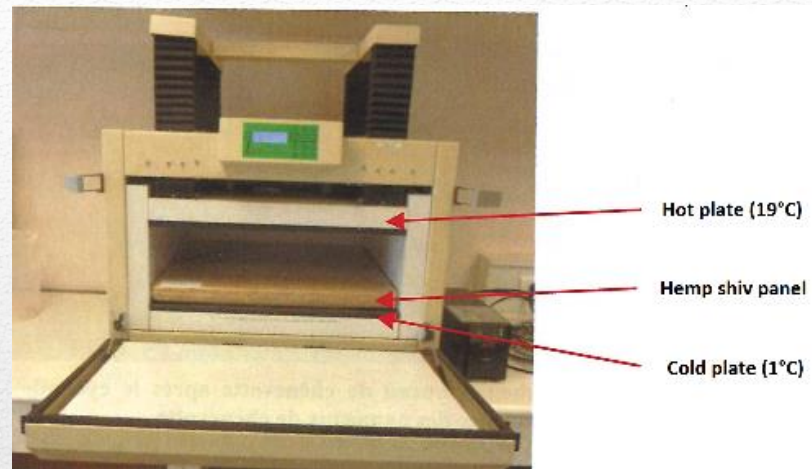


**Production trials led to**

- **the identification of a fully automatised continuous production process**
- **Compatible with rigid hemp shiv insulation panel**



# Development with ISOBIO



## Panel performances





# Panel performances

- **New valorisation of an industrial byproduct**
- Low density  $\sim 200 \text{ kg/m}^3$
- Good thermal insulation
- Good/excellent moisture buffering value :  
Improve indoor air quality
- Vapor permeable
- Water proof
- Good mechanical properties
- Bio based content > 95 %wt
- Groove and Tongue profil
- Improved fire retardancy if required



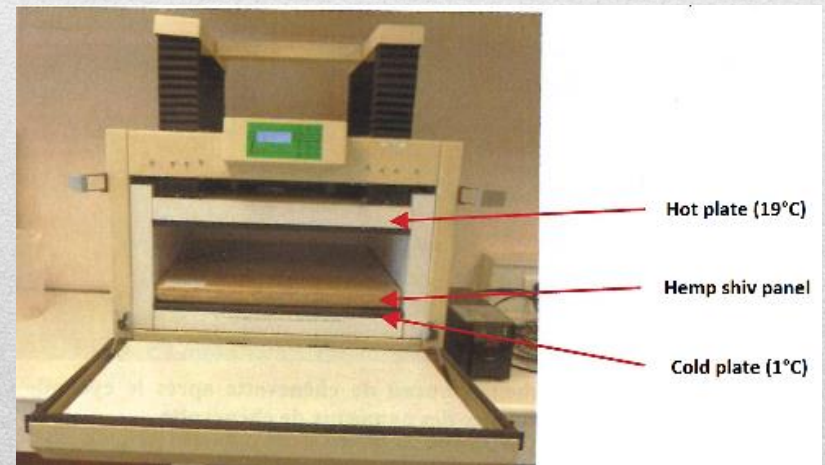
# Panel performances

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**$\lambda = 0.055 \text{ W/m.K}$  (hot plate method)**

Complementary insulation  
50 mm thickness,  $R = 0.9 \text{ m}^2.\text{K/W}$





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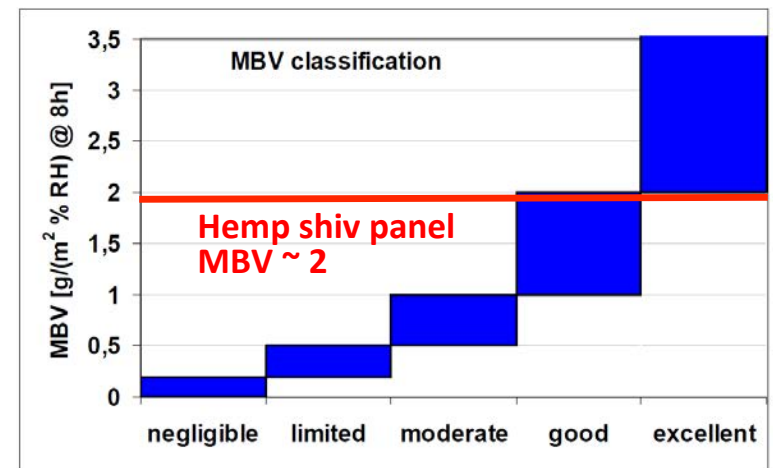


Figure 4-3. Graphic presentation about practical Moisture Buffer Value classes

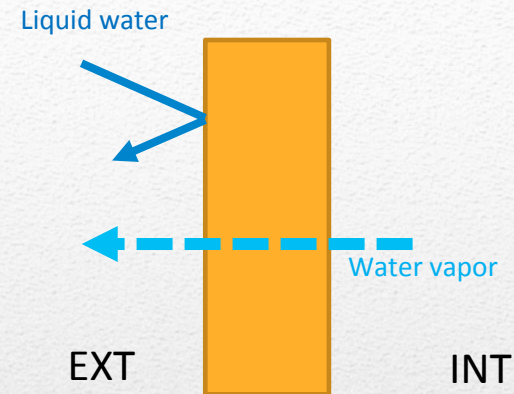
## Nordest project MBV classification

**Hemp shiv insulation panel :  
Good or excellent hygric  
regulator**



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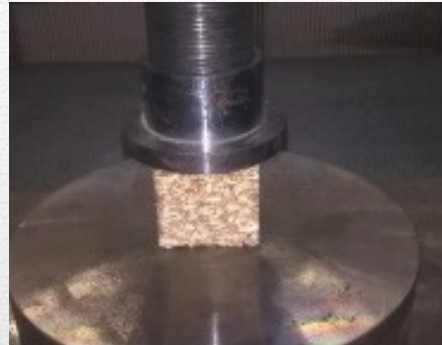
Moisture vapor can pass through the panel :

- Reduced condensation risk
- Avoid water vapor blocking in the wall



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Compressive strength can reach 1 MPa  
(5 times higher than similar wood based product)

Flexural strength can reach 2 MPa



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No added formaldehyde  
No reactive PMDI  
**Reduced VOC content**



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**Ease of implementation**  
**Reduce thermal bridges**



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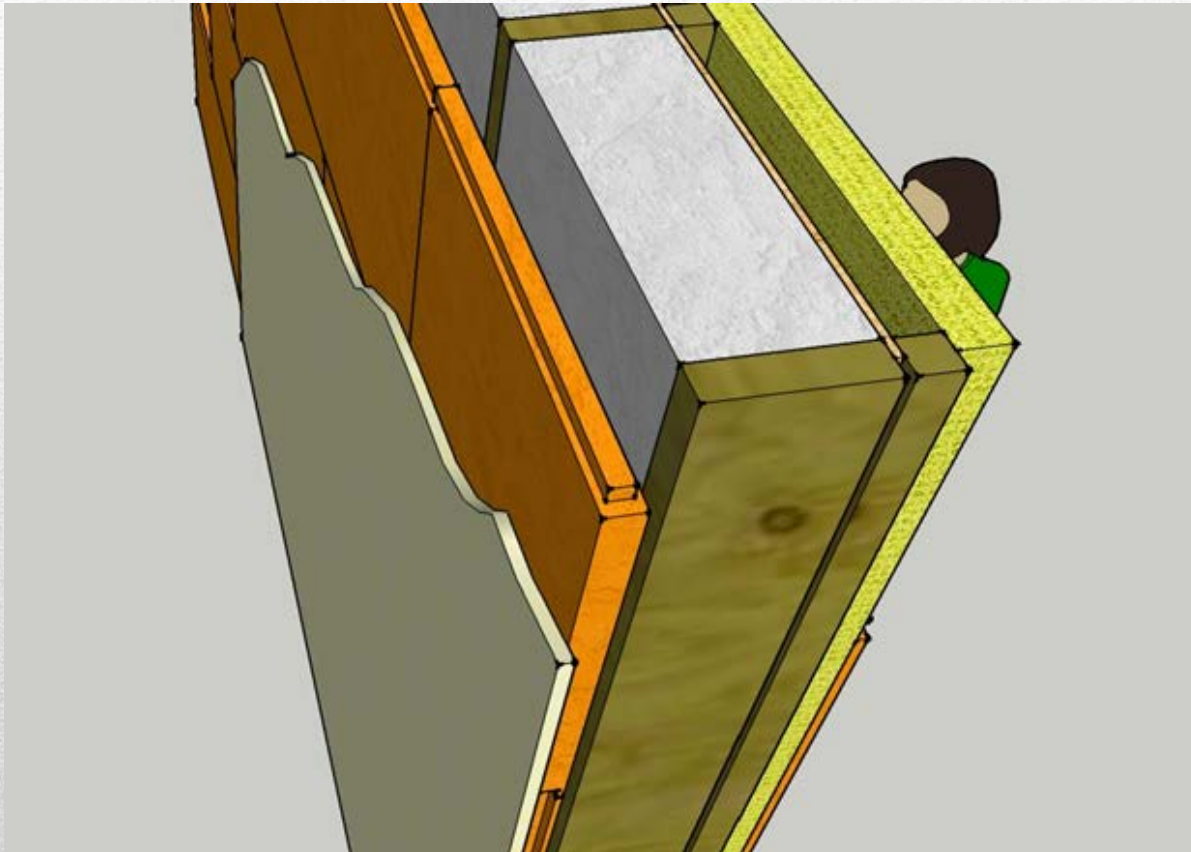


# Expected uses

- Expected uses:
  - Wood frame building
  - Internal insulation (new building and retrofiting)
  - External insulation (new building and retrofiting)
  - Plaster/render substrate
  - Sarking insulation

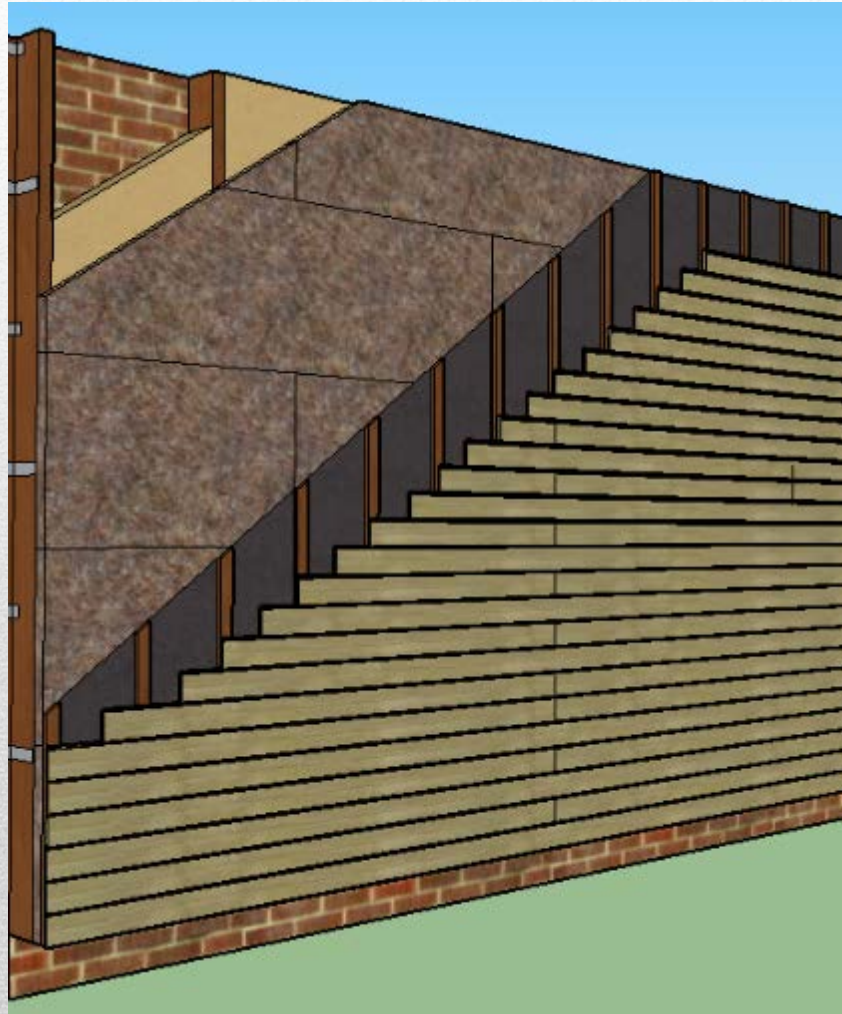


## Wood frame building : lime render finish





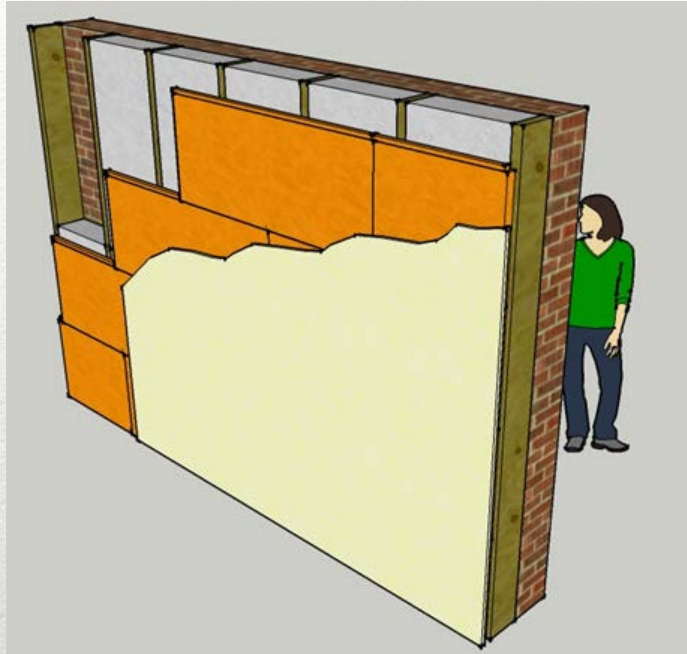
## Wood frame building : siding



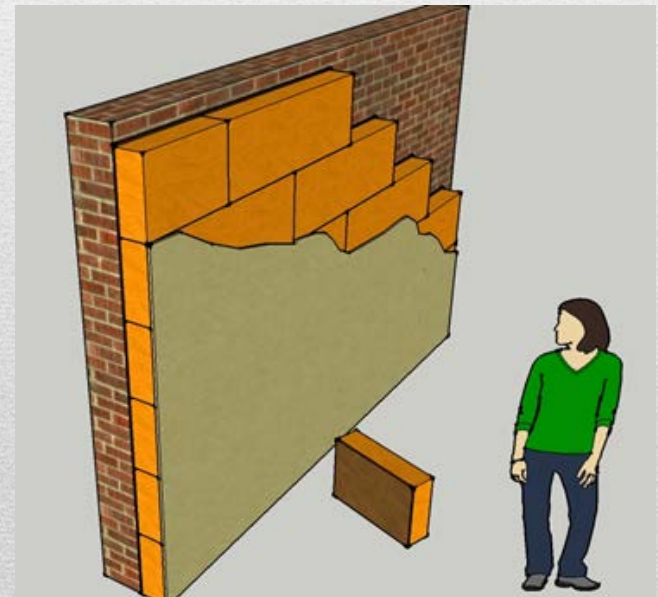


# External insulation

External insulation (retrofit or new building)



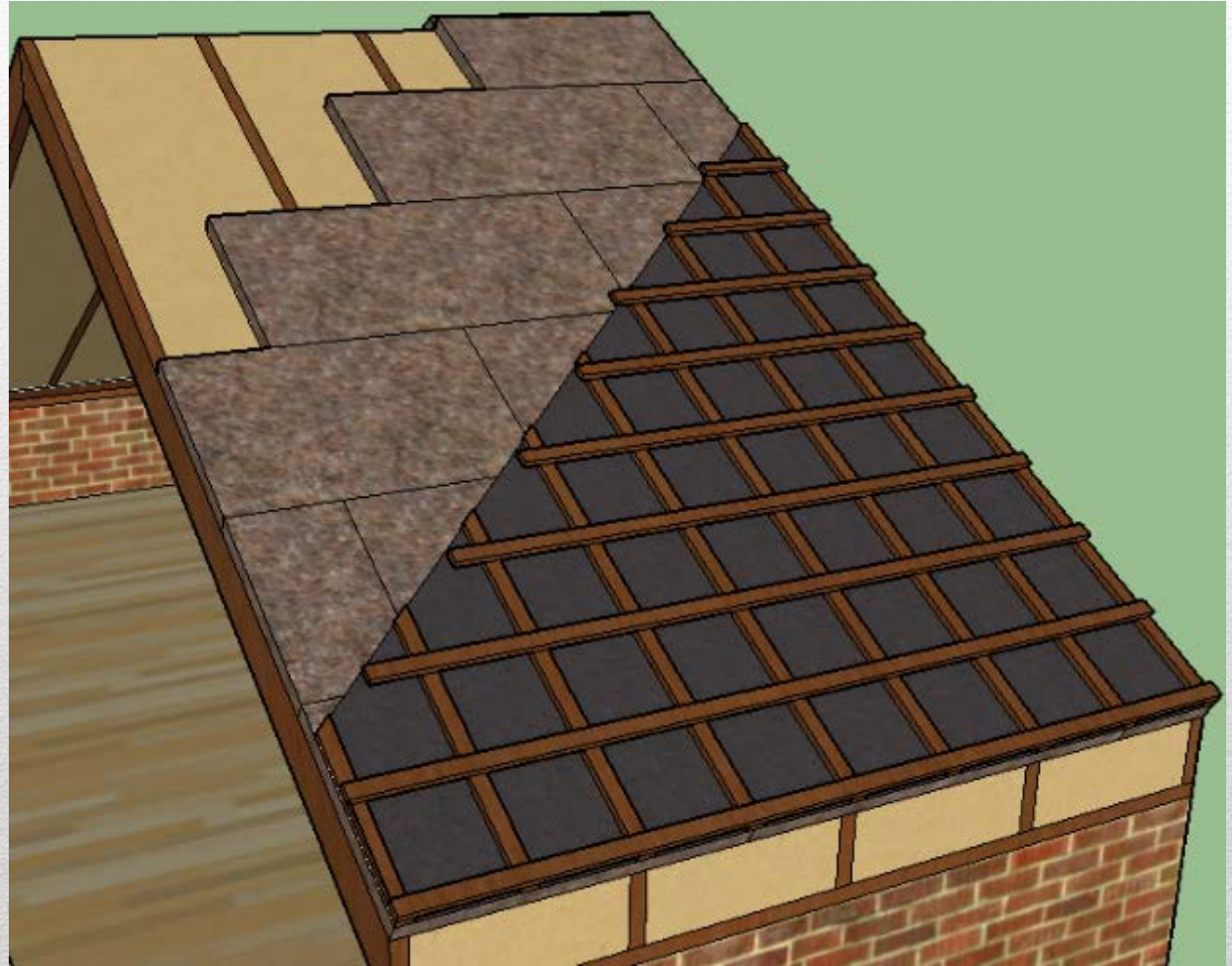
Internal insulation (retrofit or new building)





# Sarking insulation

Sarking insulation





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isobio

Thank you

