

VIP as Thermal Breaker for Interior Insulation System

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Building renovation is a major challenge in Europe with more than 200 millions of existing buildings to renovate.

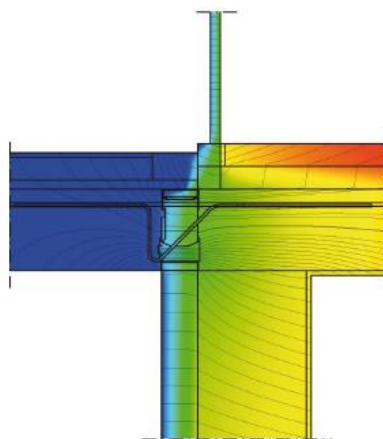
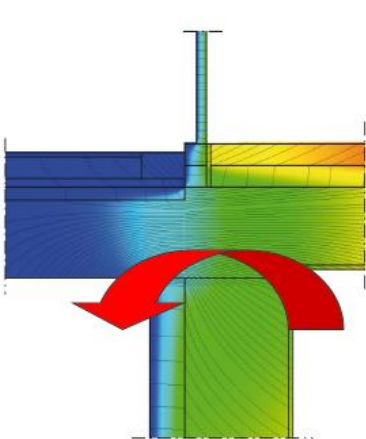
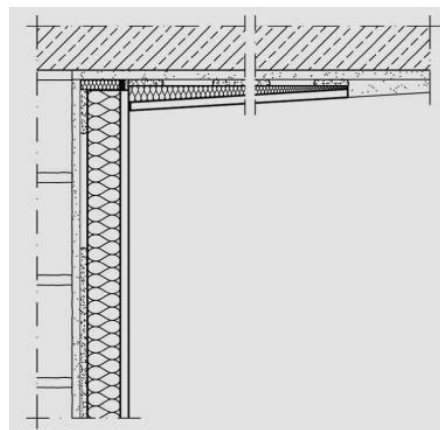
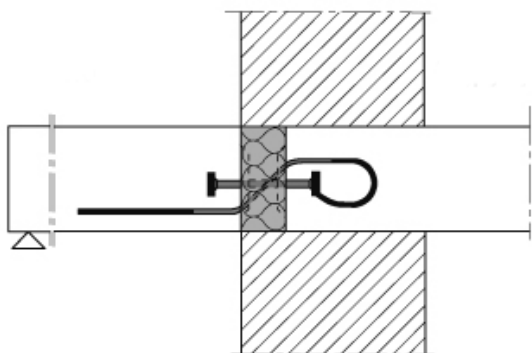
ETICS (External Thermal Insulation Complex System) is often claimed as being the most efficient system especially for tackling thermal bridges and keeping thermal inertia. Nevertheless, this system cannot be applied to some existing buildings, especially those having a façade with a high architectural character.

As thermal bridges represent a significant share of heat losses in buildings : (about 40% of the whole U-value; source of a lot of pathologies due to local condensation), many thermal breakers have been developed for new buildings but technical solutions for existing buildings are missing.

In order to meet this requirement, a slim thermal breaker (STB) has been developed using a VIP panel.

For New buildings

Concept for existing building



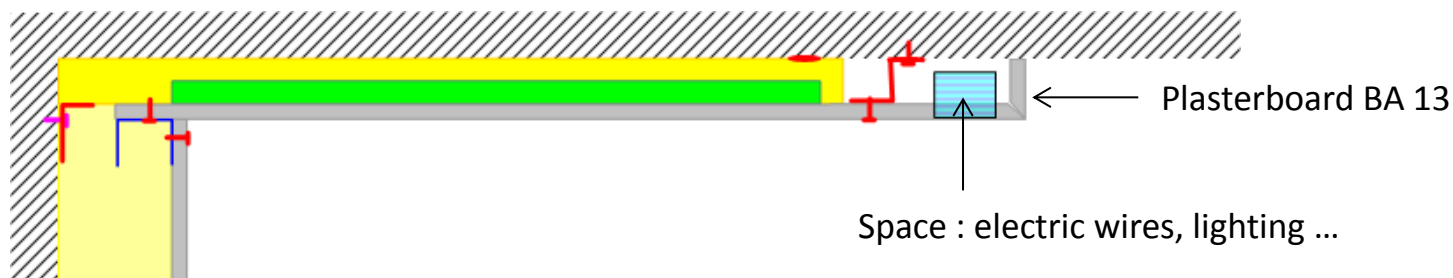
Schoeck



Rockwool

VIP embedded in a PU foam & protected by a plaster board

✓ Ceiling Application

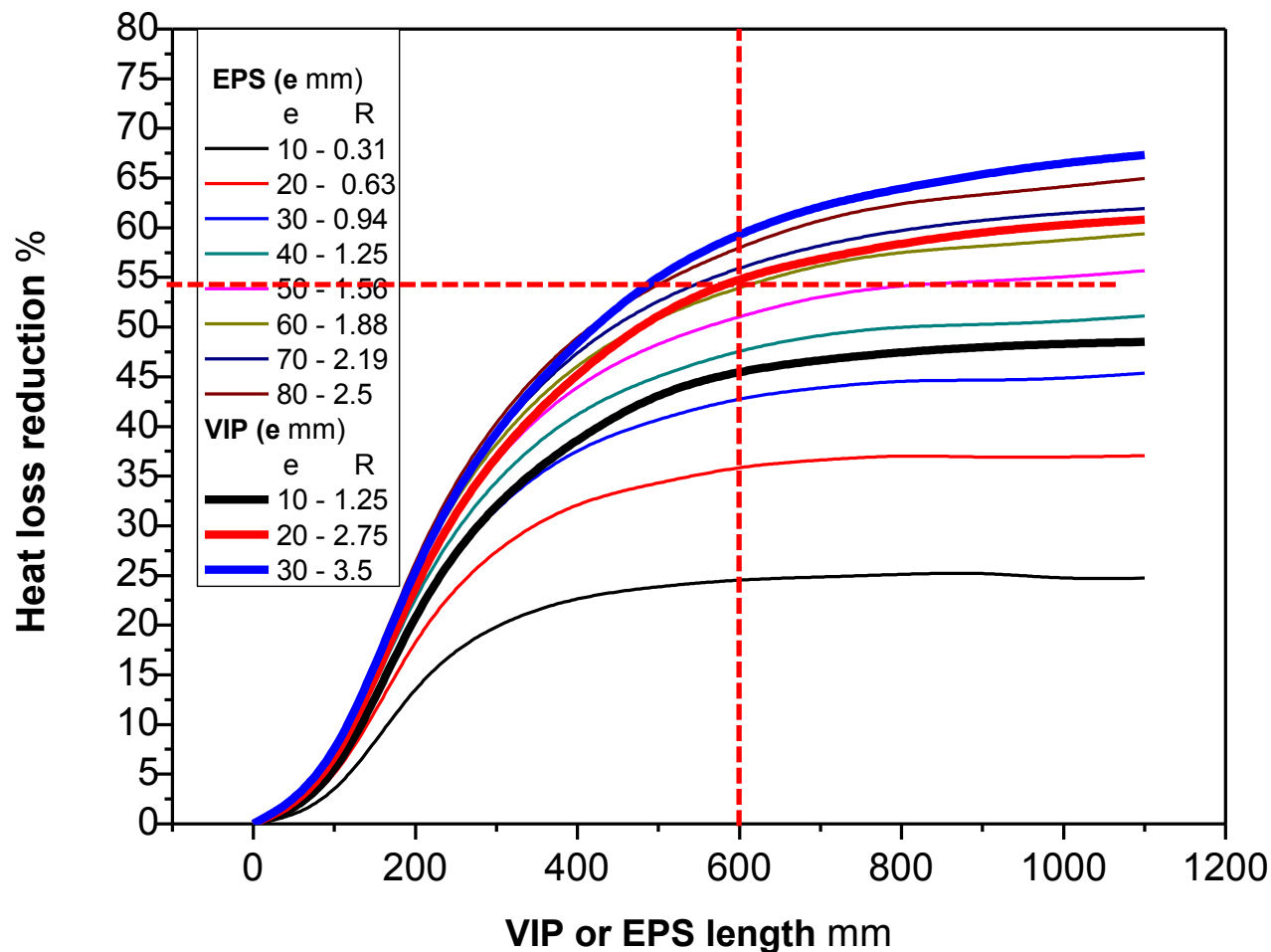
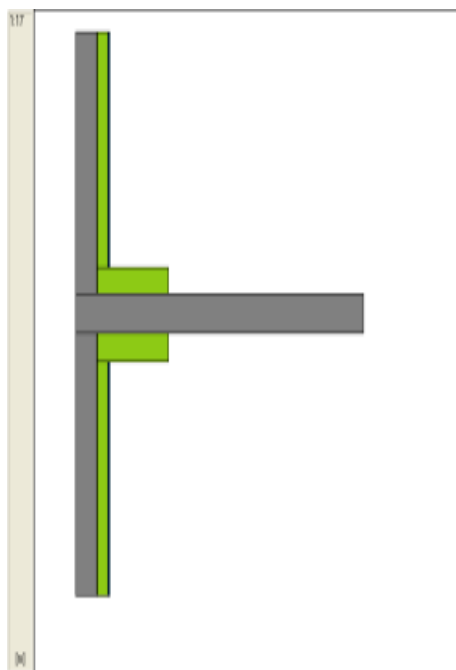


Connection of 2 STB

✓ Floor Application



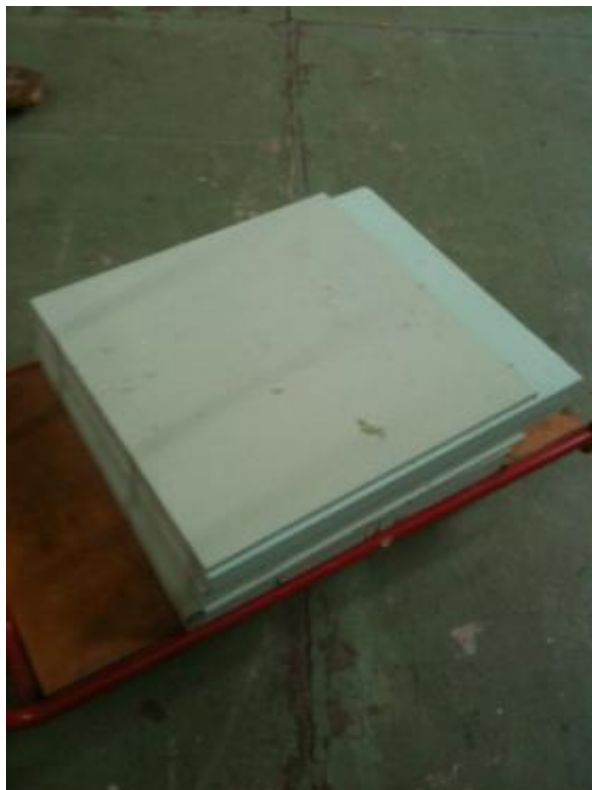
Length & Thickness of the VIP



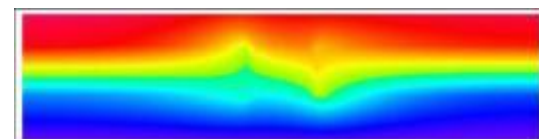
STB for ceilings & floors



« Cornice » STB for Ceiling

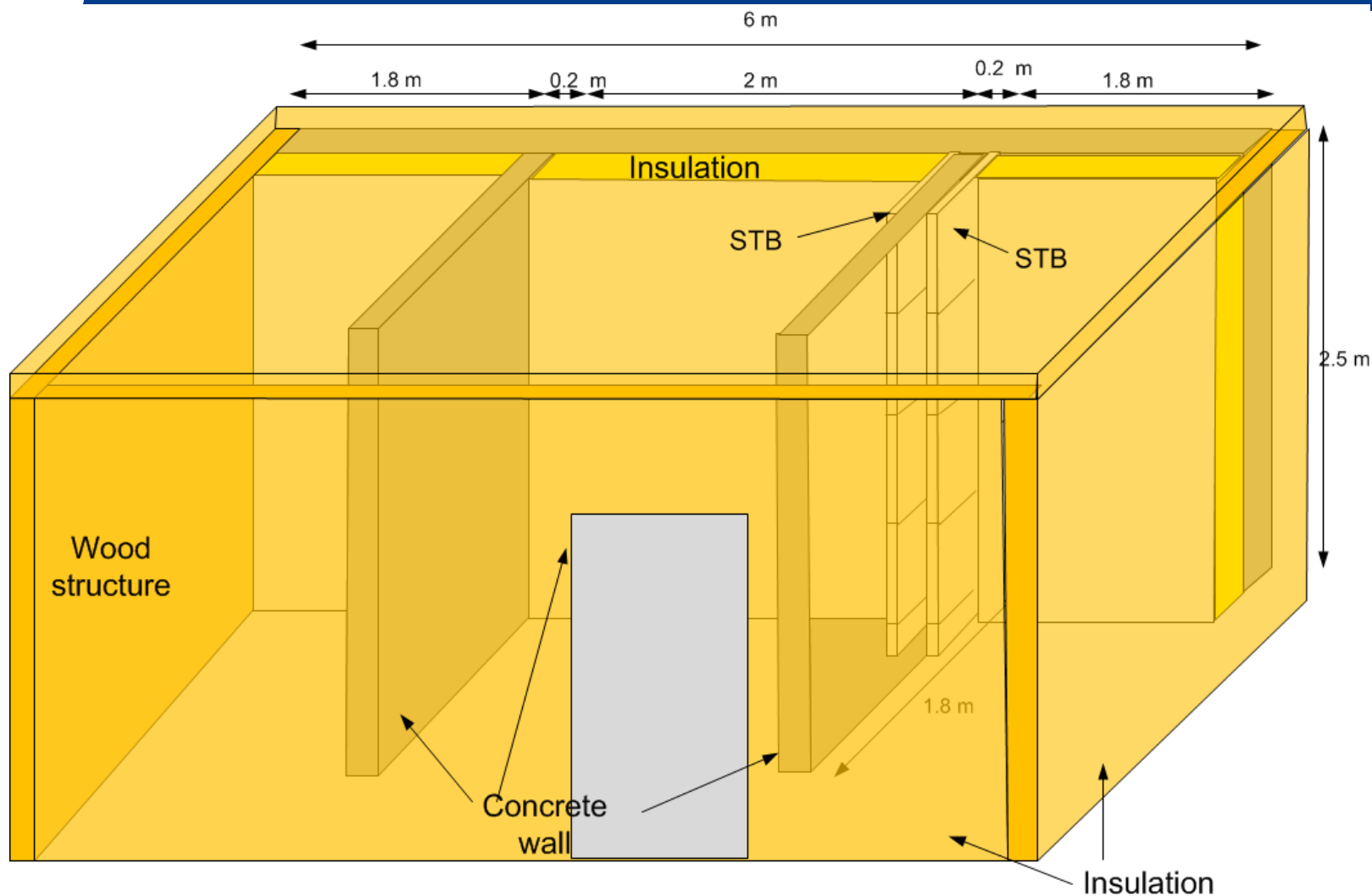


“Floor” STB



STB connection

Mock-Up for Testing



Mock-Up for Testing



Vertical walls are considered as Floors !



Electric Heating

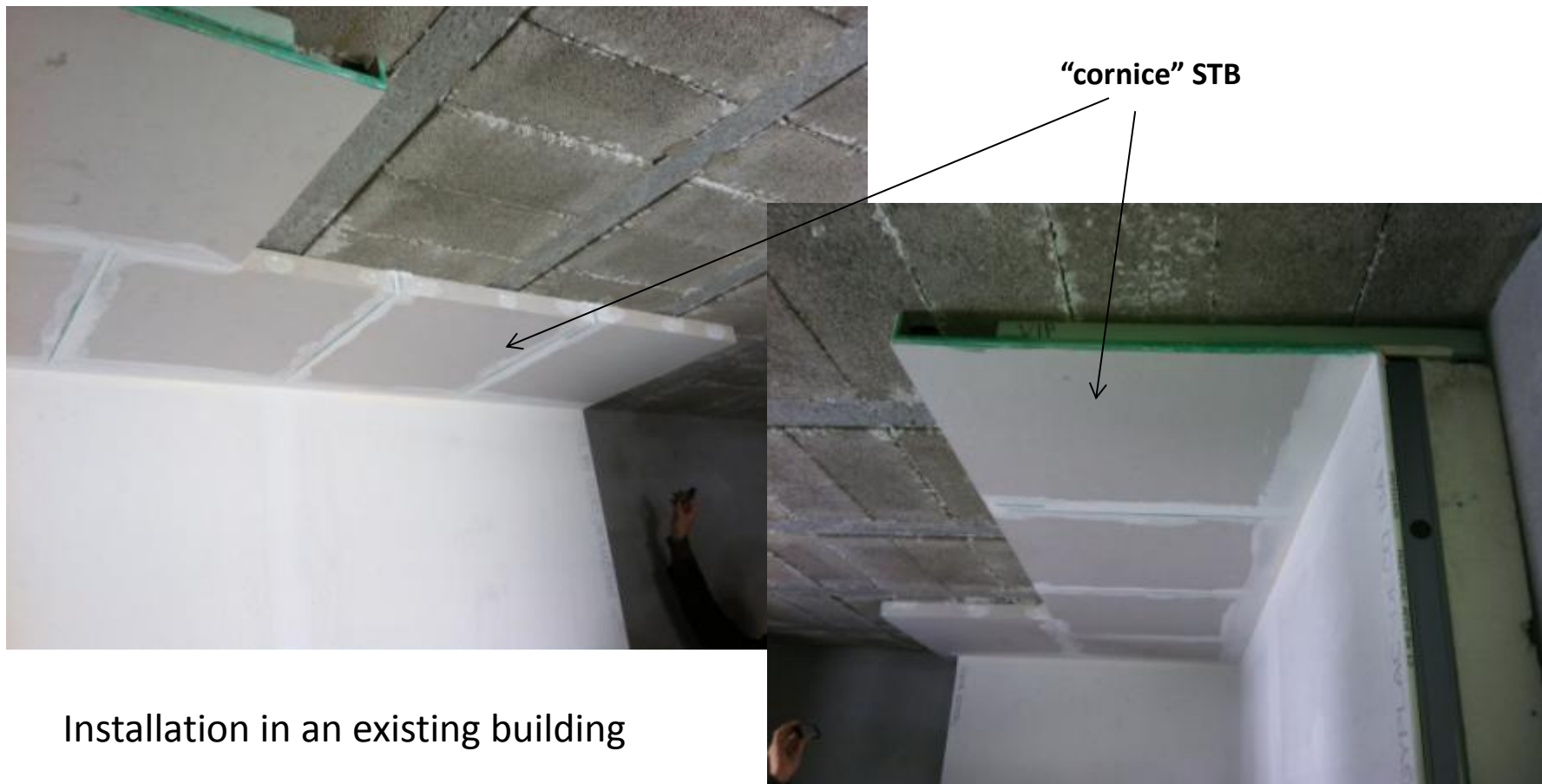


« cornice » STB

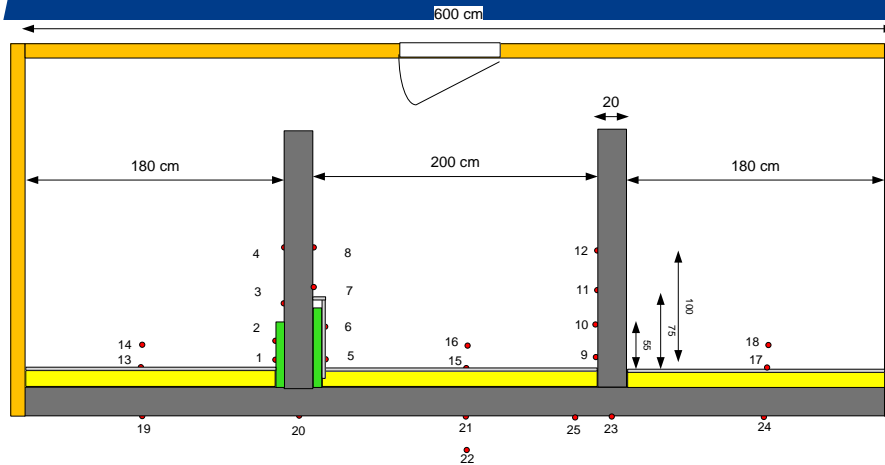


Floor STB

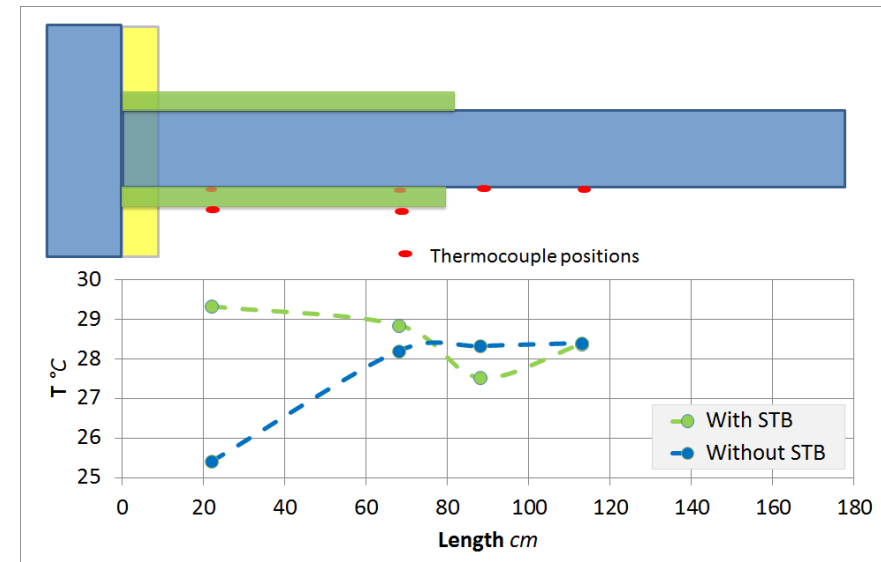
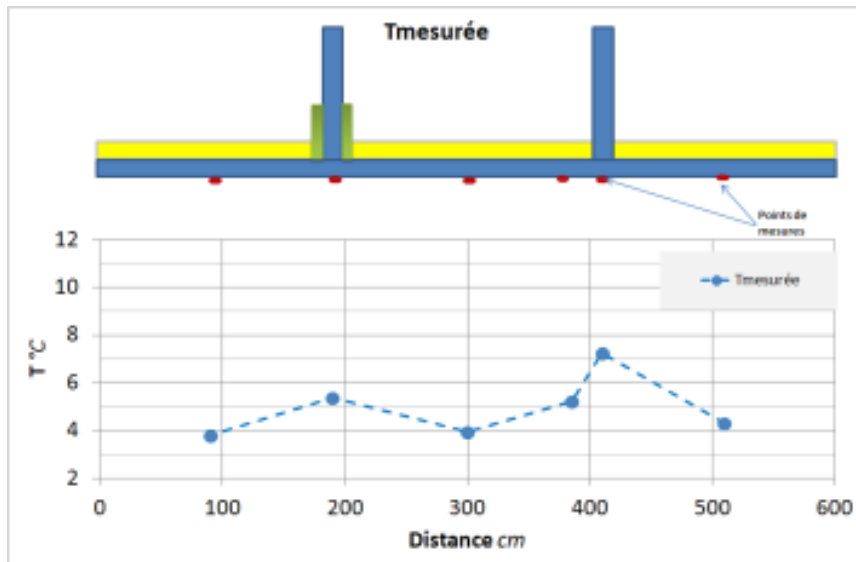
« Cornice » STB for ceiling Installation on site



Implementation of Sensors

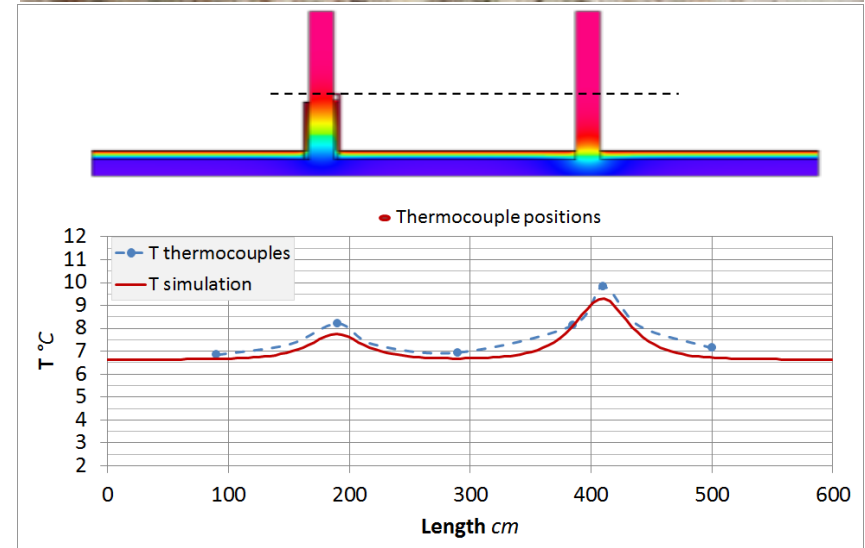
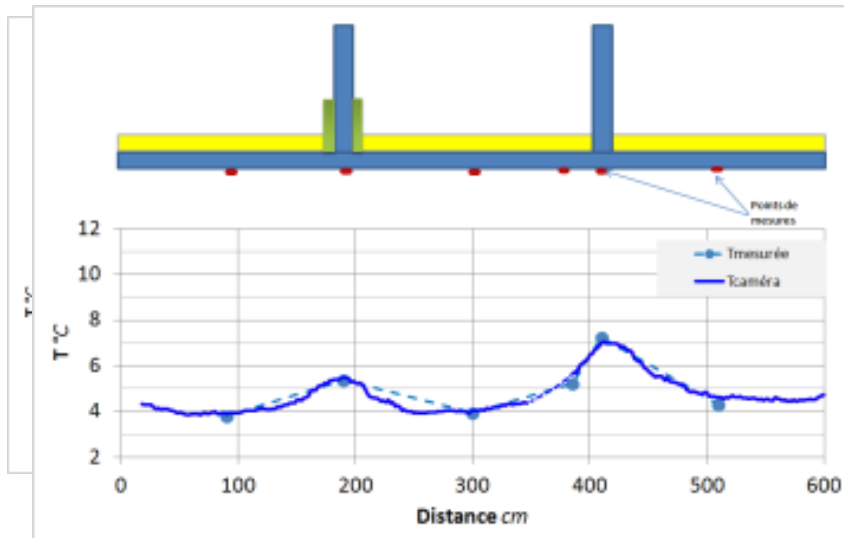


Temperature Sensors

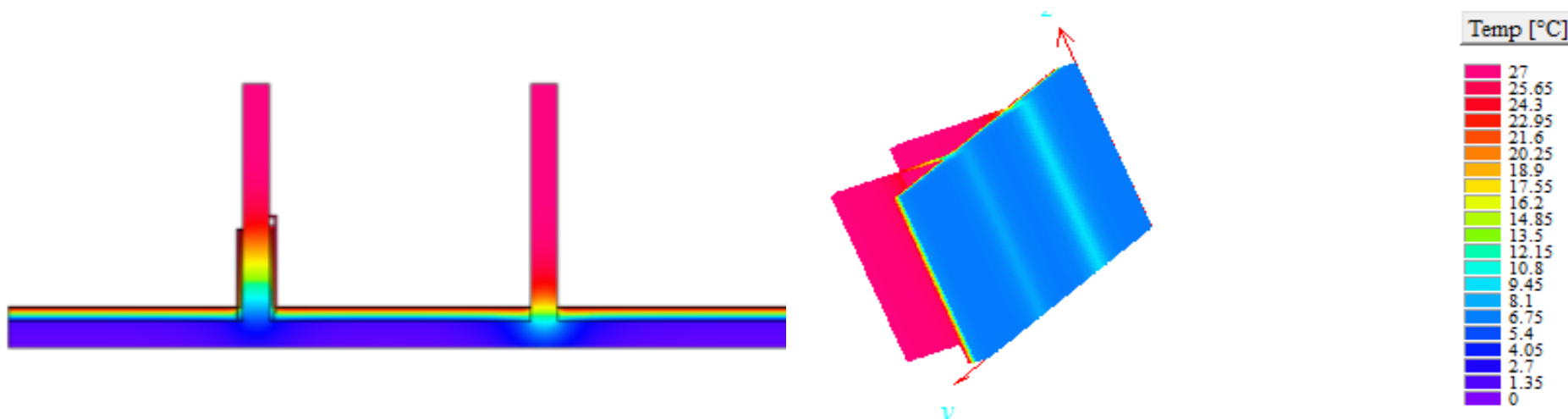


Experimental Results

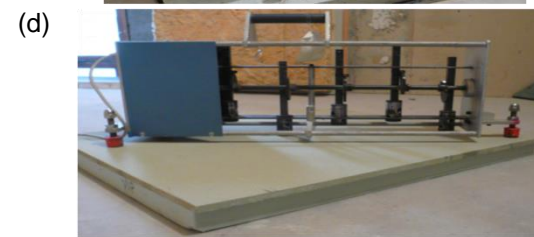
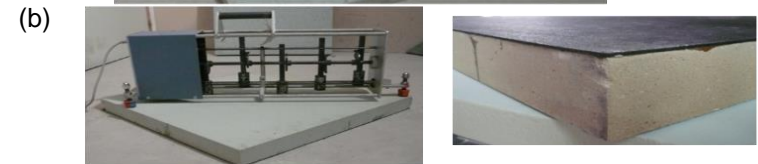
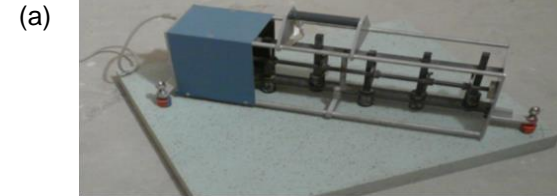
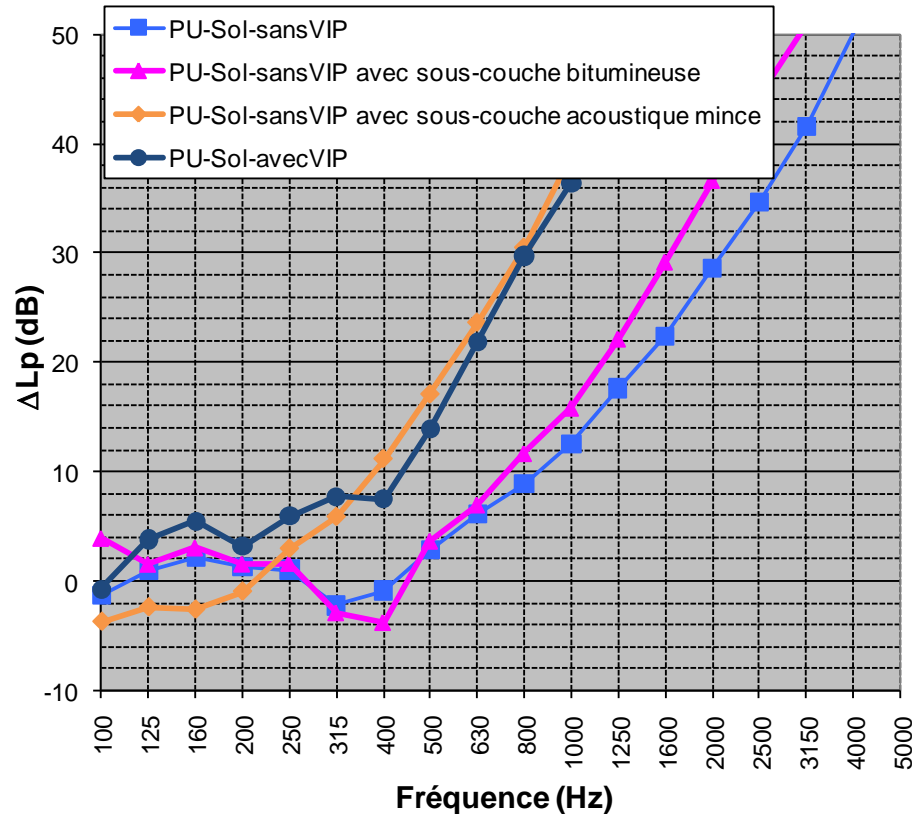
Thermocouples - IR camera - Simulation



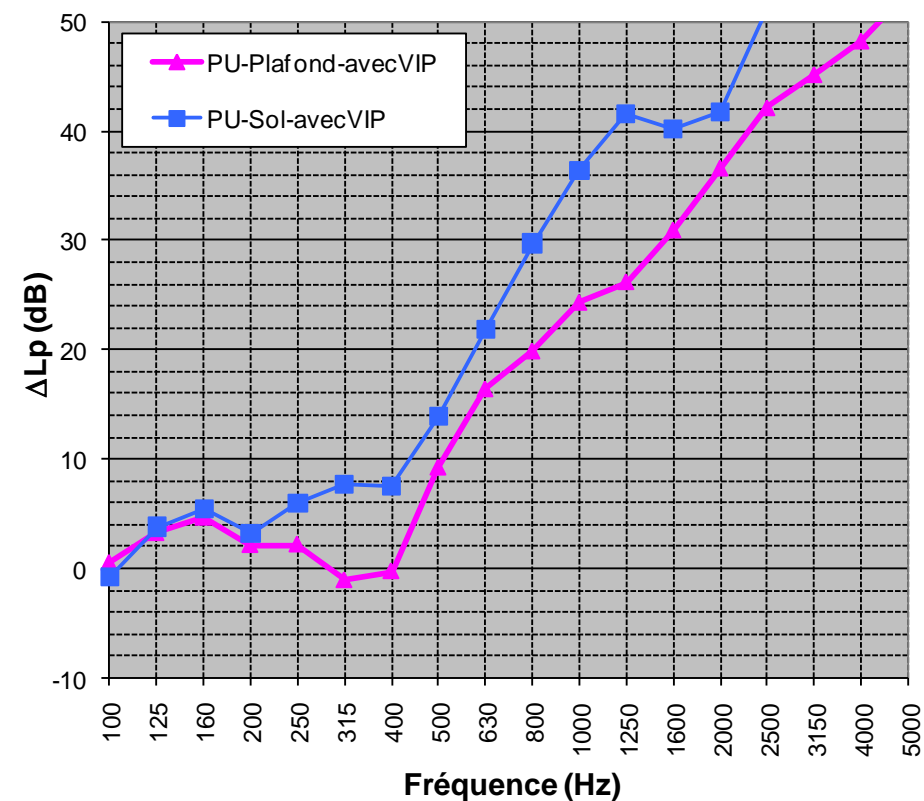
Calculated Uvalue W/m².K



Wall	Without STB	STB one side	STB two sides	ETICS
Mean U-value W/m ² .K)	0.6	0.5	0.4	0.3
ΔU %	0%	16%	29%	51%

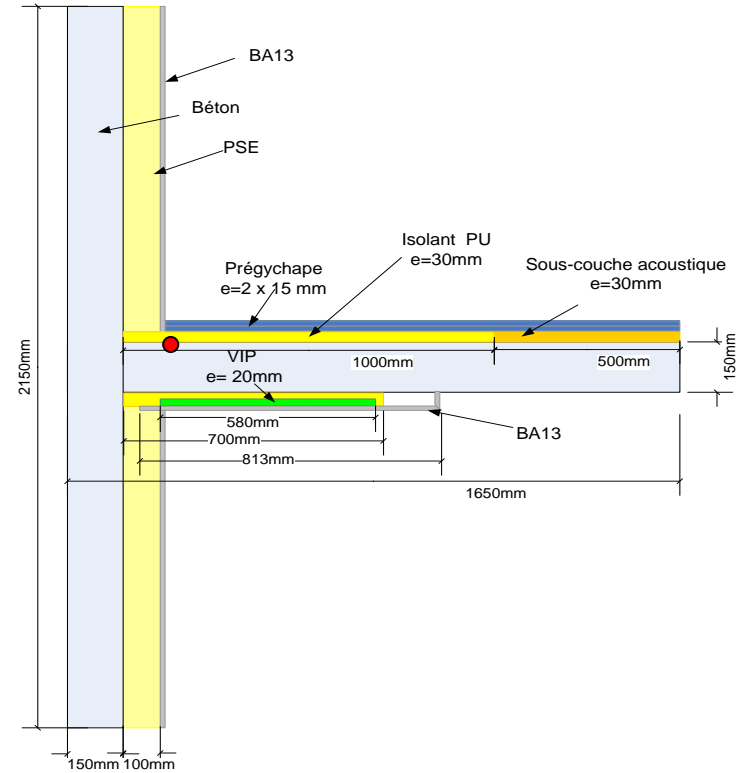
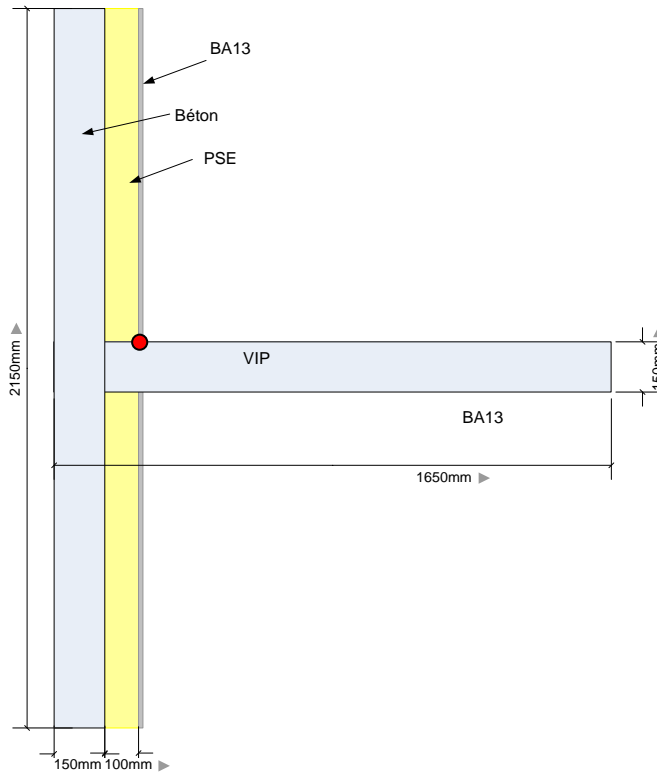


The acoustic layer improves the acoustic performance.
The VIP slightly damages this performance

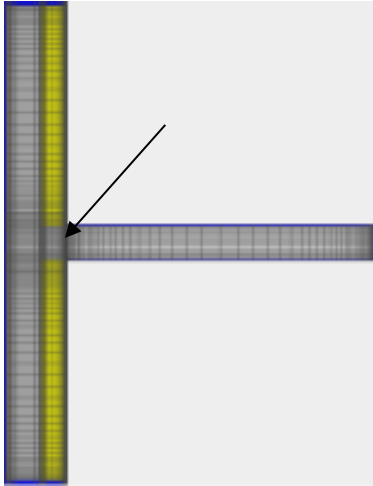


The performance of the « corniche » STB is lower than the « floor » STB

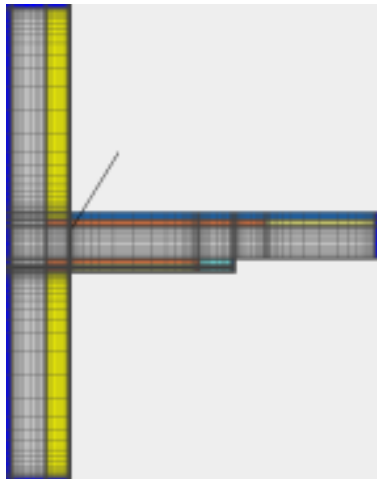
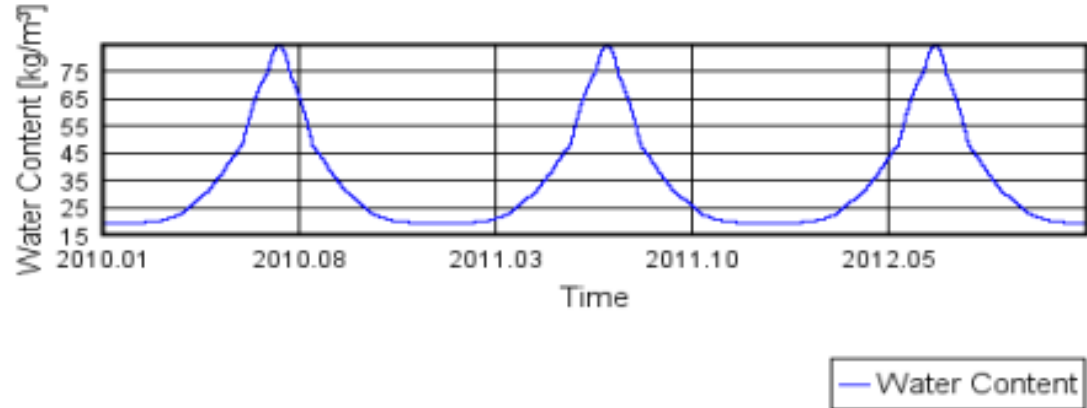
Heat & Moisture Transfer



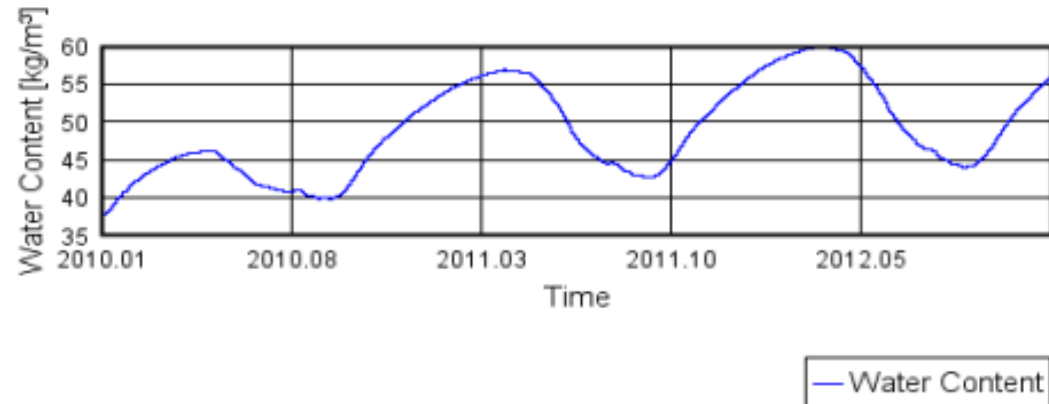
Materials	Thermal Conductivity <i>W/m.K</i>	Thickness
Béton	1.7	150
BA13	0.43	13
Prégypchape	0.43	30
Doublage PSE	0.032	100
Sous couche acoustique LV	0.036	30
Sous couche PU	0.028	30
Enrobage VIP PU	0.022	20
VIP	0.005	20



Water Content



Water Content



VIP Thermal Breaker

- ✓ Reduction of the Ψ value by 55%
- ✓ In the example presented, the U value is reduced by 30%
Around 60% of the ETICS value
- ✓ No additional condensation risks
- ✓ Acoustic Performance in agreement with the Regulation

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