



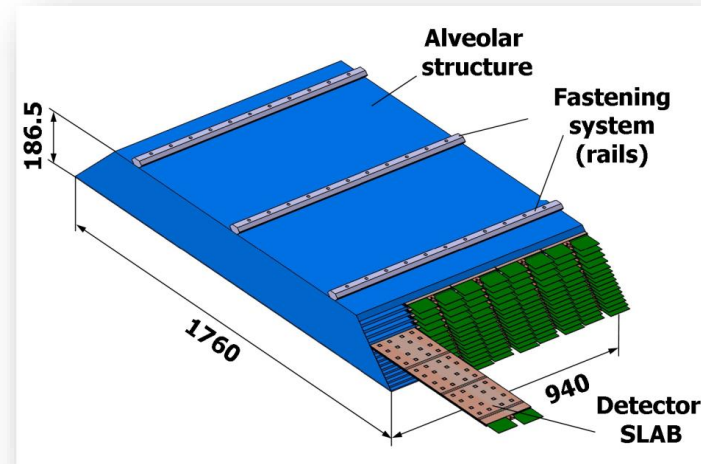
Detector cooling SiW ECAL

Cooling studies : From detector to cooling station.

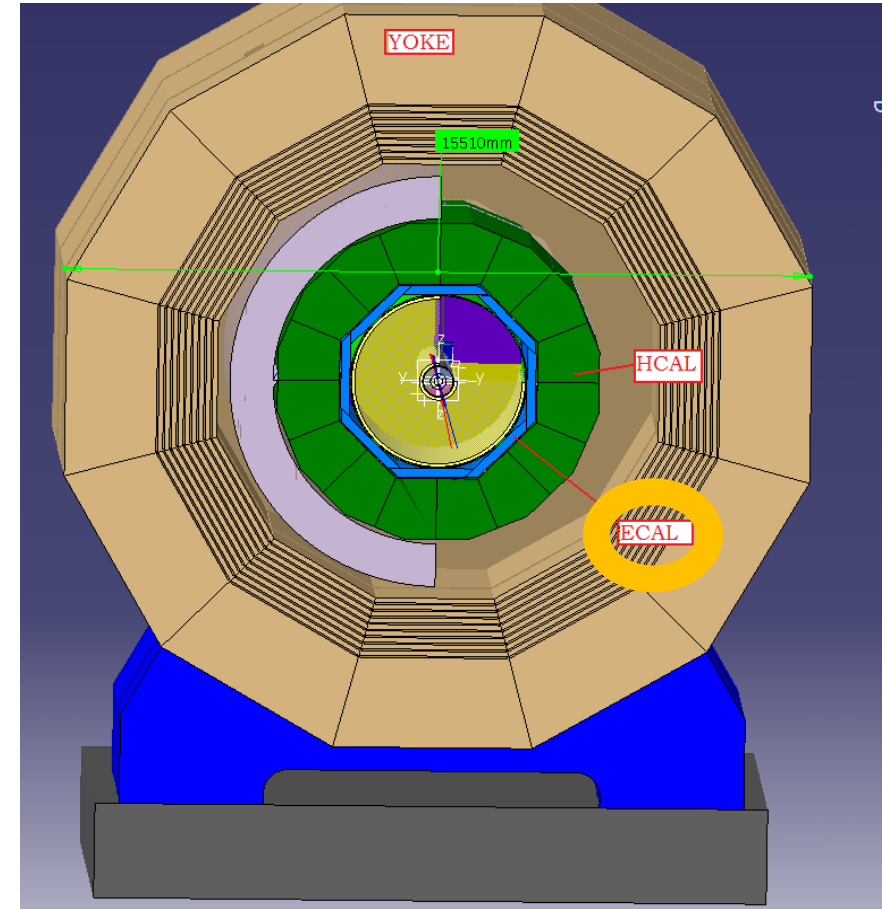
- Tests and simulation on detector (EUDET module).
- Tests and simulation on global cooling system (Pipe at real scale + Cooling station).



Cooling station



ECAL Module

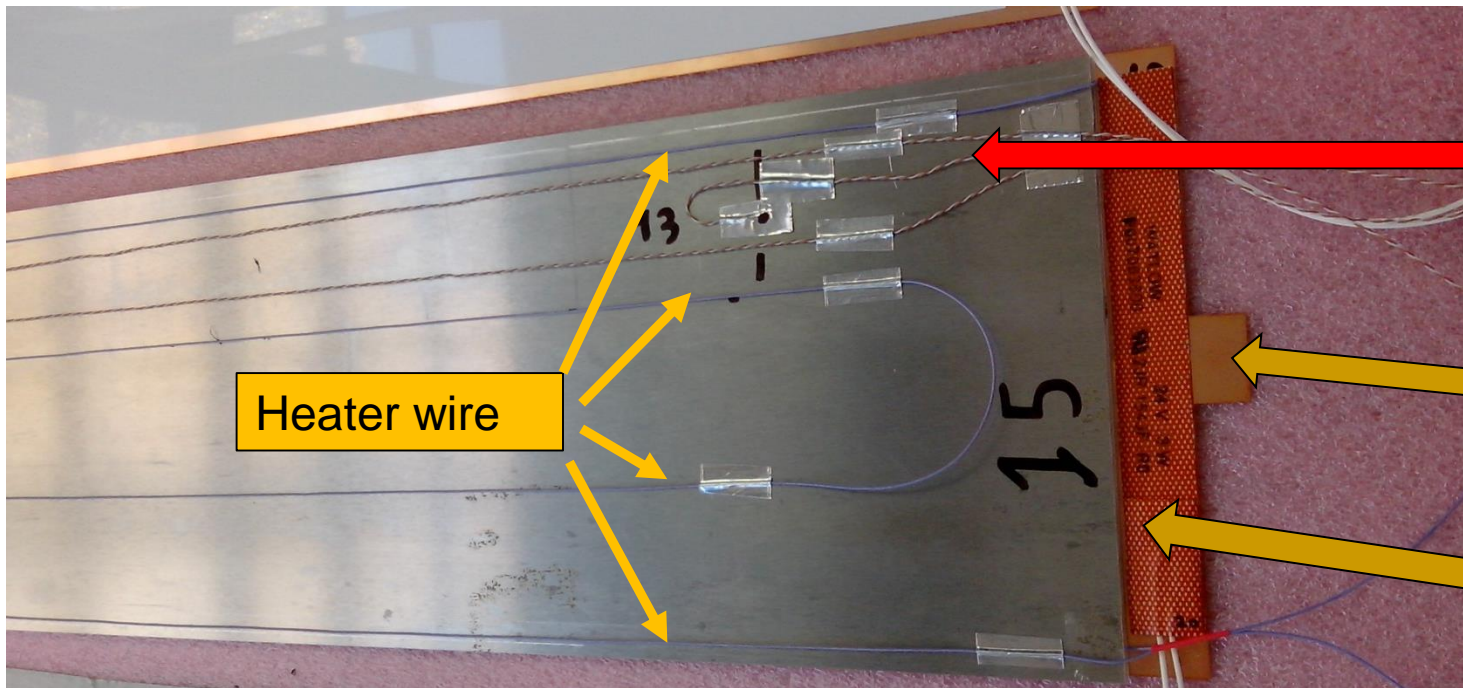
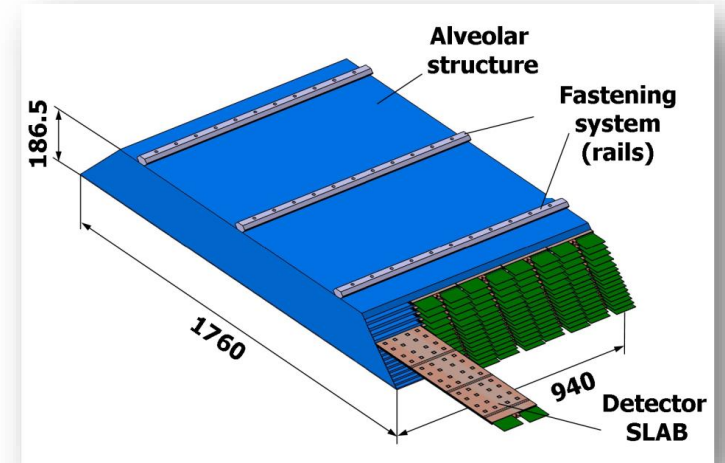


ILD global detector

Dummy SLAB with heater to simulate power dissipation :

- ASU => 0.5 W to 1 W per ½ SLAB
- Front => 0.3 W to 3 W per ½ SLAB
- Cooling effect.

Realization of 15 SLAB (Aluminum / copper / Plastic)

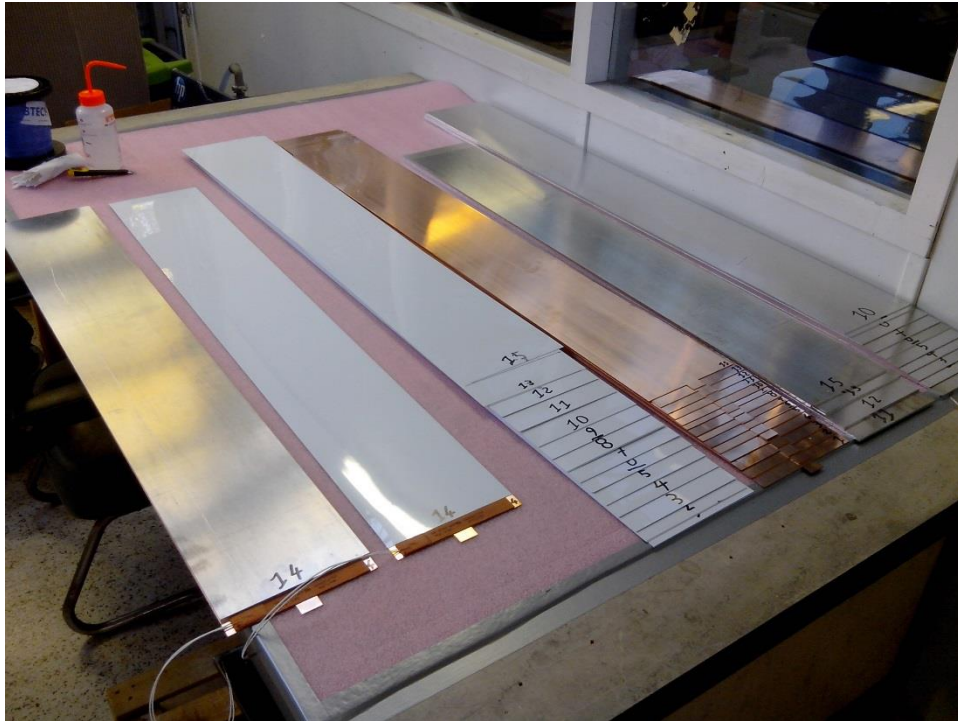


3 x Thermocouple P class 1
($\pm 0.5^\circ\text{C}$ de -40 à $+125^\circ\text{C}$)
Inside 4 SLAB

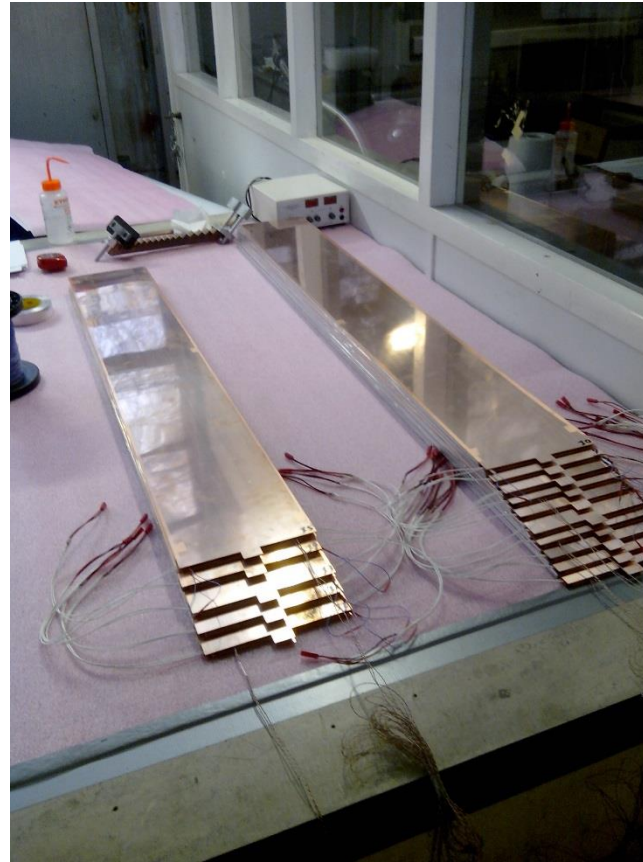
Heat exchanger connection

Front Heater

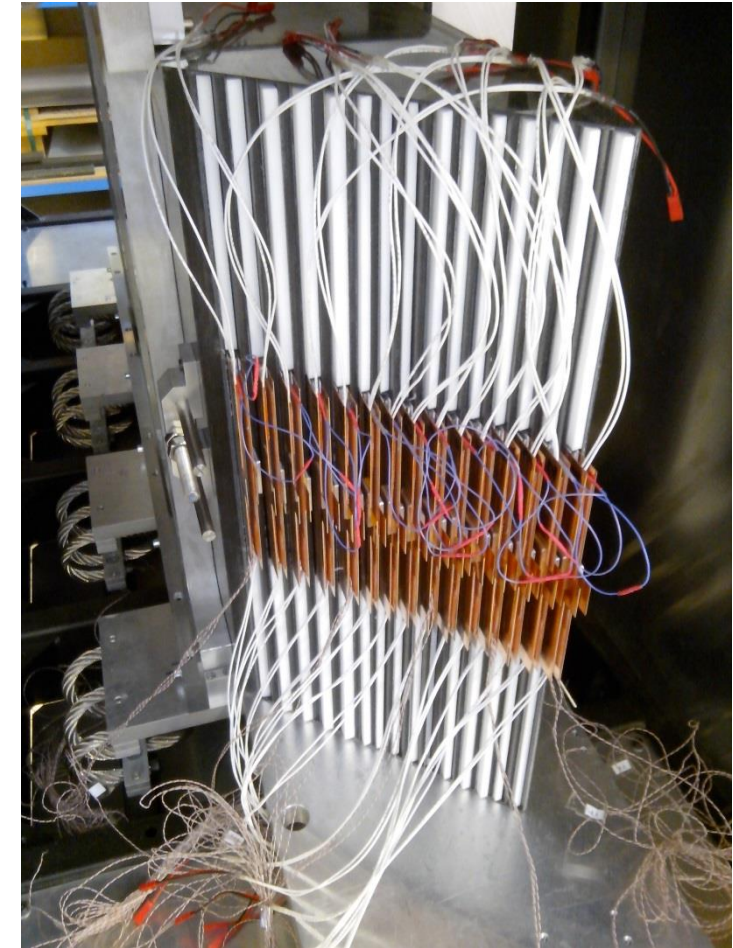
Tests and simulation on detector (EUNET module)



SLAB assembly

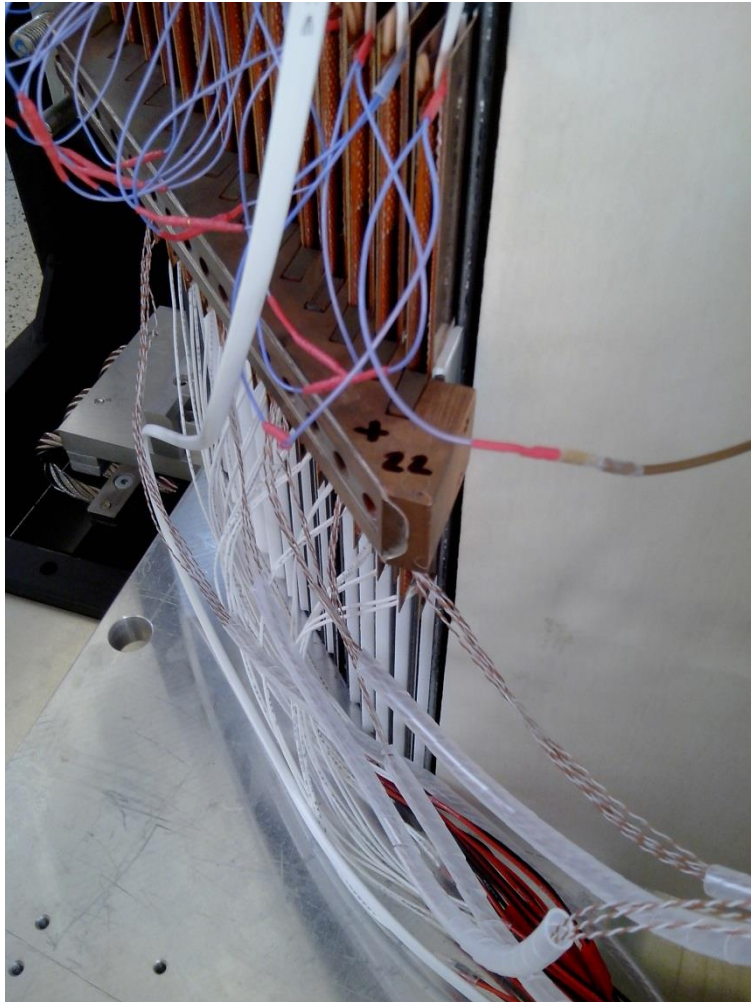


15 - SLAB assembly



15 - SLAB in EUNET module

Tests and simulation on detector (EUNET module)



Heat exchanger assembly



Insulation



Insulation

Test plan :

Puissances ASU / SLAB (W)	1	2	1	2
Puissances Front / SLAB (W)	1	1	2	2
Total ASU SLAB (W)	15	30	15	30
Total FRONT SLAB (W)	15	15	30	30
Total (W)	30	45	45	60

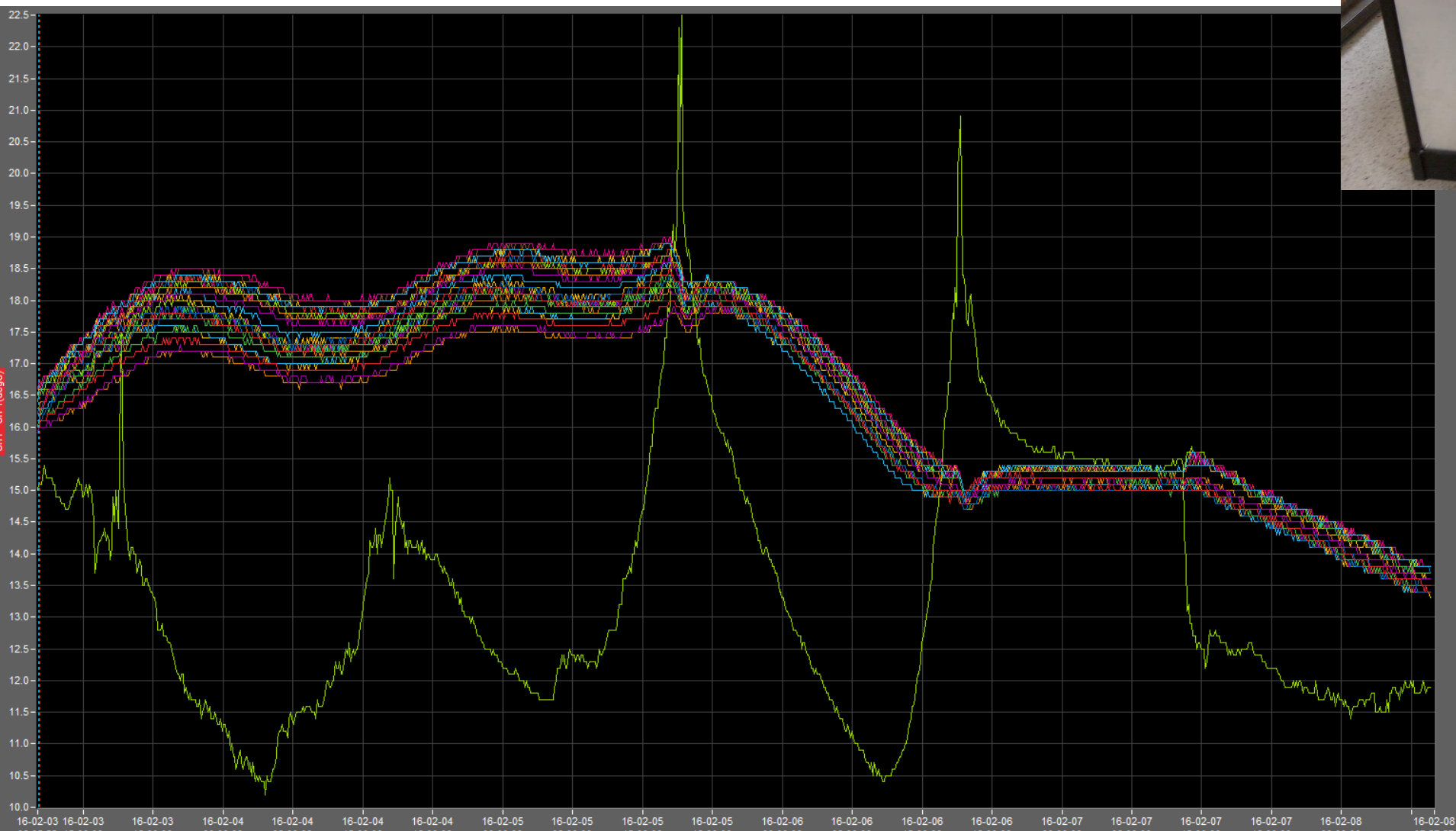
Important thermal inertia => 4 days minimum of stabilization

Test 1 : 2016-02-03 8h05 => 2016-02-08 7h57

Config : Asu uniquement sans cooling

Puissance : V 14.6 A 1.06 P = 15.476 W

- Augmentation en température dans les slab : de 1.5°C à 2.5°C.
- Pics de température externe due au soleil sur le capteur.
- Temps de montée en température : 12 h
- Temps de prise de mesure mini : 3 jours.



Test 2 : 2016-02-09 13h40 => 2016-02-17 9h00

Config : Asu uniquement sans cooling
Puissance : V 14.9 A 1.05 P = 15.645 W

- Augmentation en température dans les slab : de 8°C environ (T5).
- Isolation efficace !

