ASBP The Alliance for Sustainable Building Products

Fact or fiction – Dispelling common misconceptions about Natural Fibre Insulation

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Back to Earth

NATURAL FIBRE INSULATION GROUP

Fact or fiction – Dispelling common misconceptions about Natural Fibre Insulation

In the wider community there can be assumptions about wood fibre insulation that are often based on a lack of understanding and not fact, which hinder its use along with other natural fibre insulations.

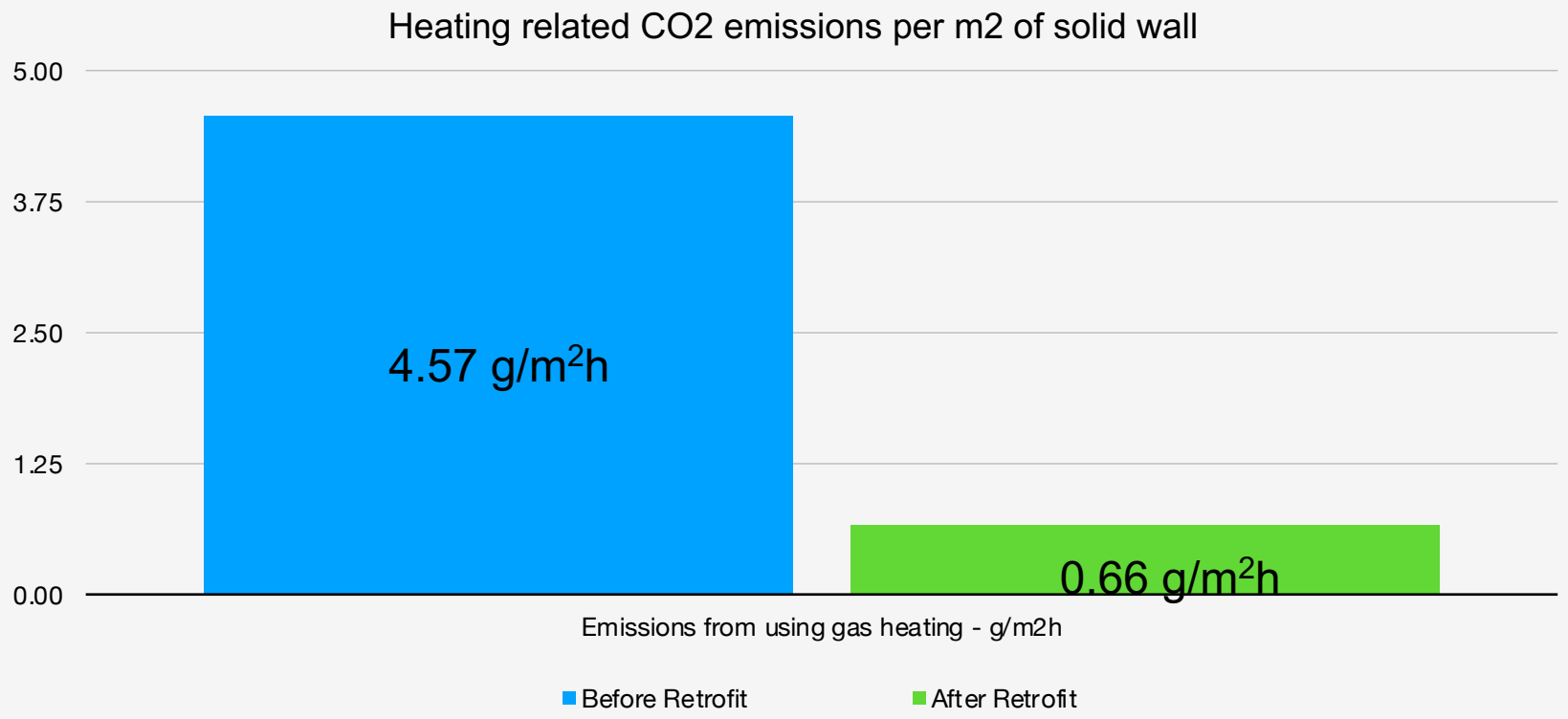
The main areas we're asked about are:-

- Carbon savings
- Fire
- Getting insulation wet
- Summer overheating
- Cost

Aren’t the carbon savings the same for all insulation?

- Carbon savings tend to focus on the energy savings given by the insulation, ignoring the embodied energy of the material and it’s associated emissions.
- Wood absorbs CO_2 as it grows and once incorporated into a wood fibre board, is carbon negative. Mineral based insulation produces CO_2 when it is manufactured.
- In a retrofit scenario, if we assume the use of 120mm of external solid wall insulation, a typical mineral wool batt will emit 15.7kgCO_2/m^2, whereas wood fibre boards will lock up 23.1 kgCO_2/m^2.

Aren’t the carbon savings the same for all insulation?



Typical gas heating related carbon emissions for a solid brick walled house with a starting U-value of around 2.0 W/m^{2}K and finishing with 0.29 W/m^{2}K. Avg. Temps, Int = 18C, Ext = 5.3C (Oct-Mar avg. for Midlands)

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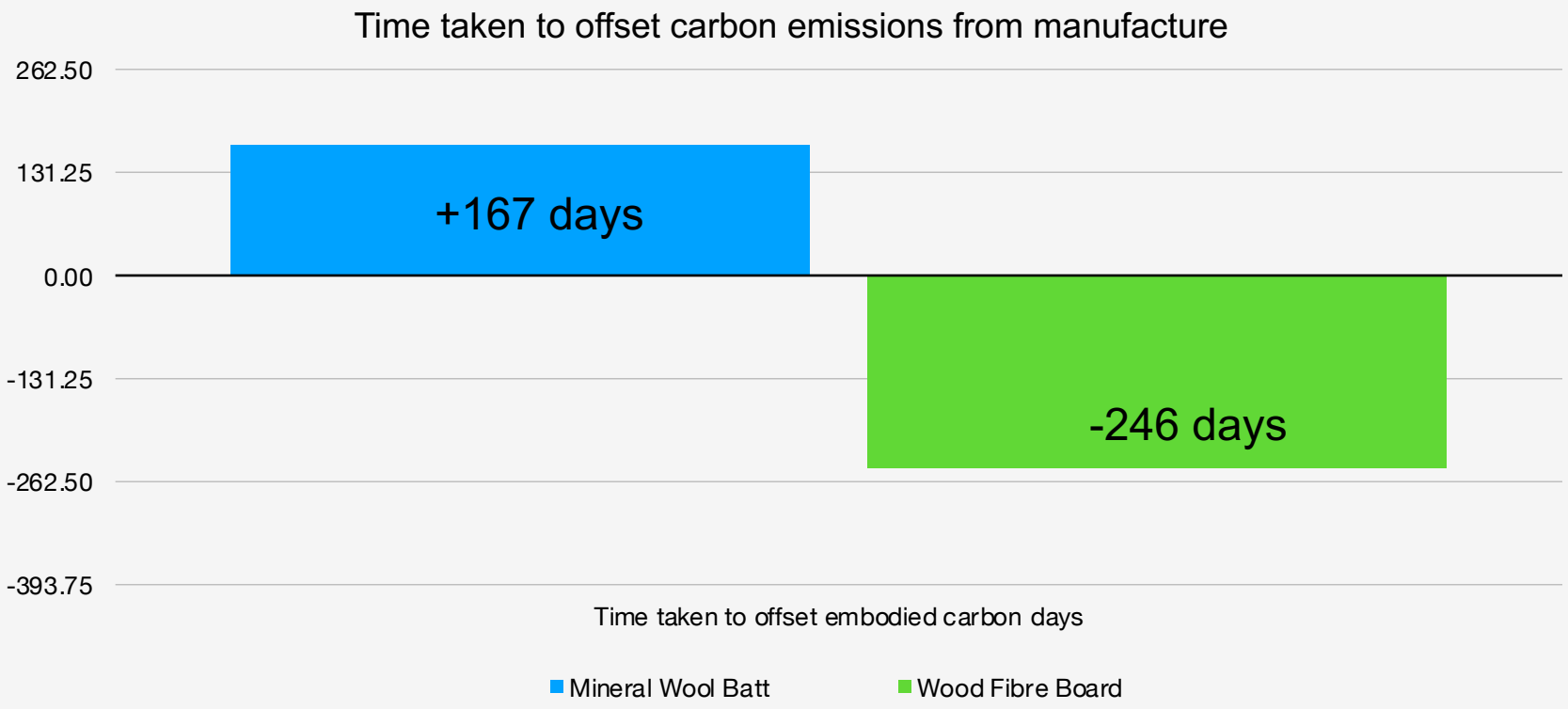


Number of days to offset carbon emissions from manufacture of insulation products.
U-value 0.29 W/m^{2}K. Avg. Temps, Int = 18C, Ext = 5.3C

Aren’t the carbon savings the same for all insulation?

To see the calculations used here please see - https://www.backtoearth.co.uk/carbon-emissions-the-difference-between-natural-and-synthetic-insulation/

Doesn’t wood fibre just burn in a fire?

Doesn’t wood fibre just burn in a fire?

- Natural fibre insulations do burn in a fire and so are often assumed to be unsafe from a fire perspective.
- However, dense materials like wood fibre insulation burn **slowly** and **predictably**.
- In intense fires they do not release much smoke, they do not drip burning droplets of material and they do not release highly incapacitating gasses like Hydrogen Cyanide or Hydrogen Chloride.

Building Regulations for fire - Part B

- Walls in housing (masonry/timber frame) - rendered wood fibre fire rating B-s1,d0 which passes all surface spread of flame requirements.
- Main limiting factor is wood fibre can’t be used in most instances over 11m.
- Timber framed structural walls - REI60 available for rendered and clad wall surfaces (with B2 cladding).
- Roofs - Wood fibre insulation can be used in any detached house, semi/terraced housing with masonry fire separating wall so long as it is tiled or slated.

Fire rated wall construction

Fire

To read more about building regulations and how wood fibre insulation complies with all of the latest fire regulations, please see - https://www.backtoearth.co.uk/fire-and-wood-fibre-insulation/

Doesn’t wood fibre insulation fall apart when it gets wet?

Doesn’t wood fibre insulation fall apart when it gets wet?

- Wood fibre boards can be left exposed for up to 3 months.
- Wood fibres transport moisture very quickly, dispersing water very effectively. If they do get wet, they dry out fast.
- Rain water always enters new build structures during construction - needs to dry. Slow drying can cause problems in timber and sheet materials.
- Used in modern timber constructions, it speeds up drying and it’s flexibility prevents gaps from forming as timber shrinks or dries.

Doesn’t wood fibre insulation fall apart when it gets wet?

- Glass/mineral wools tend to dry very slowly. Rigid PIR boards prevent drying - moisture can still be present many months later.
- Voids in structures increase heat loss so preventing voids ensures the performance targets are met.
- Wood fibre insulation keeps historic timber dry, preventing accumulation of moisture & decay making it ideal for building renovation.

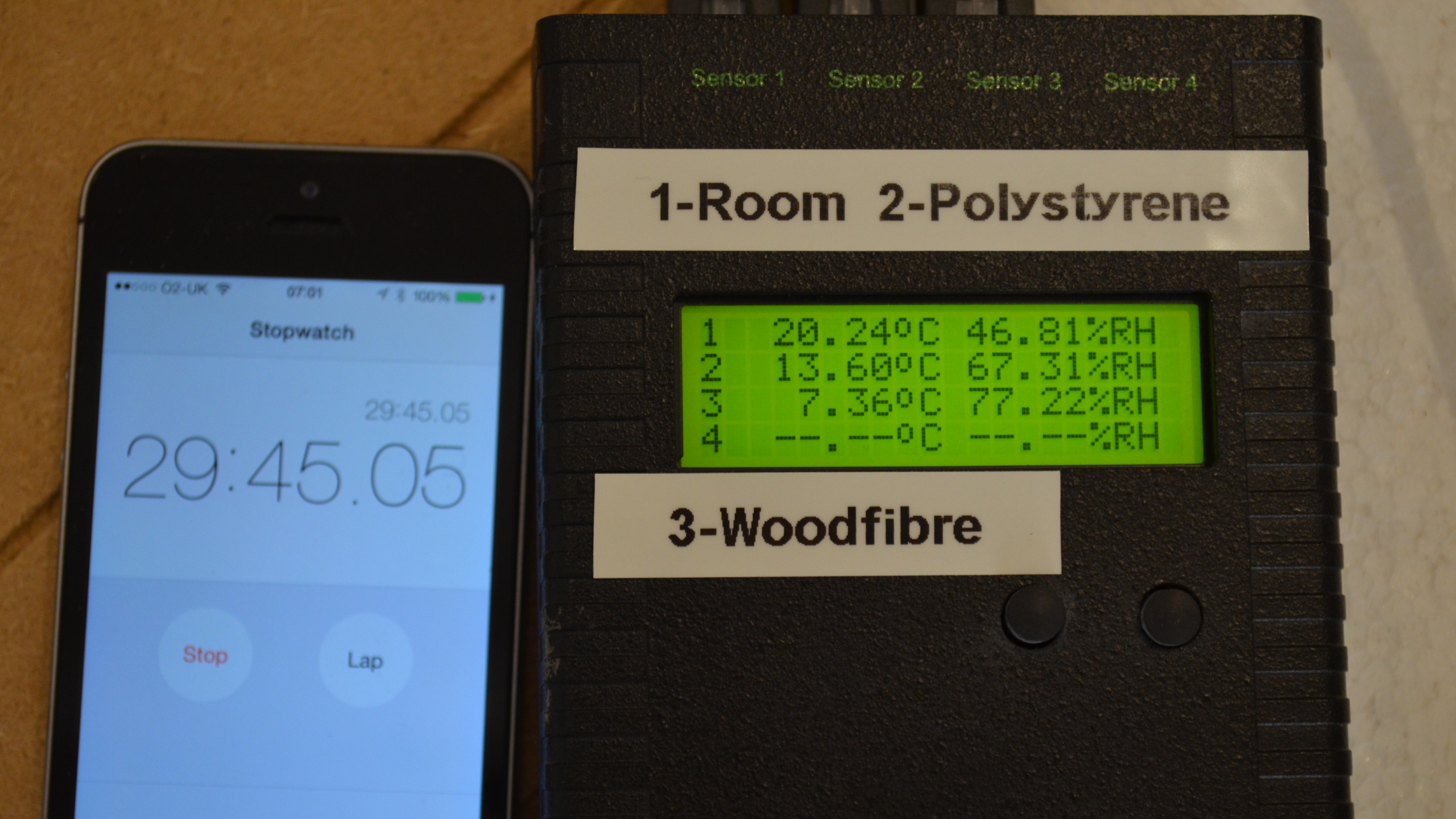
Don’t all insulations keep you cool in the summer?

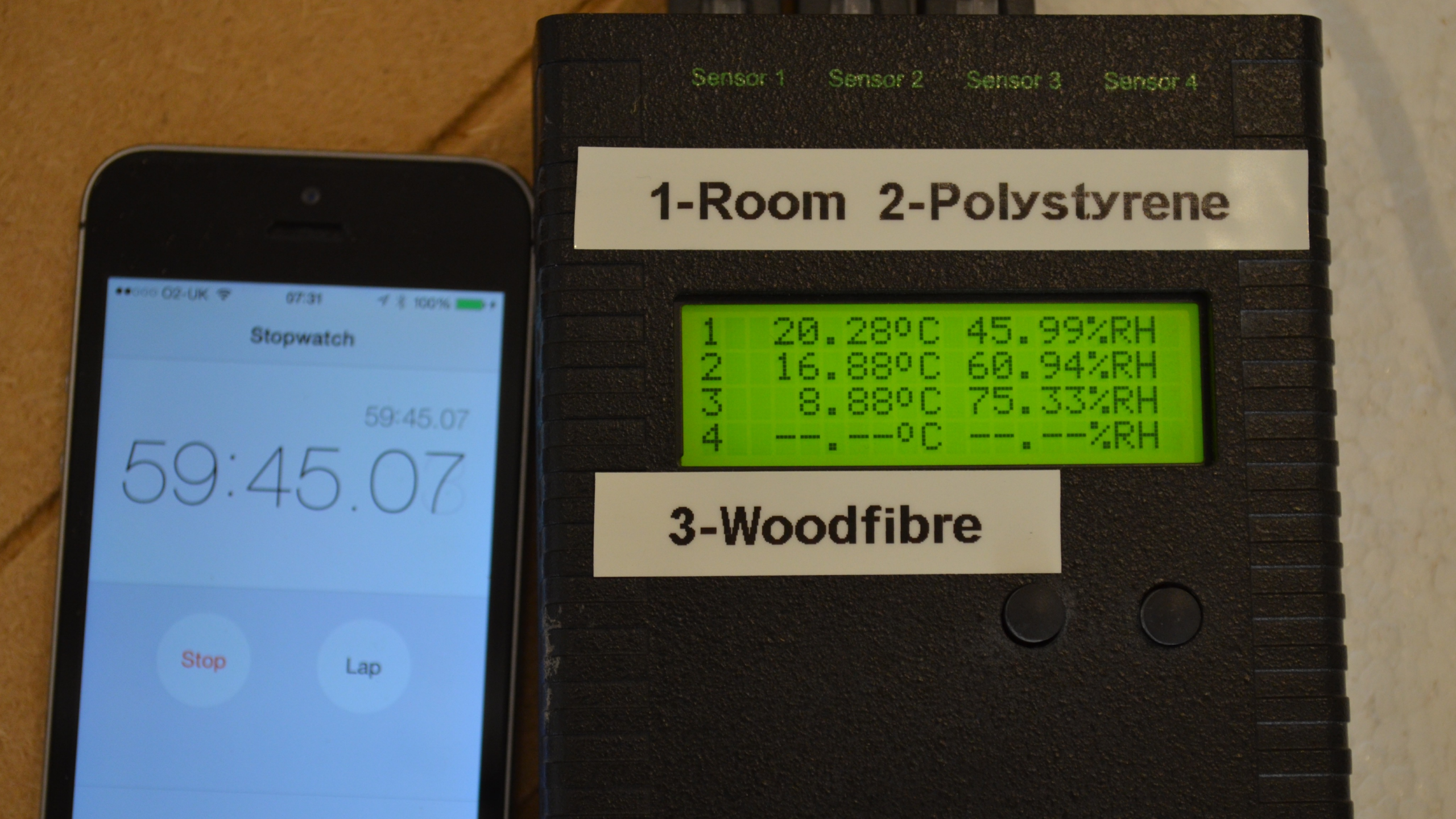
Don’t all insulations keep you cool in the summer?

- It is usually assumed that if walls/roofs/floors have the same U-value, the heat transfer through them is the same.
- U-value, based on thermal conductivity, is based on a steady-state measurement of heat flow. In the UK, the external environment changes continuously and so a steady state is not achieved during the summer.
- Thermal Diffusivity is a property of insulation that gives an indication of how long it takes heat to travel through it and allows us to calculate Decrement Delay.

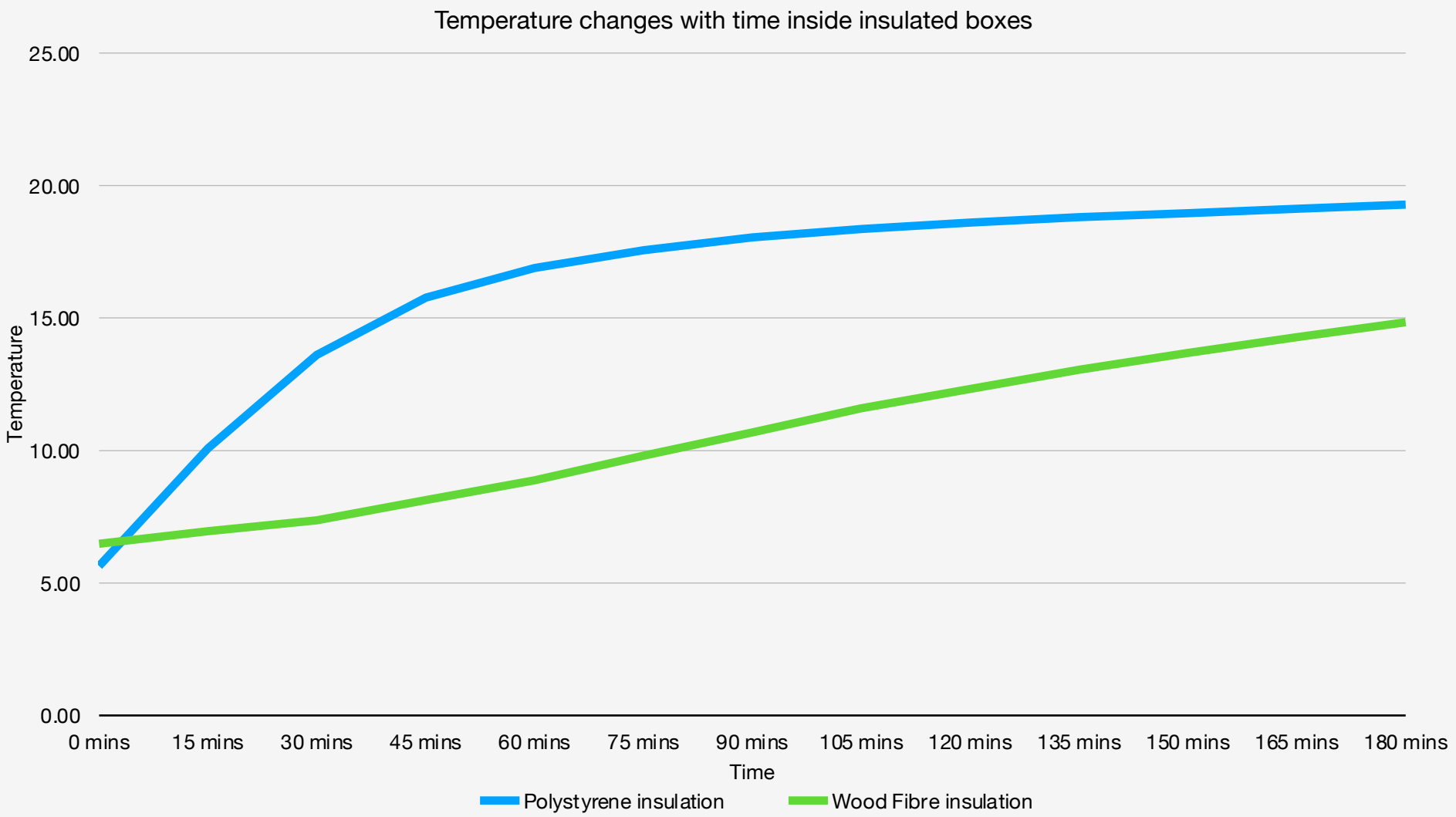
Product	Thermal conductivity W/mK	Density kg/m^3	Specific heat capacity J/kgK	Thermal Diffusivity $m^2/s \times 10^{-7}$	Decrement delay for roof - U-value 0.13 W/m^2K
Hemp Wool	0.038	45	2100	4.02	11.45 hrs
Sheep's Wool	0.035	31	1800	6.27	7.90 hrs
Flexible Wood fibre	0.036	60	2100	2.86	15.7 hrs
Wood fibre sarking board	0.042	180	2100	1.11	15.7 hrs
Straw	0.060	120	2000	2.50	21.2 hrs
Cork	0.038	120	1900	1.67	
Cellulose	0.038	60	2100	2.86	13.50 hrs
Hempcrete	0.068	270	1500	1.68	
High performance Fibreglass	0.032	30	700	15.23	3.25 hrs
High performance mineral wool	0.035	33	840	12.63	4.28 hrs
PIR insulation	0.022	30	1500	4.89	6.30 hrs
Expanded Polystyrene	0.032	16	1130	17.70	2.94 hrs
Extruded Polystyrene	0.035	32	1130	9.67	4.90 hrs


Sensor 1
Sensor 2
Sensor 3
Sensor 4
1-Room 2-Polystyrene
1 20.28°C 47.01%RH
2 5.64°C 80.32%RH
3 6.48°C 79.94%RH
4 --.--°C --.--%RH
3-Woodfibre
O2-UK
06:31
Stopwatch
00:00.00
00:00.00
Start
Lap


Sensor 1
Sensor 2
Sensor 3
Sensor 4
1-Room 2-Polystyrene
1 20.24°C 46.81%RH
2 13.60°C 67.31%RH
3 7.36°C 77.22%RH
4 --.--°C --.--%RH
3-Woodfibre
O2-UK
07:01
100%
Stopwatch
29:45.05
29:45.05
Stop
Lap


Sensor 1
Sensor 2
Sensor 3
Sensor 4
1-Room 2-Polystyrene
1 20.28°C 45.99%RH
2 16.88°C 60.94%RH
3 8.88°C 75.33%RH
4 --.--°C --.--%RH
3-Woodfibre
O2-UK
07:31
100%
Stopwatch
59:45.07
59:45.07
Stop
Lap

Don’t all insulations keep you cool in the summer?



Isn’t wood fibre insulation expensive?

- On the surface, wood fibre and other natural fibre insulations are more expensive to buy then some synthetic insulations, but what is the comparison?
- Will the insulation perform in the real world as well as on paper? How simple is it so install **properly**?
- Does it give similar Psi-values for SAP? Are junctions thermally insulated?
- How easy is it to make the structure airtight?

Isn’t wood fibre insulation expensive?

- Render on very lightweight EWI boards tend to go green on North walls and needs expansion joints regularly.
- Wood fibre boards prevent renders greening, improving longevity, reducing maintenance cost.
- High mass of wood fibre render boards reduces stress on EWI renders and can prevent buckling in dark renders.
- All of this combines to reduce the cost.

Thank you

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