

## INSULATION – IT'S MORE THAN JUST U-VALUES

### THE MULTIPLE ROLES OF NATURAL FIBRE INSULATION

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## NATURAL FIBRE INSULATION IS PRODUCED FROM LOWER GRADE FIBRES OR LOW VALUE BY- PRODUCTS

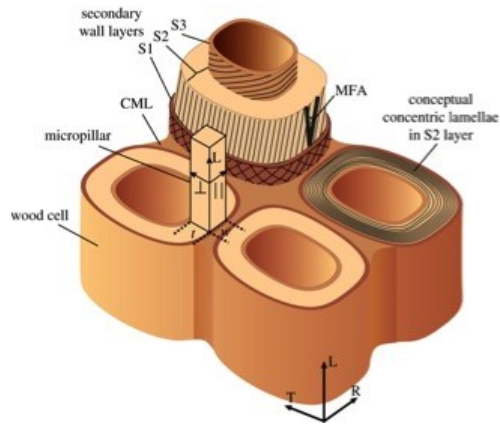


**LESS THAN 0.1% OF UK INSULATION MARKET  
COMPARED TO APPROX 6% IN GERMANY  
UNTAPPED POTENTIAL**

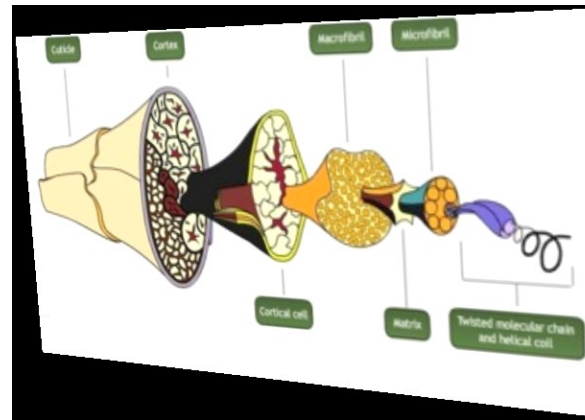
## NATURAL FIBRES

- **Carbohydrates: Cellulose, Hemi-Cellulose, Lignin**
- **Proteins:  $\alpha$ -Keratin,  $\beta$ -Keratin, Fibroin**
- **Energy of synthesis comes from the sun.**
- **All have a carbon backbone**
- **Insoluble, stable and strong**
- **Poor conductors of heat**
- **All can bind and release water at a molecular level**

## THE MICROSCOPE REVEALS THE COMPLEXITY OF NATURAL FIBRES



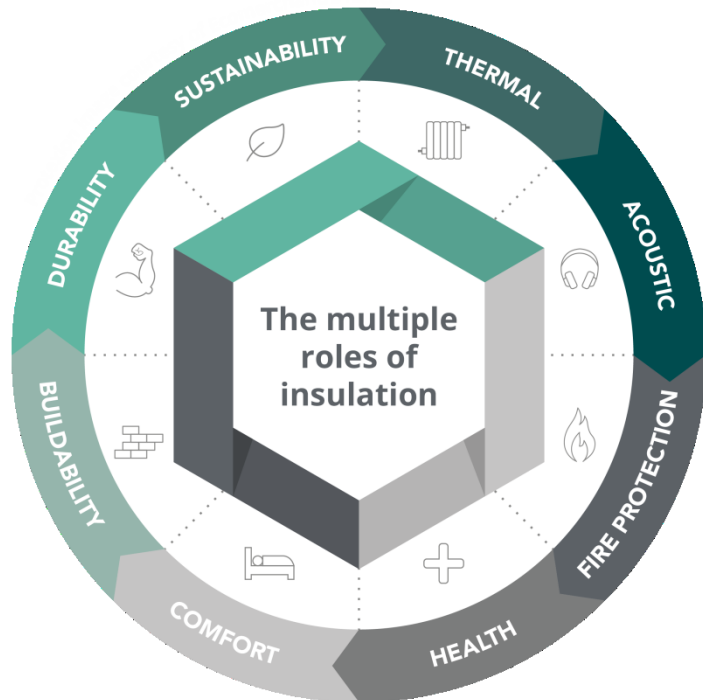
**Wood**



**Wool**

## THIS COMPLEXITY HAS PURPOSE

## RECOGNISING VALUE COMES FROM UNDERSTANDING WHAT SOMETHING REALLY DOES



*This project is supported by the **INTERREG VA France (Channel) England** programme and receives financial support from the **European Regional Development Fund (ERDF)***

## THERMAL PERFORMANCE

### Aim:

- Minimise heat loss – maximise energy efficiency
- Manage heat gain – prevent over-heating
- Regulate heat flux – provide most comfort

### Achieved through:

- Lower thermal conductivity
- Higher density
- Greater specific heat capacity

## NATURAL FIBRE INSULATION PROVIDES THESE



## ACOUSTIC PERFORMANCE

- The excellent acoustic performance of NFIs is down to their relatively high density and,
- Non-uniform size, shape, texture of the fibres helps the absorb sound across a wide range of frequencies.

50 mm Insulation Thickness	Practical Absorption Coefficients (BS EN ISO 354:2003)					
Product	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
32 kg/m <sup>3</sup> Sheep's Wool	0.20	0.55	0.85	0.90	1.00	1.00
45 kg/m <sup>3</sup> Rock Wool	0.20	0.50	0.85	1.00	1.00	1.00

## FIRE PROTECTION

### Combustibility limited by:

- Density
- Natural charring
- Use of mineral FR additives as appropriate

NFI's pass fire tests to ensure they are fit for purpose. Tests include Euro Class fire ratings or British Standards such as BS476 or BS5803. Inorganic mineral based fire retardants are used where necessary.

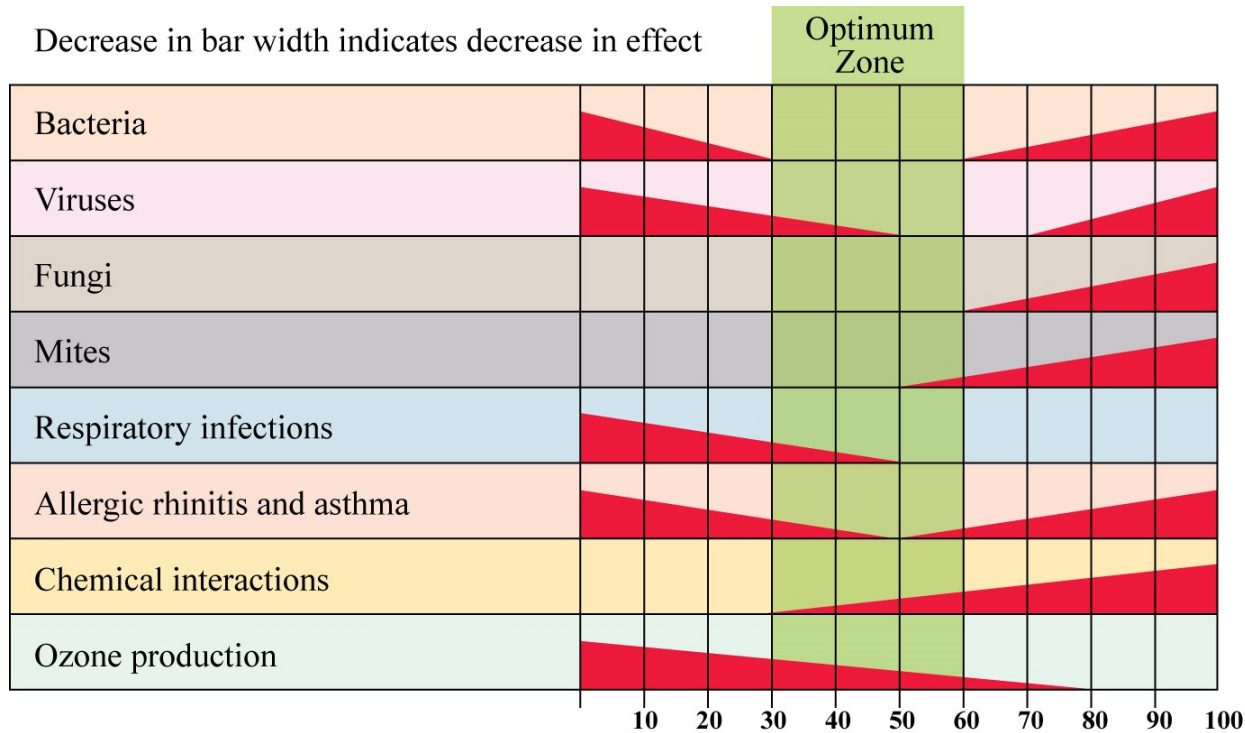


## HEALTHY & COMFORTABLE INDOOR ENVIRONMENT

Insulation should support a comfortable, healthy internal environment:

- Thermal comfort (limit overheating, heat stability)
- Healthy indoor air (VOC's and airborne particulates)
- Moisture comfort (healthy humidity levels)
- Psychological wellbeing (biophillic)

## THE IMPORTANCE OF HEALTHY HUMIDITY

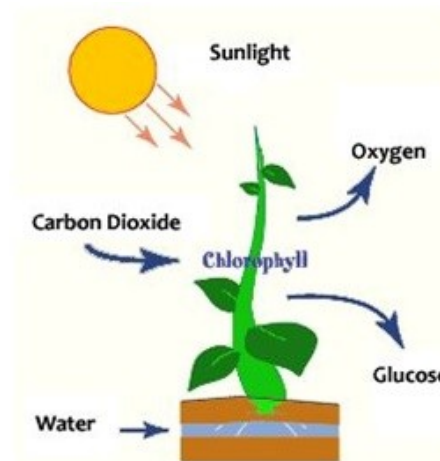


## **BUILDABILITY & DURABILITY**

- **Structurally & chemically stable – performance doesn't diminish over time.**
- **Designed for ease of use.**
- **Relatively new innovation harnesses different approaches where insulation takes a high priority.**
- **Buildings designed around NFI's are less prone to damaging effects of harmful moisture.**

## SUSTAINABILITY

- Raw material sustainability (abundant/continuously renewable)
- Healthy (in both production and use)
- Low embodied carbon
- Greater end-of-life options
- Transparency



**Interreg**   
EUROPEAN UNION

France ( Channel  
Manche ) England

European Regional Development Fund

**SB&WRC**

Sustainable Bio & Waste Resources for Construction



**THANK YOU**

**ANY QUESTIONS?**

**Find out more at [www.asbp.org.uk](http://www.asbp.org.uk)**

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