

Benefits of natural fibre Insulation for Clients, Contractors and Clients

Neil Turner, Ecological Building Systems



**NATURAL FIBRE
INSULATION GROUP**



Natural Fibre Insulation



Neil Turner

UK Technical Sales Manager

- Former TIMSA BBA-competent U-value Scheme Member
- Involved in development of CEN European Standards
- Extensive experience within the natural insulation sector

Natural Fibre Insulation

- Background and history of natural fibre insulation
- Types of commercially available products
- Benefits
- Applications
- Project examples

Natural Fibre Insulation

- Insulation produced from plant based raw materials
- Been used in the UK since early 1980's
- Certification systems have been developed
 - Can CE Mark (European Technical Approval or Harmonized Euro Norm)
 - National Certifications (BBA, CSTB, DIBT, SP etc)
 - Many products have independently verified Environmental Product Declarations
 - Many are Natureplus certified – extremely low VOC's – high indoor air quality
- Can use on a wide variety of construction types
 - Timber Frame, Masonry, Walls, Roof , Floors: External and internal partitions
 - Internal and external application
- Loose fill, quilts/batts/rolls, rigid boards
- Used anywhere so long as above ground *

* (basement details being investigated)

Commercially Available Natural Fibre Insulation

Cotton/Denim



Wood Fibre



Cork



Cellulose



Straw



Sheep Wool

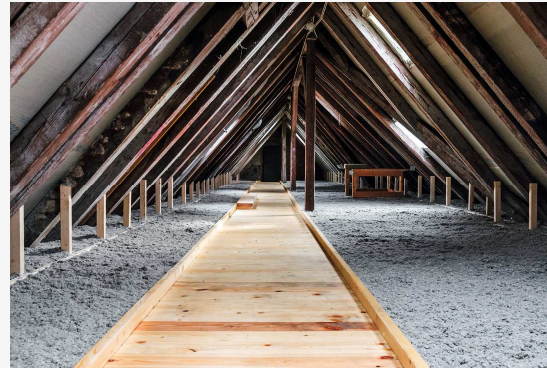
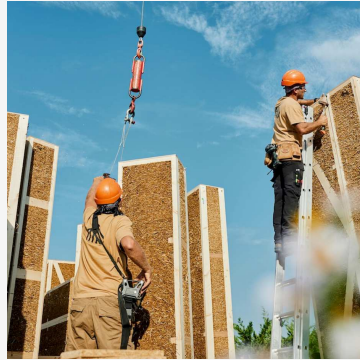


Hemp



Natural Fibre Product Types: Density and Profile

Loose Fill Natural Insulation:



Installed Density ~25 – 70kg/m³

Open blow into cold attic spaces (low density)

Inject into voids (timber frame walls, roof, floors – higher density avoids settlement)

Factory filled Panels

Added fire retardants: Bicarbonate of Soda, Epsom Salts, Aluminium Tri Hydrate, Ammonium Polyphosphate

Thermal Conductivity: 0.036 – 0.040W/mK



Loose Fill Products typically consist of minimum 90% natural fibre

Natural Fibre Product Types: Density and Profile

Quilts/Batts:

Friction fit in between timber

Density ~40-60kg/m³

Added fire retardants: Bicarbonate of Soda, Epsom Salts, Aluminium Tri Hydrate, Ammonium Polyphosphate

Added Binders to form the quilt: PUR or PET

Thermal Conductivity: 0.035 – 0.040W/mK



Products typically consist of minimum 90% natural fibre

Natural Fibre Product Types: Density and Profile

Rigid Boards

Internal or external wrap around timber frame

Internal or external on solid masonry construction

Density ~140 - 200kg/m³

Typically, no fire retardants added to higher density natural fibre products

Added Binders/Moisture Resistant additives: PUR

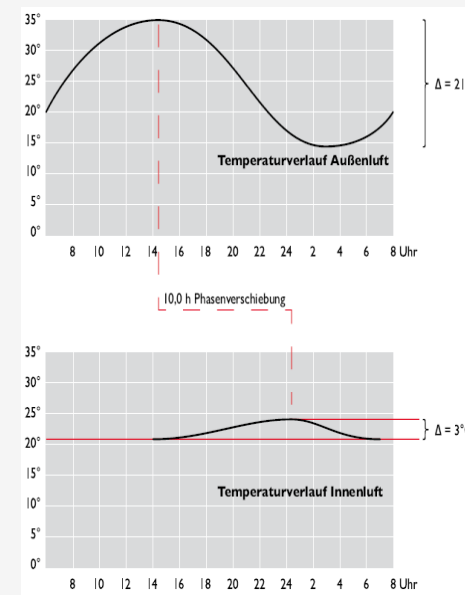


Products typically consist of minimum ~95% natural fibre

Natural Fibre Product Types: Benefits

The Benefits:

- **Optimum combination of Thermal insulation in Winter & Summer**
 - High Specific Heat Capacity (2100 J/kgK)
 - High Density (up to 180kg/m³)
 - Combination gives a high level of protection against summer overheating
 - Heat from the sun takes longer to enter into the building (Decrement Delay)
 - Temperature increase reduced (Amplitude Damping)



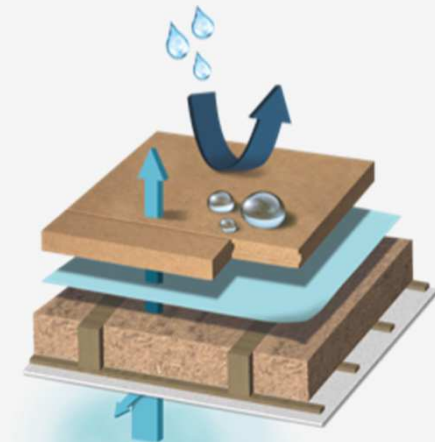
Phase shift = 10,0 h

Amplitude damping (1/TAR) = $21^\circ\text{C} / 3^\circ\text{C} = 7$

Natural Fibre Product Types: Benefits

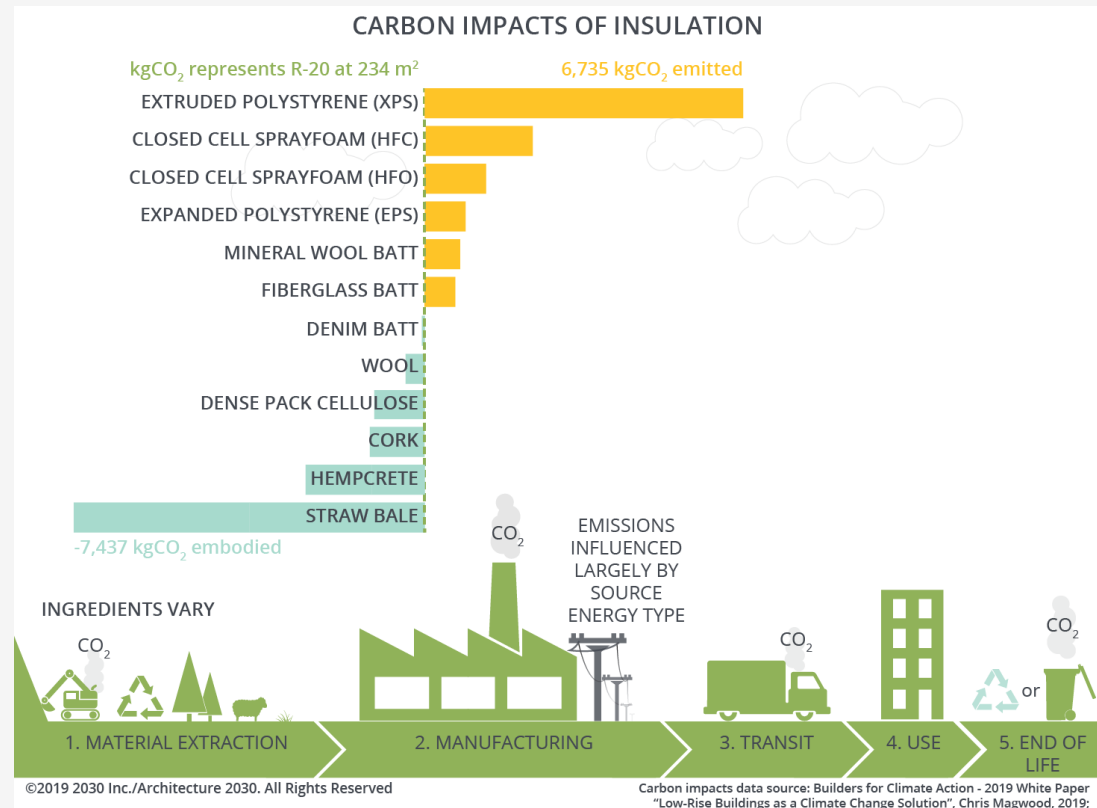
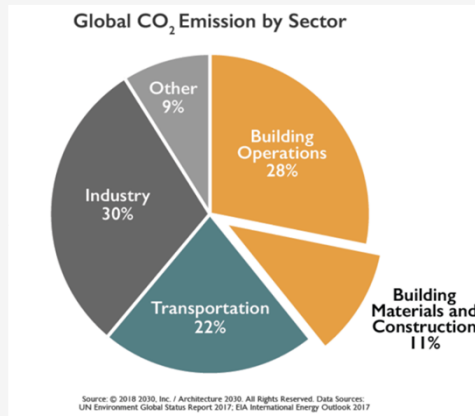
The Benefits:

- **Extremely diffusion open, reducing condensation risk**
- Moisture Vapour Diffusion Open – typical **μ -values = 1-3**
- Absorb and release moisture vapour
- Moisture vapour diffusion open and wind tight rigid boards
- Design flexibility – don't have to use high vapour resistant VCL membranes – improved internal humidity regulation



Natural Fibre Product Types: Benefits

Embodied Carbon:



Embodied Carbon in Building Materials Accounts for ~11% of Total Global Carbon Emissions – and increasing

Natural Fibre Product Types: Benefits

Other Benefits:

- Effective acoustic properties
- Speed of application
- Very Robust
- Consistent quality and reliable application
- Recyclable & Optimum Sustainability
 - Many natural insulation products are made from recycled feedstock (paper, wood chips, clothes etc)
- Low VOC (Natureplus, WELL standards)

Natural Fibre Installer Benefits

Factory Filled Panels (MMC)



Using Natural insulation in factory
Can improve resource efficiency



Natural Fibre Installer Benefits

Fast Installation

Temporary weather proofing

Safe to handle

Natural Fibre – Think Big as well as small – It's everywhere - !



Thank you

www.ecologicalbuildingsystems.com

info@ecologicalbuildingsystems.com

UK: 0044 1228 711511

Irl: 00353 46 9432104

