

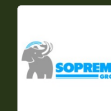
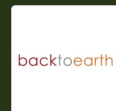
# Natural fibre insulation in practice: An overview of applications

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Back to Earth



**NATURAL FIBRE  
INSULATION GROUP**



# What are Natural Fibre Materials?

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- Natural Fibre Insulation, also called Natural and Renewable Fibres, are made from plant or animal fibres.
- The fibres would usually be mechanically processed and not involve chemical changes.
- The amount of processing varies and the addition of other fibres or glues also varies.



# What are Natural Fibre Materials?

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- Main products used construction/retrofit are:-
- **Hemp wool** - made from the hemp fibres wrapped around the stalk.
- **Sheep's wool** - made from sheep's fleece.
- **Wood fibre** - made from fiberising softwood and formed into flexible batts, boards or loose fibre.
- **Straw** – made from either whole straw bales or timber panels filled with straw.
- **Cork** - made from the bark of the cork oak, formed into boards/ slabs.
- **Cellulose** – a loose fibre made from recycled paper and blown into timber frames.
- **Hempcrete** – made from a mixture of the woody core of the hemp plant with a lime based binder.



# Where are they used?

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- Hemp Wool, Sheeps Wool, Flexible Wood fibre batts and to some extent, straw are used between rafters, studs, joists
- This is mainly due to their flexibility and dimensional stability, amongst other properties.



# Where are they used?

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- Wood fibre insulation, in various forms, is the most commonly used natural fibre insulation.
- Used in both rigid board and flexible batt form in roofs , walls and floors.





# Where are they used?

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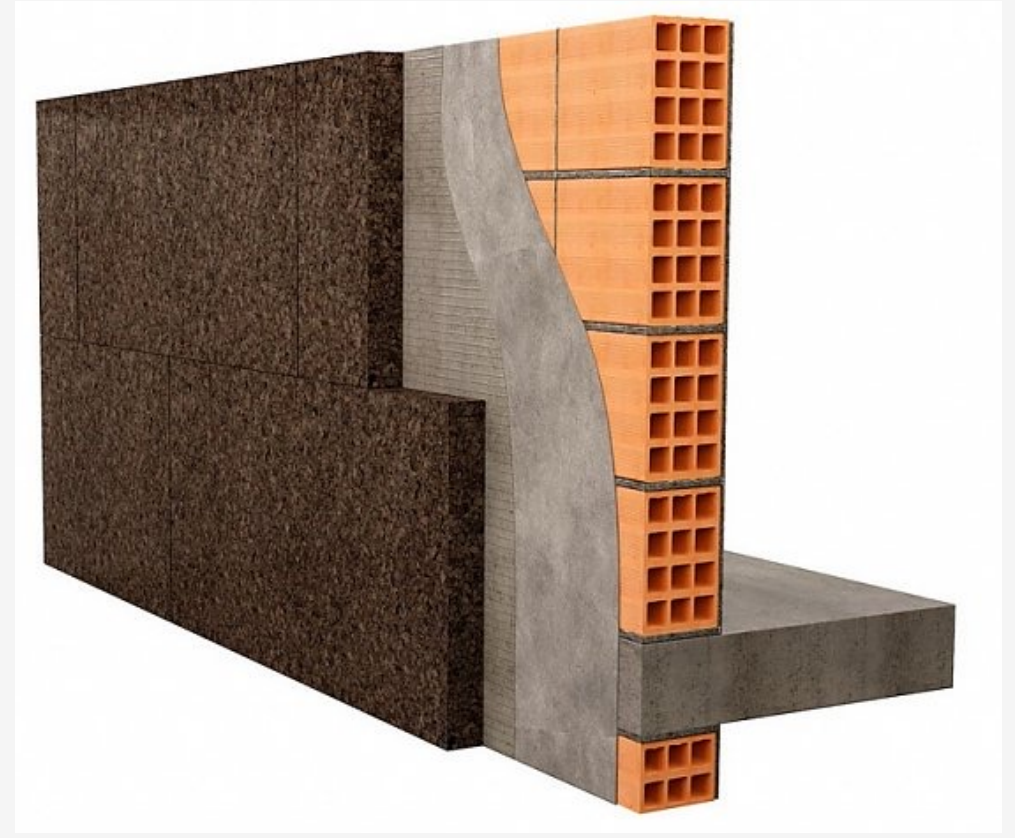
- Straw can be used in bale form, chopped or layered into panels, as per EcoCocon



# Where are they used?

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- Cork boards can be used in various locations but usually found in wall, floor or flat roof insulation.
- Can be rendered directly on to to provide external and internal wall insulation.





# Where are they used?

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- Cellulose and loose wood fibre is usually blown into a timber structure, between studs.
- Blown insulation useful for awkward or irregular cavities, such as between I-joists or Larsen trusses.
- Similar densities achieved to batts.
- Other loose-fill materials such as chopped straw can also be used in this scenario.





# Where are they used?

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- Hempcrete is usually site mixed and poured into formwork around a timber frame structure.
- It can provide racking resistance due to it's structure although this is usually provided by the frame



# How do they perform?

| Product                       | Thermal conductivity W/mK | Density kg/m <sup>3</sup> | Specific heat capacity J/kgK | Thermal Diffusivity m <sup>2</sup> /s x 10 <sup>-7</sup> | Decrement delay for roof - U-value 0.13 W/m <sup>2</sup> K |
|-------------------------------|---------------------------|---------------------------|------------------------------|--|--|
| 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   |



Thank you

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