Interreg France (Channel Manche) England
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Sustainable Bio & Waste Resources for Construction

BREATHABILITY AND MOISTURE – A KEY TO BUILDING PERFORMANCE

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ASBP The Alliance for Sustainable Building Products

What is a breathable material?

- Adjusts its moisture content to be in balance with surrounding humidity.
- Adjusts surrounding humidity to be in balance with its moisture content.
- Is able to bind water molecules in a harmless way.
- Is vapour open.

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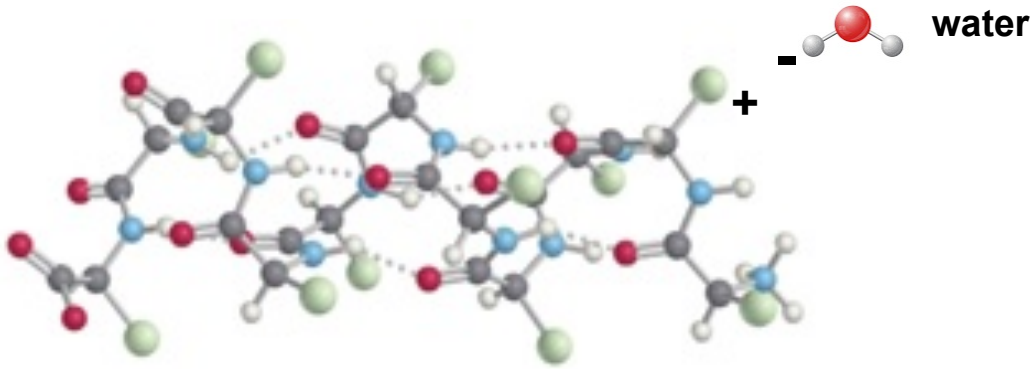
What insulation materials are breathable?

- Any fibre containing, keratin, cellulose, hemi-cellulose or lignin.
- Small regions of these molecules have a slight electrical charge and attract water molecules like magnets.
- Wool, hair, wood, hemp, coir, flax, jute, cotton, cork.



Keratin

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Adsorption & Desorption

- The process of binding and releasing water molecules.
- **Adsorption** – water vapour is pulled from the air and bound to the natural fibre through static electricity
- **Desorption** – the electrostatic bond is broken and water molecules are released to the air as water vapour.

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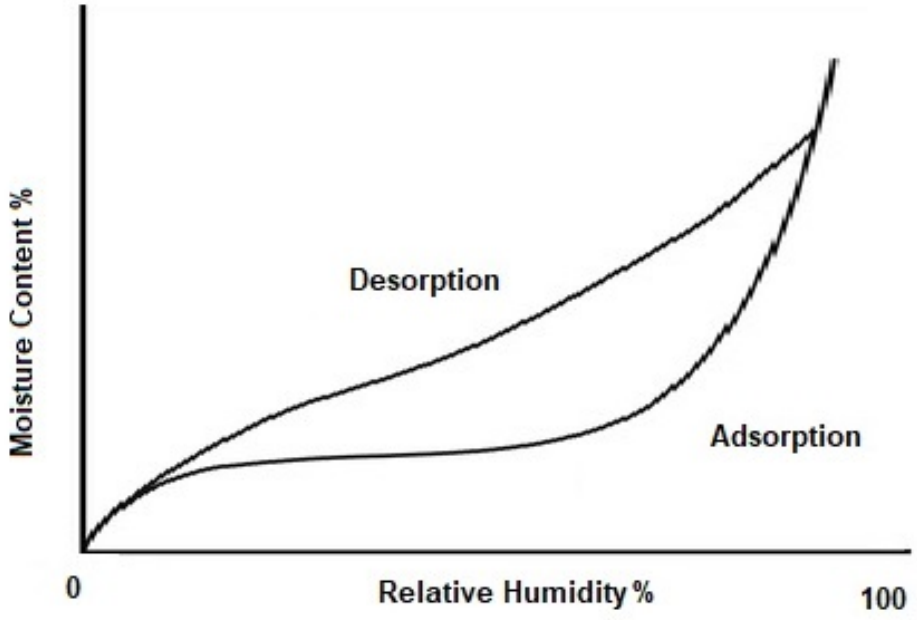
What Drives Sorption & Desorption?

- NF's are constantly capturing and releasing water vapour from the air.
- NF's want to capture as much water as they release to reach equilibrium moisture content (**emc**).
- At a given temp and relative humidity the NF wants to achieve a specific moisture content.



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What Drives Sorption & Desorption?

Sorption is mainly driven by relative humidity

NFI adsorbs moisture

Higher relative humidity

NFI desorbs moisture

Lower relative humidity

Relative humidity is mainly driven by temperature

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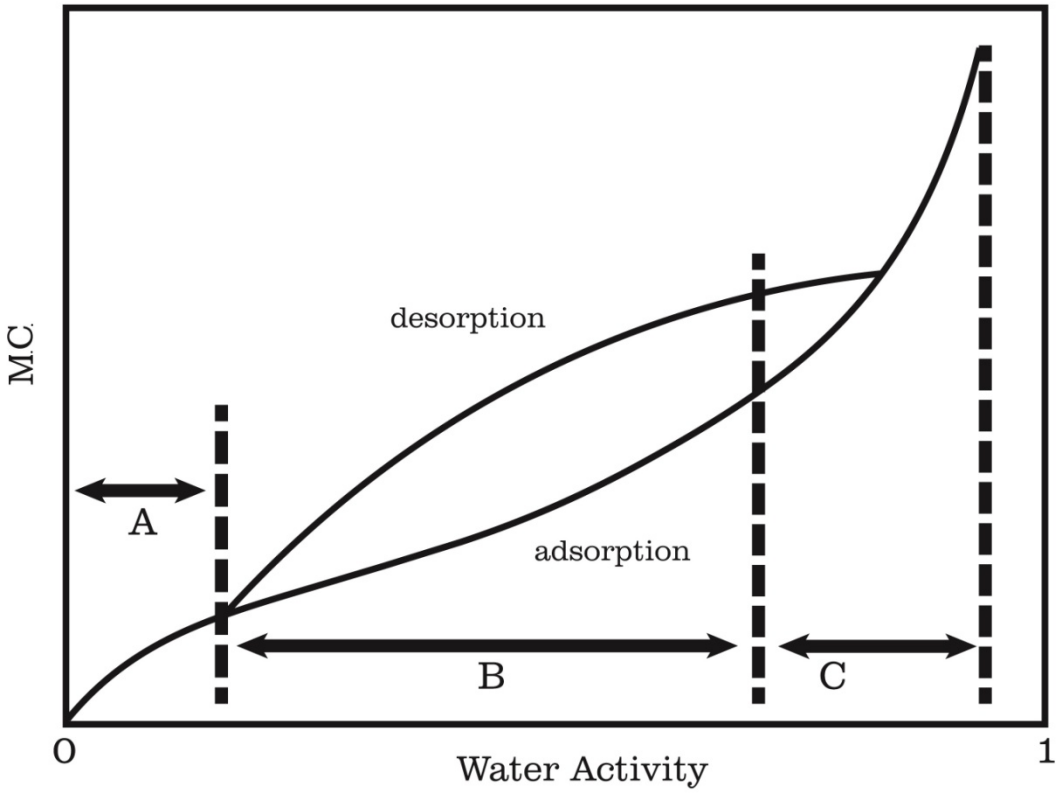
Sorption & Humidity Buffering



A – strongly bound

B – less strongly bound

C – free water

Zone B is the humidity buffering zone

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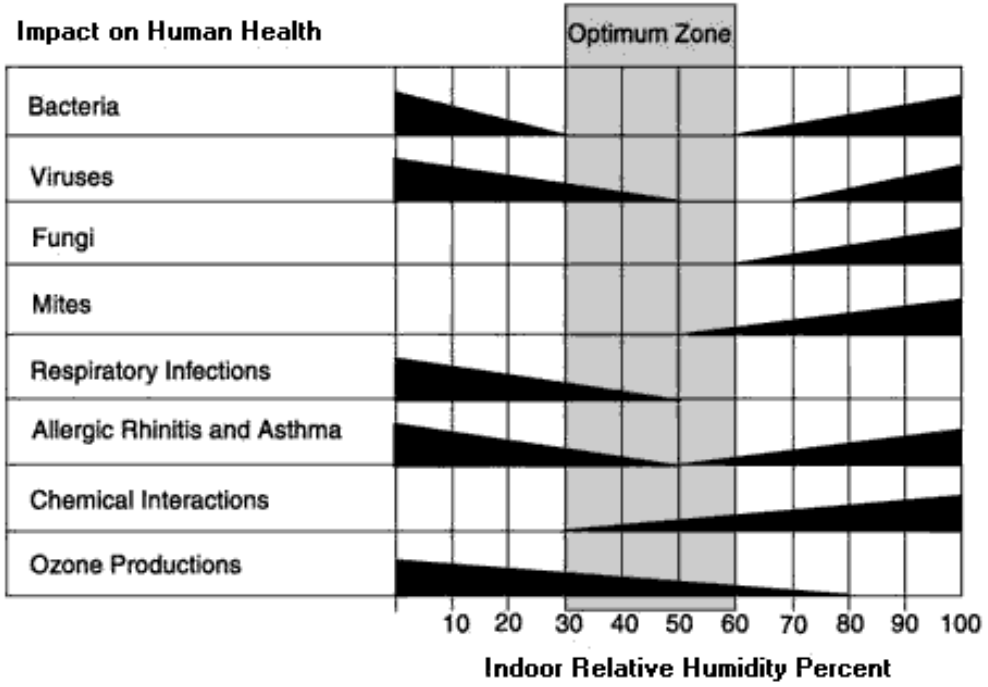
Why is Breathability Important?

- Moisture can cause health problems and damage the building fabric
- Breathable materials help keep humidity within the optimum zone for human health.
- Breathable materials bind moisture in a harmless way.



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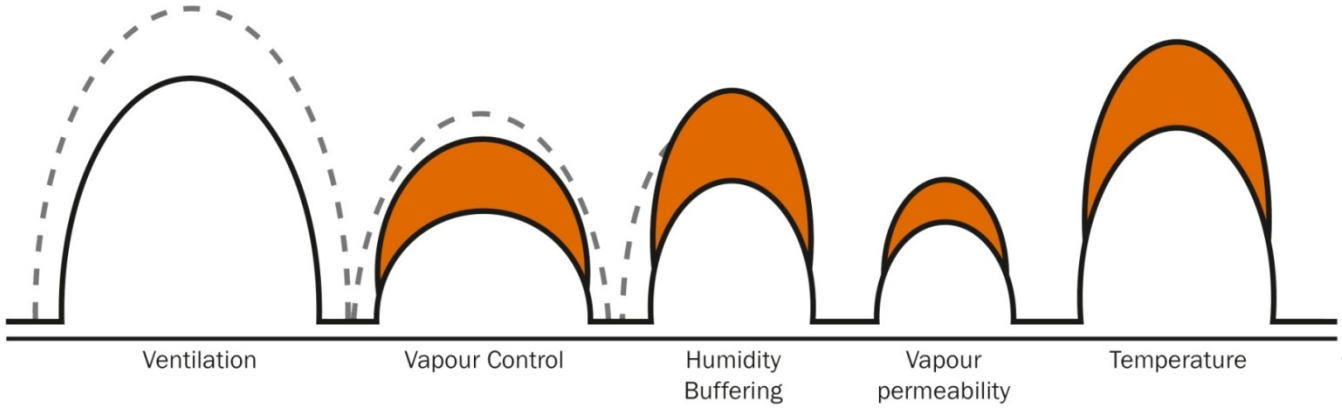
Why are Breathable Materials Important?

- Approximately 95% of moisture is removed from buildings through ventilation.
- What about the other 5%? That's the equivalent of two bathtubs of water not ventilated each year.
- We need to make use of all available technologies including breathable natural fibre insulation.



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THANK YOU

ANY QUESTIONS?

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