Advantages of BioBased Airtight Dwellings

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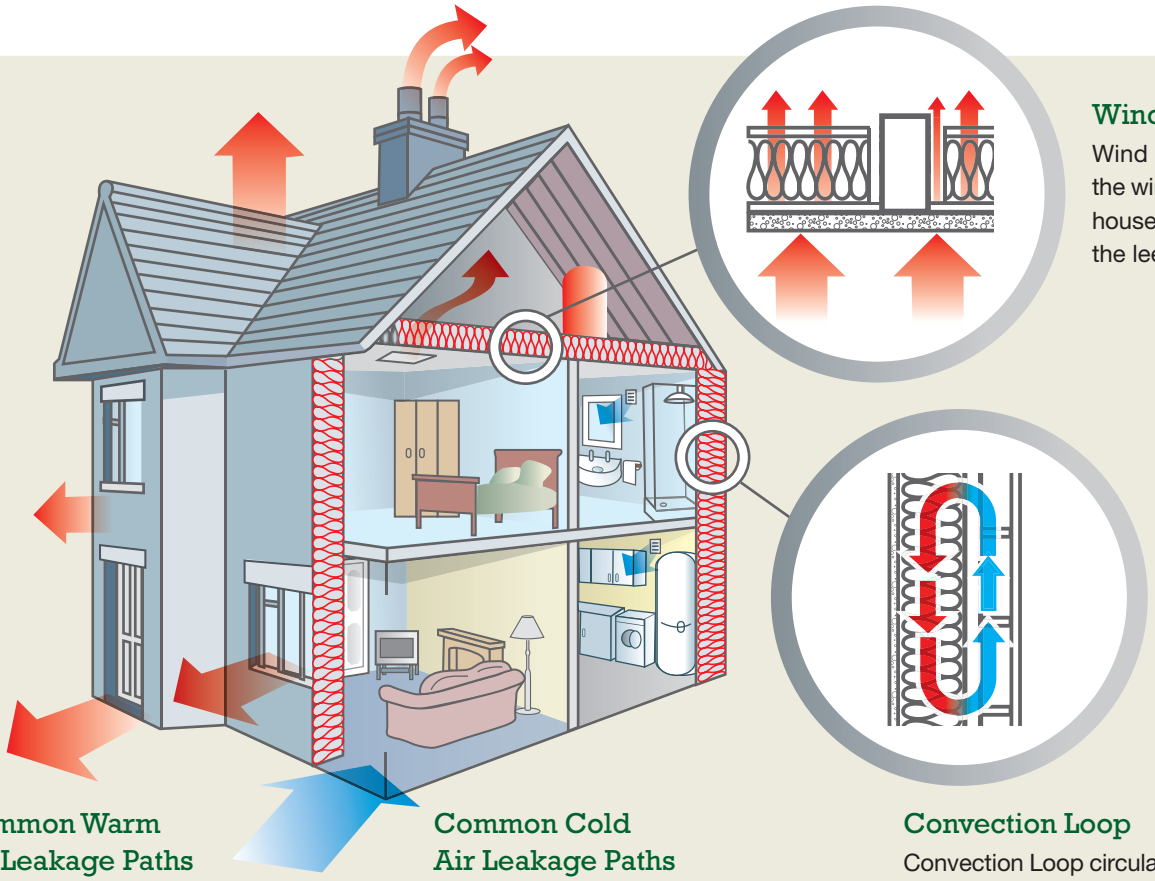
Airtightness

Home energy is responsible for a significant percentage of carbon dioxide emissions. Air leakage from buildings, both new and old is a major cause of energy loss and increased emissions. Improving airtightness in dwellings will reduce air leakage thereby preventing unnecessary heat loss and excessive fuel costs and will increase comfort levels.

To ensure airtightness, the issue needs to be addressed at design stage. Careful consideration should be given to the building envelope and the products used to create an airtight barrier. Airtight construction combined with appropriate ventilation will improve energy efficiency and comfort levels.

> Conventionally Insulated Dwelling

For any type of insulation to work, it needs to be part of an effective system. Conventional insulation will block heat flow by conduction through materials in contact with each other. However heat also transfers through convection (air currents). Air moves throughout the house due to a variety of natural and man-made forces. Water vapour rides on these air currents and when it reaches a cold surface it can condense and lead to mould growth and rotting materials. Air movement through the building fabric needs to be controlled with an effective air barrier. Controlling air movement decreases moisture and drafts, making a house more comfortable and less expensive to heat and cool.



Wind Infiltration

Wind can push air into the windward side of the house and draw it out of the leeward side.

Common Warm Air Leakage Paths

This is the uncontrolled flow of air through gaps and cracks in the fabric of dwellings. Sometimes referred to as infiltration, exfiltration or draughts.

Common Cold Air Leakage Paths

Cold air can be drawn into the building through gaps in walls, floors and ceilings (infiltration) resulting in draughts. In some cases infiltration can cool the surface of elements in the structure, leading to condensation.

Convection Loop

Convection Loop circulates near the wall. During winter warm internal air is cooled by exterior walls and falls towards the floor, creating a convection loop. A better insulation/air barrier system minimizes air currents and saves energy.

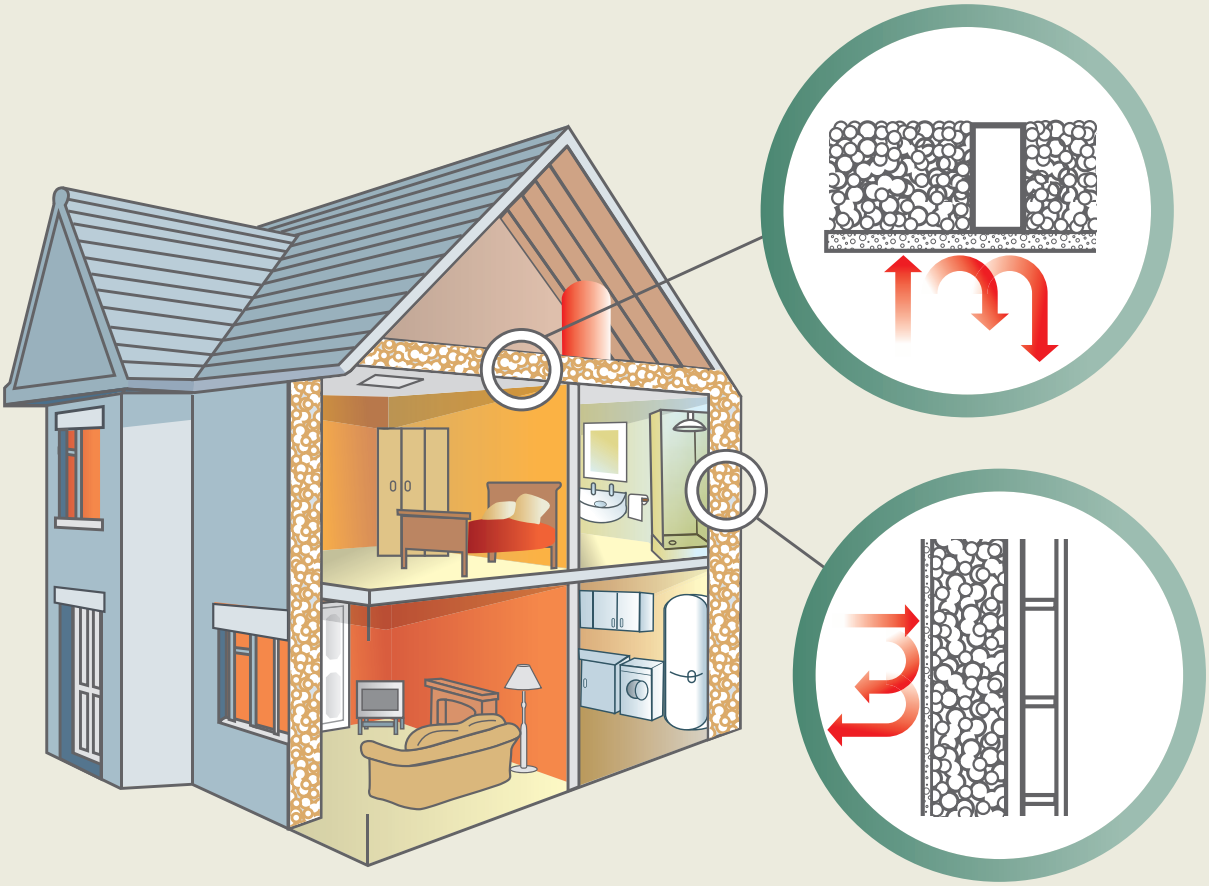
Disadvantages of a Draughty Dwelling

a) CO_2 emissions – A leaky dwelling will result in higher emissions
b) Cost – The additional heat loss will result in excessive fuel costs
c) Comfort – Draughts and localised cold spots can cause discomfort. Excessive infiltration will make rooms uncomfortable during colder periods
d) Risk of Deterioration – Excessive air leakage will allow damp air to penetrate the building fabric, degrading the structure and reducing the effectiveness of the insulation. Air leakage paths often lead to dust marks that look unsightly.

BioBased Spray Foam Insulated Dwelling

BioBased 501s spray foam insulation when installed expands to 100 times its original size to completely fill all voids in walls and roof areas while tightly adhering to structural timbers. What occurs naturally during BioBased installation would require a great degree of skill and patience on the part of a tradesman using conventional forms of insulation material. BioBased insulation helps to create a sealed thermal and airtight barrier around the building envelope. This airtight barrier eliminates heat loss and creates an improved building which is comfortable, safe, energy efficient and an overall healthier indoor environment.

Unlike conventional insulations BioBased 501 spray foam insulation provides a seamless air barrier that conforms to irregular shapes and slopes and allows easy detailing around penetrations such as plumbing and electrical works. With BioBased insulation in a typical domestic house there is no need for vapour control layers as BioBased 501 is a complete air barrier.



Ventilation

Draughts induced through air leakage within a conventionally insulated house had a role to play by inadvertently introducing fresh cold air into the building. However life inside the BioBased home will provide a fully sealed thermal and airtight envelope. With this in mind it is critical to look at a way of introducing CONTROLLED fresh air into your dwelling. We suggest you consider either 1. Passive Ventilation System - low energy natural ventilation designed around your building or 2. Heat Recovery Ventilation System - mechanical heat exchange system introducing fresh air without losing heat.

Advantages of BioBased Airtight Dwellings

a) Reduced CO_2 emissions
b) Maintains heat in the house and saves on energy costs
c) Comfortable draught free house and improved air quality
d) Healthy indoor living environment
e) Resists moisture and prevents mould growth
f) Natural alternative to traditional insulations

Air Permeability testing

In a recent air permeability test carried out by a UKAS accredited laboratory, BioBased 501 insulation performed exceptionally well. An air permeability result of 0.075m^3/m^2/hr was recorded on a timber test panel containing BioBased 501 that had naturally filled the stud void during installation, completely adhering itself to the adjacent timber frame. This result compares to both traditional board and a low density mineral wool material installed tightly within the frame reflecting ideal on-site conditions. Results of 201.9m^3/m^2/hr and 401.1m^3/m^2/hr were recorded respectively indicating the negative effect of air gaps between insulation material and the construction frame.

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