

Natural Insulation & Intelligent Airtightness: The key to healthy, low energy construction

Historically natural insulation products have struggled to enter the mainstream of the built environment due to the incorrect perception that they cannot compete in the area of performance or cost. When we consider the array of benefits which natural insulation provides the reality is that natural materials outperform many man made insulation products in both these categories.

Until relatively recently it was solely the superior ecological natural characteristics which separated natural insulation products from the various other forms of man made synthetic based insulation products currently available on the market.

The introduction of Building Energy Ratings (BER's) in Ireland and more stringent requirements for higher levels of quality insulation has lead to a significant influx of a vast array of alternative insulation materials. In a slowing market consumers have more time to research the various insulation products available on the market. Characteristics which were, until now, considered supplementary, are now seen as a critical part of deciding which insulation to use in their homes. Living health, durability, and comfort are now considered just as critical as thermal performance. It is for this reason that natural insulation has now moved from been a fringe insulation material to the mainstream in Irish homes.

As the market for natural insulation has rapidly expanded over the recent past, more and more designers, specifiers and dwellers are appreciating the vast array of superior technical properties which natural insulation inherently offers. The range of natural insulation products currently available vary from wood fibre mats, hemp, sheep's wool, woodfibre softboards and cellulose/recycled paper natural insulation products. Each of these materials has a unique combination of key characteristics which helps to create a healthier, comfortable, energy efficient, durable construction. Natural insulation materials do not underperform when compared to man made synthetic insulation. They are generally far better materials in terms of performance, and in addition are renewable and sustainable materials which meet key sustainability criteria. Natural insulation materials feature an array of characteristics which, when used correctly, can improve the buildings performance considerably.

From a sustainability and ecological standpoint natural insulation products are simply second to none. Many natural insulation materials not only reduce heat loss and CO₂ in buildings, but also may absorb CO₂ while been harvested, such as hemp or woodfibre. In fact, it has been proven that for every cubic meter of Thermo Hemp natural insulation produced; at least 13kg of CO₂ is absorbed. This is quite an astonishing fact when one considers high levels of CO₂ emitted in the production of other forms of man made insulation.

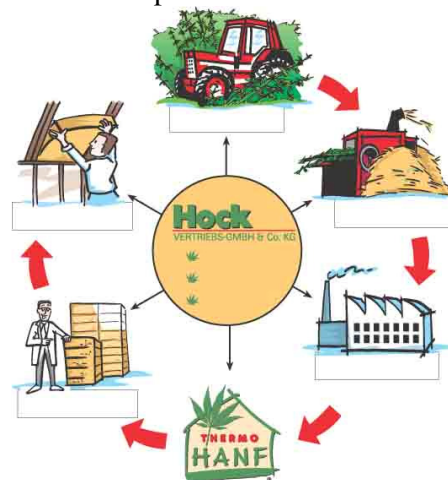


Figure 1: The Life Cycle of Natural Insulation: Thermo Hemp

When one factors in the additional health benefits for the dwelling occupier, the fact that one can insulate a house completely both thermally and acoustically with natural insulation for approximately 3% of the complete build cost, the superior durability and the breathable features of natural insulation products, the cost effectiveness of these natural insulation materials becomes more apparent.



Figure 2: Various Forms of Natural Insulation: Thermo Hemp, Thermafleecce, HolzFlex and Warmcel 100

When considering the energy efficiency of buildings one can not under estimate the positive contribution which natural insulation materials offer buildings on so many levels. Constructions which are energy efficient, durable, healthy, ecological and sustainable in every sense of the word should be designed with some form of natural insulation, the benefits of which are not only in the money we save, but in the environment we live, particularly as it is estimated that we spend up to 90% of our lives in buildings.

Whether natural or man made insulation is used in buildings, the airtightness of the building envelope is integral for building performance. Airtightness generally refers to the minimisation of gaps, cracks and unintended openings in the external envelope of the building. Ventilation refers to the controlled replacement of the stale indoor air with fresh air. When a high level of airtightness is achieved, some form of controlled ventilation, be it mechanical or otherwise is a necessity. Insulating buildings to high levels without due consideration for airtightness leads to well insulated, draughty buildings. Unfortunately there are many such buildings throughout the country today, some only built in the last 5 years.

In many cases, where timber is used in the roof of masonry buildings, or in external walls of timber frame buildings, the airtightness layer also acts as a vapour control layer to limit the risk of condensation within building elements. Buildings constructed to low levels of airtightness may be exposed to condensation within building elements, leading to insulation and structural degradation and mould growth within building components, leading to potential exposure to harmful VOC's by building inhabitants.

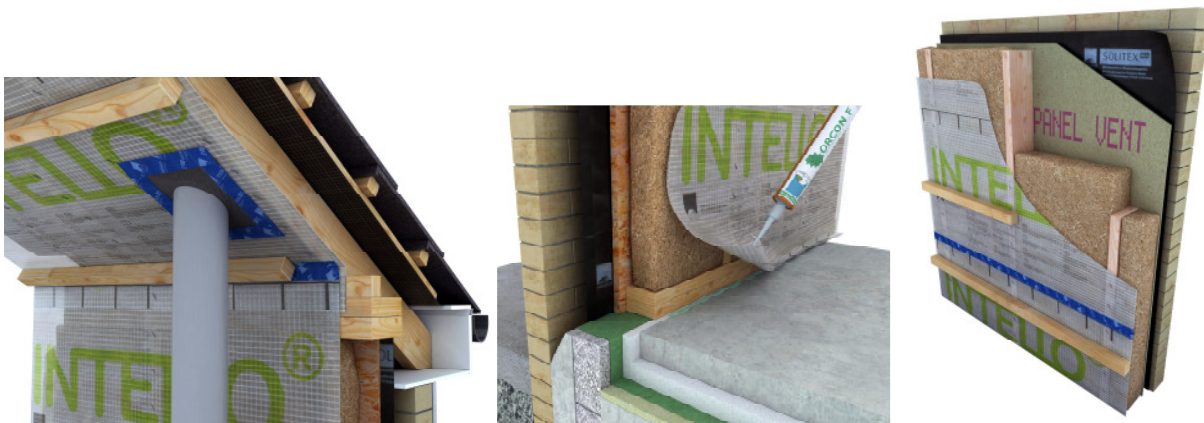


Figure 3: Good airtightness detailing with Intelligent membranes and sealing solutions

In a damp Irish climate specifying more “breathable”, vapour open constructions makes perfect sense. This means that if moisture ever penetrated into building elements, it can dry out and not remain trapped. It is for this reason that more and more people are seeking to use “Intelligent” airtightness membranes, such as INTELLO PLUS. INTELLO PLUS is airtight but can allow moisture to dry out of walls and roofs if required, rather than remaining vapour tight (i.e. vapour barriers). To achieve highest levels of airtightness, durable and easy to use tapes, glues, and sealing grommets should be used and installed correctly to ensure a durable, low energy, healthy building. For a low energy, healthy, durable, ecological building, natural insulation and Intelligent airtightness is the obvious solution.

Ecological Building Systems the sole distributors of Thermo Hemp, Homatherm HolzFlex 040, Gutex, Warmcel 100 and Thermafleece natural insulation products, and the pro clima Intelligent airtight system to Ireland.

Builders, homeowners and Installers can learn more about low energy healthy living by visiting our offices in Athboy, Co Meath or by viewing our website: www.ecologicalbuildingsystems.com.

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