

# The Conker way to build a passivhaus

## The NutHaus approach

Passivhaus is now a well known term, but often misquoted and misused, partly because it is such an exciting concept and everyone wants to be involved. A true Passivhaus is one which is Certified to the Passivhaus Institut's standards. This ensures that the design and execution receive scrutiny by the designer, contractor and an independent certifier.

There are many high quality buildings that are designed and built to the exacting principles, but not certified. Certification can cost around £2000, plus the cost of some additional calculations and management, and for collating the information and submitting it for approval.

We often recommend using [AECB Silver Standard](#) as an alternative to the Passivhaus Standard, especially for those on a tight budget or carrying refurbishment of older or more complex buildings. The same measurement, calculation method, software, and principles are used, but a very slight relaxation on airtightness, thermal bridging, and insulation levels are permitted. The certification only costs £65 plus a little time in collating and submitting the evidence.

Passivhaus is primarily an energy and comfort standard, it was borne out of research into low energy houses that failed to deliver the energy savings predicted. Detailed research and analysis during the 1990's into completed low energy buildings found that there were numerous inaccurate assumptions and weaknesses in the designs, and failures in construction quality resulting in poor real life performance. Many of these failings are still common in buildings today, such as air leakage, insulation not fitting properly, inadequate ventilation, over-estimation of the performance of insulation products.



A building designed, built and certified to the Passivhaus Standard will be exceptionally comfortable, well ventilated, easy to control, cool in summer, warm in winter, and cost very little to heat. In fact hot water generation usually costs more than the heating.

The main thing that Passivhaus makes no attempt to cover, as it is up to the designer and client to decide upon, is what materials to use for the construction. There has been a tendency for the early adopters of the standard to use high performance petro-chemical insulations, notably polystyrene and polyurethane. As the most fundamental element in a Passivhaus is the high level of insulation, a large volume of material is required, potentially causing a greater impact on the environment. It is true that the embodied energy consumed in creating the insulation will be recouped many times in energy savings in the life of the building, but there is no reason why green materials cannot be used to create a low impact Passivhaus.



We call this the **Nuthaus** approach. We have used woodfibre, cork, recycled paper, recycled cotton and even straw bales to create low energy airtight buildings.



According to Bath University's ICE Database, cork has an embodied energy value of 4MJ/kg, compared to 101.5MJ/kg for rigid polyurethane boards (excluding the aluminium facings usually used on these products which adds further embodied energy and prevents the boards from being recycled).

Furthermore, petrochemical insulations such as polystyrene and polyurethane cannot be recycled once they have left the manufacturing plant due to the need for purity and quality control. Any advertising on products that state 'fully recyclable' refers to waste created in the factory, not waste from a



building site, which we believe is highly misleading.

Therefore the choice of insulation materials is extremely important, and something which many less-experienced designers sidestep and leave up to the contractor or suppliers to choose rather than tackle themselves.

In many respects the building industry is as guilty as the car industry in hiding behind laboratory test figures for efficiency and emissions, knowing that the testing regime is weak and easily abused. This is where Passivhaus stands out against the UK energy standards, there is no avoiding the rigorous evaluation and testing required.