



South-facing rear elevation of the Passive House

Ultimate Energy Saver

In these days of ever-increasing energy prices, being able to heat your home at minimal cost seems like an impossible dream, but for the delighted owners of a recently built Passive House in West Somerset the dream has become reality.

Words and photos by Peter Booton

The German company Hanse Haus have been manufacturing bespoke pre-manufactured houses since 1929 and have an enviable international reputation for building technologically advanced, extremely low-energy houses. Although they have constructed a number of properties in this country that meet the stringent requirements for Passive House standards, the West Somerset Passive House is the first house that Hanse Haus has built in the UK to gain certification.

So what is a Passive House? In simple terms, it is a structure with an outstandingly well insulated, air-tight



Hanse Haus Project Liaison Manager Matt Slader with the Passive House certificate

shell that utilises natural solar radiation and heat generated within the building, from such sources as human bodies and operating electrical appliances. Coupled with an internal heat recovery system, which transfers heat energy from warm air being expelled from the house to fresh air being drawn in, a comfortable living environment is maintained all year round.

Consequently, any supplementary heat required on exceptionally cold days is therefore minimal, which results in extremely low running costs, typically no more than 15kWh per square metre of floor area per annum, less than 10 per

Somerset Home



Curving oak staircase in the entrance hall



The living room enjoys far reaching views



The interior is stylish and contemporary

cent of a conventionally heated house! The International Passive House Association (iPHA) claim that a 20sq.m room can be heated using just 10 tea lights, or the body heat of four people, even in the middle of winter.

The owners of the West Somerset Passive House don't use tea lights, but they do have under-floor heating on the ground floor – that has hardly ever been switched on – and a clever ventilation heat recovery system that continuously extracts used air from every room, draws off the heat and then mixes this with fresh incoming air before being re-circulated around the house. During summer, solar gain through the triple-glazed, south facing windows can be reduced by closing electrically controlled external steel blinds fitted to that elevation.

A Passive House hadn't been a consideration when they began thinking about replacing the old house in which they'd lived for 15 years. Their main priority was a house with big windows that would let in lots of light and allow them to fully enjoy the stunning views of Exmoor and West Somerset's beautiful coast, which the elevated position of the site afforded. The concept of a custom-designed house that could be built in a very short period of time offered a number of advantages, particularly with regard to the cost of alternative living accommodation while the house was being erected.

After researching the various options and visiting the Hanse Haus stand at the 2009 Homebuilding and Renovating exhibition at the NEC, their minds were made up. First they discussed their requirements with the regional UK sales agent for Hanse Haus, Giles Hirst, who oversaw the project as it developed and liaised with the company's architect Annette Muller. They then viewed a property in Chard that Hanse Haus had built and visited the company's headquarters in Germany. At the comprehensively stocked Sample Centre they were able to select every component part of the house, ranging from the doors and flooring to the sanitary ware and architectural fittings, including the door handles and even the door bell!



The light and spacious open-plan kitchen and dining area



The well laid out kitchen affords views of the coast and countryside

By this stage it had become apparent that to upgrade their new home to Passive House standards would be well worthwhile in terms of future savings on energy costs. And so the decision was made.

Meanwhile, the regional Project Liaison Manager for Hanse Haus in the JK, Matt Slader, was obtaining planning permission for the new house that, although benefitting from a much greater floor area, would have a similar footprint to the existing property. A crucial factor in the effectiveness of a Passive House is its orientation in order to maximise solar gain. Following a number of complex

calculations regarding the size, quantity and position of the property's windows, the original alignment of the house was altered by a mere 6 degrees!

Various options for external finishes were available, such as brick cladding and weatherboarding, but the owners felt that white render, the same finish as the old house, would be more appropriate to the location. Planning permission was granted without encountering any problems. The old house was then demolished and new foundations prepared.

The first of three huge lorries from Hanse Haus arrived at the site on 16

June 2010 and the German building team immediately began offloading and erecting the structure. Impressed by the team's speed and efficiency, the Passive House's owners were delighted to step across the threshold of their new home two days later, by which time the walls were in place and the roof was on.

The walls of a Passive House consist of 410mm thick, multi-layered Structural Insulation Panels, 250mm which is external insulation with a further 125mm thick layer between the framework timbers. The roof is equally well insulated and every joint throughout the house is meticulously

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sealed to maintain the air-tightness of the structure. Even the pre-formed cut-outs for power sockets and light switches are sealed on installation. Hanse Haus employ a qualified local electrician because of the need to understand and comply with Building Regulations in England.

On completion of a build it is a German tradition to stage a Rickfest, or 'topping out' ceremony, which is performed by the Zimmerman – usually the site manager or team leader – who places an evergreen tree (often a Christmas tree) on the roof of the house to symbolise the natural elements and the evergreen's ability to survive a harsh winter. At the Passive House this was followed by a short speech from the Zimmerman to wish the owners good fortune in their new home, as well as a celebratory toast culminating in the smashing of his glass against the building to affirm the structure's strength and solidity.

After the house had been pressure tested to confirm its air-tightness, a test it passed with ease, representatives of Hanse Haus presented their first UK Passive House certification to the proud homeowners. By this time they had lived in the property during one of the most severe winters on record and were able to comment, "Throughout last winter, and even amidst all the snow, we had to supplement the house's own natural self heating capabilities by using the under-floor heating just a few times. The house really is very warm and we no longer have central heating oil bills to pay, just bills for electricity, the heating element of which is negligible. That in itself is like a breath of fresh air."

Further information on the energy saving advantages of a Passive House, can be found at: hanse-haus.co.uk and passivehouse-international.org



The master bedroom enjoys panoramic views of Exmoor and the West Somerset coast



One of the four stylish bathrooms. The owners have used 1-metre-wide wall tiles, which they sourced locally



Bold colours in the 'Jack and Jill' bathroom