

Technical Information - Energy Efficiency

At a glance

- U-Value is the amount of heat energy in Watts that can pass through a square metre of element per degree Kelvin of temperature difference (W/m^2K).
- As little as 0.08 air changes per hour at normal air pressure with our panels.
- 175mm thick SIP structures are insulated, achieving an excellent U-Value of alone of $0.18W/m^2K$.

More detail

Energy efficiency is calculated in SAP, the Government's Standard Assessment Procedure for Energy Rating of Dwellings and is used to measure the heat loss and carbon emissions from buildings. To achieve an energy efficient building, the three main categories of performance need to be addressed:

U-values of building elements – heat loss through the walls, floors, roof, windows and external doors.

Ψ-Values (Psi-values or thermal bridging) of element junctions – heat loss at junctions in elements such as the wall to foundation junction and corner junctions.

Air permeability of the building envelope – additional heat loss through unplanned air infiltration, for example, around windows and external doors.

'Fabric First' is a popular principle taken from the German Passivhaus standard, where energy efficient buildings are created by focusing on the performance of the external envelope, before using renewable energy sources or 'bolt on' technology. With this approach, elemental U-Values and heat loss are driven down to low levels, resulting in the building consuming minimal amounts of energy to stay warm or cool. As SIP structures are partly insulation, excellent U-Values can be achieved with minimal wall thickness. The Low Carbon Construction Building System panels are joined together using a unique insulated jointing system, providing a more continuous layer of insulation, minimising air leakage.

To demonstrate this point, the repeating thermal bridges in timber framed buildings, caused by timber studs in the walls and roof rafters, means that it could be expected that 15% of the walls and 6% of the roof be uninsulated. In comparison, a building constructed from The Low Carbon Construction Building System, as little as 4% of the walls and 1% of the roof could be uninsulated.

The overall thermal performance of The Low Carbon Construction Building System, provided by the high performance insulation core, air tightness and low thermal bridging, means that the heating system could be significantly downsized which could save both capital and running costs. The Low Carbon Construction Building System is the perfect high performance building fabric for a low energy building requiring very little heating at all, putting it in line with Passivhaus standard.

The Low Carbon Construction Building System walls are typically 223mm deep and can achieve a U-Value of $0.22W/m^2K$ with no additional insulation and so both meets and exceeds the Building Regulations. The Low Carbon Construction Building System can easily achieve lower U-Values of $0.1W/m^2K$ with more insulation, which ultimately means lower running costs.

The closed cell structure of the polyurethane insulation core does not allow air movement within the wall; therefore the insulation will not sag or deteriorate over time. The jointing system used in The Low Carbon Construction Building System creates an airtight structure, as little as 0.08 air changes per hour at normal air pressure, and little opportunity for air leakage. It is important to note that buildings with very low air leakage rates require additional ventilation methods.

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