



Kingspan **TEK**® Building System

An introduction



- Can achieve whole wall and roof U-values of 0.20 - 0.10 W/m²K or better
- Can achieve air leakage levels as good as approximately 1 m³/hour/m² at 50 Pa
- Recognised by major building warranty providers such as Building Life Plans and NHBC
- BBA Certified
- Quick and safe to build
- Can create efficient buildings with very low fuel bills
- Internal works can start earlier
- Minimal on-site waste



Kingspan TEK® Building System

The Kingspan TEK® Building System

The Kingspan TEK® Building System comprises 142 mm or 172 mm thick structural insulated panels (SIPs) connected with a unique jointing system for walls and roofs, and intermediate floors using I-beams or open web joists.

Kingspan TEK® Building System panels consist of a high performance fibre-free rigid urethane insulation core, sandwiched between two layers of Oriented Strand Board type 3 (OSB/3).

During manufacture, the insulation core of the TEK® Building System panels is autohesively bonded to the OSB/3 facings.

This process provides more reliable and superior adhesion than the secondary bonding process used in the manufacture of most other SIPs.

Kingspan TEK® Building System panels are a structural composite. This composite assembly provides stiffness, strength and predictable responses to applied loads.

The Kingspan TEK® Building System is recognised by major building warranty providers such as NHBC, Building Life Plans, Premier, Build Zone Homebond and HAPM.

The Kingspan TEK® Building System comprising 142 mm and 172 mm thick panels, holds BBA Certification No. 02/S029.

**Fibre-free
Core**



Design flexibility

The Kingspan TEK® Building System leaves ample scope for individual design. The panels are pre-cut and manufactured offsite to match a project's engineering and design specifications, and a complete kit is delivered to site ready for erection.

The Kingspan TEK® Building System can be used to create the walls (loadbearing and non-loadbearing) and roofs of a complete building.

The Kingspan TEK® Building System can be erected on any ground floor construction, however the foundations must have specific tolerances as per guidance available from the Kingspan Insulation Technical Service Department (see rear cover for details).

The Kingspan TEK® Building System can be used to create buildings up to 4 storeys. The panels are lightweight compared with brick and block, at a maximum of 24 kg/m² (excluding any additional timber), therefore they are ideal for use where heavy constructions are not possible.

As with all construction methods, including traditional masonry, a long lasting external weather proofing is also a necessary part of walls and roofs constructed using the Kingspan TEK® Building System.

The performance characteristics of buildings constructed from the Kingspan TEK® Building System quoted in this document are predicated on its use as a full System i.e. incorporating walls and roof built with TEK® Building System panels. TEK® Building System roof and wall elements can be used individually with other non-TEK® Building System components. For example TEK® Building System panels can be used as a wall system in conjunction with a timber rafter roof. For further guidance on the performance characteristics of TEK® Building System panels used in conjunction with other construction components please contact the Kingspan Insulation Technical Services Department (see rear cover for details).

NB The System is not recommended for cellars or basement constructions or for use in high humidity environments.



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Floor space

When building a wall to achieve a U-value of 0.17 W/m²K using the Kingspan TEK® Building System, the structure can be just 275.5 mm thick¹. In comparison, a timber frame wall to achieve the same U-value may have to be 450.3 mm thick², and a full fill masonry cavity wall to achieve the same U-value may have to have a wall 433.0 mm thick³.

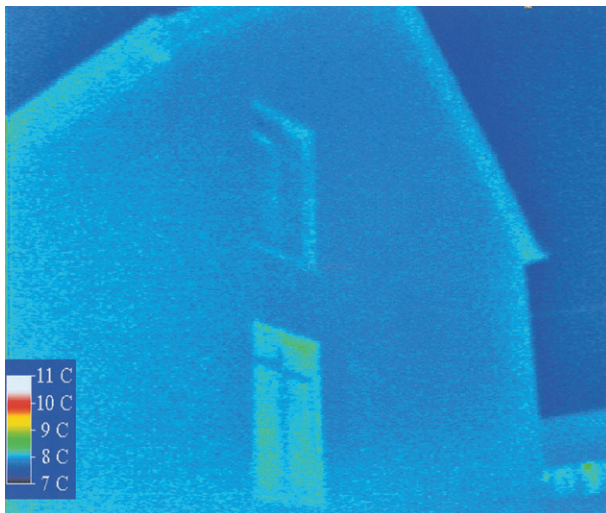
This means that the Kingspan TEK® Building System can provide more floor space for the same external dimensions. In the case of a two storey house, with external dimensions 10 x 8 m, the TEK® Building System can yield 11.6 m²* more useable floor space than a house built with timber frame walls, and 10.5 m²* more useable floor space than a house built with masonry full fill cavity walls, assuming the wall constructions detailed above and below.

- 1 Kingspan TEK® Building System Wall = 27.5 mm brick slip / bedding compound, 10 mm calcium silicate board, 25 mm deep batten, 0.5 mm Kingspan nilvent® breathable membrane, 172 mm Kingspan TEK® panel, 25 mm deep batten, 12.5 mm plasterboard, 3 mm skim.
- 2 Timber frame wall = 102.5 mm brick, 50 mm cavity, 0.3 mm foil faced breather membrane, 12 mm OSB, 270 mm glass mineral fibre quilt (0.040 W/mK) between 270 mm deep studs, 12.5 mm vapour check plasterboard, 3 mm skim.
- 3 Masonry full fill cavity wall = 102.5 mm brick, 200 mm glass mineral fibre full fill (0.036 W/mK), 100 mm dense block, 15 mm dab cavity, 12.5 mm plasterboard on dabs, 3 mm skim.

* Internal floor area of each construction is rounded to one decimal place.

CO₂ emissions

The first step in minimising the CO₂ emissions of a building is to reduce its space heating demand. The most effective way to reduce the space heating demand of a building is to improve the performance of its envelope by specifying low U-values, low air permeability and by avoiding significant thermal bridging wherever possible.



U-values

The Kingspan TEK® Building System comprising 142 mm thick panels can achieve whole wall and roof U-values of 0.20 W/m²K or better with no additional insulation. The TEK® Building System comprising 172 mm thick panels can achieve whole wall and roof U-values of 0.17 W/m²K or better with no additional insulation. Extremely low U-values, e.g. 0.10 W/m²K, can easily be achieved with the addition of an insulated lining, e.g. Kingspan Thermowall® TW55, on the inside of the TEK® Building System panels.

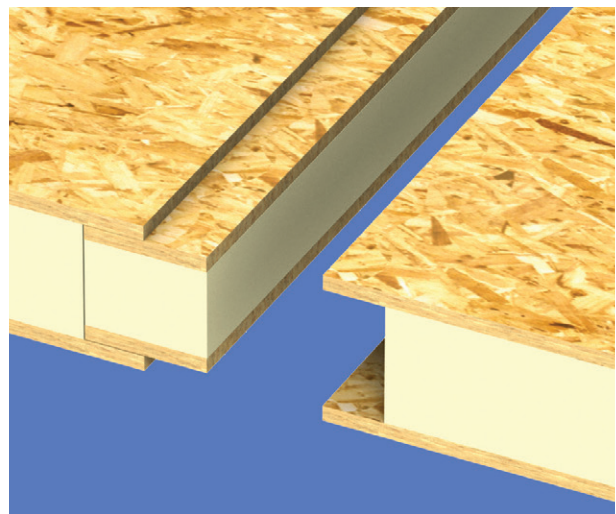
Air-tightness

In addition to the excellent U-values that can be achieved by walls and roofs constructed using the Kingspan TEK® Building System, the closed cell structure of the rigid urethane insulation core of the panels does not allow movement of air within them. The insulation will not sag or physically deteriorate over time, as may be the case with other insulating materials.

The Kingspan TEK® Building System's proprietary jointing system can create a very air-tight structure. Air leakage levels can be as good as 0.08 air changes per hour at normal pressures (approximately 1 m³/hour/m² at 50 Pa).

Thermal bridging

Repeating thermal bridges occur where a material with a significantly worse thermal conductivity interrupts the insulation layer in a construction. U-value calculations for conventional timber frame systems take into account the effects of repeating thermal bridges i.e. timber studs etc. The insulation layer in the Kingspan TEK® Building System is not interrupted by repeating studwork. Therefore, there is less repeating thermal bridging.



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There are, however, some thermal bridges, e.g. where timbers are used to support point loads etc.

The overall result is that the Kingspan TEK® Building System only has 4% thermal bridging from timber elements for a typical domestic building wall and 1% thermal bridging from timber elements for a typical domestic building roof.

Linear thermal bridges occur at junctions, e.g. wall to floor interface, and openings, e.g. windows, in the building fabric, and are expressed as psi (ψ) values. ψ -values are an important factor in the calculation methodologies used to assess the operational CO₂ emissions of buildings. The Kingspan TEK® Building System achieves very good ψ -values, due to the continuity of insulation at junctions and openings inherent in the System's design.

Kingspan Insulation has had a number of the junctions detailed in the Kingspan TEK® Building System Standard Details Handbook modelled and ψ -values calculated for them. The TEK® Building System set of junction details can assist significantly in achieving Building Regulations compliance. For further information, please contact the Kingspan Insulation Technical Service Department (see rear cover for details).

Responsible sourcing

Kingspan Insulation's Selby, North Yorkshire manufacturing facility, at which Kingspan TEK® Building System panels are produced, carries FSC® (FSC®- C109304) and PEFC Chain of Custody certification. As standard, the OSB facing of the TEK® Building System panels is PEFC certified. This certification verifies that the OSB facing of TEK® Building System panels is legally sourced from well managed forests and other controlled sources.



The mark of responsible forestry



BREEAM

The Kingspan TEK® Building System can help achieve credits in a number of sections of BREEAM. A technical bulletin has been produced covering, in detail, what credits are available. The technical bulletin can be downloaded from www.kingspantek.co.uk/literature.

Delivery Partners

The Kingspan TEK® Building System is available via a network of approved Delivery Partners, that are responsible for the design, and erection of each specific project. A full list of UK, Irish and international Delivery Partners is available from the TEK® Building System website (see rear cover for details).

Enquiries should be directed to a Kingspan TEK® Delivery Partner for the following:

- specific structural engineering and design advice;
- to convert a drawing (including plans and elevations) into a Kingspan TEK® Building System scheme; and
- quotations and lead times.



Kingspan TEK® Building System

Advantages of the Kingspan TEK® Building System

Environmental Sustainability at its Core

- Can be used to create highly energy efficient buildings.
- Can achieve whole wall and roof U-values of 0.20 - 0.10 W/m²K or better.
- Can achieve air leakage rates as good as 0.08 air changes per hour at normal pressures (approximately 1 m³/hour/m² at 50 Pa).
- Creates minimal site waste, as kits are designed, cut and palletised in a quality controlled, factory environment.
- All the components for a typical Kingspan TEK® Building System kit, e.g. panels and ancillaries, come from one source, therefore there are fewer deliveries, less transport, congestion, noise and traffic pollution, which reduces a project's impact on the environment.
- The OSB facing of Kingspan TEK® Building System panels is PEFC Chain of Custody certified.
- The Kingspan TEK® Building System panels produced at Kingspan Insulation's Selby, North Yorkshire manufacturing facility are manufactured under a management system certified to ISO 14001: 2015 (Environmental management systems).



Fast, cost effective & predictable

- The panelised nature of the System can enable a fast track building process, which can help to reduce construction time.
- Follow on trades can start work sooner, as an erected Kingspan TEK® Building System kit, when wrapped with a breathable membrane (e.g. Kingspan nilvent®), can provide a weather-tight shell, helping the contractor complete the project faster.
- Much easier to predict project completion times, as the System is relatively simple to erect and requires no wet trades or brick layers.
- Defects are vastly reduced due to factory controlled manufacturing, precise engineering and the design of the System.

Innovative

- Can provide a more controllable indoor environment than traditional construction methods, such as masonry, due to the System's potential for superior air-tightness.
- First SIP building system in the UK and Ireland to receive BBA Certification.
- Has been used on many projects that have achieved Passivhaus certification.



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