



## Kingspan TEK® Building System

### AN INTRODUCTION



- Can achieve whole wall and roof U-values of 0.16 W/m<sup>2</sup>·K or better
- Can achieve air leakage levels as good as approximately 1 m<sup>3</sup>/hour/m<sup>2</sup> at 50 Pa
- Recognised by major building warranty providers such as Building Life Plans and NHBC
- Use is covered by a European Technical Approval
- BBA and NSAI Agrément certified\*
- Certified by LABC Registered Details
- Insulation core manufactured with a blowing agent that has zero ODP and low GWP
- Constructions available that correspond to BRE Global Green Guide generic elements which achieve a Summary Rating of A+\*
- Quick and safe to build
- Can create warm buildings with very low fuel bills
- Internal works can start earlier
- Minimal on-site waste

Fibre-free  
Core

  
**Kingspan®**

*Low Energy –  
Low Carbon Buildings*



## 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 *Kingspan 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's use is covered by European Technical Approval ETA-11/0466 and by LABC Registered Details Certificate No. EWW546.

The *Kingspan TEK®* Building System comprising 142 mm thick panels holds BBA and NSAI Agrément certification.

For more details on certification for 172 mm thick panels, please contact the Kingspan Insulation Technical Service Department (see rear cover).



## Design Flexibility

The *Kingspan TEK®* Building System leaves ample scope for individual design. The panels are pre-cut 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 Services Department (see rear cover).

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/m<sup>2</sup> (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 *Kingspan TEK®* Building System panels. *Kingspan TEK®* Building System roof and wall elements can be used individually with other non-*Kingspan TEK®* Building System components. For example *Kingspan 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 *Kingspan TEK®* Building System panels used in conjunction with other construction components please contact the Kingspan Insulation Technical Services Department (see rear cover).

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





## Floor Space

When building a wall to achieve a U-value of  $0.16 \text{ W/m}^2\cdot\text{K}$  using the **Kingspan TEK® Building System**, the structure can be just 275.5 mm thick<sup>1</sup>. In comparison, a timber frame wall to achieve the same U-value may have to be 460.3 mm thick<sup>2</sup>, and a full fill masonry cavity wall to achieve the same U-value may have to have a wall 453 mm thick<sup>3</sup>.

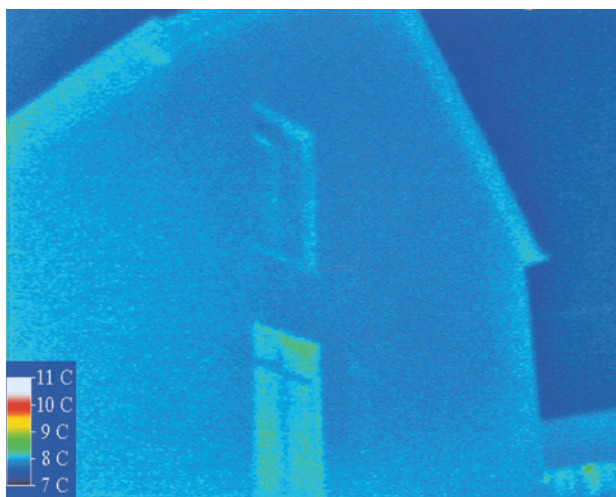
This means that the **Kingspan TEK® Building System** can provide more floor space for the same external dimensions. In the case of a two storey house, with external dimensions 10 x 8 m, the **Kingspan TEK® Building System** can yield 12.2 m<sup>2</sup>\* more useable floor space than a house built with timber frame walls, and 11.8 m<sup>2</sup>\* 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 **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, 280 mm glass mineral fibre quilt ( $0.040 \text{ W/m}\cdot\text{K}$ ) between 280 mm deep studs, 12.5 mm vapour check plasterboard, 3 mm skim.
- 3 **Masonry Full Fill Cavity Wall** = 102.5 mm brick, 220 mm rock mineral fibre full fill ( $0.036 \text{ W/m}\cdot\text{K}$ ), 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.

## CO<sub>2</sub> Emissions

The first step in minimising the CO<sub>2</sub> 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  $0.20 \text{ W/m}^2\cdot\text{K}$  or better with no additional insulation. The **Kingspan TEK® Building System** comprising 172 mm thick panels can achieve whole wall and roof U-values of  $0.16 \text{ W/m}^2\cdot\text{K}$  or better with no additional insulation. Extremely low U-values, e.g.  $0.10 \text{ W/m}^2\cdot\text{K}$ , can easily be achieved with the addition of an insulated lining, e.g. **Kingspan Thermawall® TW55**, on the inside of the **Kingspan TEK® Building System** panels.

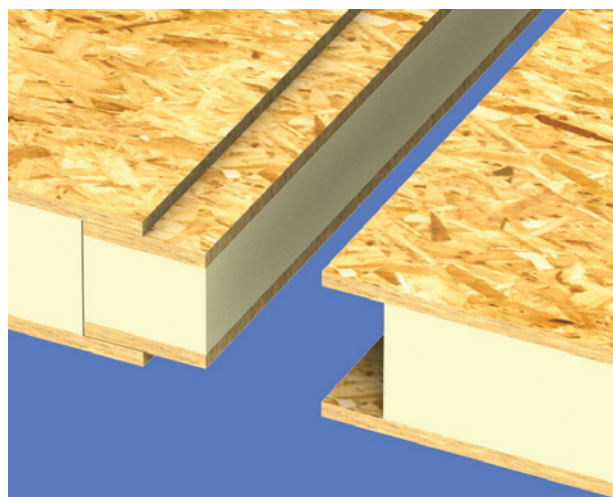
## Air-tightness

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  $1 \text{ m}^3/\text{hour}/\text{m}^2$  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.





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 ( $\psi$ ) values.  $\psi$ -values are an important factor in the calculation methodologies used to assess the operational CO<sub>2</sub> emissions of buildings. The **Kingspan TEK® Building System** achieves very good  $\psi$ -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 psi values calculated for them. The **Kingspan TEK® Building System** set of junction details can assist significantly in achieving Building Regulations compliance. For further information, please contact the Kingspan Insulation Technical Services Department (see rear cover).

## Zero ODP and Low GWP

The fibre-free insulation core of **Kingspan TEK® Building System** panels is manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

## Responsible Sourcing

Kingspan Insulation's 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 **Kingspan TEK® Building System** panels is PEFC certified at 70%. This certification verifies that, a minimum of 70% of the OSB facing of **Kingspan TEK® Building System** panels has Chain of Custody and is legally sourced.



## Green Guide Ratings

2008 BRE Green Guide Summary Ratings, for walls and roofs constructed using generic **Kingspan TEK®**-type SIPs, as a result of the comparatively low environmental impact of the SIPs, are heavily influenced by the external cladding specification. Wall and roof elements, constructed using the **Kingspan TEK® Building System**, correspond to generic elements, described in the 2008 BRE Global Green Guide, which achieve Summary Ratings of A+ or A.

The environmental impact of the insulation core of **Kingspan TEK®**-type SIPs is incorporated into the generic elemental Green Guide Summary Ratings of the walls and roofs of which the panels form the basis, because it provides a significant structural function. Therefore, the Green Guide Summary Rating of the insulation core of **Kingspan TEK®**-type SIPs can be taken as being A+ for the purposes of BREEAM.

*NB: 2008 BRE Green Guide Summary Ratings constructed using generic Kingspan TEK®-type SIPs are only currently available for 142 mm thick panels. For more details please contact the Kingspan Insulation Technical Service Department (see rear cover).*

## BREEAM & The Code for Sustainable Homes

The **Kingspan TEK® Building System** can help achieve credits in a number of sections of the Code for Sustainable Homes and BREEAM. Technical bulletins have been produced covering, in detail, what credits are available. Copies of these technical bulletins can be downloaded from

[www.kingspantek.co.uk/literature/technical-bulletins](http://www.kingspantek.co.uk/literature/technical-bulletins).

## Delivery Partners

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

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.





## 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/m<sup>2</sup>-K or better.
- Can achieve air leakage rates as good as 0.08 air changes per hour at normal pressures (approximately 1 m<sup>3</sup>/hour/m<sup>2</sup> 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 at 70%.
- Wall and roof elements, constructed using the *Kingspan TEK*® Building System in a 142 mm panel thickness, correspond to generic elements with 2008 BRE Global Green Guide Summary Ratings of A+ or A.
- Manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).



### 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 and NSAI Agrément certification (for 142 mm thick panels).
- Used on the UK's first house to achieve Code for Sustainable Homes – Level 6 (BRE Innovation Centre 2007).
- Has since been used on several multiple dwelling projects that have achieved Code for Sustainable Homes Level 5 and Level 6.





# Contact Details

## Customer Service

For quotations, order placement and details of despatches please contact the Kingspan Insulation Customer Service Department on the numbers below:

UK	– Tel:	+44 (0) 1544 388 601
	– Fax:	+44 (0) 1544 388 888
	– email:	customerservice@kingspantek.co.uk
Ireland	– Tel:	+353 (0) 42 979 5000
	– Fax:	+353 (0) 42 975 4299
	– email:	info@kingspantek.ie

## Technical Advice

Kingspan Insulation supports all of its products with a comprehensive Technical Advisory Service for specifiers, stockists and contractors.

This includes a computer-aided service designed to give fast, accurate technical advice. Simply phone the Kingspan Insulation Technical Service Department with your project specification. Calculations can be carried out to provide U-values, condensation / dew point risk, required insulation thicknesses etc... Thereafter any number of permutations can be provided to help you achieve your desired targets.

The Kingspan Insulation Technical Service Department can also give general application advice and advice on design detailing and fixing etc... Site surveys are also undertaken as appropriate.

The Kingspan Insulation British Technical Service Department operates under a management system certified to the BBA



Scheme for Assessing the Competency of Persons to Undertake U-value and Condensation Risk Calculations.

Please contact the Kingspan Insulation Technical Service Department on the numbers below:

UK	– Tel:	+44 (0) 1544 387 382
	– Fax:	+44 (0) 1544 387 482
	– email:	technical@kingspantek.co.uk
Ireland	– Tel:	+353 (0) 42 975 4297
	– Fax:	+353 (0) 42 975 4296
	– email:	technical@kingspantek.ie

## Literature & Samples

Kingspan Insulation produces a comprehensive range of technical literature for specifiers, contractors, stockists and end users.

The literature contains clear 'user friendly' advice on typical design; design considerations; thermal properties; sitework and product data.

**Kingspan TEK®** technical literature is an essential specification tool. For copies please contact the Kingspan Insulation Marketing Department or visit the **Kingspan TEK®** website, using the details below:

UK	– Tel:	+44 (0) 1544 387 384
	– Fax:	+44 (0) 1544 387 484
	– email:	literature@kingspantek.co.uk
Ireland	– Tel:	+353 (0) 42 979 5000
	– Fax:	+353 (0) 42 975 4299
	– email:	info@kingspantek.ie

## General Enquiries

For all other enquiries contact Kingspan Insulation on the numbers below:

UK	– Tel:	+44 (0) 1544 388 601
	– Fax:	+44 (0) 1544 388 888
	– email:	info@kingspantek.co.uk
Ireland	– Tel:	+353 (0) 42 979 5000
	– Fax:	+353 (0) 42 975 4299
	– email:	info@kingspantek.ie

*Kingspan Insulation Ltd. reserves the right to amend product specifications without prior notice. The information, technical details and fixing instructions etc. included in this literature are given in good faith and apply to uses described. Recommendations for use should be verified for suitability and compliance with actual requirements, specifications and any applicable laws and regulations. For other applications or conditions of use, Kingspan offers a Technical Advisory Service (see above), the advice of which should be sought for uses of Kingspan products that are not specifically described herein. Please check that your copy of this literature is current by contacting the Kingspan Insulation Marketing Department (see above).*

Kingspan Insulation Ltd is a member of:  
The Structural Timber Association (STA)



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*\*Refers to the Kingspan TEK® Building System using a 142 mm thick panel. For more details please contact the Kingspan Insulation Technical Service Department.*

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