Structural Insulated Panels
Great Britain & Ireland

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Kingspan TEK® Building System

Specification Manual

Silverlake, West Dorset
Image: Habitat First Group

Kingspan®

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Introduction

Structural Insulated Panel technology

Timber, worldwide, is traditionally the most widely used building material. It is easy to handle, natural and brings flexibility to design.

Today, many buildings are built with a traditional timber frame structure and this trend is growing as Building Regulations / Standards strive for better thermal performance and the construction industry increasingly moves towards faster and lighter methods of construction.

Structural Insulated Panel (SIP) technology is the next generation of timber based construction.

In the UK and Ireland, demand for offsite construction methods such as SIPs is growing rapidly. This is being driven by factors such as the availability of on-site skills being at an all time low.

Building Regulations / Standards are demanding much higher levels of energy efficiency. This is challenging many traditional construction systems and, in some instances, forcing people to look at alternative ways of meeting the requirements more economically. Unparalleled energy efficiency combined with high build-speed and the low site wastage make the Kingspan TEK® Building System a very cost effective way of achieving and exceeding the thermal requirements of the Building Regulations / Standards.

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 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 a more reliable and superior adhesion than the traditional 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.

If a building guarantee is required, then guidance should be sought from the organisation offering the guarantee. Typically, third party independent certification would be required e.g. BBA Certification.

The Kingspan TEK® Building System, manufactured at the Selby (North Yorkshire) manufacturing facility, comprising 142 mm and 172 mm thick panels, holds BBA Certification No. 02/S029.

Applications

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^2 (excluding any additional timber). The lightweight nature of TEK® Building System panels means that they may be ideal for use where heavy constructions are not possible e.g. where soil conditions are unfavourable, or foundation depth restricted.

Buildings constructed with the Kingspan TEK® Building System can have extremely low levels of energy use. As a result, the TEK® Building System can be the perfect building fabric solution for Passivhaus design.

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

NB The System is not recommended for cellars or basement constructions or for use in high humidity environments, such as swimming pools.

Introduction

Environmental sustainability at its core

- 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 offsite.
- 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 once a Kingspan TEK® Building System kit is erected and wrapped with a breathable membrane (e.g. Kingspan nilvent®), the shell is weather-tight, and this can help the contractor complete the project more quickly.
- 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 offsite 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.
- Perfect building fabric solution for Passivhaus design.

Project gallery

Multiple residential - private & social

The Kingspan TEK® Building System has been widely used across the UK and Ireland by major developers, house builders and housing associations to construct multiple residential dwellings. To these clients, the System offers a range of unique advantages, including: speed of construction; predictable completion dates; offsite manufacturing; less on-site labour; and the provision of a weather-tight shell.

Rayne Park, Norwich

Shepherds Bush, London

Project gallery

Education & healthcare

Public Sector buildings are increasingly required to meet a standard of construction above and beyond those set out in the Building Regulations / Standards. By demanding low U-values and low long term running costs the Public Sector seeks to ensure that the buildings they commission offer not only the best value for money, but also deliver industry best practice in respect of environmental and socio-economic responsibility.

Atherleigh Park, Manchester

John Warner School, Hertfordshire

Private residential

The Kingspan TEK® Building System has long proved popular with those self-builders who demand the best possible construction techniques for their new home. By offering a super insulated structure, with very low fuel bills, additional room space and a quick and predictable build programme, the TEK® Building System meets their exacting standards and is recognised by a range of industry bodies.

Lynch House, Hampshire

Passivhaus, Manchester

Typical constructions & U-values

Assumptions

The U-values in the tables that follow have been calculated using the method detailed in BS EN ISO 6946: 2017 (Building components and building elements. Thermal resistance and thermal transmittance. Calculation methods) and using the conventions set out in BR 443 (Conventions for U-value calculations).

The U-values in the tables that follow are valid for the constructions shown in the details immediately above. Unless otherwise stated, the U-values quoted are based on an internal construction comprising a 3 mm plaster skim on 12.5 mm plasterboard fixed to 50 x 25 mm softwood timber battens. The external finishes are as specified in the examples themselves.

NB For calculations which do not feature additional internal insulation, a 4% bridging factor has been assumed for walls and 1% for pitched roofs. The thermal conductivity of the timber has been assumed at 0.12 W/mK.

NB U-value calculations calculated with timber bridging percentage of 1% for TEK® roof panels and 4% for TEK® wall panels. Results may differ on projects where the stated solid timber and cassette spline bridging percentages are exceeded.

NB Calculations assume that the use of a foil faced breather membrane yields an airspace thermal resistance of 0.57 m^2K/W.

NB For the purposes of these calculations the standard of workmanship has been assumed good and therefore the correction factor for air gaps has been ignored.

NB The figures quoted are for guidance only. A detailed U-value calculation together with condensation risk analysis should be completed for each individual project.

NB If your construction is any different to those specified and / or to gain a comprehensive U-value calculation along with a condensation risk analysis of your project please consult the Kingspan Insulation Technical Service Department for assistance (see rear cover for details).

Kingspan TEK® Building System walls with 102.5 mm brickwork outer leaf

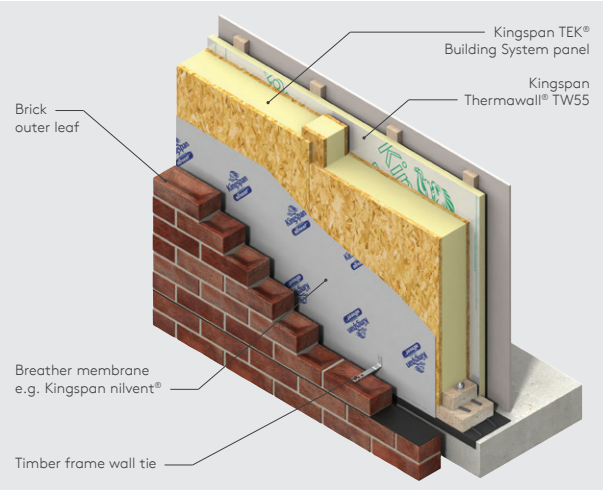


Figure 1

U-values for Kingspan TEK® Building System walls with various thicknesses of additional insulation and different breathable membranes			
Thickness of Kingspan TEK® Building System panels (mm)	Thickness of Kingspan Thermawall® TW55 (mm)	U-value (W/m^2K)	
		Standard breathable membrane	Foil faced breathable membrane
142	0	0.19	0.18
142	25	0.15	0.14
142	30	0.14	0.14
142	40	0.13	0.13
142	50	0.13	0.12
142	60	0.12	0.12
142	70	0.12	0.11
142	75	0.12	0.11
142	80	0.11	0.11
142	90	0.11	0.10
172	0	0.16	0.15
172	20	0.13	0.13
172	25	0.13	0.12
172	30	0.12	0.12
172	40	0.12	0.11
172	50	0.11	0.11
172	60	0.11	0.10
172	70	0.10	0.10

Typical constructions & U-values

Kingspan TEK® Building System walls with 10 mm polymer rendered 100 mm dense blockwork outer leaf

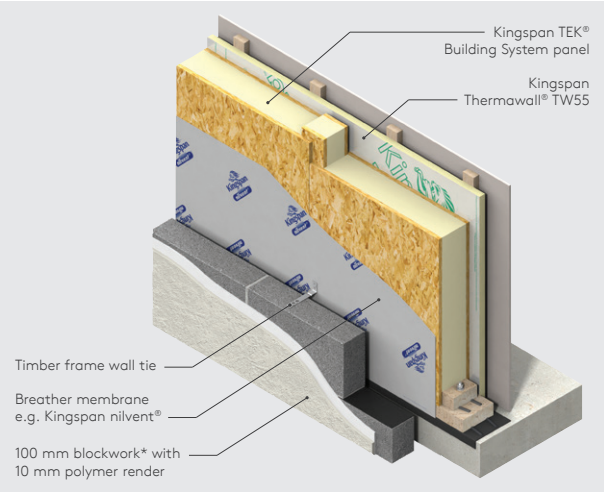


Figure 2

U-values for Kingspan TEK® Building System walls with various thicknesses of additional insulation and different breathable membranes			
Thickness of Kingspan TEK® Building System panels (mm)	Thickness of Kingspan Thermawall® TW55 (mm)	U-value (W/m²K)	
		Standard breathable membrane	Foil faced breathable membrane
142	0	0.19	0.18
142	25	0.15	0.14
142	30	0.14	0.14
142	40	0.13	0.13
142	50	0.13	0.12
142	60	0.12	0.12
142	70	0.12	0.11
142	75	0.11	0.11
142	80	0.11	0.11
142	90	0.11	0.10
172	0	0.16	0.15
172	20	0.13	0.13
172	25	0.13	0.12
172	30	0.12	0.12
172	40	0.12	0.11
172	50	0.11	0.11
172	60	0.11	0.10
172	70	0.10	0.10

* Calculations assume dense block of λ-value 1.13 W/mK

Kingspan TEK® Building System wall panels with ventilated cladding

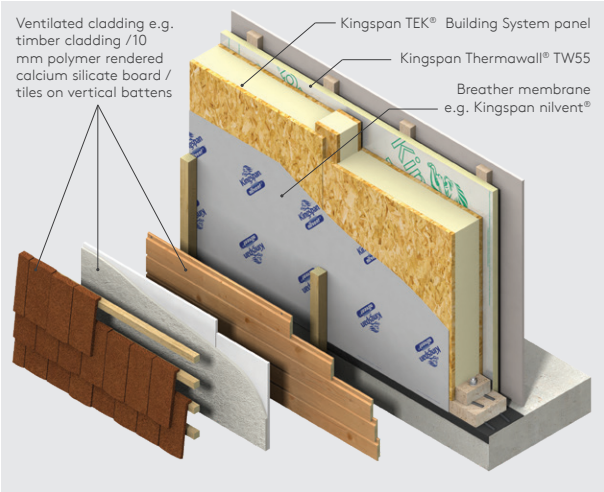


Figure 3

U-values for Kingspan TEK® Building System walls with various thicknesses of additional insulation		
Thickness of Kingspan TEK® Building System panels (mm)	Thickness of Kingspan Thermawall® TW55 (mm)	U-value (W/m²K)
142	0	0.20
142	25	0.15
142	30	0.15
142	40	0.14
142	50	0.13
142	60	0.13
142	70	0.12
142	75	0.12
142	80	0.12
142	90	0.11
172	0	0.17
172	20	0.14
172	25	0.13
172	30	0.13
172	40	0.12
172	50	0.11
172	60	0.11
172	70	0.11

Typical constructions & U-values

Kingspan TEK® Building System pitched roofs

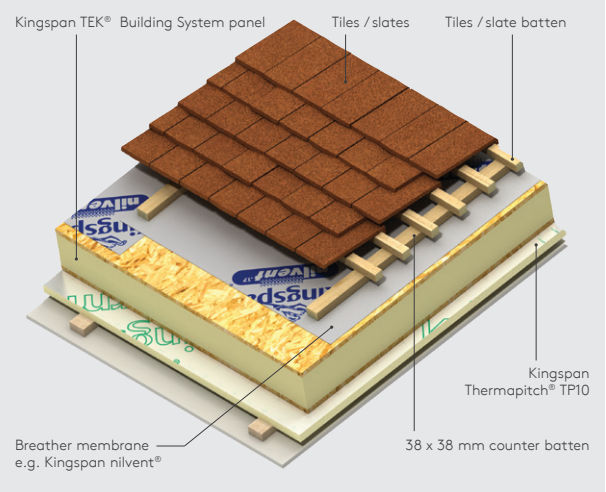


Figure 4

U-values for Kingspan TEK® Building System walls with various thicknesses of additional insulation and different breathable membranes		
Thickness of Kingspan TEK® Building System panels (mm)	Thickness of Kingspan Thermapitch® TP10 (mm)	U-value (W/m^2K)
142	0	0.19
142	25	0.15
142	30	0.15
142	40	0.14
142	50	0.13
142	60	0.13
142	70	0.12
142	75	0.12
142	80	0.11
142	90	0.11
172	0	0.16
172	20	0.13
172	25	0.13
172	30	0.12
172	40	0.12
172	50	0.11
172	60	0.11
172	70	0.10

Design considerations

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 specification, 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, up to four storeys in height.

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).

For further guidance on designing buildings with the Kingspan TEK® Building System please refer to the 'Kingspan TEK® Building System Standard Details', available for download from **www.kingspantek.co.uk/literature** or contact the Kingspan Insulation Technical Service Department (see rear cover for details).

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 the TEK® Building System panels. The TEK® Building System roof and wall elements can be used individually with other non-TEK® Building System components. For example the TEK® Building System panels can be used as a roofing system in conjunction with masonry or timber frame walls, and the TEK® Building System wall panels can be used in conjunction with a traditional truss rafter roof. For further guidance on the performance characteristics of the TEK® Building System panels used in conjunction with other construction components please contact the Kingspan Insulation Technical Service Department (see rear cover for details).

Specification clause

The Kingspan TEK® Building System should be described in specifications as:

The walls and / or roof shall be constructed from 142 or 172 mm thick Kingspan TEK® Building System panels comprising a rigid urethane insulation core, sandwiched between two layers of FSC® or PEFC Chain of Custody certified Oriented Strand Board type 3 (OSB/3) autohesively bonded to the insulation core during manufacture. The product shall be manufactured under a management system certified to ISO 9001: 2015, ISO 14001: 2015; ISO 45001: 2018, ISO 50001: 2018 and ISO 37301: 2021; by Kingspan Insulation Limited; and installed in accordance with the instructions issued by them.

Product classifications

Uniclass UK

Pr_20_93_85_90 Timber structural insulated panels (SIPs)
Pr_20_65_60_84 Structural insulated panel (SIP) modules

CAWS

G20/347 Structural insulated roof panels
B14/110 Prefabricated panelled
G20/348 Structural insulated wall panels

Details also available at the **NBS Source**.

Water vapour control

Consideration should be given to the risk of condensation when designing thermal elements.

Condensation can be controlled in buildings constructed with the Kingspan TEK® Building System by ensuring the panels are properly installed in accordance with Kingspan Insulation Ltd's guidance, and a fully integrated and operating mechanical ventilation system is incorporated within the building design. Provided these directions are followed, interstitial condensation under normal domestic conditions should be minimised and no vapour control layer is required.

Notwithstanding this, a condensation risk analysis should be carried out for all projects following the procedures set out in BS 5250: 2021 (Management of moisture in buildings. Code of practice). The Kingspan Insulation Technical Service Department (see rear cover for details) can provide this service.

If a condensation risk is predicted, it can be controlled by ensuring there is a layer of high vapour resistance on the warm side of the insulation layer. If required, the vapour resistance of the wall lining can be increased by the use of a vapour check plasterboard*; the use of Kingspan Thermapitch® TP10 or Thermawall® TW55, both of which contain an integral vapour control layer*; the use of a layer of polythene sheeting*; or by the application of two coats of Gyproc Drywall Sealer to the plasterboard lining.

* With appropriate detailing at joints, penetrations and wall perimeters.

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

Design considerations

External walls & roofs

Internal lining

All Kingspan TEK® Building System panels should be lined internally with plasterboard. The minimum plasterboard requirement may vary subject to statutory requirements for fire and acoustics. Please consult the Kingspan Insulation Technical Service Department (see rear cover for details) for definitive guidance on your construction.

Where services need to be fixed on an external Kingspan TEK® Building System wall or roof a service cavity can be created as follows:

- a single layer of min. 12.5 mm plasterboard on min. 25 mm deep by 50 mm wide vertical timber battens (see Figure 5).

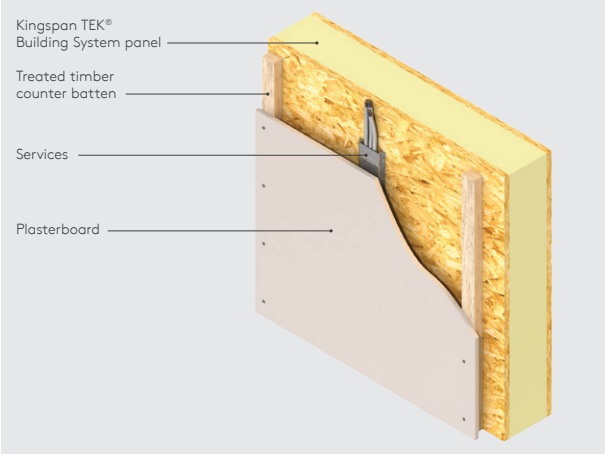


Figure 5

Where services need to be fixed and there is an additional layer of insulation, e.g. Kingspan Thermawall® TW55, fixed to the inside of the Kingspan TEK® Building System panels, a service cavity can be created by installing a single layer of min. 12.5 mm plasterboard on min. 25 mm deep by 50 mm wide vertical timber battens (see Figure 6).

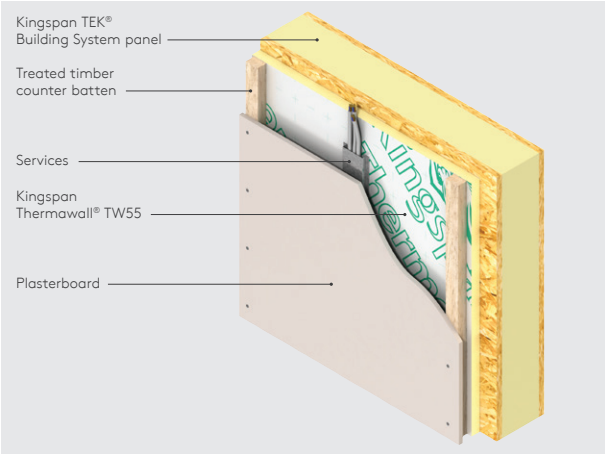


Figure 6

In all cases the need for electrical sheathing / conduit should be assessed in accordance with Building Regulations / Standards and BS 7671: 2008 + A3: 2015 (Requirements for Electrical Installations. IET Wiring Regulations).

Where an electrical back box must be fixed to a Kingspan TEK® Building System wall or roof, the electrical back box must be either surface mounted, or the service cavity must be sufficiently wide to accommodate a flush fitting electrical back box. Under no circumstances should the OSB/3 facing and / or the insulation core of the TEK® Building System panels, or any internal insulation, be 'chased out' to accommodate service fittings.

Design considerations

External cladding - walls

As soon as possible after Kingspan TEK® Building System walls have been erected, a breathable membrane, e.g. Kingspan nilvent®, should be fixed directly to the panels. External cladding should be installed over the breathable membrane.

The following are examples of external cladding for walls constructed using the Kingspan TEK® Building System:

- outer leaf of brickwork / stone, ensuring a minimum 50 mm cavity is maintained between the breather membrane and the brickwork;
- lightweight render coating carried on calcium silicate board which is supported by min. 25 mm deep by 50 mm wide vertical treated timber counter battens;
- feather edge timber boarding on min. 25 mm deep by 50 mm wide vertical treated timber counter battens;
- wall tiling mounted on tiling battens which are supported by min. 25 mm deep by 50 mm wide treated timber counter battens; and
- proprietary brick slip system supported by min. 25 mm deep by 50 mm wide vertical treated timber counter battens.

Other wall cladding options are possible, if you have any queries regarding the suitability of your wall cladding, please contact the Kingspan Insulation Technical Service Department (see rear cover for details).

External cladding - roofs

As soon as possible after Kingspan TEK® Building System roofs have been erected, a breathable membrane, e.g. Kingspan nilvent®, should be fixed directly to the panels. External cladding should be installed over the breathable membrane.

The following are examples of external cladding for roofs constructed using the Kingspan TEK® Building System:

- tiles on tiling battens;
- slates on slate battens; or
- profiled metal sheeting onto horizontal battens.*

All roof cladding options should be supported by 25 mm (min.) x 50 mm vertical treated timber counter battens.

If other cladding options are being considered contact the Kingspan Insulation Technical Service Department (see rear cover for details).

The roof cladding option should be decided upon at the earliest opportunity, as loading design values must be calculated when designing your project in the Kingspan TEK® Building System.

* The need for battens may be negated with the use of a suitable breathable underlay.

Internal / partition walls

Internal / partition walls are typically supplied as kiln dried timber stud components. Internal / partition walls can also be built from other components e.g. steel frame, Kingspan TEK® Building System panels.

Where cabled services are required, it is recommended that they be fixed into a timber or steel stud wall. However, where cabled services need to be fixed to an internal wall that is constructed from Kingspan TEK® Building System wall panels please follow the directions given in 'External Walls & Roofs - Internal Lining'.

Separating walls (party walls)

Timber frame separating wall

Robust Standard Details are available for the Kingspan TEK® Building System in a 142 mm thickness (see Robust Standard Details Handbook, Appendix A2, Proprietary Flanking Conditions).

It is considered best practice to avoid installing services in party walls where possible. However, it is accepted that at times it is necessary to allow for electrical back boxes, cables and service ducts within the party wall. The inclusion of water and gas services in party walls should be avoided at all times. Please refer to the Robust Standard Details Handbook and / or TRADA Handbook for guidance on integrating services into timber frame party walls, available from **www.robustdetails.com** and **www.trada.co.uk** respectively.

Kingspan TEK® Building System separating wall

The Kingspan TEK® Building System can be used to construct party walls as an alternative to timber frame. The TEK® Building System panels can be used as a single panel in a party wall, or alternatively the TEK® Building System can be used to build a double skin party wall with a cavity between the panels. For further guidance on TEK® Building System party walls please refer to the 'Kingspan TEK® Building System Standard Details' which is available for download from **www.kingspantek.co.uk/literature**.

Design considerations

Fire stops

Current Building Regulations / Standards should be considered with regard to the requirements for, and provision of, fire stops.

Ventilation

The need for ventilation

The Kingspan TEK® Building System can be considerably more air-tight than conventional constructions, achieving air leakage rates as low as 0.08 air changes per hour at normal pressures when both wall and roof panels are combined.

It is widely accepted that healthy buildings require a minimum air leakage rate of 0.5 air changes per hour at normal pressures. This is typically achieved with conventional construction techniques, but may not be achieved with buildings constructed using the Kingspan TEK® Building System. Therefore additional ventilation may be a sensible and beneficial addition to a building constructed with the TEK® Building System.

The Building Regulations / Standards encourage architects and builders to 'Build Tight, Ventilate Right'. This means controlled ventilation. Introducing controlled ventilation is considered good practice in energy efficiency terms.

Ventilation options

There are many different options for controlled ventilation systems in buildings. Every building has specific ventilation requirements, and these must be considered alongside the advantages and disadvantages of each ventilation system.

Mechanical ventilation with heat recovery systems (MVHR) typically offer the best solution for energy efficient ventilation of buildings constructed using the Kingspan TEK® Building System.

MVHR systems bring controlled volumes of fresh air into the building and exhaust controlled volumes of moisture laden or stale air to the outside. With the addition of heat recovery, these systems can recover heat from outgoing air to preheat the incoming air. This heat recovery can provide a large proportion of the heat required to keep a building at comfortable living temperatures. Most MVHR systems also have the provision of a by–pass to disable the heat recovery element and allow cooling in the summer months.

NB Please refer to suppliers of MVHR equipment for guidance on equipment sizing and the environmental and improved indoor air quality advantages associated with their systems. It is advisable to seek systems that carry third party accreditation e.g. BBA equivalent.

The addition of humidity control to the mechanical ventilation system can provide an environment in which dust mites cannot thrive. This may be of benefit to some asthma sufferers.

Design considerations

Heating systems

Heating systems in buildings constructed using the Kingspan TEK® Building System can usually be 'down-sized' considerably, as heating demand is typically very low or negligible. This can mean a reduction in construction costs, e.g. no need to install radiators, and also a reduction in running costs, due to low heating bills.

The Kingspan TEK® Building System can act as a stimulus to think outside the box with regards to heating systems. What heat is lost through the fabric of the building, or through unintentional bulk air movement, can be more than compensated for by incidental gains and the introduction of a combined ventilation and heating strategy e.g. the introduction a fan coil into a MVHR unit or the use of small wood burning stove in tandem with a standard MVHR system.

Conventional heating systems can be installed into buildings constructed using the Kingspan TEK® Building System, but sizing and controls are important. Controls are important so as to avoid overheating. A normal domestic heating regime could cause a building constructed with the TEK® Building System to overheat. The heating load requirement of a domestic building can usually be calculated from the output of SAP software programs. For further guidance please contact the Kingspan Insulation Technical Service Department (see rear cover for details).

Whatever heating system you chose, you should have it engineered to suit the heating demands of the Kingspan TEK® Building System rather than traditional construction methods and if possible install a system that is recognised or approved under Appendix Q of SAP.

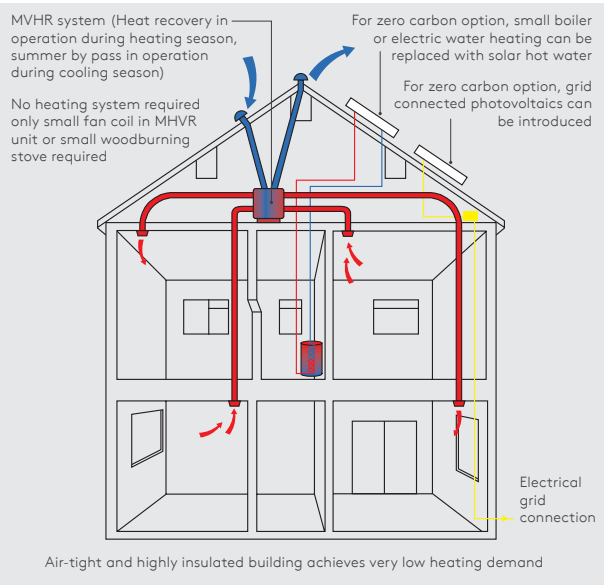


Figure 7: Heating systems in the Kingspan TEK® Building System

Technical support

The Kingspan Insulation Technical Service Department offers free advice regarding the performance and suitability of the Kingspan TEK® Building System for any given project.

The Kingspan Insulation Technical Service Department can also perform a wide variety of relevant calculations including U-values* and condensation risk analysis**.

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

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

* Calculations performed to BS EN ISO 6946: 2017 (Building components and building elements. Thermal resistance and thermal transmittance. Calculation methods) and using the conventions set out in BR 443 (Conventions for U-value calculations).

** Calculations performed to BS 5250: 2021.

Habitable roof space

People are driven to demand a habitable roof space by various forces including:

- demands for higher housing densities and therefore reductions in footprint size (these reductions are forcing builders to build up or down to put floor area into houses); and
- the need to fully utilise all of the potential for space to accommodate changing life styles - homeowners want extra space for a home office, guest rooms, children's play rooms etc., or simply a warm storage area in the roof.

The Kingspan TEK® Building System is ideally suited to the creation of a room in the roof because the System's roof and wall panels as standard can achieve U-values of 0.20 W/m^{2}K or better.

Kingspan TEK® Building System roof panels are manufactured up to 7.5 m long and with the use of intermediate purlins, any size of roof can be constructed with the TEK® Building System.

Design considerations

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 thick. In comparison, a timber frame wall to achieve the same U-value may have to be 450.3 mm thick, and a full fill masonry cavity wall to achieve the same U-value may have to have a wall 433.0 mm thick.

Kingspan TEK® Building System wall

Wall thickness 275.5 mm

(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).

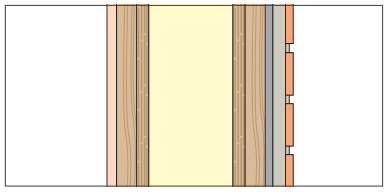


Figure 8

Timber frame wall

Wall thickness 450.3 mm

(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).

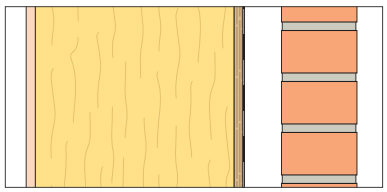


Figure 9

Masonry full fill cavity wall

Wall thickness 433.0 mm

(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).

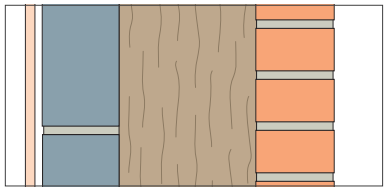
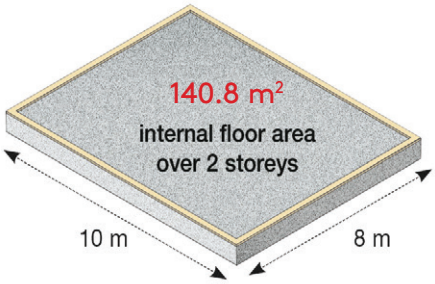


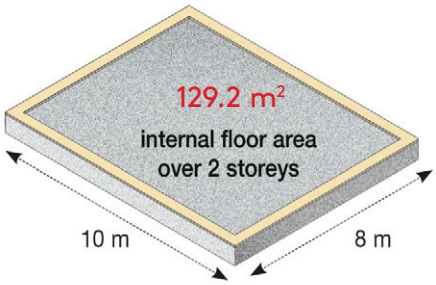
Figure 10

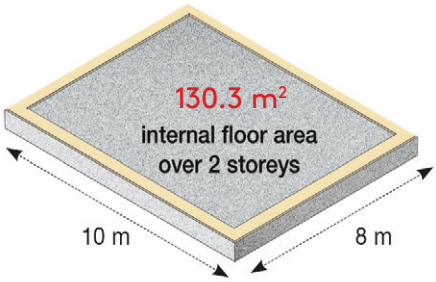
* Internal floor area of each construction is rounded to one decimal place.

This means that the Kingspan TEK® Building System can provide more floor space for the same external dimensions.

With the Kingspan TEK® Building System, in the example shown below, you can achieve 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 of the same external dimensions and U-value (0.17 W/m²K).







Design considerations

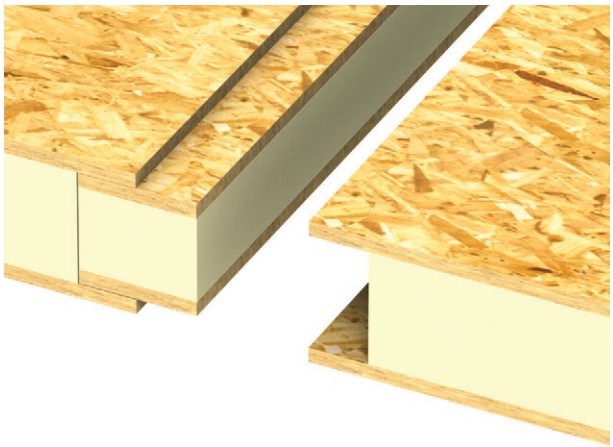
U-values

The Kingspan TEK® Building System comprising 142 mm thick panels yields worst case whole wall and roof U-values of 0.20 W/m²K with no additional insulation. The TEK® Building System comprising 172 mm thick panels yields worst case whole wall and roof U-values of 0.17 W/m²K with no additional insulation. The TEK® Building System can also meet the U-values that are expected to be set in future changes to the Building Regulations / Standards, as extremely low U-values, e.g. 0.10 W/m²K and lower, can easily be achieved with the addition of an insulated lining, e.g. Kingspan Thermawall® TW55, on the inside of the TEK® Building System panels. This can mean low running costs and impressive comfort for the lifetime of the building.

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).



In order to achieve these low air leakage rates for the full building envelope, care must also be taken to maintain air tightness at junctions other than those between Kingspan TEK® Building System panels, such as:

- air leakage at the junction of the soleplate and foundation substructure where temporary levelling shims have been used - air leakage can be minimised by ensuring the cement based mortar (e.g. EasiPoint Standard), which has been injected underneath the soleplate to distribute the load of the building, has been fully installed from both sides of the soleplate;
- air leakage at intermediate floor zones can be minimised by ensuring that each connection layer between timbers, e.g. between the OSB floor decking and the timber head plate of the TEK® Building System panel below, is fully sealed with silicone sealant; and
- air leakage through timber frame party walls can be minimised by the inclusion of an additional air barrier behind the plasterboard, returned 100 mm back to the flanking TEK® Building System wall.

The Kingspan TEK® Building System does not suffer from the problems associated with other common construction techniques such as:

- air leakage through poorly sealed sockets, switches etc. in timber frame walls;
- air leakage at floor zones through wet plastered masonry cavity walls;
- air leakage under skirting boards and through poorly sealed sockets, switches etc. in dry lined masonry cavity walls; and
- air leakage through poorly sealed loft hatches and top storey ceiling light fittings.

Design considerations

Limiting cold bridging

Repeating thermal bridges occur where a material with a significantly worse thermal conductivity interrupts the insulation layer in a construction i.e. timber studs etc. U-value calculations for conventional timber frame systems take into account the effects of repeating thermal bridges. Guidance documents for the calculation of U-values, BS EN ISO 6946: 2017 (Building components and building elements. Thermal resistance and thermal transmittance. Calculation methods) and BR 443 (Conventions for U-value calculations), indicate that in a typical domestic timber frame building, a minimum of 15% of walls and 9% of the pitched roof is un-insulated.

The percentage figures quoted include structural timbers and noggins, but do not account for timbers that are outside the wall or pitched roof area used for heat loss calculations, such as timbers around window zones, and at intermediate floors, as these are accounted for by linear thermal bridging (Psi values).

The insulation layer in the Kingspan TEK® Building System is not interrupted by repeating studwork. Therefore, there is less repeating thermal bridging, which can yield better thermal performance. There are, however, some thermal bridges, e.g. where timbers are used to support point loads etc.

The overall result is that thermal bridging from timber elements, in walls constructed using the Kingspan TEK® Building System, can be as low as 4%, whilst that for roofs can be as low as 1%.

Linear or non–repeating thermal bridges occur at junctions, e.g. wall to floor, and openings, e.g. windows, in the building fabric, and are expressed as psi (ψ) values. A ψ-value is the heat loss through a junction, which is additional to the heat flow through the adjoining plane elements, and is expressed in W/mK.

ψ-values are not taken into account in U-value calculations, but, instead, they are taken into account separately in the calculation methodologies e.g. the Standard Assessment Procedure (SAP) that are used to assess the operational CO_2 emissions and, where applicable, the fabric energy efficiency of buildings, primary energy or delivered energy rates. The Kingspan TEK® Building System can achieve very good ψ-values, due to the continuity of insulation at junctions and openings inherent in the TEK® Building System design.

Passivhaus design

Passivhaus is a low energy building design standard developed by the Passivhaus Institute in Germany.

The objective of Passivhaus is to produce buildings that provide excellent living environments for occupants, with very little energy use for heating and cooling.

The Passivhaus Standard requires:

- a maximum space heating and cooling demand of less than 15 kWh/m²/year or a maximum heating and cooling load of 10 W/m²;
- a maximum total primary energy demand of 120 kWh/m²/year; and
- an air change rate of no more than 0.6 air changes per hour @ 50 Pa;

To achieve the Passivhaus Standard in the UK typically involves:

- very high levels of insulation;
- extremely high performance windows with insulated frames;
- airtight building fabric;
- 'thermal bridge free' construction; and
- a mechanical ventilation system with highly efficient heat recovery

NB Information sourced from the Passivhaus Trust
www.passivhaustrust.org.uk

Passivhaus combines practical design principles with products and good quality workmanship, to deliver extremely low energy buildings. This combination has made Passivhaus an increasingly popular solution with building designers.

The Kingspan TEK® Building System is the perfect building fabric solution for Passivhaus design. The excellent thermal performance inherent in the System's building fabric can easily be supplemented and improved to meet the exacting standards required by Passivhaus standards. The factory engineering and prefabricated nature of the panels lend themselves to the meticulous attention to detail and rigorous quality standards required, as well as helping to speed up the construction process.

Design considerations

Responsible sourcing

It should be noted that Kingspan Insulation only manufactures and supplies Kingspan TEK® Building System panels and the information below only relates to the TEK® Building System panels.

As well as using Kingspan TEK® Building System panels, the system also uses a large number of other components e.g. timber, engineered timber beams and joists, joist hangers, fixings, sealants etc. These other components are sourced and provided by the Kingspan TEK® Delivery Partner or its contractor. Kingspan Insulation cannot provide certification for these other components and this must be sought from the TEK® Delivery Partner or its contractor.

Kingspan TEK® Building System panels are produced at Kingspan Insulation's Selby (North Yorkshire) manufacturing facility which is FSC® certified (FSC® C109304) and PEFC certified (PEFC 16-37-1330).

This certification verifies that the OSB facing of the TEK® Building System panels is legally sourced from well managed forests and other controlled sources.

Kingspan TEK® Building System panels produced at Kingspan Insulation's Selby, North Yorkshire manufacturing facility is certified to BES 6001 (Framework Standard for the Responsible Sourcing of Construction Products) 'Good'.

NB Please confirm the above information at the point of need by contacting Kingspan Insulation's Technical Service Department (see rear cover for details), from which copies of Kingspan Insulation's certificates can be obtained.

Sustainability & responsibility

Kingspan Insulation has a long-term commitment to sustainability and responsibility: as a manufacturer and supplier of insulation products; as an employer; as a substantial landholder; and as a key member of its neighbouring communities.

A report covering the sustainability and responsibility of Kingspan Insulation Ltd's operations at its Pembridge, Herefordshire and Selby, North Yorkshire manufacturing facilities is available at **www.kingspaninsulation.co.uk/sustainabilityandresponsibility**.

Less transport

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 compared with more traditional construction methods, where components can often be sourced from, and delivered by, a number of different distributors or manufacturers. The overall result is less transport, congestion, noise and traffic pollution, which reduces a project's impact on the environment.

Minimal landfill

The construction industry is responsible for around 61% of the UK's waste[1]. The key issue here is the land for landfill, which is fast running out. The government is currently dealing with this by imposing increasingly heavy landfill taxes. However, a number of EU countries have already instigated a landfill ban on combustible and recyclable materials.

The Kingspan TEK® Building System is factory manufactured, meaning there is minimal site wastage and therefore more efficient use of materials on-site. The minimal levels of site wastage means less site waste to landfill, which also helps to reduce cost.

[1] 'UK Statistics on Waste', February 2019 edition, Department for Environment, Food & Rural Affairs.

Financial advantages & Delivery Partners

Energy savings

The most effective way to reduce the space heating demand of a building is to improve the energy performance of its envelope by specifying low U-values, low air leakage, and by avoiding significant thermal bridging wherever possible. The thermal efficiency of the Kingspan TEK® Building System can offer dramatic energy cost savings over the lifetime of the building.

The potential energy efficiency of a project built with the Kingspan TEK® Building System could result in your project being so energy efficient that you may have the potential to avoid installing a conventional heating system, e.g. radiators, altogether. This could result in dramatic energy cost savings over the lifetime of the building.

Capital cost savings

To achieve equal energy performance e.g. a U-value of 0.20 W/m^2K and air leakage as good as approximately 1 $m^2/hour/m^2$ at 50 Pa, the capital cost of the Kingspan TEK® Building System would be considerably lower than an equivalent building using timber frame or masonry construction.

Landfill savings

The Kingspan TEK® Building System arrives on site as a complete scheme therefore there should be no site wastage apart from packaging materials and empty foam cans. This results in more efficient use of materials and also lower landfill fees.

Labour savings

The Kingspan TEK® Building System is designed and manufactured offsite and in the factory. Therefore, the scheme (including all ancillaries and fixings) is delivered complete and from one source, which will enable a weather-tight structure to be erected quickly.

Easily recognised components are shipped to the site for assembly, rather than waiting for a builder's interpretation of plans. Kingspan TEK® Building System panels also come in much larger dimensional sizes than other building materials meaning fewer components have to be handled during the erection process. A contractor's team of 4-6 can erect a typical TEK® Building System house very quickly.

This can compare favourably with traditional construction techniques such as brick and block where there are more components which can result in more processes and therefore more labour and possible construction errors.

Opens doors faster

When the building is built for the purpose of renting, the shorter construction time of the Kingspan TEK® Building System, can enable tenants to move in sooner and consequently the owner achieves a better cash flow and therefore faster payback.

Delivery Partners

Projects incorporating the Kingspan TEK® Building System are designed, coordinated and erected by a nationwide approved and audited Delivery Partner network. These Delivery Partners have unrivalled knowledge of SIP construction and this ensures that the advantages of the TEK® Building System are designed and built into every project.

A full list of Delivery Partners is available from the Kingspan TEK® Building System website (see rear cover for details).

Kingspan TEK® Delivery Partners typically have a background of timber frame, SIPs, green oak framing as well as traditional masonry construction and have undergone special training to erect the Kingspan TEK® Building System. The services offered by Delivery Partners range from simple erection of the TEK® Building System through to a full turn key package including the provision of heating and ventilation equipment, windows, doors, staircases and all external finishes.

The advantages of Kingspan TEK® Delivery Partner support are detailed below.

Design

- Experienced in delivering dwellings for Passivhaus standard.
- Collaborative approach with clients ensures design optimisation.
- Maximise design flexibility and spanning capability of the Kingspan TEK® Building System to minimise raw material costs.
- All supporting drawings and method statements are supplied.

On site

- Fully trained erectors offer peace of mind with predictable completion times, regardless of weather conditions.
- Rigorous attention to detail - audits ensure that excellence in design is replicated on site and 'as built' construction minimises air leakage and cold bridging.
- Single point of contact for entire supply chain, minimising risk and hassle for clients and contractors alike.
- CAD and CNC engineered offsite fabrication ensures the entire system arrives on site as a kit ready for installation without the need for additional on-site fabrication or waste.

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

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

Sitework

Supply and erect

Typically, the complete System is delivered to site ready for erection by fully qualified construction teams.

Jointing Kingspan TEK® Building System panels

Kingspan TEK® Building System panels have a routed channel along their long edges, which accommodate a unique cassette joint. These are fixed through the panel's OSB/3 facings. Expanding urethane sealant is applied between the urethane core of the cassette and the panel. Sealing this jointing system with the expanding urethane sealant enables the TEK® Building System to be very air-tight.

Lifting panels

Lifting should be organised in accordance with the Contractors own method statement.

Delivery of the Kingspan TEK® Building System

Information relating to the site and its access will be required and should be provided at an early stage, e.g. quotation stage. When the Kingspan TEK® Building System is delivered, it will be via an appropriate sized vehicle.

Additional information relating to the unloading, use and positioning of a crane and other machinery should be discussed with the Kingspan TEK® Delivery Partner.

Storage of components

The polyethylene packaging of Kingspan TEK® Building System panels and associated timber components, should not be considered adequate for outdoor protection.

Ideally, Kingspan TEK® Building System panels and associated timbers should be stored inside a building. If, however, outside storage cannot be avoided, then all panels and timbers should be kept at least 150 mm off the ground on supports, and protected from the elements with an opaque polythene sheet or weatherproof tarpaulin sheet until used. Supports to the TEK® Building System panels should be positioned at maximum 1,200 mm centres ensuring the ground is flat, so that the panels will not twist.

Any products that have been allowed to get wet should not be used.

Alterations to the Kingspan TEK® Building System

Alterations can usually be accommodated during the construction process if required. Prior approval in writing from the Kingspan Insulation Technical Service Department (see rear cover for details) will be required. Alterations following completion of the building are possible but more difficult and should, where possible, be carried out by a Kingspan TEK® Delivery Partner who has access to the original design plans.

NB A structural engineer must verify all alterations.

Water ingress during construction

A non-tenting breather membrane, e.g. Kingspan nilvent®, will be applied to the Kingspan TEK® Building System panels to ensure they are protected from the elements during the construction process.

Fixing items to Kingspan TEK® Building System walls

Through plasterboard fixed direct to Kingspan TEK® Building System panels

Cabinets, boilers, radiators etc. can be fixed anywhere to the internal wall surface using appropriately sized screw fixings. Screws should be long enough to fully penetrate through the inner OSB face of the Kingspan TEK® Building System panel. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover for details).

Through plasterboard fixed to timber battens

Install noggins at locations where items are to be fixed. Noggins should be the same depth as the timber batten framework and should be fixed to the inner OSB face of the Kingspan TEK® Building System panel using appropriately sized screw fixings. Screws should be long enough to fully penetrate through the OSB. Cabinets, boilers, radiators etc. can be fixed through the plasterboard to the noggins using appropriately sized screw fixings.

Alternatively, in the case of rooms with many fixing points, or rooms that may be remodelled e.g. kitchens, 18 mm plywood may be fixed to the timber battens, using either drywall screws at 300 mm centres, or large headed galvanised clout nails at 150 mm centres, before the plasterboard is installed.

Cabinets, boilers, radiators etc. can be fixed anywhere to the internal wall surface using appropriately sized screw fixings. Screws should be long enough to fully penetrate through the plywood.

For further information please contact the Kingspan Insulation Technical Service Department (see rear cover for details).

Services installation

Wiring

Where possible run wiring through internal stud partition walls. However, if it is necessary to run wiring on Kingspan TEK® Building System panels then do so on a single layer of plasterboard on battens. Battens should be fixed to the inner OSB face of the Kingspan TEK® Building System panel using appropriately sized screw fixings. Screws should be long enough to fully penetrate through the OSB. Ensure that the wiring is protected with an IEE approved metal guard (see 'Design Considerations - External Walls, Internal Linings').

Plumbing

Plumbing is done in a conventional fashion, utilising interior partition walls and / or plumbing chases. Any small bore plumbing that must run on a Kingspan TEK® Building System wall should be surface mounted using pipe clips screwed through internal lining into the internal OSB/3 facing of the TEK® Building System wall panels.

Kingspan TEK® Building System panel details

The facings

Kingspan TEK® Building System panels are faced on both sides with a maximum of 15 mm OSB/3, autohesively bonded to the rigid thermoset urethane insulation core during manufacture.

The core

The core of Kingspan TEK® Building System panels is a fibre-free, thermoset, 112 mm or 142 mm thick rigid urethane insulant.

Standards and approvals

Kingspan TEK® Building System panels are manufactured to the highest standards under a management system certified to ISO: 9001: 2015 (Quality Management Systems), ISO 14001: 2015 (Environmental Management Systems), ISO 45001: 2018 (Occupational Health and Safety Management Systems), ISO 50001: 2018 (Energy Management Systems) and ISO 37301: 2021(Compliance Management Systems).

The Kingspan TEK® Building System, produced at Kingspan Insulation's Selby, North Yorkshire manufacturing facility (in thicknesses of 142 and 172 mm), holds BBA Certification No. 02/S029, UK Technical Assessment (UKTA-0836-21/0006) and European Technical Assessment (21/0048).

Structural dimensions

Kingspan TEK® Building System panels are available in the following standard size(s):

Nominal dimension		Availability
Length	(mm)	7,500 (max.) (for walls a maximum 3 m storey height is allowed)
Width	(mm)	200 (min.) 1,220 (max.)
Thickness	(mm)	142 (112 mm rigid urethane insulation core sandwiched between two layers of 15 mm OSB/3) 172 (142 mm rigid urethane insulation core sandwiched between two layers of 15 mm OSB/3)

Water vapour resistance

The insulation core of Kingspan TEK® Building System panels has a water vapour diffusion resistance factor of 70-100 for PU density of 32-35 kg/m^3, when tested to BS EN 12572: 2016 (Hydrothermal performance of building materials and products- determination of water vapour transmission properties). The OSB/3 facings have a water vapour diffusion resistance factor of 30-50 (at a density of 640 kg/m^3); the structural wood elements have a factor of 20-50 (for a density of 500 kg/m^3).

Durability

The Kingspan TEK® Building System panels will have comparable durability to that of OSB/3 to BS EN 300 (Code of Practice for the selection and application of Particle Board, Oriented Strand Board (OSB), Cement Bonded Particle Board and Wood Fibre for specific purposes.), therefore as long as the System remains weather-tight, a life of at least 60 years may be expected.

Resistance to solvents, fungi and rodents

The rigid urethane insulation core is resistant to dilute acids, alkalis, mineral oil and petrol. It is not resistant to some solvent-based adhesive systems, particularly those containing methyl ethyl ketone.

Adhesives containing such solvents should not be used in association with Kingspan TEK® Building System. TEK® Building System components, which have been in contact with harsh solvents, petrol, mineral oil or acids, or components that have been damaged in any way should not be used.

The rigid urethane insulation core and facings used in the manufacture of Kingspan TEK® Building System panels resist attack by mould and microbial growth and do not provide any food value to vermin.

Strength & stability

The permissible vertical load resistance for Kingspan TEK® Building System panels is sufficient for the System's use as loadbearing partitions, separating walls, the inner leaf of external walls and pitched roofs in dwellings up to four storeys high.

For specific structural properties please refer to BBA certificate 02/S029, which is available from **www.bbacerts.co.uk** or from the Kingspan TEK® website (see rear cover for details).

Kingspan TEK® Building System panel details

Fire performance

There are restrictions placed upon this product which vary dependent on the building type, height, construction and location. For guidance regarding the routes to compliance for meeting the fire safety requirements of the Building Regulations / Standards, refer to the relevant Technical Bulletins and links to Government websites at **www.kingspaninsulation.co.uk/fireregulations**.

The Kingspan TEK® Building System in the constructions specified in the table below, when subjected to BS EN 1365-1: 2020 (Fire resistance tests for loadbearing elements. Walls), achieved the results shown.

Test	BS EN 1365-1		
Report no.	345653 issue 2	EUI-19-B000198 rev 2	EUI-21-B-000294
Issue date	27/01/2015	12/05/2020	30/11/2021
Build up*	1	2	3
Direction	Inside to outside	Inside to outside	Inside to outside
Loading (kN)	38.3	38.3	40.0
Load bearing (mins)	78	42	50
Integrity (mins)	77	42	50
Insulation (mins)	77	42	50

Test	BS EN 1365-1		
Report no.	EUI-21-B-000130	EUI-23-000206	EUI-25-B-000345
Issue date	25/05/2021	03/07/2023	20/11/2025
Build up*	4	5	6
Direction	Outside to inside	Inside to outside	Inside to outside
Loading (kN)	40.0	40.0	40.0
Load bearing (mins)	53	49	45
Integrity (mins)	53	49	45
Insulation (mins)	53	49	45

Test	BS EN 1365-1	
Report no.	EUI-25-B-000346	EUI-25-B-000515
Issue date	20/11/2025	20/11/2025
Build up*	7	8
Direction	Inside to outside	Inside to outside
Loading (kN)	40.0	104.0
Load bearing (mins)	66	30
Integrity (mins)	66	30
Insulation (mins)	66	30

* 1. Inside to outside. 15 mm Siniat Firecheck, 25 mm x 50 mm battens, 142 mm Kingspan TEK® Building System panel.

2. Inside to outside. 12.5 mm Knauf Type A Plasterboard, 25 mm x 38 mm battens, 142 mm Kingspan TEK® Building System panel.

3. Inside to outside. 12.5 mm Knauf Type A Plasterboard, 25 mm x 38 mm battens, 20 mm TW55 142 mm Kingspan TEK® Building System panel, nilvent®.

4. Outside to inside. nilvent®, 12.5 mm FERMACELL, nilvent®, 142 mm Kingspan TEK® Building System panel, 25 mm x 38 mm battens, 12.5 mm Type A Knauf Plasterboard.

5. Inside to outside. 12.5 mm Knauf Type A Plasterboard, 25 mm x 38 mm battens, 142 mm Kingspan TEK® Building System panel, nilvent®, 50 mm Kingspan Thermawall TW55, nilvent®.

6. Inside to outside. 0.4 mm nilvent® (unexposed side), 142 mm Kingspan TEK® Building System panel, 25 mm x 38 mm battens, 12.5 mm Type A Knauf Plasterboard.

7. Inside to outside. 0.4 mm nilvent® (unexposed side), 142 mm Kingspan TEK® Building System panel, 25 mm x 38 mm battens, 12.5 mm Type A Knauf Plasterboard.

8. Inside to outside. 0.4 mm nilvent® (unexposed side), 142 mm Kingspan TEK® Building System panel, 20 mm Kingspan Thermawall TW55, 25 mm x 38 mm battens, 12.5 mm Type A Knauf Plasterboard.

NB The results shown can also be applied to the Kingspan TEK® Building System in a 172 mm thickness.

Kingspan TEK® Building System panel details

When classified under BS EN 13501-1: 2007 + A1: 2013 (Fire classification of construction products and building elements. Classification using data from fire resistance tests, excluding ventilation services), the Kingspan TEK® Building System in the constructions specified in the table below, achieved the results shown.

Classification	BS EN 13501-1		
Report no.	370193 issue 3	EUI-19-000198	EUI-21-000294
Issue date	04/08/2016	12/05/2020	09/12/2021
Build up*	1	2	3
Direction	Inside to outside	Inside to outside	Inside to outside
Loading (kN)	38.3	38.3	40.0
Classification	REI60	REI30	REI45

Classification	BS EN 13501-1		
Report no.	EUI-21-000130	EUI-23-000206	EUI-25-000345
Issue date	06/09/2021	01/12/2023	09/12/2025
Build up*	4	5	6
Direction	Outside to inside	Inside to outside	Inside to outside
Loading (kN)	40.0	40.0	40.0
Classification	REI45	REI45	REI45

Classification	BS EN 13501-1	
Report no.	EUI-25-000346	EUI-25-000515
Issue date	09/12/2025	09/11/2025
Build up*	7	8
Direction	Inside to outside	Inside to outside
Loading (kN)	40.0	104.0
Classification	REI60	REI30

* 1. Inside to outside. 15 mm Siniat Firecheck, 25 mm x 50 mm battens, 142 mm Kingspan TEK® Building System panel.

2. Inside to outside. 12.5 mm Knauf Type A Plasterboard, 25 mm x 38 mm battens, 142 mm Kingspan TEK® Building System panel.

3. Inside to outside. 12.5 mm Knauf Type A Plasterboard 25 mm x 38 mm battens, 20 mm TW55 142 mm Kingspan TEK® Building System panel, nilvent®.

4. Outside to inside. nilvent®, 12.5 mm FERMACELL, nilvent®, 142 mm Kingspan TEK® Building System panel, 25 mm x 38 mm battens, 12.5 mm Type A Knauf Plasterboard.

5. Inside to outside. 12.5 mm Knauf Type A Plasterboard, 25 mm x 38 mm battens, 142 mm Kingspan TEK® Building System panel, nilvent®, 50 mm Kingspan Thermawall TW55, nilvent®.

6. Inside to outside. 0.4 mm nilvent® (unexposed side), 142 mm Kingspan TEK® Building System panel, 25 mm x 38 mm battens, 12.5 mm Type A Knauf Plasterboard.

7. Inside to outside. 0.4 mm nilvent® (unexposed side), 142 mm Kingspan TEK® Building System panel, 25 mm x 38 mm battens, 12.5 mm Type A Knauf Plasterboard.

8. Inside to outside. 0.4 mm nilvent® (unexposed side), 142 mm Kingspan TEK® Building System panel, 20mm Kingspan Thermawall TW55, 25 mm x 38 mm battens, 12.5 mm Type A Knauf Plasterboard.

NB The results shown can also be applied to the Kingspan TEK® Building System in a 172 mm thickness.

Kingspan TEK® Building System panel details

Fire performance cont'd

Kingspan TEK® panel components consist of an OSB facing and PUR core.

Reaction to Fire	Verification procedure	Euroclass
OSB BOARD Grade 3	2003/43/EC*	D-s2, d0
Rigid urethane insulation core	BS EN ISO 11925-2 and classified to BS EN 13501-1	E
Wooden structural element	2003/43/EC*	D-s2, d0

* As amended by Commission decision 2003/593/EC,2006/673/EC and 2007/348/EC.

Kingspan TEK® Building System is assessed under Assessment and Verification of Constancy of Performance (AVCP) System 1.

Certificate of Constancy of Performance	0836-CPR-22/P6146 (UK) 0809-CPR-23002780 (EU)

Further fire test data for Kingspan TEK® Building System may be obtained by contacting the Kingspan Insulation Technical Service Department at **technical@kingspaninsulation.co.uk**

Resistance to airborne sound

The Kingspan TEK® Building System, in a 142 mm thickness, has been listed with Robust Details and achieved a proprietary flanking condition using the TEK® Building System inner leaf in combination with timber separating walls E-WT1 and E-WT-2 (see Robust Details, Appendix A2).

Thermal properties

The λ-values and R-values detailed below are quoted in accordance with BS EN 13165: 2012 + A2: 2016 Thermal insulation products for buildings. Factory made rigid polyurethane foam (PU) products – Specification.

Thermal conductivity

The thermal conductivity (λ-value) of the OSB/3 component of Kingspan TEK® Building System panels should be taken as 0.13 W/mK. The declared thermal conductivity of the insulation core of the TEK® Building System panels is 0.024 W/mK.

Thermal resistance

Kingspan TEK® Building System panels have a thermal resistance (R-value) of 4.85 m^2K/W (142 mm thick panels) or 6.10 m^2K/W (172 mm thick panels). It is calculated by dividing the thickness of each component (expressed in metres) by its thermal conductivity and adding the resultant figures together. The resulting number is rounded down to the nearest 0.05 (m^2K/W).

About Kingspan Insulation

Products & solutions

Rigid insulation products for building fabric applications, including roofs, walls and floors.

- Kingspan AlphaCore® – microporous silica-based insulation.
- Kingspan OPTIM-R® – vacuum insulation panel (VIP) systems.
- Kingspan Kooltherm® – phenolic insulation.
- Kingspan Therma™ – PIR insulation.
- K-Roc® – rock mineral fibre insulation.
- Kingspan GreenGuard® – extruded polystyrene insulation (XPS).
- STEICO – wood fibre insulation
- Kingspan TEK® – structural insulated panels (SIPs).
- Cavity closers – PVC-U extrusions with an insulation core.
- Membranes – for pitched roofs and walls.

About Kingspan Insulation

Company details

Kingspan Insulation Ltd is part of the Kingspan Group plc., one of Europe's leading construction product manufacturers. The Kingspan Group was formed in the late 1960s and is a publicly quoted group of companies headquartered in Kingscourt, County Cavan, Ireland.

Kingspan Group, Ireland

Kingspan Insulation Ltd is a leading manufacturer of rigid insulation products and insulated systems for building fabric and building services applications.

Our GB head office is located in Pembridge, in the heart of rural Herefordshire. Our northern hub is near Selby in North Yorkshire. We also have a site in Castleblayney, Ireland. All three sites are accredited to the independent compliance standard ISO 37301: 2021.

Kingspan Insulation, Pembridge

Services

Our support services provide fast and accurate advice no matter what your role is. Visit our website to access the following services.

- U-value calculations – free, quick and easy U-value calculations with our U-value Calculator.
- Help and advice on your projects, including stockists, how to guides, regulatory guidance and e-learning.
- Dedicated Specification and Sales teams to support projects.
- Building Information Modelling (BIM) – download BIM objects for our products.
- Tapered roofing service – Kingspan Insulation's tapered roofing systems come with a supporting design service to ensure the most cost-effective solution for a roof is identified.

Tapered roofing service

- CPDs – Kingspan Insulation offers a number of free CPD seminars for architects and specifiers covering a wide range of industry topics. CPDs can be booked or a range of courses can be found online.
- Product awareness training (GB only) – build your team's knowledge with on-site training and support with one of our experienced product technicians who cover the full range of Kingspan products and applications, from flooring to roofing and everything in-between with both internal and external wall insulations.

Product awareness training

PLANET PASSIONATE

Planet Passionate is our group wide global sustainability programme.

Our Planet Passionate programme aims to have a positive impact on three big global challenges: climate change, circularity and protection of our natural world.

Scan for our latest progress report to learn more about our targets, partnerships and global commitments, or click **here**.

Notes

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