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Kingspan TEK® Building System

PRODUCT INFORMATION

Climate for Change

Kingspan®

OFF-SITE

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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 the off-site construction of buildings.

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

In the UK and Ireland, demand for off-site 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 and the need for organisations such as local authorities and housing associations to innovate when seeking Egan compliance. The introduction of SIPs technology, through systems such as the *Kingspan* **TEK**® Building System is playing a major role in meeting this demand.

The Code for Sustainable Homes together with the revised Building Regulations / Standards, which came into effect in 2006 in England and Wales and the Republic of Ireland and 2007 in Scotland 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 compliance with the building fabric measures of the Code for Sustainable Homes and of exceeding the thermal requirement of the Building Regulations / Standards..

Introduction

The *Kingspan* **TEK**® Building System

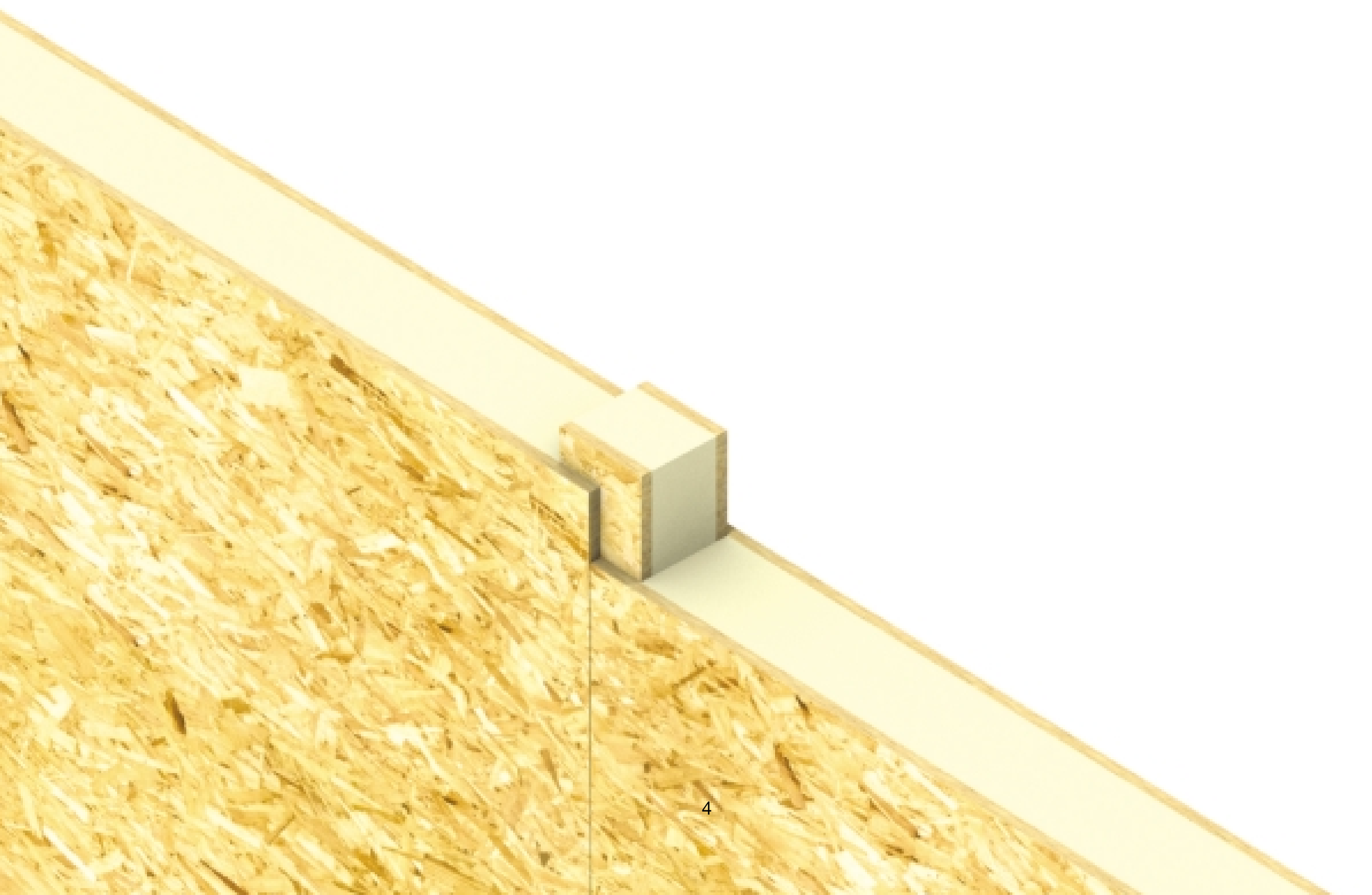
The *Kingspan* **TEK**® Building System comprises SIP panels connected with a unique jointing system for walls, roofs and intermediate floors using I-beams or open web joists. Design and structural calculation services are also an integral part of the System.

Kingspan **TEK**® Building System panels consist of a high performance rigid urethane insulation core, with zero Ozone Depletion Potential (ODP), 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 a more reliable and superior adhesion than the traditional secondary bonding process.

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 the major building warranty providers such as Building Life Plans, Homebond, HAPM, NHBC and Zurich Municipal. It also holds BBA, IAB, BM Trada and Zulassung Certification.

The complete System is delivered to site ready for erection by fully qualified *Kingspan* **TEK**® construction teams. In addition to this, in the UK and Ireland there are a large number of registered *Kingspan* **TEK**® Building System contractors who will quickly and efficiently erect the System. Details of registered contractors can be downloaded from the website or obtained from the Kingspan Off-Site Marketing Department (see rear cover).



Advantages of the *Kingspan* **TEK**® Building System

Sustainable

- Highly energy efficient.
- U-value range between 0.10 W/m²·K and 0.23 W/m²·K.
- Air-tight construction – as low as 0.08 air changes per hour at normal air pressures or 0.91 air changes per hour at 50 Pa (approximately 1 m³/hour/m² at 50 Pa).
- Low site wastage as schemes are designed, cut and palletised in the factory meaning no excess building materials are delivered to site.
- All the components for a typical *Kingspan* **TEK**® Building System scheme e.g. panels and ancillaries, come from one source, therefore there are fewer deliveries compared to 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, which reduces the project's impact on the environment.
- CFC/HCFC-free with zero Ozone Depletion Potential.
- Low GWP (Global Warming Potential).

zero O.D.P

Egan Compliant

- Panelised system enables a fast track building process, which helps to reduce construction time considerably.
- Follow on trades can start work sooner as the *Kingspan* **TEK**® Building System, when wrapped with a non-tenting breather membrane (e.g *Kingspan* **nilvent**®) offers a weather-tight shell helping the contractor complete the project faster.
- For the contractor and developer, faster completion of projects can result in earlier cash recovery, improved cashflow and can increase capacity through the ability to achieve more project completions in a year.
- Much easier to predict project completion times as the System is relatively simple to erect and requires no wet trades or brick layers.
- As a result of reduced time on-site, and as only trained and approved contractors will erect the *Kingspan* **TEK**® Building System, the likelihood of accidents on-site are reduced.
- Defects are vastly reduced due to the factory controlled manufacture, precise engineering and design of the system.

Innovative

- More controllable indoor environment than traditional construction methods such as masonry due to the superior air-tightness of the System.
- Incorporates a room in roof, so it is an excellent solution to Planning Policy Statement Note 3 (PPS3) in England and Section 5 in the Planning and Development Act in the Republic of Ireland.
- First SIPs building system in the UK and Ireland to receive BBA and IAB certification.
- **Building Homes Innovation Awards – Runner-up 2001.**
- **Plan Expo Best Innovation Category – Winner 2001.**
- **Plan Expo Best Sustainable Product Category – Highly Commended 2001.**
- **BBA Innovation Award winner 2002.**
- **Design for Manufacturer (60K Competition) – Winner 2006.**
- **Used on the UK's first house to achieve Code for Sustainable Homes – Level 6 (BRE Innovation Centre 2007).**

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.

Private Residential – Cleveland

Private and Social – Beswick, Manchester

Private Residential – Nettlesworth

Private Residential – Bay Horse Court, Skipton

Private Residential – Waterloo Mills, Silsden

To these clients the System offers a range of unique advantages, including: speed of construction; predictable completion dates; less on-site labour and the provision of a weather-tight shell.

Private and Social – Broadlands HA, Norfolk

Private Residential – North East

Private and Social – Reema, Petersfield

Education & Healthcare

Public Sector buildings are increasingly required to meet a standard of construction above and beyond those set out in the Building Regulations. 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.

Education – Southwark, London (night view)

Education – Peckham, London

Healthcare – St. Catherine's Hospice, Scarborough

Education – Berkeley School, Gloucestershire

Education – William Penn Nursery, Berkshire

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 *Kingspan* **TEK**® Building System meets their exacting standards and is recognised by a range of industry bodies.

Kings House, Oxford (night view)

Middle Barton, Oxfordshire

Kingspan Lighthouse, Watford

Battle, East Sussex

Durham

Clane, County Kildare

Design

Design Flexibility

The *Kingspan* **TEK**® Building System leaves ample scope for individual design. The panels are pre-cut in the manufacturing plant according to individual construction plans. The complete System is delivered to site ready for erection by the fully qualified construction team.

The *Kingspan* **TEK**® Building System can be used to create the walls (loadbearing and non-loadbearing), roofs and floors of a complete building. Alternatively, roof and wall elements of it can be used individually with other non-*Kingspan* **TEK**® Building System components. For example the *Kingspan* **TEK**® Building System can be used as a roofing system in conjunction with masonry or timber frame walls.

The *Kingspan* **TEK**® Building System can be erected on any flooring system, however the foundations must have specific tolerances as per guidance available from the Kingspan Off-Site Technical Services Department (see rear cover).

Applications

The *Kingspan* **TEK**® Building System can be used to create buildings up to 4 storeys. The panels are lightweight compared to brick and block, at a maximum of 25 kg/m^2, 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 the *Kingspan* **TEK**® Building System.

NB: The System is not recommended for cellars or basement constructions.

If a building guarantee is required e.g. 10 year warranty from Building Life Plans, Homebond, NHBC, Zurich Municipal, then guidance should be sought from the organisation offering the guarantee. Typically, a third party independent certificate would be required e.g. BBA or IAB certificate.

Recommended Constructions

Internal / Partition Walls

Internal / partition walls are supplied as kiln dried timber stud components.

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 there are two options (see Figures 8-10 on page 22):

- single layer of minimum 15 mm plasterboard on minimum 10 mm deep by 38 mm wide vertical timber battens; or
- double layer of minimum 12.5 mm plasterboard – the layer closest to the *Kingspan* **TEK**® Building System wall panel should be chased out to create a cavity for services. The second layer should be 12.5 mm plasterboard.

Where cabled services do not need to be fixed to the *Kingspan* **TEK**® Building System wall panel, a single layer of 15 mm sound resisting plasterboard can be fixed direct to the wall panel.

NB: Requirements for minimum thickness and number of layers of plasterboard will vary depending on fire rating required.

External Walls

Internal Cladding

All *Kingspan* **TEK**® Building System wall panels should be lined internally with vapour check plasterboard. Please consult with the Kingspan Off-Site Technical Services Department (see rear cover) for definitive guidance on your construction.

Where services need to be fixed on an external *Kingspan* **TEK**® Building System wall, there are two options for creating a service cavity (see Figures 8-10 on page 22):

- single layer of 12.5 mm plasterboard on min. 10 mm deep by 38 mm wide vertical timber battens; or
- double layer of 12.5 mm plasterboard – the layer closest to the *Kingspan* **TEK**® Building System wall panel should be chased out to create a cavity for services. The second layer should be 12.5 mm vapour check plasterboard.*

Where cabled services do not need to be fixed to the *Kingspan* **TEK**® Building System wall panel, a single layer of 12.5 mm vapour check plasterboard* can be fixed direct to the wall panel.

External Cladding

Before cladding *Kingspan* **TEK**® Building System walls, a non-tenting breather membrane (e.g. *Kingspan* **nilvent**®) is fixed direct to the wall panels. A minimum cavity of 25 mm should be maintained between the breather membrane and the wall cladding.

The following are wall cladding options for the *Kingspan* **TEK**® Building System (see Figures 11–16 pages 23–24):

- 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;

If other wall cladding options are being considered, contact the Kingspan TEK Technical Services Department (see rear cover).

Separating Walls (Party Walls)

Timber Frame

Typically, party walls are manufactured from kiln dried timber stud components. Both timber frame wall panels that form the separating wall should be lined internally with (in order of application):

- 9.5 mm plasterboard; 19 mm gypsum plank or 12.5 mm vapour check plasterboard*; or
- 2 x 15 mm sound resisting plasterboard.

Roofs

Internal Cladding

All *Kingspan* **TEK**® Building System roof panels should be lined internally with vapour check plasterboard*.

Where services need to be fixed on a *Kingspan* **TEK**® Building System roof panel, there are two options for creating a service cavity:

- single layer of 12.5 mm vapour check plasterboard* on min. 10 mm deep by 38 mm wide vertical timber battens; or
- double layer of 12.5 mm plasterboard – the layer closest to the *Kingspan* **TEK**® Building System roof panel should be chased out to create a cavity for services. The second layer should be 12.5 mm vapour check plasterboard.*

Where services do not need to be fixed to the *Kingspan* **TEK**® Building System roof panel, a single layer of 12.5 mm vapour check plasterboard* can be fixed direct to the roof panel. Please consult with the Kingspan Off-Site Technical Services Department (see rear cover) for definitive guidance on your construction.

External Cladding

Before cladding the *Kingspan* **TEK**® Building System roofs, a non tenting breather membrane (e.g. *Kingspan* **nilvent**®) should be fixed direct to the roof panels.

The cladding options available for *Kingspan* **TEK**® Building System roofs are:

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

All roof cladding options should be supported by 38 mm x 50 mm vertical treated timber counter battens.

If other cladding options are being considered contact the Kingspan Off-Site Technical Services Department (see rear cover).

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.

Calculations in accordance with BS 5250: 2002 (Code of practice for control of condensation in buildings) will determine whether there is a requirement for a vapour control layer with the Kingspan* **TEK® Building System*. However, it is always good practice to install a vapour control layer as buildings have a tendency to alter their psychrometric conditions (relative humidity) through change of use.*

This can be installed in the conventional manner, using 500 gauge polythene sheet, or by using vapour check plasterboard.

Free condensation risk calculations for specific projects are available upon request from the Kingspan Off-Site Technical Services Department (see rear cover). These calculations are performed to BS 5250: 2002 (Code of practice for control of condensation in buildings).

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

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.

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 when both wall and roof panels are combined. Therefore additional ventilation may be a sensible and beneficial addition to a building constructed with the *Kingspan* **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

One method seems to offer the best solution:

Mechanical Ventilation (with Heat Recovery) Systems (MVHR).

These 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.

NB: It is the responsibility of the domestic scale mechanical ventilation with heat recovery systems supplier, for the specific sizing of the equipment and the environmental and improved indoor air quality advantages associated with their systems.

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.

Another possibility is:

Passive Stack Ventilation (PSV) Systems.

Ducts run from 'wet' rooms - kitchens, bathrooms etc. - up to roof terminals. Warm moisture-laden air rises up the ducts as a result the stack effect, requiring no electric fan or power source. These ducts can have humidity controlled vents i.e. they become activated when humidity levels reach a set point.

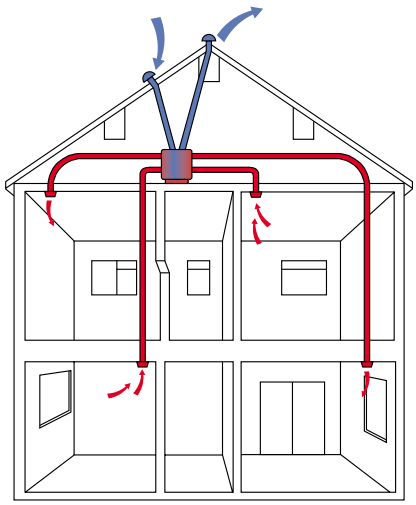


Figure 1 MVHR System
(see also Kingspan Air Recovery System on page 15)

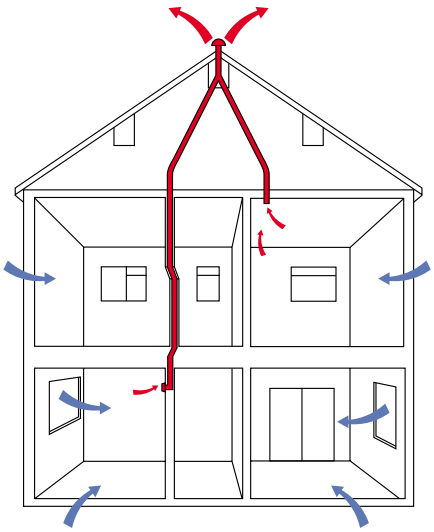


Figure 2 Passive Stack Ventilation System

Wall or window inlets provide a flow of replacement fresh air into the building as required. In order to provide fresh air in living areas these inlets may need to be placed in dry rooms. These inlets could be humidity controlled, but the building will still need ventilation when these rooms have low humidity and therefore closed vents. Humidity controlled inlets would appear to be counter productive in a building constructed with the *Kingspan* **TEK**® Building System.

The position of inlets and extract ducts ensure that air always moves from 'dry' rooms to 'wet' rooms, where it is extracted.

Disadvantages - the system may need inlets in 'dry' rooms for it to provide adequate ventilation in a very air-tight building. These inlets may have to remain permanently open and thus provide paths for unwanted wind-generated air-leakage. Although desired ventilation could be achieved, there is a risk that undesired over-ventilation could compromise the energy performance of the building through uncontrolled ventilation.

Advantages - while heat recovery is not an option, the system operates with no energy use.

Positive Input Ventilation (PIV) Systems.

These systems act rather like mechanical extract in reverse. A fan blows air into a property and effectively pressurises the building. In a building with 'normal' levels of air-tightness, this air is forced out through normal air-leakage pathways e.g. cracks, poorly fitting doors and windows etc., taking moisture and air pollutants with it.

In a very air-tight building these pathways may not occur to any useful extent and so extract ventilation ports may have to be provided. As with PSV, the position of inlet ducts and extract ventilation ports ensure that air always moves from 'dry' rooms to 'wet' rooms, where it is extracted. These extract ventilation ports could be humidity controlled, but the building will still need ventilation when these 'wet' rooms have low humidity and therefore closed vents. Humidity controlled inlets would appear to be counter productive in a building constructed with the *Kingspan* **TEK**® Building System.

Disadvantages – the system may need extract ventilation ports in 'wet' rooms for it to provide adequate ventilation in a very air-tight building. These extract ventilation ports may have to remain permanently open and thus provide paths for unwanted air-leakage. Although desired positive input ventilation could be achieved, there is a risk that undesired wind-generated over-ventilation could compromise the energy performance of the building. Why 'Build Tight' to keep energy use down then cut holes in the system to allow uncontrolled ventilation?

Advantages - while heat recovery is not an option, some systems claim to preheat input air by gathering solar heat from the batten space under roof tiles. This may reduce running costs.

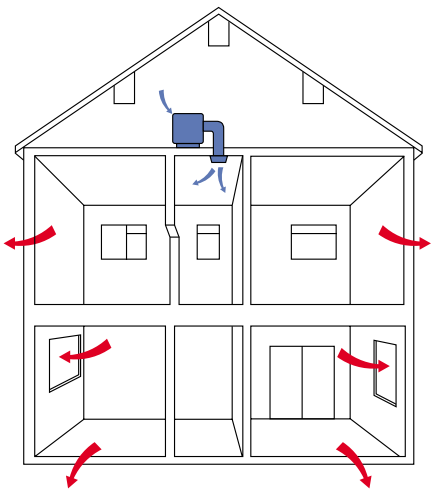


Figure 3 Positive Input Ventilation System

Heating Systems

Buildings constructed using the *Kingspan* **TEK**® Building System can be cheap to run from the viewpoint of heating bills because they can be so energy efficient.

You can use any conventional heating system but sizing and controls are important. Heating systems can be 'down-sized' considerably as heating demand can be very low or negligible. Controls are important so as to avoid overheating - a normal domestic heating regime could cause a building constructed with the *Kingspan* **TEK**® Building System to overheat.

The *Kingspan* **TEK**® Building System can also 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 of a small fan coil into a mechanical ventilation with heat recovery (MVHR) unit or the use of small wood burning stove in tandem with a standard MVHR system.

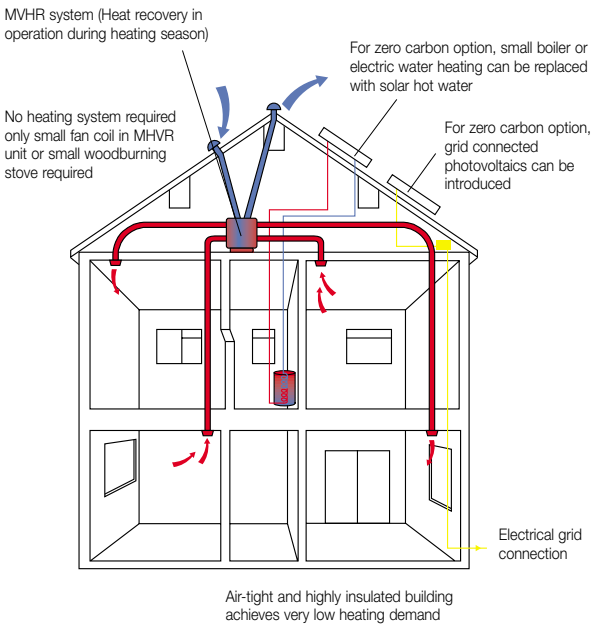


Figure 4 Heating Systems in The Kingspan TEK™ Building System

Technical Support

Kingspan Off-Site offers a wide range of technical support.

- Typically the *Kingspan* **TEK**® Building System is supplied and erected under contract. However, if you wish to erect the system yourselves you can use a contractor that is registered to erect the System. A list of CITB trained Registered Contractors is available for download from the website (see rear cover).
- The *Kingspan* **TEK**® Building System incorporates a comprehensive Design Service. The customer sends fully dimensioned drawings including plans and elevations* either via email or by post (see rear cover) and they will be engineered into a *Kingspan* **TEK**® Building System scheme to match your design. The scheme will lay out in detail, the way in which the *Kingspan* **TEK**® Building System panels are to be joined on site to create your building. You will be consulted on all aspects of design throughout this process, and a full itemised quotation will be provided along with the final scheme.
- Kingspan Off-Site can also convert your house designs to incorporate room in roof design using the *Kingspan* **TEK**® Building System.
- The Kingspan Off-Site Design Service ensures that buildings comply with the Building Regulations / Standards (Conservation of Fuel and Power / Energy).
- The Kingspan Off-Site Technical Services Department can perform a wide variety of relevant calculations including: U-values, SAP, NHER, Home Energy Rating (see rear cover). The department can also offer advice on subjects such as Ventilation, Heating Systems and compliance with The Code for Sustainable Homes.
- Free condensation risk calculations for specific projects are available upon request from the Kingspan Off-Site Technical Services Department (see rear cover). These calculations are performed to BS 5250: 2002 (Code of practice for control of condensation in buildings).
- Every design is certified by independent Chartered Engineers which includes full drawings and structural calculations.

** Only drawings in AutoCAD, DWG and DXF can be sent via email*

Important Information

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 2005.

Kingspan Air Recovery System

Keeping the warmth inside with Kingspan Air Recovery System:

Air-tightness

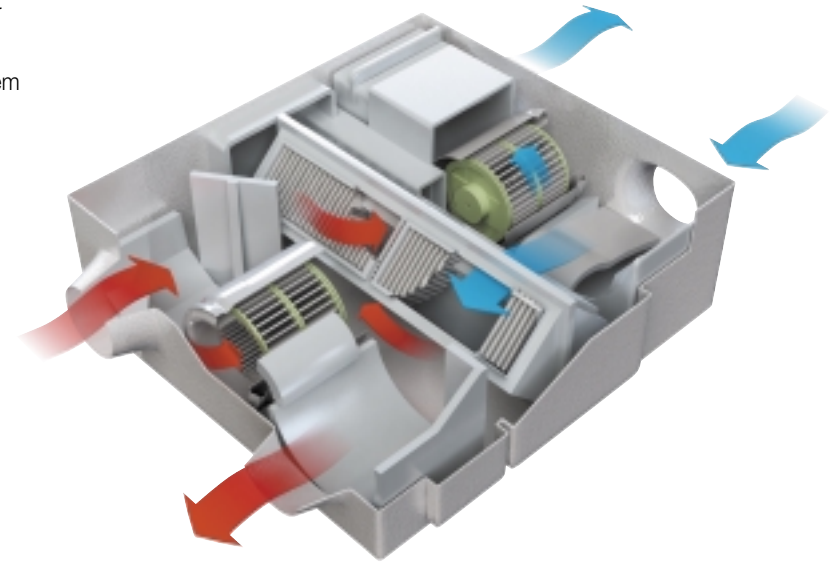
Air-tightness has been a much over looked cause of heat loss.

Air-tightness is achieved using special air-leakage barriers on the walls and roof. All junctions of walls, floors, ceilings and roofs are sealed. This keeps the cold external air out and the warm internal air in.

A well sealed building requires designed mechanical ventilation. Air-tightness in conjunction with the Kingspan Air Recovery System keeps the warm air in and reduces the heating load of the house. The Kingspan Air Recovery System allows dust, irritants and moist, stale air to be exhausted by the ventilation system. This helps create a healthy and comfortable environment within the house.

The Kingspan Air Recovery System recycles up to 88% of the heat normally lost with conventional extractors.

At the same time air recovery systems filter dust, pollen and smoke, providing superior air quality as well as maintaining stable internal temperature and humidity levels.



As part of the commitment to providing low carbon, energy efficient homogeneously designed buildings, Kingspan Off-Site can offer a fully designed and installed high performance MVHR system. For information and product literature please contact the Kingspan Off-Site Marketing Department (see rear cover).

Space

Habitable Roof Space

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

- the demands of PPS3 in England and Section 5 of the Planning and Development Act in the Republic of Ireland are calling for higher housing densities and therefore causing 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 can achieve U-values of as little as 0.18 W/m^2·K as standard.

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 System.

Floor Space

When building a wall to achieve a U-value of 0.20 W/m²·K using the *Kingspan* **TEK**® Building System, the structure can be just 223 mm thick. In comparison, a timber frame wall to achieve the same U-value may have to be 390.5 mm thick, (100 mm brick, 50 mm cavity, 12 mm OSB, 215 mm glass fibre quilt between 215 mm studs, 12.5 mm vapour check plasterboard on dabs). A full fill masonry cavity wall to achieve the same U-value will have to have a wall 430 mm thick (100 mm brick, 205 mm rock mineral fibre full fill, 100 mm dense block, 12.5 mm plasterboard on dabs).

This means that the *Kingspan* **TEK**® Building System provides more floor space for the same external dimensions. Ideal when considering compliance with the housing densities demanded by guidelines such as PPS3 in England and Section 5 of Planning and Development Act in the Republic of Ireland.

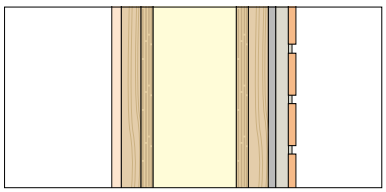


Figure 5

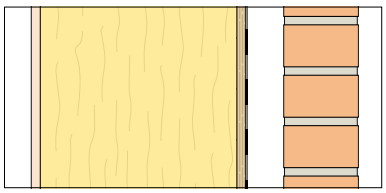


Figure 6

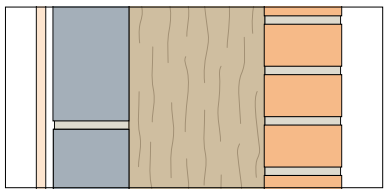
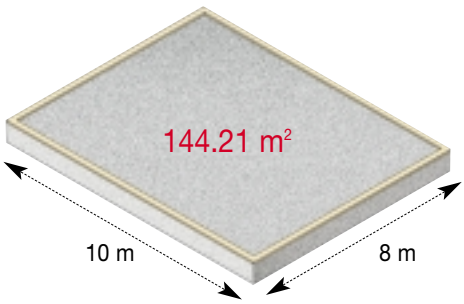
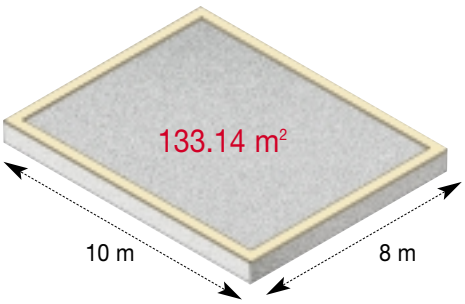
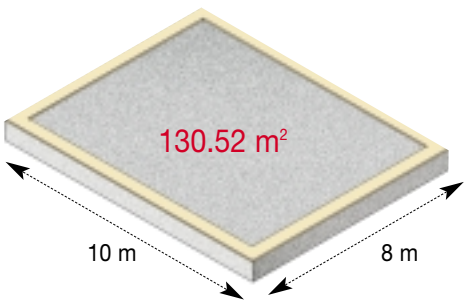


Figure 7







Kingspan **TEK**® Building System Wall
Wall thickness 223 mm
Floor space, throughout house:
144.21 m²

Timber Frame Wall
Wall thickness 390.5 mm
Floor space, throughout house:
133.14 m²

Masonry Full Fill Cavity Wall
Wall thickness 430 mm
Floor space, throughout house:
130.52 m²

With the Kingspan TEK™ Building System, in the example shown above*, you achieve 11.07 m² more useable floor space than a house built with timber frame walls and 13.69 m² more useable floor space than a house built with masonry full fill cavity walls of the same external dimensions and U-value (0.20 W/m²·K).

**Extra floor space based on two storeys*

Environmental Sustainability

Global Issues

Reduce Space Heating Demand and go zero ODP

It is widely recognised that there are four main global sustainability issues: global warming, non-renewable resource depletion, toxic pollution and ozone depletion, and that these global issues far outweigh any local sustainability issues in their need for immediate attention and potential impact from inaction.

Recent studies have shown that the first three issues are essentially one. The extraction and consumption (burning) of fossil fuels is by far the most significant contributor to global warming, non-renewable resource depletion and toxic pollution.

In the UK 60% of fossil fuels are used to heat buildings and half of this is housing. Therefore as far as housing is concerned environmentally sustainability comes down to two main issues: reduce fossil fuel use and specify zero ODP products.

By far the most economical method of reducing fossil fuel use in housing is to reduce space heating demand. The investment for renewable energy sources only becomes convincing once space heating demand is minimised as capital costs are prohibitive to most.

There are two main methods of reducing space-heating demand: reduce heat losses through the building fabric and reduce heat losses from unintentional air-leakage.

The former has been the subject of Building Regulation for 30 years but still has a long way to go before an optimum level is attained. It is estimated that U-values of 0.10 $W/m^2 \cdot K$ would be the practical optimum.

Building Regulations / Standards are only starting to attend to the issue of air-leakage, which becomes more significant an effect as U-values are reduced, but it is likely that Building Regulations / Standards will come to focus more on air-tight constructions over the coming years as U-values and energy performance move closer to the optimum.

Local Issues

Reduce Landfill

The UK construction industry generates at least 70 million tonnes of waste per annum. In addition to this, it is estimated that 13% of materials that go to site never get used and go straight into the waste stream. 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.

Reduce Transport

Traditional construction methods often require delivery of components to site from many different manufacturers or distributors. This can often mean numerous deliveries to site increasing congestion, noise and traffic pollution (which is strictly a global issue), but all of which can have a major impact on the environment.

Sustainable Building Solution

Minimum Space Heating, Zero ODP & Low GWP

The *Kingspan* **TEK**® Building System can reduce space heating demands not only by achieving U-values of 0.22 W/m²·K as standard and down to 0.10 W/m²·K with additional insulation but also by achieving air-tightness as low as 0.08 air changes per hour at normal pressures or 0.91 air changes per hour at 50 Pa. Further information on how this performance helps to reduce space-heating demand can be found in Heating Systems on page 14.

The *Kingspan* **TEK**® Building System panels are produced in a continuous zero Ozone Depletion Potential (CFC/HCFC-free) process.

zero o.d.p

NB: the OSB/3 facings of the panels are manufactured from the routine thinnings from managed plantations.

Minimal Landfill

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 landfill which also helps to reduce cost.

Less Transport

The complete *Kingspan* **TEK**® Building System scheme (e.g. panels and ancillaries) comes from one source. Therefore there is less impact on the environment from congestion, noise and traffic pollution because fewer lorries are travelling to and from sites.

Energy Efficiency

General

The low U-values that can be achieved by using the *Kingspan* **TEK**® Building System e.g. 0.22 W/m²·K with no additional insulation, mean that not only can the System meet and exceed current Building Regulations / Standards but it also can meet the U-values that are expected to be set in future changes to the Building Regulations / Standards in 2012 and beyond. Extremely low U-values e.g. 0.10 W/m²·K, can also easily be achieved with the *Kingspan* **TEK**® Building System by applying additional insulation. This means low running costs and impressive comfort for the lifetime of the building.

In addition to the *Kingspan* **TEK**® Building System panel's excellent thermal performance, the closed cell structure of its rigid urethane insulation core does not allow movement of air within the wall. The insulation will not sag or physically deteriorate over time as may be the case with other insulating materials.

The proprietary jointing system used with the *Kingspan* **TEK**® Building System creates a very air-tight structure (as low as 0.08 air changes per hour at normal air pressures) with little opportunity for air leakage.

U-value calculations for a conventional timber framed house always have to take into account, the effects of cold bridging which, in a new build situation is typically 15%. Cold bridging occurs where a material with a significantly worse thermal conductivity interrupts the normal continuous layer of insulation.

The 15% figure includes:

- 38 mm timbers at 600 mm centres for 1 and 2 storey buildings; and
- all timbers such as noggins (also known as repeated cold bridges).

The 15% figure does not include:

- timbers that are outside the wall area used for heat loss calculations;
- timbers (max. depth 50 mm) around window zones and lintels (max. depth 175 mm); and
- intermediate floor joists that are not insulated behind.

The SIP technology, upon which the *Kingspan* **TEK**® Building System is based, means the insulation layer is not interrupted by repeating studwork. Therefore there is less cold bridging and a better thermal performance. There are however some cold bridges e.g. where timbers are used to support point loads etc. However, as with U-value calculations for timber frame the same rules apply for timbers that do not have to be included.

Limited Cold Bridging

Due to the continuity of insulation within its panels, the *Kingspan* **TEK**® Building System provides greatly enhanced thermal reliability when compared with other more traditional forms of construction.

Example 142 mm thick panel.

Thermal bridges exist at:

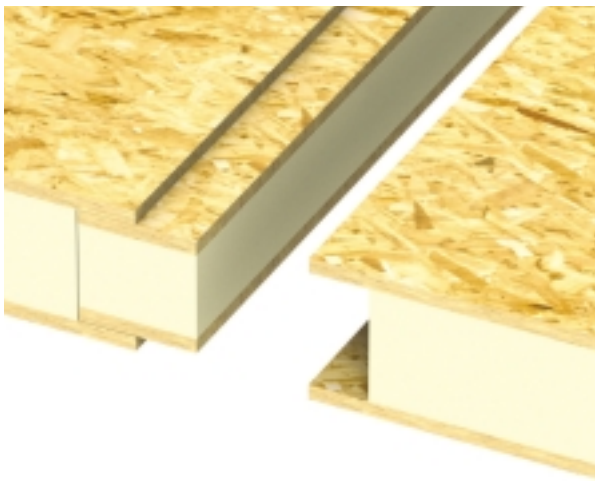
- 140 mm x 38 mm soleplates where they have been installed on top of the floor screed;
- 50 mm x 110 mm timber headplates;
- half the 50 mm x 110 mm end timbers which are fixed into the wall panels to enable them to be butt jointed at corners;
- half the 50 mm x 110 mm end timbers which are fixed into the roof panels to enable them to be butt jointed over the ridge beam; and
- the 110 mm x 100 mm timbers posts which are occasionally used at the junctions between panels for structural reasons.

This results in a system that only has 4% thermal bridging from timber elements for a typical domestic building wall (up to 15% or more with a traditional timber frame wall) and 1% thermal bridging from timber elements for a typical domestic building roof (6% in a typical domestic roof with insulation between joists or rafters). Guidance on thermal bridging in the *Kingspan* **TEK**® Building System should be sought from Kingspan Off-Site Technical Services Department (see rear cover).

The *Kingspan* **TEK**® Building System does not suffer from:

- sagging insulation;
- wet insulation due to exposure on site which could reduce thermal performance;
- gaps and voids in insulation coverage left by poor site workmanship; or
- compressed loft insulation from storage of items in the loft.

Air-tightness



The *Kingspan* **TEK**® Building System is ideal for the construction of an air-tight building envelope. The System's proprietary jointing system provides an effective air seal.

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

- 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.

The *Kingspan* **TEK**® Building System achieves excellent results in blower door tests e.g. 0.08 air changes per hour at normal air pressures or 0.91 air changes per hour at 50 Pa (approximately 1 $m^3/hr/m^2$ at 50 Pa).

NB: To put this in context, a recommendation for air-tightness in current 2006/2007 Part L Regulations and Standards in the UK is 10$m^3/hr/m^2$ at 50 Pa for dwelling. This is currently given as a good guideline for the purpose of calculating SAP.

The *Kingspan* **TEK**® Building System is again clearly bringing future building standards home today.

Service Integration / Internal Linings

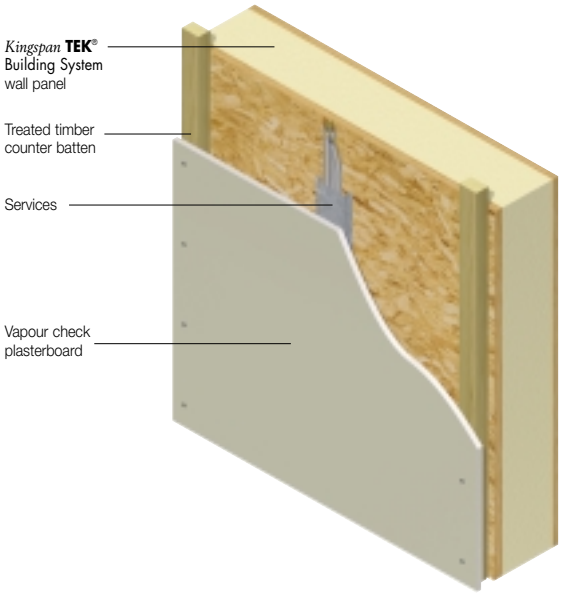


Figure 8
Minimum 12.5 mm vapour check* plasterboard on 25 mm timber battens†.

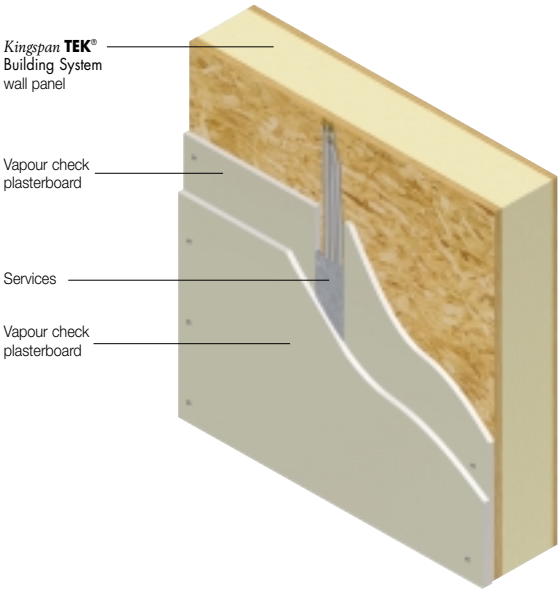


Figure 9
Minimum 12.5 mm vapour check* plasterboard on 19mm gypsum Plank or 12.5mm plaster board.

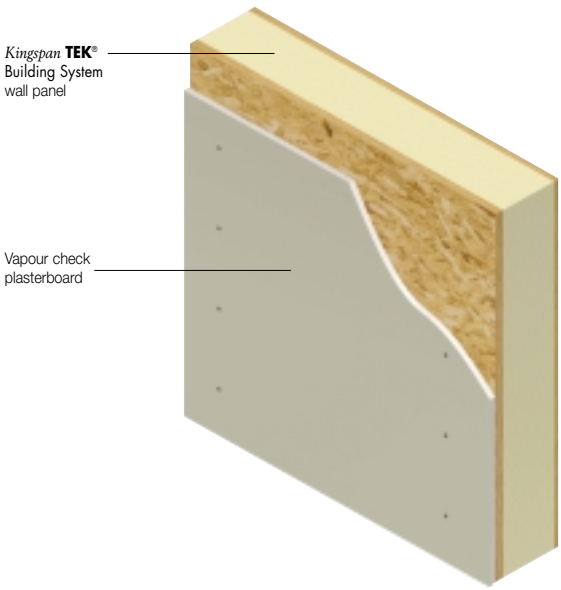


Figure 10
Minimum 12.5 mm vapour check* plasterboard fixed direct to the *Kingspan* **TEK**® Building System.

The minimum plasterboard requirement may vary subject to statutory requirements for fire and acoustics.

The need for electrical sheathing / conduit should be assessed in accordance with Building Regulations/ Standards and BS 7671: 2001

Typical Wall Constructions

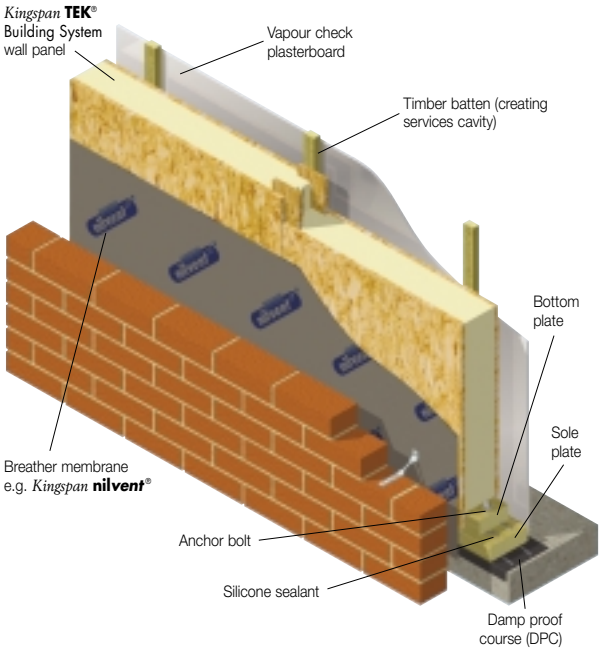


Figure 11
12.5 mm vapour check* plasterboard on 25 mm timber battens†.

Non tenting breather membrane (e.g. *Kingspan* **nilvent**®, 50 mm cavity, brickwork facing. U-value 0.19 - 0.21 W/m²·K.

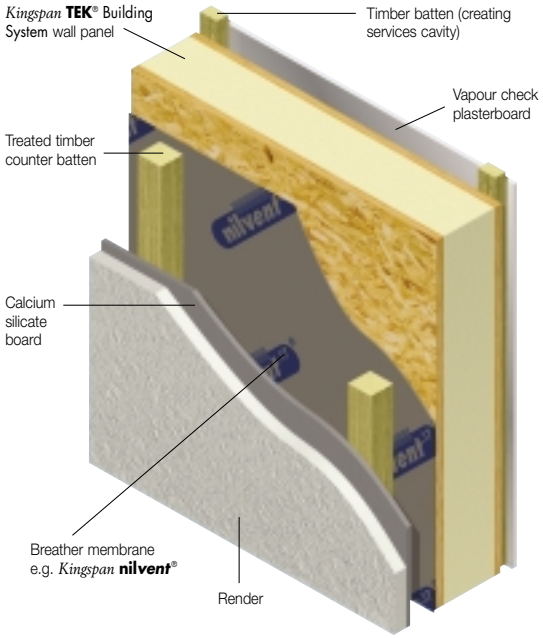


Figure 12
12.5 mm vapour check* plasterboard on 25 mm timber battens†.

Non tenting breather membrane (e.g. *Kingspan* **nilvent**®, 25 mm (min.) vertical treated timber counter battens, calcium silicate board with lightweight render coating. U-value 0.20 - 0.22 W/m²·K.

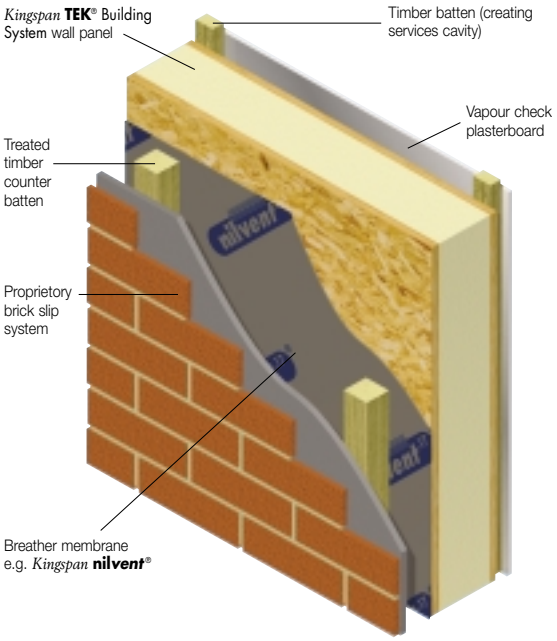


Figure 13
12.5 mm vapour check* plasterboard on 25 mm timber battens†.

Non tenting breather membrane (e.g. *Kingspan* **nilvent**®, 25 mm (min.) vertical treated timber counter battens, proprietary brick slip system. U-value 0.20 - 0.22 W/m²·K.

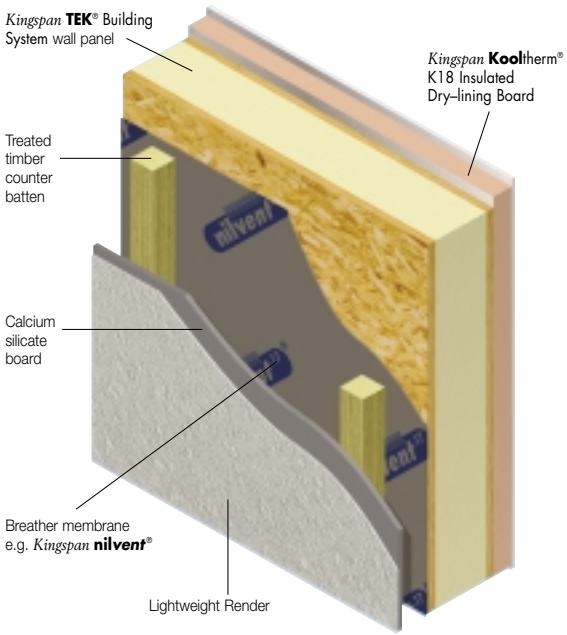


Figure 14
Kingspan **Kool**therm® K18 Insulated Dry–lining Board.

Non tenting breather membrane (e.g. *Kingspan* **nilvent**®, 25 mm (min.) vertical treated timber counter battens, calcium silicate board with lightweight render coating.

Cladding Options

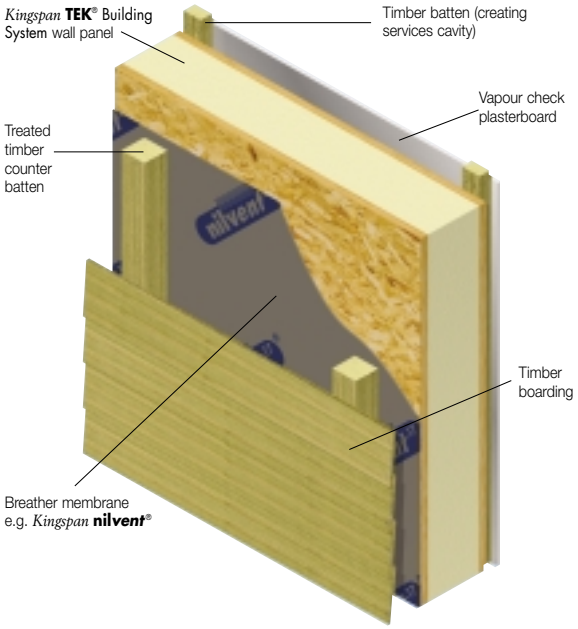


Figure 15
12.5 mm vapour check* plasterboard on 25 mm timber battens†.
Non tenting breather membrane (e.g. *Kingspan* **nilvent**®, 25 mm (min.) vertical treated timber counter battens, timber boarding. U-value 0.20 - 0.22 W/m²·K

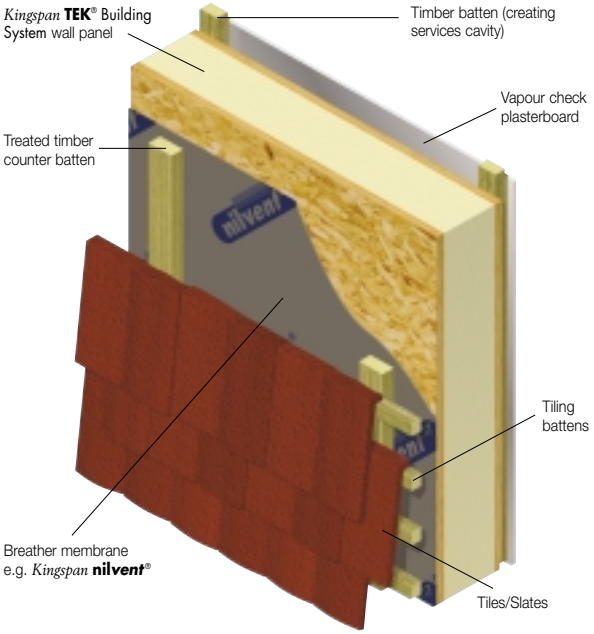


Figure 16
12.5 mm vapour check* plasterboard on 25 mm timber battens†.
Non tenting breather membrane (e.g. *Kingspan* **nilvent**®, 25 mm (min.) vertical treated timber counter battens,
tiling battens, tile hanging. U-value 0.20 - 0.22 W/m²·K

Wall U-values

- Using the *Kingspan* **TEK**® Building System complete walls can easily provide extremely low U-values between 0.10 W/ m²·K and 0.22 W/ m²·K.
- *Kingspan* **TEK**® is clearly bringing future building standards home today.

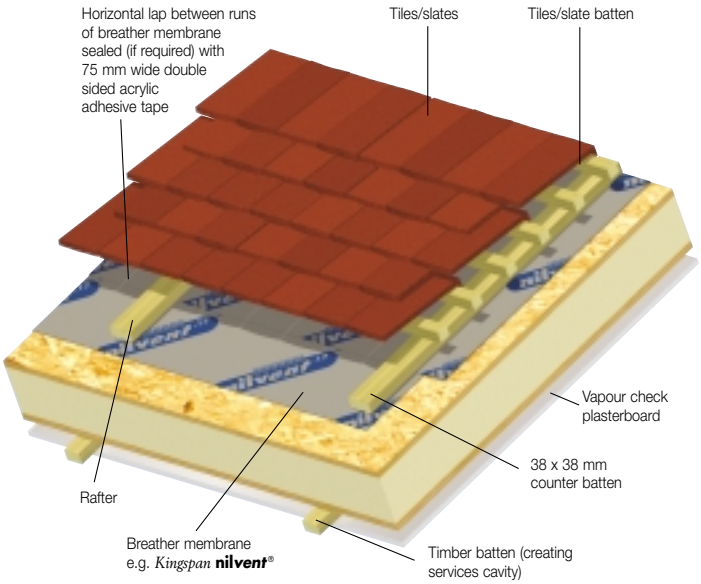


Figure 17
12.5 mm vapour check* plasterboard on 25 mm timber battens†.
Non tenting breather membrane (e.g. *Kingspan* **nilvent**®, 38 mm x 38 mm vertical treated timber counter battens, tiling battens and tiles / slates. U-value 0.18 - 0.20 W/m²·K

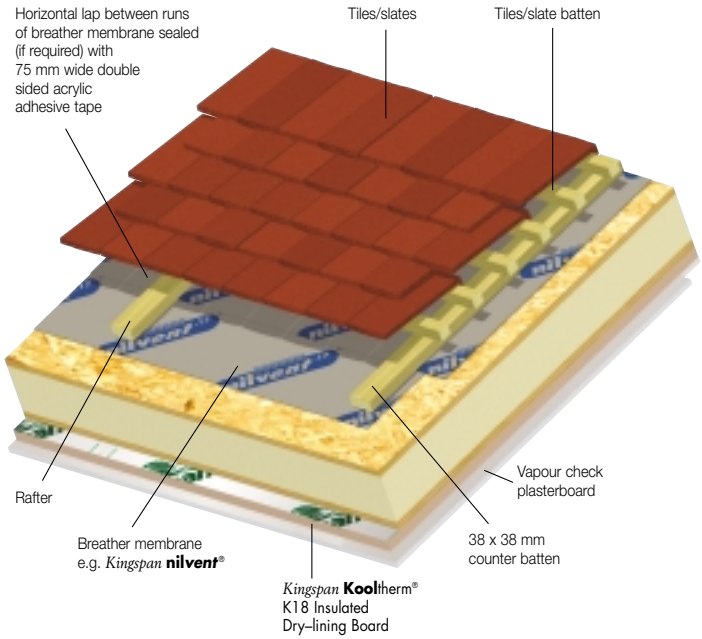


Figure 18
37.5 mm *Kingspan* **Kool**therm® K18 Insulated Dry–lining Board.
Non tenting breather membrane (e.g. *Kingspan* **nilvent**®, 38 mm x 38 mm vertical treated timber counter battens, tiling battens and tiles / slates. U-value 0.16 W/m²·K

† An alternative to plasterboard on battens is two layers of 12.5 mm plasterboard with the inner layer being vapour check plasterboard.*

Calculations in accordance with BS 5250: 1989 (1995) (Code of practice for control of condensation in buildings) will determine whether there is a requirement for a vapour control layer with the Kingspan* **TEK® *Building System. However it is always good practice to install a vapour control layer as buildings have a tendency to alter their psychrometric conditions (relative humidity) through change of use. This can be installed in the conventional manner, using 500 gauge polythene sheet, or by using vapour check plasterboard.*

Roof U-values

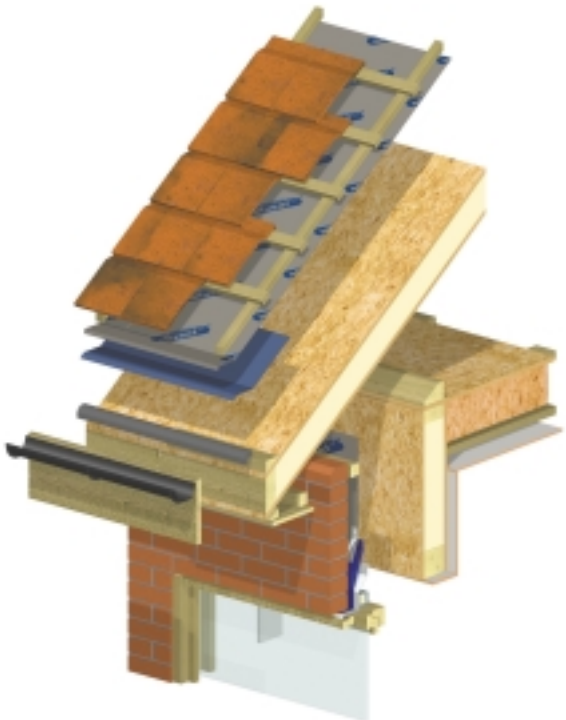
Using the *Kingspan* **TEK**® Building System complete roofs can easily provide extremely low U-values.

For roofs in dwellings with insulation in the slope of the roof (room in roof constructions) 0.20 – 0.16 W/m²·K are the current U-values required by the Building Regulations / Standards in the UK and Ireland.

Kingspan **TEK**® Building System can clearly meet these requirements.

All U-values stated for the *Kingspan* **TEK**® Building System are quoted for a complete element build up consisting of all layers involved in the detail, including the external and internal surface resistances and does not relate to the *Kingspan* **TEK**® Building System panel on its own.

It is always advisable to undertake a condensation risk analysis in accordance with BS 5250: 2002 as the same time as performing the U-value. This will evaluate the likelihood of interstitial condensation.



Building Process

Supply and Erect

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

Registered Contractors

In addition, Kingspan Off-Site has a network of Registered *Kingspan* **TEK**® Building System Contractors throughout UK and Ireland. Contact Kingspan Off-Site Customer Services (see rear cover) for more information. These contractors, who have a background of timber frame, SIPs, green oak framing as well as traditional masonry construction have undergone special training with the CITB to erect the *Kingspan* **TEK**® Building System. The services offered by registered contractors range from simple erection of the *Kingspan* **TEK**® Building System through to a full turn key package including the provision heating and ventilation equipment, windows, doors, staircases and all external finishes.

Jointing *Kingspan* **TEK**® Building System Panels

Kingspan **TEK**® Building System panels have twin 50 mm deep routed channels 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 *Kingspan* **TEK**® Building System to be very air-tight.

Refer to the *Kingspan* **TEK**® Building System Construction Manuals for full details.

Lifting Panels

Kingspan **TEK**® Building System panels should only be lifted by fully qualified construction teams or Registered Contractors who have completed the *Kingspan* **TEK**® Building System CITB training course. Lifting should be organised in accordance with the Registered 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 registered *Kingspan* **TEK**® Building System contractor.

Storage of Components

Kingspan **TEK**® Building System panels should be kept at least 150 mm off the ground on supports, and protected from the elements with a polythene sheet until used. Supports should be supplied at maximum 1,200 mm centres ensuring the ground is flat, so that the panels will not twist.

OSB/3 floorboards should be stacked flat, clear of the floor, on level bearers and at centres not exceeding 600 mm. The whole stack should be covered with a polythene sheet to prevent warping.

Alterations to the *Kingspan* **TEK**® Building System

Alterations can usually be accommodated during the construction process if required. Prior approval in writing from Kingspan Off-Site will be required. Alterations following completion of the building are possible but more difficult and should, where possible, be carried out by a registered *Kingspan* **TEK**® Building System contractor who has access to the original design plans.

NB: A structural engineer must verify all alterations.

Water Ingress during Construction

Kingspan **TEK**® Building System wall and roof panels are supplied so that they are protected from the elements during and after the construction process. A breathable membrane (e.g. *Kingspan* **nilvent**®) is factory applied to prevent site error.

Internal Dry-lining

Plasterboard should be fixed directly to the *Kingspan* **TEK**® Building System panel. Refer to the *Kingspan* **TEK**® Building System Construction Manual for full details.

Where services need to be run on a *Kingspan* **TEK**® Building System wall panel there are alternative internal dry-lining options which are discussed in the Services Installation section on page 28.

Fixing items to *Kingspan* **TEK**® Building System Walls

Cabinets

Cabinets can be fixed anywhere along the surface of *Kingspan* **TEK**® Building System wall panels using suitable screw fixings. For optimal strength, cabinets should be hung before the wall panels have been lined with plasterboard. For further information refer to the *Kingspan* **TEK**® Building System Construction Manual.

Boilers/Radiators

Boilers/radiators can be fixed anywhere along the surface of an external *Kingspan* **TEK**® Building System wall using appropriately sized fixings. For further information contact Kingspan Off-Site Technical Services Department (see rear cover).

Flexibility of Layout

Compared with timber frame walls where, in many cases, noggins have to be installed to take the load, *Kingspan* **TEK**® Building System wall panels offer flexibility for layout and the potential for saving time as the need for installing noggins is eradicated*.

**Except in cases where a single layer of plasterboard is mounted on vertical timber battens. In this situation, additional timber battens would need to be fixed as noggins to help take the load off items such as cabinets.*

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 walls there are two possible methods, double layer plasterboard or single layer plasterboard on battens. With both methods ensure that the wiring is protected with an IEE approved metal guard.

Double layer plasterboard is an excellent option, especially if you are building to sell on or rent. Because there is no service cavity, *Kingspan* **TEK**® Building System walls have a very solid sound unlike timber frame walls.

Refer to the *Kingspan* **TEK**® Building System Construction Manual for full details.

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 *Kingspan* **TEK**® Building System wall panels.

Refer to the *Kingspan* **TEK**® Building System Construction Manual for full details.

Financial Advantages

Energy Savings

The thermal efficiency of the *Kingspan* **TEK**® Building System can offer dramatic energy cost savings over the lifetime of the building.

Capital Cost Savings

To achieve equal energy performance e.g. a U-value of 0.22 W/m^2·K and air leakage as low as 0.08 air changes per hour at normal air pressures, 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 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 registered contractor's team of 4-6 can erect a *Kingspan* **TEK**® Building System 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.

Kingspan TEK™ Building System Panel Data

Product Description

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 urethane insulation core during manufacture.

The Core

The core of *Kingspan* **TEK**® Building System panels is a high performance CFC/HCFC-free rigid urethane insulant of typical density 33 kg/m³.

CFC/HCFC-Free

Kingspan **TEK**® Building System panels are manufactured without the use of CFCs/HCFCs and have zero Ozone Depletion Potential (ODP).

zero o.d.p

Product Data

Standards and Approvals

Kingspan **TEK**® Building System panels are manufactured to the highest standards under a documented internal factory production quality control management system. The *Kingspan* **TEK**® Building System's use is covered by BBA certificate 02/S029, IAB certificate 02/0158 and Zulassung certificate 2-9.1-315.

BBA BRITISH BOARD OF AGREMENT CERTIFICATE 02/S029

Bord Agrément na hÉireann Irish Agrément Board CERTIFICATE No. 02/0158

Z-9.1-315

The OSB/3 facings used in the manufacture of *Kingspan* **TEK**® Building System panels have BM TRADA Q-Mark product certification.

Q-Mark is the ideal tool for independently proving that products are:

- properly tested and appraised in the first instance;
- manufactured under an appropriate quality management system; and
- consistently manufactured to the same high standard, day after day.

BM TRADA

Structural Insulated Panel Standard Dimensions

Width: 200 mm (min) – 1220 mm (max)

Length: 7,500 mm (max) – for walls a maximum 3 m storey height is allowed.

Water Vapour Resistance

Vapour resistivity of *Kingspan* **TEK**® Building System panel components:

- the rigid urethane core – 300 MN.s/g.m; and
- the OSB/3 facing – 500 MN.s/g.m.

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. *Kingspan* **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.

Fire Performance

The *Kingspan* **TEK**® Building System exceeds the Building Regulations / Standards requirements with regards to fire resistance. When tested in accordance with BS 476: Part 21: 1987 (Fire tests on building materials and structures. Methods for determination of the fire resistance of load bearing elements of construction to the Building Regulations / Standards) achieved up to 73 minutes resistance.

NB: Requirements for minimum thickness and number of plasterboards will vary depending on fire rating required.

Kingspan TEK™ Building System Panel Data

Resistance to Airborne Sound
Field tests to BS EN ISO 140-4: 1998 (Field measurements of airborne sound insulation between rooms) on separating walls, externally faced with 12.5 mm plasterboard, 19 mm gypsum planks and 9.5 mm plasterboard to each *Kingspan* **TEK**® Building System wall panel, achieved an average sound reduction of 58 dB ($D_{nT,w}$ ($C;C_{tr}$) 58 (–3; –7) dB).

A laboratory test on a single wall panel with no internal dry-lining achieved a sound reduction (Rw) of 31 dB.

When adopting the use of super dried timber frame party walls, the guidelines contained within the Robust Standard Details would be followed.

Thermal Properties

The λ-values and R-values quoted are based on accelerated ageing for 25 weeks at 70°C, in line with the methods used in the new European Standard BS EN 13165: 2001 (Thermal insulation products for buildings – Factory made rigid polyurethane foam (PUR) products – Specification). Comparison with alternative products may not be appropriate unless the same procedures have been followed.

Thermal Conductivity
Thermal conductivity (λ-value) of the OSB/3 component of *Kingspan* **TEK**® Building System panels should be taken as 0.13 W/m.K. The thermal conductivity of the insulation core of *Kingspan* **TEK**® Building System panels is 0.023 W/m.K.

Thermal Resistance
Kingspan **TEK**® Building System panels have a thermal resistance (R-value) at a maximum of 5.100 m^2.K/W. It is calculated by dividing the thickness of each component (expressed in metres) by its thermal conductivity and adding the resultant figures together.

The Purchasing Process
10 Steps to TEK™

- At the earliest opportunity (e.g. from planning permission) fully dimensioned drawings should be sent to the *Kingspan* **TEK**® Building System design office.
- Kingspan Off-Site will confirm receipt of the drawings and allocate the project a project number.
- Kingspan Off-Site will issue a budget quotation normally within two weeks.
- Kingspan Off-Site will discuss specific project details and any value engineering requirements with you. A revised quotation will be produced if necessary.
- A written order will be given to Kingspan Off-Site.
- Kingspan Off-Site will prepare and generate CAD working drawings.
- CAD drawings are issued for approval and signing by you, usually within four working weeks.
- A delivery date is allocated. This is normally upto six weeks from receipt of signed and approved drawings.
- Typically the *Kingspan* **TEK**® Building System is supplied and erected under contract. However, if you wish to erect the system yourselves you can use a contractor that is registered to erect the System. Kingspan Off-Site will provide a list of CITB trained Registered Contractors which is available for download from the website.
- A Kingspan Off-Site representative will make periodic checks on your project to monitor the erection progress as required.

About Kingspan Off-Site

Kingspan Off-Site is Europe's leading manufacturer and innovator of modern methods of construction, providing high performance solutions to the private and affordable house-building and commercial sectors, as well as the public sector. The company uses the latest in off-site manufacturing techniques to produce complete building systems for a broad range of applications at its UK and European facilities.

Product Overview:

Kingspan Logic
Kingspan Logic is Kingspan's traditional open panel timber frame system. Kingspan Logic is available with factory fitted high performance insulation.

Kingspan TEK® Building System
The *Kingspan* **TEK**® Building System is a high performance Structural Insulated Panel system (SIPs) connected with a unique jointing system.

Kingspan Optima
Kingspan Optima is a closed timber panel system that has dry-lining, insulation, conduits and external doors and windows pre-installed in the factory.

Kingspan Metro Building System
A highly customisable core and shell panellised, integrated load bearing steel frame system, with factory fitted insulation and brackets. Fully BRE certificated, with a range of site and factory fitted façades and site installed lining options, it provides a range of technical solutions for buildings up to 10 storeys, including steel cassette or concrete deck based floors.

Timber Trusses
Kingspan Off-Site provides tailored roof solutions, including total roof design, full supply package and installation. Roofs supplied are responsibly sourced and quality assured.

Open Web Joists
Open web joists from Kingspan Off-Site are a lightweight and strong solution. Individually engineered to suit specific requirements, they offer greater clear spans and easy installation of services.

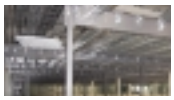
Kingspan Metro Architectural Façade System
A bespoke configured, steel framed envelope panel system suitable for low to high rise buildings of conventional steel or concrete construction. Panels are supplied factory fitted with boards, insulation, façade brackets and, where appropriate the façade; all carry BRE certification for through wall performance and durability; available with a number of connectivity options.

Kingspan Fabrik
A complete unitised wall system comprising steel frame, insulation and architectural façade in one high performance panel. Fabrik façades are also available as standalone thin section rainscreen panels and as lightweight façade panels.

Low Carbon Technologies
A range of low carbon technologies that can be incorporated onto Kingspan Off-Site's building fabric package.

Balconies
Kingspan Off-Site can supply a range of Juliette, Open, Closed or Winter Garden balconies.

Sustainable Urban Drainage (SUDs)
Kingspan is able to advise and supply essential required components for the delivery of a successful sustainable urban drainage scheme.



Profiles & Sections
Kingspan Off-Site Profiles & Sections develop and produce cold rolled steel products for on-site manufacture of Steel Framing Systems, Dry-lining and Mezzanine Flooring backed up by a full design service by their in-house technical team.

Customer Service

For quotations and order placement please contact the Kingspan Off-Site Sales Department on the numbers below:

UK – Tel: +44 (0) 1908 266 200
– Fax: +44 (0) 1908 266 120
– email: sales@kingspanoffsite.com

Ireland – Tel: +353 (0) 47 81270
– Fax: +353 (0) 47 84397
– email: sales@century.ie

General Enquiries

For all other enquiries contact Kingspan Off-Site on the numbers below:

UK – Tel: +44 (0) 1908 266 200
– Fax: +44 (0) 1908 266 120
– email: info@kingspanoffsite.com

Ireland – Tel: +353 (0) 47 81270
– Fax: +353 (0) 47 84397
– email: info@century.ie

Literature and Samples

Kingspan Off-Site produces a comprehensive range of technical literature.

Kingspan Off-Site's technical literature is an essential specification tool. For copies please contact the Kingspan Off-Site Marketing Department on the numbers below:

UK – Tel: +44 (0) 1908 266 200
– Fax: +44 (0) 1908 266 120
– email: marketing@kingspanoffsite.com

Ireland – Tel: +353 (0) 47 81270
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