Structural Insulated Panels
Great Britain & Ireland

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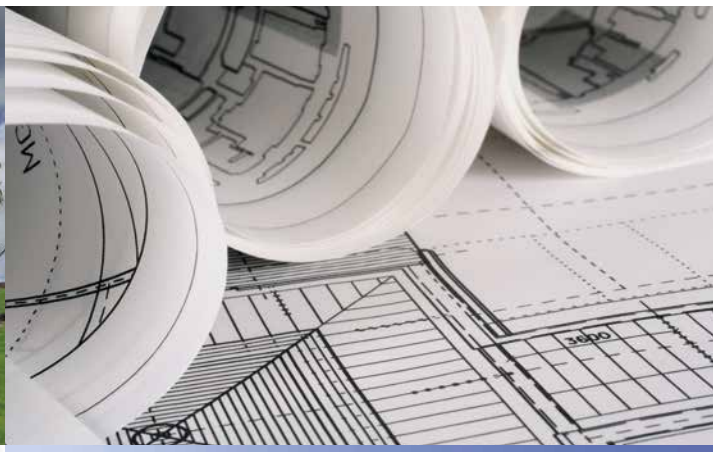
Kingspan TEK® Building System

Information for Self Builders

Fibre-free Core

Kingspan®

Intelligent Design for a Smart Future

You want your dream home, but you want it to be at the cutting edge of construction techniques and quality.

You want your home to be comfortable and warm, but you don't want it to cost the earth to heat, or for it to be any less environmentally sustainable than it can be.

The Kingspan TEK® Building System is a simple, but revolutionary, way of building your dream home quickly and with outstanding energy efficiency. Living in a home built using the TEK® Building System can allow you to benefit from future living standards today.

A Kingspan TEK® Building System home can not only provide comfort in terms of heating bills and temperature control, but it can also provide a spacious and desirable living space.

Using this technology, walls can be no thicker than you would normally expect, in fact, in many cases, they can be thinner, but still provide equivalent, if not better, thermal efficiency.

A home built using the Kingspan TEK® Building System incorporates a pre-insulated room-in-the-roof space, which can be a simple and straightforward way of providing extra living space in your home. Even if you just want a safe storage area, the TEK® Building System is ideal because the pre-insulated roof space is warm, dry, and can be naturally lit.

The Kingspan TEK® Building System can enable you to live in an extremely energy efficient home, that is stylish, comfortable, and cheap to run.

What is the Kingspan TEK® Building System?

Traditional construction methods rely on bricks and blocks, or a conventional timber frame. The Kingspan TEK® Building System is based on structural insulated panels (SIPs). These 142 mm or 172 mm thick panels comprise high performance fibre-free rigid urethane insulation sandwiched between two sheets of 15 mm Oriented Strand Board type 3 (OSB/3). The panels can be up to 1.22 m wide, up to 7.50 m long and are very strong.

The panels are joined together using a unique insulated jointing system that minimises air leakage (see image bottom right). In addition, the design of the joints yields a more continuous layer of insulation in your walls and roof. To illustrate this point, in a property constructed with traditional timber frame, the repeating thermal bridges caused by timber studs in the walls, and rafters in the roof, means that you could typically expect 15% of the walls and 9% of the pitched roof to be uninsulated. By comparison, in a property constructed using the Kingspan TEK® Building System (in a 142 mm thickness), as little as 4% of the walls and 1% of the roof may be uninsulated. The overall thermal performance of the TEK® Building System, which is provided by a combination of the high performance insulation core of the panels, air tightness, and low thermal bridging, can mean that a home's heating system may be able to be 'down-sized' considerably, which could save on both capital and running costs.

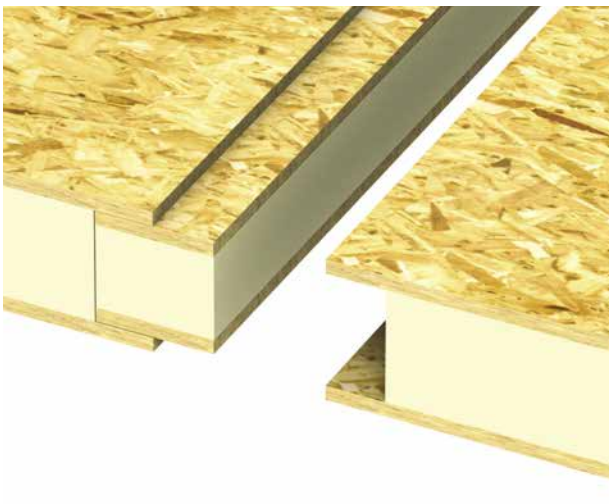
In fact, the Kingspan TEK® Building System is the perfect high performance building fabric solution for extremely low energy buildings which require little or no heating at all, such as those designed to Passivhaus standard. The TEK® Building System has been used as an integral component in delivering a number of certified Passivhaus projects.

Ventilation is an integral part of any airtight home. A mechanical ventilation with heat recovery (MVHR) system is recommended for properties constructed using the Kingspan TEK® Building System. In short, MVHR systems extract the moist waste air from your home and replace it with fresh air from outside. Integral to MVHR systems is a heat exchanger, which will extract the heat from the outgoing waste air to heat the incoming air. Recovering this heat can provide a large proportion of the heat required to keep a home at comfortable living temperatures.

The combination of an airtight building envelope and a MVHR system can mean that traditional central heating systems, which rely on hot water to heat radiators, can become a thing of the past. You should check with your architect to ensure that your heating system, if required at all, is not over-sized and therefore over-expensive.

The Kingspan TEK® Building System is also typically very quick to build, particularly if you are also constructing the roof from TEK® Building System panels. The panels can be erected and joined together very quickly and, with the application of a breather membrane, the System forms a weather tight shell, enabling you to start doing jobs such as dry-lining at the same time as tiling the roof.

More detailed information, about the design and performance characteristics of the Kingspan TEK® Building System, is given in the 'Kingspan TEK® Building System Specification Manual', which is available for download from the Kingspan TEK® website (see rear cover for details).



Why use the Kingspan TEK® Building System?

Energy Efficiency & Environmental Sustainability

- The first step in minimising the CO_2 emissions from a building is to reduce its space heating demand.
- The most effective way to reduce the space heating demand of a building is to improve the energy performance of its envelope by specifying low U-values, low air leakage, and by avoiding significant thermal bridging wherever possible.
- The Kingspan TEK® Building System can achieve whole wall and roof U-values of 0.20 W/m²K or better.
- The Kingspan TEK® Building System can achieve air leakage levels as good as approximately 1 m³/hour/m² at 50 Pa.
- The Kingspan TEK® Building System is not interrupted by repeating studwork, which means the System can achieve very low levels of repeating thermal bridging.
- The Kingspan TEK® Building System also has good continuity of insulation at junctions and openings, which means the System can achieve very low levels of linear thermal bridging.
- It is very difficult for traditional timber frame or masonry construction methods to achieve these standards of energy efficiency, and in order to do so it may incur higher capital costs than using the Kingspan TEK® Building System.
- The potential energy efficiency of a home built with the Kingspan TEK® Building System could result in your home 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.
- The fibre-free insulation core of Kingspan TEK® Building System panels is manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

Fibre-free Core

- The OSB component of Kingspan TEK® Building System panels is manufactured from the routine thinnings of managed plantations, and carries PEFC Chain of Custody certification.

PEFC

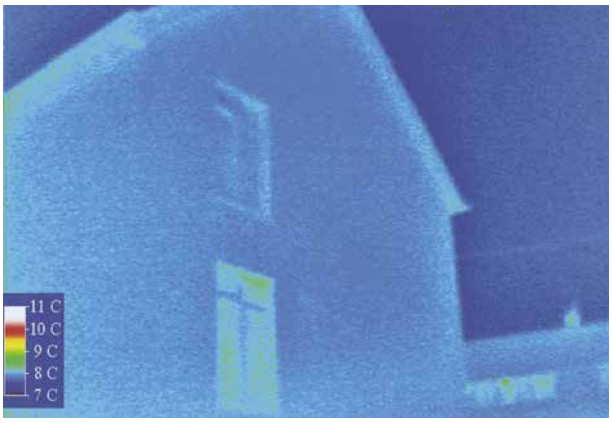
Some Technical Terms Explained

U-value - the figure that indicates thermal performance of an external wall, roof or floor - the lower the figure the higher the performance.

Air leakage - this is the amount of air that can escape from your home and is commonly expressed in m³/hour/m² at 50 Pa i.e. the amount of air that escapes from your home per hour when subjected to an air pressure test at 50 Pascals. This is the standard industry measurement. The higher the figure, the more leaky your home will be and the more energy you will need to maintain a comfortable living temperature.

Repeating thermal bridges - these occur where a material with a significantly worse thermal conductivity interrupts the insulation layer in a construction e.g. timber studs in a timber frame wall. U-value calculations for conventional timber frame systems take into account the effects of repeating thermal bridges i.e timber studs etc.

Linear thermal bridges - these occur at junctions, e.g. wall to floor interface, and at openings, e.g. windows, in the building fabric, and are expressed as psi (Ψ) values. Ψ-values are an important factor in the calculation methodologies used to assess the operational CO_2 emissions of buildings e.g. Standard Assessment Procedure (SAP) in the UK and Dwelling Assessment Procedure (DEAP) in Republic of Ireland.



The image above shows a Kingspan TEK® Building System gable wall with a relatively even surface temperature. Very little thermal bridging can be identified. There is also no visible air leakage at the verge. It should be noted that the rooms behind the wall are well heated which further displays the well insulated nature of the construction.

Why use the Kingspan TEK® Building System?

Insulated Warm Roof Space

- Because Kingspan TEK® Building System roof and wall panels are pre-insulated, your home can easily be designed to incorporate an insulated warm roof space.
- Designing an insulated warm roof space into a home can provide extra living space, or a useful warm storage area which can be easily converted to living space at a later time, without incurring the cost or disruption of insulating a traditional rafter construction.

Floor Space

- In order to meet the same U-value as a Kingspan TEK® Building System wall, traditional constructions, e.g. timber frame or masonry, may have to be considerably thicker.
- This means that the Kingspan TEK® Building System could provide more floor space for the same external dimensions.

Building Reliability

- Defects are vastly reduced due to the factory-controlled manufacture, precise engineering, and the design of the Kingspan TEK® Building System.
- By virtue of the System's prefabricated nature, it can only be erected one way and, thus, installation errors are evident almost immediately, and are relatively easily rectified.

Approvals

- The Kingspan TEK® Building System is recognised by the major building warranty providers such as NHBC, Building Life Plans, Premier, Build Zone, Homebond and HAPM.
- The Kingspan TEK® Building System comprising 142 mm and 172 mm thick panels, holds BBA Certification No. 02/S029.

Mortgages

- The UK Finance advises mortgage providers to assess the quality of a modern method of construction technique based on whether it holds independent accreditation, such as BBA certification. For further information please visit the UK Finance website at **www.ukfinance.org.uk**.
- The Kingspan TEK® Building System should be recognised by most mortgage providers. For further advice on mortgage providers for your TEK® Building System build please contact Kingspan Insulation (see rear cover for details).

Why use the Kingspan TEK® Building System?

Build Speed

- Kingspan TEK® Building System, roof and wall panels are pre-insulated, which means that the construction of the structural frame and the installation of thermal insulation for your home can happen in one operation.
- This can save time and money compared with traditional methods of construction such as timber frame and masonry where the equivalent operation may have to be carried out in a number of different phases.

Waste & Landfill

- The Kingspan TEK® Building System is factory produced and arrives on site as a complete scheme. Waste on site should be limited to ancillary materials e.g. expanding urethane foam cans, timber post off-cuts etc.
- The lack of on-site waste sent to landfill should reduce waste disposal charges.

Less 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.
- The complete Kingspan TEK® Building System scheme (e.g. panels and ancillaries) can come 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.

Predictable Programme

- 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 can enable a weather-tight structure to be erected quickly.
- Easily recognised components are shipped to 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.
- The ease with which the Kingspan TEK® Building System can be erected, and the eradication of wet trades, means it is easier for the Kingspan TEK® Delivery Partners to predict project completion times.
- Traditional construction techniques, such as brick and block, require more components, which can result in more processes, and therefore more labour and possible construction errors.
- The predictable construction programme and fast erection of a weathertight shell offered by the Kingspan TEK® Building System, can reduce the likelihood of costly delays, caused by the scheduling of wet trades, or inclement weather.
- When the home is built for the purpose of renting, the speed of construction that the Kingspan TEK® Building System can deliver, can enable tenants to move in sooner, and, consequently, the owner achieves a better cash flow and, therefore, faster payback.

How the Kingspan TEK® Building System is Supplied and Erected

The Kingspan TEK® Building System is available via a network of Delivery Partners that are responsible for the design, production and erection of the TEK® Building System kits. Kingspan TEK® Delivery Partners are located across the world, and are able to deliver buildings of any scale, in virtually any location. A full list of approved UK and international Delivery Partners is available from the TEK® Building System website (see rear cover for details).

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

- project specific structural engineering and design advice;
- conversion of plans into a Kingspan TEK® Building System design scheme; and
- quotations and lead times.

Self Build Case Studies

Client: Mr and Mrs Orr
Location: Kinross-shire, Scotland

Client: Confidential
Location: Hampshire

Client: Steve & Mel Howarth
Location: Manchester

Self Build Case Studies

Client: Confidential
Location: Jersey

Client: Confidential
Location: Hampshire

Client: Keith Wade
Location: Devon

Getting Your Project Underway

Getting Started

To give you some idea of how to get your self build project underway, here is a framework you may find useful.

The biggest decision comes first - committing to building your dream home. Before you make this decision, decide why you want to undertake the project and what you are hoping to achieve.

Once you are certain of your goals and are convinced of your vision you need to think about the location of your dream home.

You will need a plot of land, which should ideally carry outline planning permission. If you need help with this, here are some information sources that maybe useful:

- **Build It Magazine**
  www.self-build.co.uk
- **Buildstore**
  www.buildstore.co.uk
- **Homebuilding and Renovating Magazine**
  www.homebuilding.co.uk
- **National Custom & Self Build Association**
  www.nacsba.org.uk
- **Self Build and Design Magazine**
  www.selfbuildanddesign.com
- **Plot Finder**
  www.plotfinder.net
- **Self Build & Improve Your Home (Ireland)**
  www.selfbuild.ie
- **The Self Build Portal**

Decide on the Look You Want

Having acquired your land you can start thinking about the design of your dream home.

Having decided on the look for your dream home you need to appoint an architect, probably located reasonably close to your plot. The architect, with local knowledge, can create a design to suit your requirements and also work with the local planning authority to make the look of your home acceptable to the local area.

As part of this process, it may be advisable to arrange for your appointed architect to visit your site to address issues such as:

- the orientation of the site being compatible with views;
- access requirements;
- proximity of neighbours; and
- any site constraints or opportunities.

You should appoint a Kingspan TEK® Delivery Partner to work with the architect to convert the initial design into a Kingspan TEK® Building System scheme. It is important to involve the TEK® Delivery Partner early in the design process to ensure the design is workable as a TEK® Building System scheme. A list of TEK® Delivery Partners is available from the Kingspan TEK® website (see rear cover for details).

Once the plans have been finalised, your architect can submit the plans for detailed planning permission and Building Regulations approval. It is important to submit the plans at the earliest opportunity, as the planning process can be slow.

Getting Your Project Underway

Finalising Budgets and Finance Requirements

Having finalised your designs, and having submitted them for planning permission and Building Regulations approval, you will need to draw up a detailed budget for the build. This will make managing your project easier, and finance providers will also require this detailed information before funds can be released.

Your Kingspan TEK® Delivery Partner will be able to assist with budget prices for the Kingspan TEK® Building System element of your project.

Involvement of the Kingspan TEK® Delivery Partner

Your Kingspan TEK® Delivery Partner may be able to offer a complete turnkey construction package for your project, so all you have to do is move in. Alternatively, your TEK® Delivery Partner can just design, engineer, manufacture and erect the Kingspan TEK® Building System kit, and that will be the extent of their involvement.

If you do not have previous site management experience, it is advisable to bring in professional site management. This can be provided by a Kingspan TEK® Delivery Partner as part of a turnkey package. It can also be provided by a main contractor to which the TEK® Delivery Partner is a sub-contractor. If you feel you have sufficient experience of site management, and you want to manage the project yourself, it can save you money. However, as well as previous site management experience, you should have plenty of spare time available!

Having agreed the level of involvement that your Kingspan TEK® Delivery Partner will have in your project, it is very important to agree areas of responsibility. This should be done at the earliest opportunity, in order to ensure there are no delays once planning permission has been granted. Particularly important at this early stage, is to establish who will install services and lay foundations, as your kit cannot be erected until this work has been done.

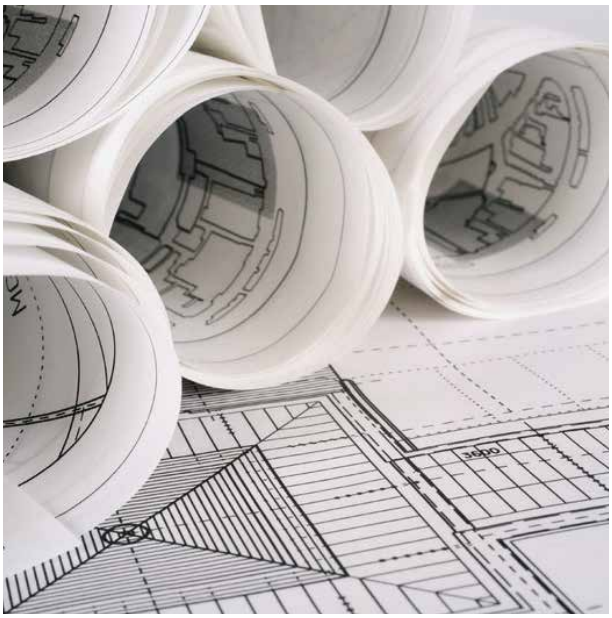
Devise a Construction Programme

Before planning permission is granted you should finalise a detailed specification for your project with your architect, and agree a construction programme with your Kingspan TEK® Delivery Partner and any other contractors you have appointed.

It is also essential at this point to agree a price with your Kingspan TEK® Delivery Partner, in order that you understand the project's cost implications, and also to agree time scales.

Due to the superior air tightness of the Kingspan TEK® Building System, a mechanical ventilation with heat recovery system (MVHR), as described on page 3 of this document is to be recommended. For further information on MVHR, speak to your Kingspan TEK® Delivery Partner or an MVHR supplier. The requirement for, and design of, an MVHR system should be considered at this stage.

More detailed information on ventilation strategies is given in the 'Kingspan TEK® Building System Specification Manual', which is available for download from the Kingspan TEK® website (see rear cover for details).



Getting Your Project Underway

Order your Kingspan TEK® Building System Kit

IMPORTANT: You should order your Kingspan TEK® Building System kit through your Kingspan TEK® Delivery Partner. You should seek guidance from your TEK® Delivery Partner on lead times well in advance of when the TEK® Building System kit is required on site. Typically your kit should be ordered 8 - 12 weeks before it is required on site, although particularly complex designs may take longer.

Generally, what you are buying when you order a Kingspan TEK® Building System kit is an erected building shell. This includes the panels and the breather membrane but does not include foundations, internal linings (e.g. plasterboard), external finishes (e.g. render, timber cladding, masonry, wall ties, battens, slates / tiles), mechanical and electrical services (e.g. plumbing, wiriang), joinery (e.g. windows, doors, internal stud partition walls) etc. However, these items can be included in the price from your Kingspan TEK® Delivery Partner, by mutual agreement.

Your Kingspan TEK® Building System kit will come supplied with a breather membrane, e.g. Kingspan nilvent®, that should be attached to the TEK® Building System roof and walls as soon as they have been erected.

Erecting your Kingspan TEK® Building System Kit

It is recommended that your Kingspan TEK® Delivery Partner not only supplies, but also erects, your Kingspan TEK® Building System kit. The TEK® Delivery Partner can erect the kit through their own in house team, if they have one, or via a sub-contractor appointed by them. If you choose not to use your TEK® Delivery Partner to erect your TEK® Building System kit, it may not be covered by the BBA certificate (Certificate No. 02/S029).

Warranty

A warranty will be available from your chosen Kingspan TEK® Delivery Partner. You should seek guidance from your TEK® Delivery Partner on conditions of, and exclusions from, a warranty.

Contact Details

UK

Kingspan Insulation Ltd
Pembridge | Leominster
Herefordshire | HR6 9LA

T: +44 (0) 1544 388 601
E: info@kingspantek.co.uk
www.kingspantek.co.uk

For individual department contact details please visit
www.kingspantek.co.uk/contact

Ireland

Kingspan Insulation Ltd
Castleblayney | County Monaghan

T: +353 (0) 42 979 5000
E: info@kingspantek.ie
www.kingspantek.ie

For individual department contact details please visit
www.kingspantek.ie/contact

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