



# Kingspan TEK® Building System

## AN INTRODUCTION



- Next generation construction system
- Achieves very low U-values of 0.20 W/m<sup>2</sup> or better
- Air tight construction, as low as 0.08 air changes per hour at normal pressures
- Provides up to 10% additional floor space
- Recognised by warranty providers: Building Life Plans, NHBC and Zurich Municipal
- BBA, IAB, BM Trada certified
- Quick and safe to build
- CFC/HCFC-free with zero Ozone Depletion Potential and low global warming potential – GWP
- 'A' rated in The BRE Green Guide
- Can create warm homes with very low fuel bills
- Highly efficient and sustainable
- Habitable room in the roof space
- Internal works can start earlier
- EGAN compliant
- Minimal on-site building waste
- Ideal for all building types

*Building to the Power of*



**Kingspan®**

**OFF-SITE**



# Introduction

## The *Kingspan TEK*® Building System

The *Kingspan TEK*® Building System comprises structural insulated panels (SIPs) connected with a unique jointing system for walls and roofs and timber I-beams or posi-joists for intermediate floors. Design and structural calculation services are also an integral part of the System.

*Kingspan TEK*® Building System **achieves an A Rating in the BRE Green Guide to Specification.**

The OSB3 facings are not bonded to the insulation core in a secondary process, they are autohesively bonded to it during the insulation manufacturing process resulting in a reliable and superior adhesion between the core and the OSB3 facings.

*Kingspan TEK*® Building System panels are a structural composite, similar to an 'I'-beam. The OSB3 facings act like the flanges and the rigid urethane insulation core is similar to the web. The two 15 mm OSB3 facings work together, rather than against one another. This composite assembly provides stiffness, strength and predictable responses to applied loads.

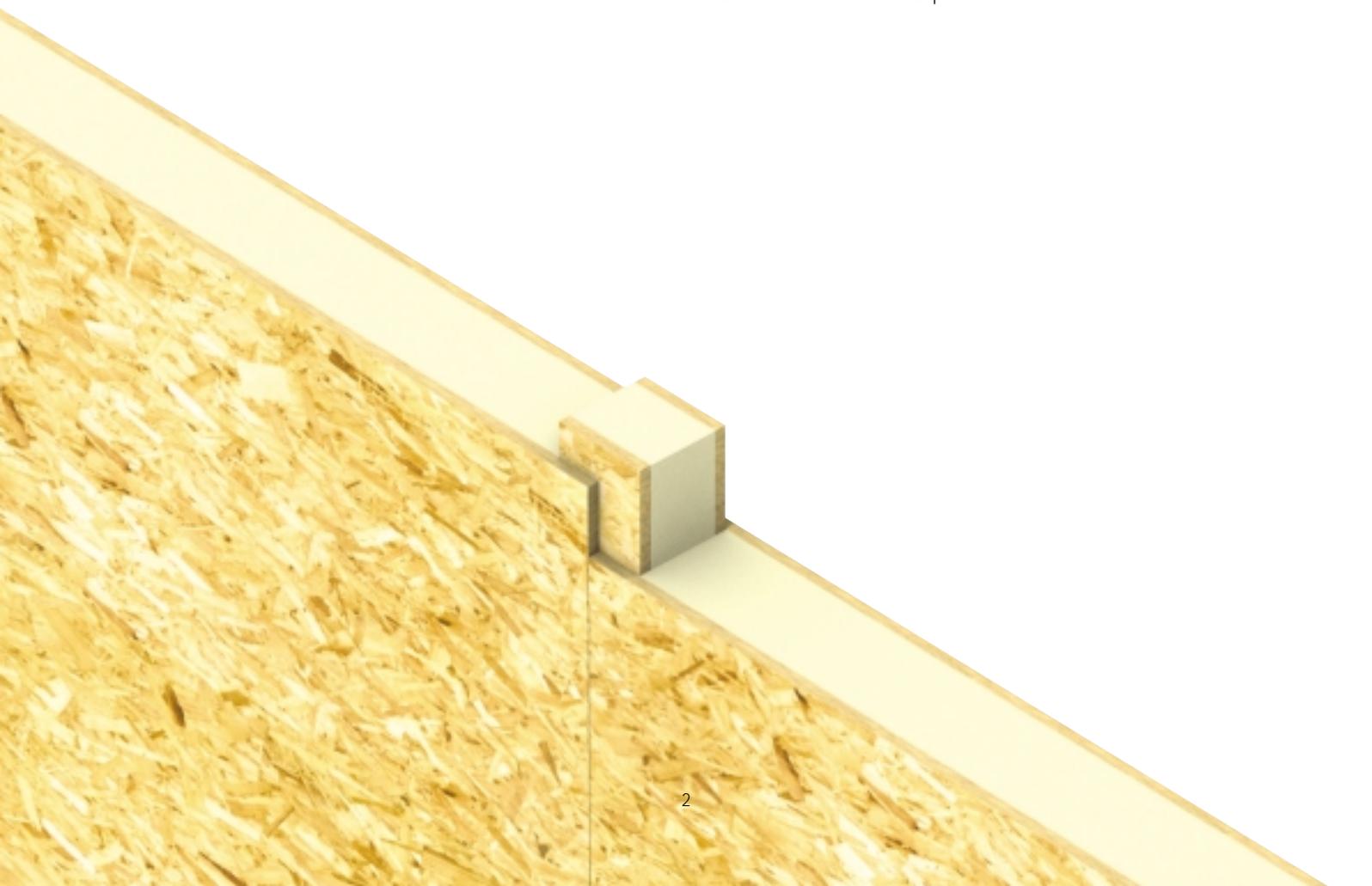
Not only do test results show the panels are stronger, but real life natural disasters have proven it time and again. The Great Hanshin (Kobe, Japan) and North Ridge earthquakes, hurricane Andrew, a Colorado tornado, a Portland gas explosion and an Omaha fire (all in the USA), have done more to prove the strength of SIPs to the property owners in addition to all of the scientific tests.

*Kingspan TEK*® Building System panels are manufactured at our state-of-the-art production facility situated in Northern Germany. They are also processed locally at our UK regional facilities.

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 our own fully qualified 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 our website or obtained from the Kingspan TEK Customer Services Department.



# Benefits of the System

## 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®** or equivalent) 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.
- Accidents are kept to a minimum as only registered **Kingspan TEK®** Building System contractors can erect the System.
- Defects are vastly reduced due to the factory controlled manufacture of the System and precise engineering and design.

## Innovative

- More controllable indoor environment than traditional construction methods such as timber frame or masonry due to the superior air tightness of the System.
- Incorporates a room in roof, so it is an excellent solution to Planning Policy Guidance Note 3 (PPG3) in England and Section 5 in the Planning and Development Act in the Republic of Ireland.
- First structural insulated panels 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.**
- **First construction system to achieve Code for Sustainable Homes – Level 6 (BRE Innovation Centre 2007)**

## Technical Support

Kingspan TEK offers a wide range of technical support.

- Typically the **Kingspan TEK®** Building System is supplied and erected under contract with ourselves. However, if you wish to erect the system yourselves you can use a contractor that is registered to erect the System. Kingspan TEK will provide a list of CITB trained Registered Contractors which is available for down-load from our website.
- The **Kingspan TEK®** Building System incorporates a comprehensive Design Service. The customer sends fully dimensioned drawings including plans and elevations\* either via email to [design@tek.kingspan.com](mailto:design@tek.kingspan.com) or by post (see address on 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. We will consult you on all aspects of design throughout this process, and a full itemised quotation will be provided along with the final scheme.
- We can also convert your house designs to incorporate room in roof design using the **Kingspan TEK®** Building System.
- The **Kingspan TEK®** Building System Design Service ensures that buildings comply with the Building Regulations / Standards (Conservation of Fuel and Power / Energy).
- The **Kingspan TEK®** Building System 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 TEK 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



# Energy Efficiency

## General

The low U-values that can be achieved by using the **Kingspan TEK® Building System** e.g. 0.20 W/m<sup>2</sup>.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/m<sup>2</sup>.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.

In addition, the **Kingspan TEK® Building System** does not suffer from settlement / shrinkage normally associated with typical timber frame construction.

The 15% figure includes:

- 38 mm timbers at 600 mm centres for 1 and 2 storey buildings; and
- all timbers such as noggins and intermediate floor joists that are not insulated behind.

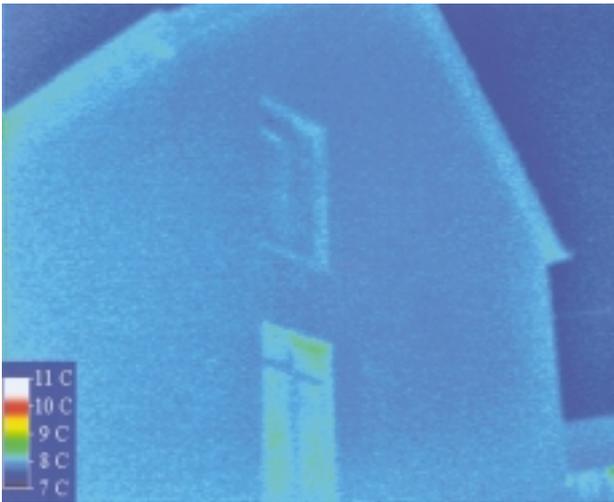
The 15% figure does not include:

- timbers that are outside the wall area used for heat loss calculations; and
- timbers (max. depth 50 mm) around window zones and lintels (max. depth 175 mm).

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 142mm thick panel.

Thermal bridges exist at:

- 140 mm x 40 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 TEK 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; or
- Shrinkage / settlement.

## Floor Space

When building a wall to achieve a U-value of 0.2 W/m<sup>2</sup>.K using the **Kingspan TEK® Building System**, the structure can be 223 mm thick. In comparison, a timber frame wall to achieve the same U-value may have to have a wall 390.5 mm thick, (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 (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** gives you more floor space for the same external dimensions. Ideal when considering compliance with the housing densities demanded by guidelines such as PPG3 in England and Section 5 of Planning and Development Act in the Republic of Ireland.

Figure 1: Brick slips on render on Kingspan TEK

223mm

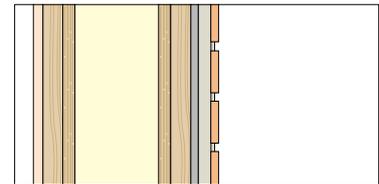


Figure 2: Standard 140 mm wide timber frame, brick clad

390.5mm

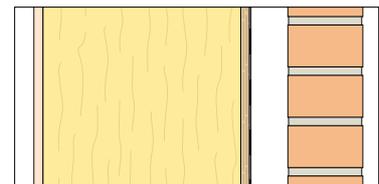
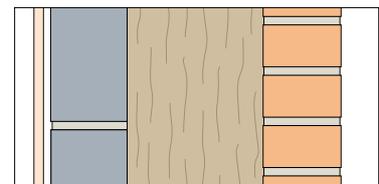


Figure 3: Full fill masonry cavity wall

430mm



**With the Kingspan TEK™ Building System in the example shown above\* you achieve 11.07 m<sup>2</sup> more useable floor space in comparison with a house built with timber frame walls and achieve 13.69 m<sup>2</sup> more useable floor space in comparison with a house built with masonry full fill cavity walls of the same external dimensions and U-value (0.2 W/m<sup>2</sup>.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 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 0.1 W/m<sup>2</sup>.K would be the practical optimum. We may have to wait 20 years for Building Regulations / Standards to demand this.

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 airtight constructions over the next 20 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 are 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.

*"You see, we should make use of the forces of nature and should obtain all our power in this way. Sunshine is a form of energy, wind and sea currents are manifestations of this energy.*

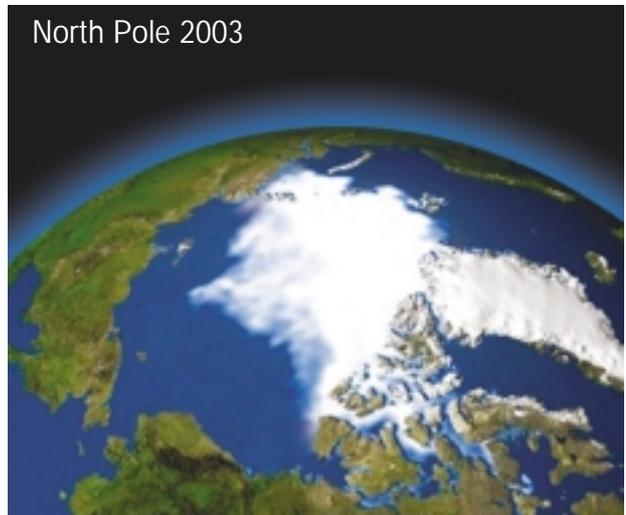
*Do we make use of them? Oh no! We burn forests and coal, like tenants burning down our front door for heating. We live like wild settlers and not as though these resources belong to us"*

*Thomas A. Edison, inventor of the tungsten lightbulb, 1916*

North Pole 1979



North Pole 2003



## 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/m<sup>2</sup>.K as standard and down to 0.1 W/m<sup>2</sup>.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.

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

**NB: the OSB3 facings of the panels are manufactured from the routine thinnings from managed plantations.**

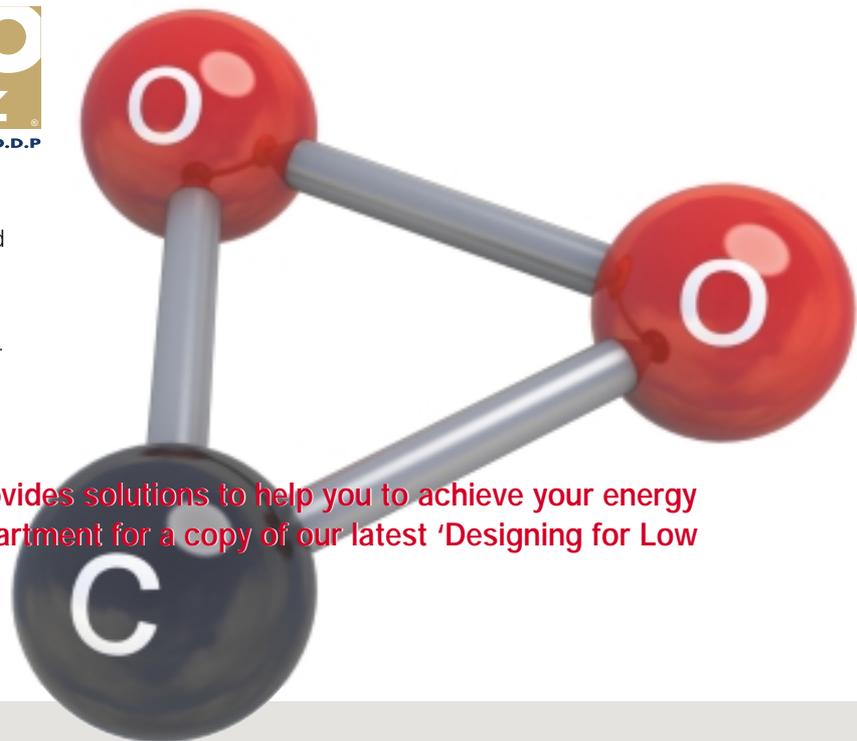


### Minimal Landfill

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.



**The Kingspan TEK™ Building System provides solutions to help you to achieve your energy efficiency targets. As our marketing department for a copy of our latest 'Designing for Low Carbon' brochure.**

## What to do Next?

### 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 drawing office via post or email ([design@tek.kingspan.com](mailto:design@tek.kingspan.com) (UK)).
- Kingspan TEK will confirm receipt of the drawings and allocate the project a project number.
- Kingspan TEK will issue a budget quotation normally within two weeks.
- Kingspan TEK 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 TEK.
- Kingspan TEK 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 with ourselves. However, if you wish to erect the system yourselves you can use a contractor that is registered to erect the System. Kingspan TEK will provide a list of CITB trained Registered Contractors which is available for down-load from our website.
- A **Kingspan TEK**® Building System representative will make periodic checks on your project to monitor the erection progress as required.

# Contact Details

## Customer Service

For quotations, order placement and details of despatches please contact our Customer Services Department on the numbers below:

UK – Telephone: +44 (0) 1544 387 308  
– Fax: +44 (0) 1544 387 477  
– email (quotations/enquiries): quotations@tek.kingspan.com

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

## Technical Advice/Design

Kingspan TEK support all of their products with a comprehensive Technical Advisory Service for specifiers, stockists and contractors.

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

We can also give general application advice and advice on design detailing and fixing etc. Site surveys are also undertaken as appropriate.

The **Kingspan TEK® Building System** incorporates a comprehensive Design Service. Give us your detailed architectural plans in hard copy or via email (see below) and we will engineer a **Kingspan TEK® Building System** scheme to match your design. This scheme lays out in detail the way in which the System's panels are to be joined on site to create your building. We will consult you on all aspects of design throughout this process.

Please contact our Technical Services Department on the numbers below:



UK – Telephone: +44 (0) 1544 387 304  
– Fax: +44 (0) 1544 387 477  
– email (technical advice): techline.uk@tek.kingspan.com  
– email (plans): design@tek.kingspan.com

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

## Literature and Samples

Kingspan TEK produces a comprehensive range of technical literature for specifiers and contractors. The literature contains clear 'user friendly' advice on typical design; design considerations; thermal properties; sitework and product data.

Kingspan TEK technical literature is an essential specification tool. For copies please contact our Marketing Department on the numbers below:

UK – Telephone: +44 (0) 1544 387 476  
– Fax: +44 (0) 1544 387 477  
– email: literature.uk@tek.kingspan.com

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

## General Enquiries

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

UK – Telephone: +44 (0) 870 850 8555  
– Fax: +44 (0) 870 850 8666  
– email: info.uk@tek.kingspan.com

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

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



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Part of the Kingspan Off-Site Division of companies

[www.tek.kingspan.com](http://www.tek.kingspan.com)