

BREEAM 2014 UK New Construction and UK Refurbishment and Fit-Out

WHAT CREDITS CAN THE KINGSPAN TEK® BUILDING SYSTEM
OF STRUCTURAL INSULATED PANELS ACHIEVE?



*Low Energy –
Low Carbon Buildings*

Introduction

BREEAM (the Building Research Establishment's Environmental Assessment Method) is the world's leading environmental assessment method for buildings.

Schemes applicable to the UK include BREEAM UK New Construction and BREEAM UK Non-Domestic Refurbishment and Fit-Out.

The BREEAM UK New Construction 2014 assessment covers the majority of non-domestic new builds including both commercial and public (non-housing) projects and can be used for fully fitted, shell only or shell and core only projects at the design and construction stages. Shell only or shell and core only projects can be 'topped up' by using the BREEAM 2014 UK Refurbishment and Fit-Out scheme.

The UK Non-Domestic Refurbishment and Fit-Out scheme is applicable to existing non-domestic buildings in the UK at the refurbishment and fit out stages. This scheme is split into four parts. The number of parts being assessed will be dependent on the scope of the project.

- Part One deals with the building fabric and structure (shell)
- Part Two is concerned with core services (e.g. centralised M&E plant)
- Part Three deals with local services
- Part Four with interior design

Other BREEAM schemes are available for domestic and non-UK buildings.

For the BREEAM UK New Construction Scheme, and UK Refurbishment and Fit-Out Schemes, credits are awarded in ten sections according to performance.

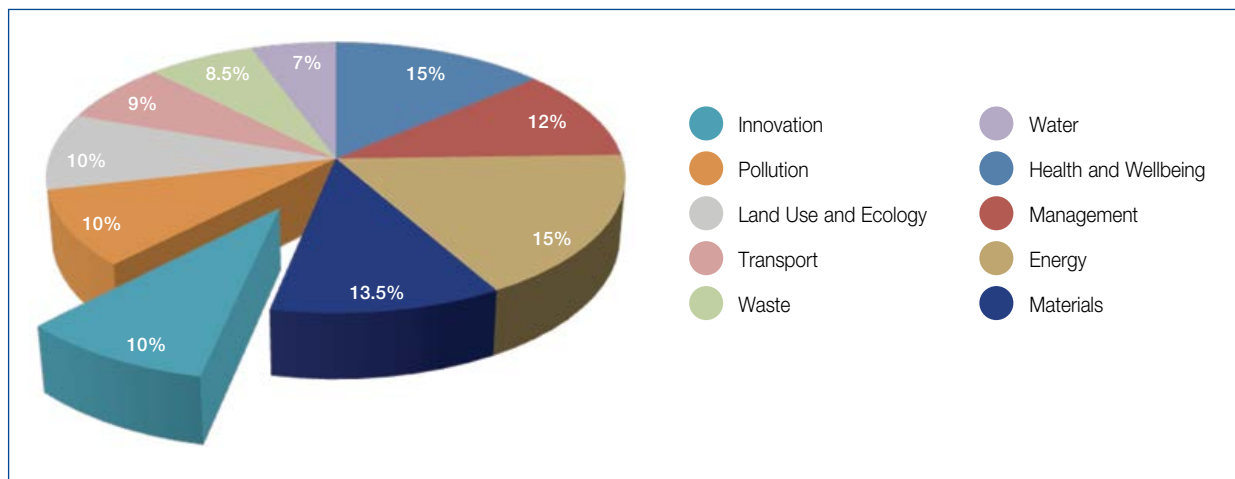
Each of the ten sections comprising BREEAM is divided into subsections. Each are given different weightings depending on the scope. The sections are shown below.

The section scores are then added together to produce a single overall score on a scale of Pass, Good, Very Good, Excellent or Outstanding.

BREEAM Sections

Management (Man 1 – Man 5)
Health and Wellbeing (Hea 1 – Hea 6)
Energy (Ene 1 – Ene 9)
Transport (Tra 1 – Tra 5)
Water (Wat 1 – Wat 4)
Materials (Mat 1 – Mat 6)
Waste (Wst 1 – Wst 6)
Land Use and Ecology (LE 1 – LE 5)
Pollution (Pol 1 – Pol 5)
Innovation (Inn 1) (additional)

Example BREEAM Section weighting for a fully fitted out, new construction project



This diagram shows the weighting for a new construction fully fitted out project. The percentages reflect the relative importance of the different sections. The weightings vary according to the type and scope of project and the applicable BREEAM scheme.

Credits directly related to thermal insulation products

Only two of these sections, energy and materials, offer credits related directly to thermal insulation products. The relevant subsections are Ene 1, Mat 1, Mat 3 and Mat 4.

Ene 1 - Reduction of Energy Use and Carbon Emissions

The aim of this section is to recognise and encourage buildings which are designed or refurbished to minimise operational energy demand, primary energy consumption and CO₂ emissions.

The number of credits achieved is determined by comparing the building's Energy Performance Ratio for New Construction (EPR_{NC}) or Non-Domestic Refurbishment (EPR_{NDR}) with a table of benchmarks and award the corresponding number of BREEAM credits.

When calculating the EPR_{NC} / EPR_{NDR}, there are three metrics of modelled building performance which are considered. These are:

1. the building's heating and cooling energy demand;
2. the building's primary energy consumption and
3. the total resulting CO₂ emissions.

Clearly, thermal insulation and air-tightness are amongst the most effective ways to reduce a building's operational energy demand, energy consumption and CO₂ emissions. Advanced thermal insulation and air-tightness are two of the main benefits of buildings constructed with structural insulated panels. These panels do not achieve any specific credits under this BREEAM subsection, but their use can contribute enormously to the achievement of a large number of credits.

Mat 1 - Life Cycle Impacts

The aim of this section is to recognise and encourage the use of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building. The impact is assessed for the building's major elements, (i.e. external walls, roof etc.).

For new constructions the number of credits available is based on the Green Guide rating(s) achieved for the specifications that make-up the main building elements.

Each element is awarded points according to its area weighted Green Guide rating. Credits are awarded on the basis of the total number of points achieved.

Where the total points achieved exceeds the level required for maximum credits, the building may be eligible for an additional innovation credit.

For refurbishment projects this can be assessed on project life cycle assessment, or elemental assessment of environmental performance information.

The first method measures the life cycle environmental impact of the refurbishment or fit-out works. Green Guide ratings can be used as a LCA tool to assess some elements. In the second method points are awarded for using products which have a third party certificated product declaration.

When a specific Environmental Product Declaration is available for a product which forms part of an element, this can potentially be used to uplift the element's BREEAM performance. This includes insulation used in wall, floor or roof elements.

The Green Guide assesses the environmental impacts of building elements assuming they contain a "generic average" insulation material and the environmental impacts of the "specific" insulation material are dealt with under Mat 4.

The exception to this rule is where the insulation provides a significant additional function or where the insulation is incorporated into the construction offsite e.g. in structural insulated panels. In this case a specific Green Guide rating is required for the building element of which the panels form the basis, with the environmental impacts of the "specific" insulation included in the assessment of the environmental impacts of the building element in question.

The environmental impact of structural insulated panels, like Kingspan TEK, is given consideration in this section as they can be assumed to achieve a rating of A+ for the purposes of Mat 4.

Using a product such as Kingspan TEK with a higher Green Guide rating will contribute to achieving credits in this area.

Refer to the end of this document for the generic BRE Green Guide ratings for Kingspan TEK Building System Panels.

Mat 3 - Responsible Sourcing of Materials

This aims to recognise the specification and procurement of responsibly sourced materials. Additionally, 100% of any timber must be legally sourced.

There are two different routes to demonstrating compliance for this section; either, or a combination of both, may be followed, depending on the amount of information available regarding quantities of materials used and their associated supply chains. The two routes follow similar methodologies but the second route allows for a more detailed calculation, usually resulting in a higher score.

Points are awarded for the use of materials, including insulation, which are covered by a Responsible Sourcing Certification Scheme certificate. This is converted into a percentage of maximum points available which is used to allocate the number of credits gained in this section.

The type of structural insulated panels manufactured by Kingspan Insulation requires a certified environmental management system for their manufacturing process and supply chains. All Kingspan TEK panels manufactured at the Sherburn-in-Elmet manufacturing facility are certified to BES 6001 'Very Good'.

All Kingspan TEK panels produced at Kingspan Insulation's Sherburn-in-Elmet manufacturing site are manufactured under a management system certified to ISO 14001: 2004.

The principle polymer component of these products is also manufactured under a management system certified to ISO 14001: 2004.

Thus the insulation at the core of the panels has the potential to achieve credits for responsible sourcing under Mat 3.

It should be noted that Kingspan Insulation manufactures and supplies **Kingspan TEK®** panels for use in the **Kingspan TEK® Building System** and the information below only related to the **Kingspan TEK®** panels.

The **Kingspan TEK® Building System** has high performance fibre-free rigid urethane insulation at its core but it also uses a large number of other components e.g. timber, engineered timber beams and joists, joist hangers, fixings, sealants etc. These other components are sourced and provided by the **Kingspan TEK®** Delivery Partner or its contractor. Kingspan Insulation can not provide certification for these other components and this must be sought from the **Kingspan TEK® Delivery Partner** or its contractor.

Kingspan Insulation's manufacturing facility, at which **Kingspan TEK®** is produced, carries FSC® (FSC®-C109304) and PEFC Chain of Custody certification. As standard, the OSB facing of **Kingspan TEK®** panels is PEFC certified. This certification verifies that, the OSB facing of **Kingspan TEK®** panels is legally sourced from well managed forests. Thus the OSB content of the product has the potential to achieve credits for responsible sourcing under Mat 3. FSC certified OSB facer is available on request.

Where timber or timber-based materials become a permanent part of a product, BREEAM only requires Chain of Custody certification up to and including the manufacturing process during which they become permanently incorporated. Thus for the **Kingspan TEK® Building System**, Kingspan Insulation's own Chain of Custody certification will satisfy the requirements for achievement of these BREEAM credits.

However, if any additional timber elements are added to the panel by a **Kingspan TEK®** Delivery Partner, the Delivery Partner must also have Chain of Custody certification for these timber elements in order to gain credits under Mat 3.

NB Please confirm the above information at the point of need by contacting Kingspan Insulation's Technical Service Department (see rear cover), from which copies of Kingspan Insulation and its supplier's ISO 14001 and Kingspan Insulation's FSC® and PEFC Chain of Custody certificates can be obtained.

In the case of OSB, only the Tier level 3 and 6 timber certification routes allow credits. Hence the OSB must be Chain of Custody (CoC) certified by FSC®, CSA, SFI, PEFC or MTCC, or comply with the requirements of SGS's TLTV or Rainforest Alliance's VLO/VLC schemes.

Mat 4 - Insulation

Mat 4 has one credit relevant to structural insulated panels: to recognise and encourage the use of thermal insulation which has a low embodied environmental impact relative to its thermal properties and has been responsibly sourced.

The credit is available for the area and thermal resistance (R-value) weighted average of the Green Guide ratings of the insulation products used in a building's roofs, external walls, ground floors and services.

For each type of thermal insulation, an area and thermal resistance weighting is calculated by the formula:

$$\begin{aligned} \text{weighting} &= \text{area of insulation (m}^2\text{)} \times \text{thermal} \\ &\quad \text{resistance (m}^2\text{·K/W)} \\ &= \frac{\text{area of insulation (m}^2\text{)} \times \text{thickness (m)}}{\text{thermal conductivity (W/m·K)}} \end{aligned}$$

The weighting for each insulation material is then multiplied by the relevant point(s) from the following table:

The weighting for each insulation material is then multiplied by the relevant point(s) from the following table:

Green Guide Rating	Points
A+	3
A	2
B	1
C	0.5
D	0.25
E	0

An Insulation Index is then calculated by dividing the sum of these values by the sum of the weightings. Where the Insulation Index for the building insulation is the same as or greater than 2, the credit is awarded. An Insulation Index of 2 or greater means that the weighted average Green Guide rating of the insulation is an A or A+.

The insulation content of structural insulated panels is assumed to have a Green Guide rating of A+ for the purposes of Mat 4 as its environmental impacts are taken account of under Mat 1.

Other Credits

There are a number of other credits available which the use of Kingspan Insulation products may contribute to, although these credits are not directly achievable from the use of Kingspan Insulation products. This may include (but not be limited to) the following:

Management 03

One credit in this section covers monitoring transport of construction materials from the factory gate to the construction site and waste from the site to disposal / recovery centre. Part of Kingspan Insulation's sustainability work includes increasing the fuel efficiency of the transport fleet and information can be provided on the transport of the insulation.

Energy 04

This section offers credits for low carbon design. Projects which use passive design measures can gain credits in this section and the analysis should include the building fabric and thermal mass of the building. Thermal insulation could be one such measure to reduce the heating load of the building and therefore reduce the energy consumption and assist in gaining credits in this section.

Material 06

One credit is available for recognising and encouraging measures which promote material efficiency. The aim of this credit is to encourage discussion with the supply chain, in order to ensure the best / most appropriate products are put forward, saving energy, waste etc. Kingspan Insulation's Technical Service Department (see rear cover) can provide advice regarding appropriate insulation products.

Waste 01

Credits are available for the proportion of construction waste which is diverted from landfill. *Kingspan TEK*[®] panels are factory manufactured which means there is minimal waste during manufacture and installation.

Also in this section, credits are awarded for the use of a resource management plan, which promotes resource efficiency. Services provided by Kingspan Insulation for particular applications can help in reducing the amount of on-site waste.

Health and Wellbeing 04

Up to 3 credits are available for ensuring that appropriate thermal comfort levels are achieved through design. Although insulation is not specifically mentioned in this section, its use could contribute significantly to achieving appropriate thermal comfort levels and may help achieve passive solutions.

Generic Green Guide Ratings - Relevant to Mat 1

The table below details elements constructed using the *Kingspan TEK® Building System* in a 142 mm thickness, the element numbers for the corresponding generic elements described in the BRE Global Green Guide, and the Summary Ratings that these generic elements achieve.

Details of all generic 2008 BRE Green Guide Summary Ratings are published on BRE's Green Guide website. Go to www.bre.co.uk/greenguide click on 'Login/Register for Ratings', log in, and you will find the generic SIP constructions below in the external wall and roofs sections.

2008 BRE Green Guide Summary Ratings, for walls and roofs constructed using generic *Kingspan TEK®-type* SIPs, as a result of the comparatively low environmental impact of the SIPs, are

heavily influenced by the external cladding specification.

Wall and roof elements, constructed using *Kingspan TEK®* correspond to generic elements, described in the 2008 BRE Global Green Guide, which achieve Summary Ratings of A+ or A, as shown in the table below.

NB The environmental impact of the insulation core of *Kingspan TEK®-type* SIPs is incorporated into the generic elemental Green Guide Summary Ratings of the walls and roofs of which the panels form the basis, because it provides a significant structural function. Therefore, the Green Guide Summary Rating of the insulation core of *Kingspan TEK®-type* SIPs can be taken as being A+ for the purposes of BREEM section Mat 4.

Generic 2008 Green Guide Summary Ratings for Various Building Elements Based on *Kingspan TEK®* Building System Panels in a 142 mm thickness

External Wall Elements	Corresponding Ecopoint Score	Corresponding Element No.	Corresponding 2008 Green Guide Summary Rating
Brickwork, cement mortar, breather membrane, <i>Kingspan TEK®</i> Building System panels, plasterboard on battens, paint	0.42	1106164006	A+
Pre-treated softwood weatherboarding on timber battens, breather membrane, <i>Kingspan TEK®</i> Building System panels plasterboard on battens, paint	0.25	1106164004	A+
Canadian cedar cladding, breather membrane, <i>Kingspan TEK®</i> Building System panels, plasterboard on battens, paint	0.25	1106164003	A+
Clay tiles on timber battens, breather membrane, <i>Kingspan TEK®</i> Building System panels, plasterboard on battens, paint	0.54	1106164002	A
Concrete tiles on timber battens, breather membrane, <i>Kingspan TEK®</i> Building System panels, plasterboard on battens, paint	0.41	1106164001	A+
Polymeric render on cement bonded particle-board on timber battens, breather membrane, <i>Kingspan TEK®</i> Building System panels, plasterboard on battens, paint	0.41	1106164005	A+
Pitched Roof Elements			
<i>Kingspan TEK®</i> Building System panels, breather membrane, counterbattens, battens and concrete interlocking tiles	0.44	1112690005	A+
<i>Kingspan TEK®</i> Building System panels, breather membrane, counterbattens, battens and UK produced fibre cement slates	0.58	1112690004	B
<i>Kingspan TEK®</i> Building System panels, breather membrane, counterbattens, battens and resin bonded slates	0.76	1112690003	A
<i>Kingspan TEK®</i> Building System panels, breather membrane, counterbattens, battens and UK produced slates	0.67	1112690002	A
<i>Kingspan TEK®</i> Building System panels, breather membrane, counterbattens and UK produced clay plain tiles	0.58	1112690001	A

Contact Details

Customer Service

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

UK – Tel: +44 (0) 1544 388 601
– Fax: +44 (0) 1544 388 888
– email: customerservice@kingspantek.co.uk

Literature & Samples

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

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

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

UK – Tel: +44 (0) 1544 387 384
– Fax: +44 (0) 1544 387 484
– email: literature@kingspantek.co.uk
– www.kingspantek.co.uk/literature

Technical Advice

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

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

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

The Kingspan Insulation British Technical Service Department operates under a management system certified to the BBA Scheme for Assessing the Competency of Persons to Undertake U-value and Condensation Risk Calculations.



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

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

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



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