



**TECHNICAL  
BULLETIN**

## BREEAM 2011

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



*Low Energy –  
Low Carbon Buildings*

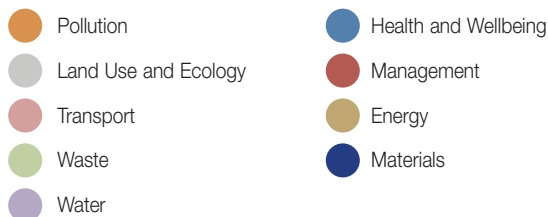
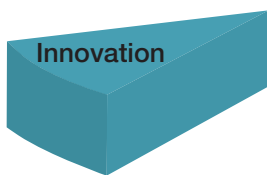
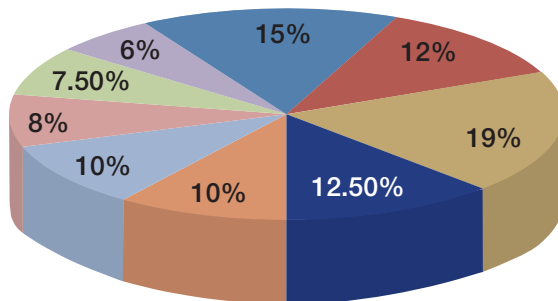
# BREEAM 2011

## Introduction

BREEAM (the Building Research Establishment's Environmental Assessment Method) is the world's leading and most widely used environmental assessment method for non-residential buildings. Credits are awarded in ten sections according to performance. These credits are then added together to produce a single overall score on a scale of Pass, Good, Very Good, Excellent or Outstanding. The current version of BREEAM for new construction works is BREEAM 2011 New Construction.

The process of determining a BREEAM rating is outlined below.

1. For each BREEAM section a number of credits are awarded.
2. The percentage of the total number of credits available in each BREEAM section that have been awarded is calculated.
3. The percentage of total credits awarded is then multiplied by the corresponding BREEAM section weighting to give a section score. The diagram below shows the section weightings for BREEAM. The percentages reflect the relative importance of the different sections.



4. The section scores are then added together to give the overall BREEAM score.
5. The relevant BREEAM rating (i.e. Pass, Good, Very Good, Excellent or Outstanding) is achieved based on the overall BREEAM score.

Each of the nine sections of which BREEAM comprises is broken up into subsections and these are shown below:

- management (Man 1 – Man 5);
- health & wellbeing (Hea 1 – Hea 6);
- energy (Ene 1 – Ene 9);
- transport (Tra 1 – Tra 5);
- water (Wat 1 – Wat 4);
- materials (Mat 1 – Mat 5);
- waste (Wst 1 – Wst 4);
- land use & ecology (LE 1 – LE 5);
- pollution (Pol 1 - Pol 5); and

Furthermore, ten additional credits are available for:

- Innovation (Inn 1).

**Only two of these sections, energy and materials, offer credits related directly to structural insulated panels. The relevant subsections are Ene 1, Mat 1, Mat 3 and Mat 4.**

## Ene 1 - Reduction of CO<sub>2</sub> Emissions

Up to 15 credits are available for a building's operational energy demand, energy consumption and CO<sub>2</sub> emissions. The number of credits achieved is determined by comparing the building's Energy Performance Ratio for New Construction (EPR<sub>NC</sub>) with the table of benchmarks below:

BREEAM Credits	EPR <sub>NC</sub>	Minimum Requirements
1	0.05	Requires a performance improvement
2	0.15	progressively better than the Target
3	0.25	Emission Rate (TER) required for Building
4	0.35	Regulations approval.
5	0.45	
6	0.55	BREEAM Excellent level (≥6 credits):
7	0.59	Requires a CO <sub>2</sub> parameter for the EPRNC
8	0.63	calculation of 0.22. This is equivalent to a
9	0.67	25% improvement on the TER
10	0.72	BREEAM Outstanding level (≥10 credits):
11	0.75	Requires a CO <sub>2</sub> parameter for the EPRNC
12	0.79	calculation of 0.30. This is equivalent to a
13	0.83	40% improvement on the TER
14	0.87	
15	0.90	Requires a CO <sub>2</sub> parameter for the EPRNC
		calculation of 0.38. This is equivalent to a
		100% improvement on the TER i.e. zero net
		CO <sub>2</sub> emissions.

**Clearly, thermal insulation and air-tightness are amongst the most effective ways to reduce a building's operational energy demand, energy consumption and CO<sub>2</sub> 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

Up to six credits are available, based on the Green Guide ratings of a building's major elements i.e. external walls, windows, roof, upper floor slabs, internal walls, and floor finishes / coverings. Not all of these elements are assessed for all building types. The number of elements assessed differs by building type. One credit is available for each element assessed. The process for calculating the number of credits awarded can be summarised as follows. Each element is awarded points according to its area weighted Green Guide rating as shown in the table below.

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

The total number of points for all elements is converted in to BREEAM credits as in the table below.

Total Points	Credits
2	1
4	1 (nb 'Industrial' = 2)
5	2
8	3
10	4
12	5
14	6

The number of elements assessed, for which points are available, and the maximum number of credits, differs by building type. So, for instance, in Healthcare buildings 6 elements are assessed, and so 18 points in total are available with a maximum of 6 credits. In Prisons 4 elements are assessed, and so 12 points in total are available with a maximum of 4 credits. Surplus credits can be covered into Innovation credits.

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 "specific" insulation is then assumed to have a Green Guide rating of A+ for the purposes of Mat 4.**

# BREEAM 2011

## Mat 3 - Responsible Sourcing of Materials

Up to 3 credits are available where evidence provided demonstrates that materials in the following building elements are responsibly sourced:

- structural frame;
- ground & upper floors (including separating floors);
- roof;
- external & internal walls;
- foundation / substructure;
- staircase, windows, doors; and
- hard landscaping

Additionally 100% of any timber must be legally sourced.

The assessed materials are: bricks & clay tiles; pavers; resin-based composites & materials; concrete and cement based materials; glass; plastics and rubbers; metals; dressed or building stone & gravel; timber and wood panel products; plasterboard and plaster; bituminous materials; other mineral-based materials including fibre cement and calcium silicate; and products with recycled content.

Insulation materials, fixings, adhesives and additives are excluded from the assessment.

To be responsibly sourced these materials must be certified in accordance with the relevant tier level described in the table below:

Tier level	Points available per element	Examples of compliant certification schemes
1	4.0	There are currently no schemes allocated to this tier
2	3.5	BES 6001 - certified "excellent"
3	3.0	BES 6001 - certified "very good" Timber: CSA, FSC®, PEFC or SFI CoC certification Reused materials
4	2.5	BES 6001 - certified "good"
5	2.0	BES 6001 - certified "pass"
6	1.5	Recycled Materials with certified EMS for the Key Process Timber: MTCC CoC certification, SGS (TLTV) or Rainforest Alliance (VLO/VLC) Certified EMS for the Key Process and Supply Chain.
7	1.0	Certified EMS for the Key Process Green Dragon Environmental Standard - Level 4 or above

80% by volume of the materials that make up each element must be in Tiers 1-7. Of the materials that make up this 80%, the volume weighted average Tier level points score is calculated for each element. These are added up for all elements and the total point score is expressed as a % of the maximum available points (4 per element). Credits are awarded as shown in the table below.

Credits	% of available points
3	54%
2	36%
1	18%

The FSC® and PEFC certification schemes require that at least 70% of the certified product comprises FSC® or PEFC certified (respectively) or recycled timber. It is, however, possible to certify a product at a certified percentage of 70%, 100%, or anywhere between.

BRE has clarified that all products certified by FSC® and PEFC, regardless of %, are deemed by BREEAM as responsibly sourced at Tier level 3. Furthermore, BRE has clarified that 100% of the products is deemed responsibly sourced, regardless of the certified percentage.

BRE has further clarified that where timber or timber-based materials become a permanent part of a product, Chain of Custody is only required up to and including the manufacturing process during which they become permanently incorporated.

**For the type of structural insulated panels manufactured by Kingspan Insulation, only the OSB facing materials are assessed under this credit. The insulation core of the panels is dealt with under Mat 4. 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 affords two credits 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.

### First Credit – Embodied Impact

One 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:

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

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

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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.**

### Second Credit – Responsible Sourcing

The second credit is available if the insulation products used in a building's roofs, external walls, ground floors and services are responsibly sourced.

At least 80% by volume of the thermal insulation used in these building elements must be certified in accordance with tier levels 1 to 6 described in the table shown under section Mat 3.

For thermal insulation, a certified environmental management system for their manufacturing processes and their supply chains, is required in all tier levels.

**For the type of thermal insulation that comprises the core of the structural insulated panels manufactured by Kingspan Insulation, this requires that the panels are certified to BES 6001, or that there is a certified environmental management system for its manufacturing process and its supply chain. The part of the supply chain identified as requiring a certified environmental management system is the manufacturing process of their principle polymer components of the insulation.**

# Kingspan TEK® Building System Panels

## Generic Green Guide Ratings - Relevant to Mat 1 & 4

The table below details elements constructed using the *Kingspan TEK® Building System*, 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](http://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 the *Kingspan TEK® Building System*, 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 BREEAM section Mat 4.

### Generic 2008 Green Guide Summary Ratings for Various Building Elements Based on *Kingspan TEK®* Building System Panels

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

## Responsible Sourcing - Relevant to Mat 3 & 4

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

The **Kingspan TEK® Building System** has **Kingspan TEK® Building System** panels 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® Building System** panels are produced, carries FSC® and PEFC Chain of Custody certification. As standard, the OSB facing of **Kingspan TEK® Building System** panels is PEFC certified at 70%. This certification verifies that, a minimum of 70% of the OSB facing of **Kingspan TEK® Building System** panels has Chain of Custody and is legally sourced. Thus the OSB content of the product has the potential to achieve credits for responsible sourcing under Mat 3.



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 **Kingspan TEK® Building System** panels, 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 your **Kingspan TEK® Delivery Partner**, it must also have Chain of Custody certification for these timber elements in order to gain credits under Mat 3.

**Kingspan TEK® Building System** panels are manufactured under a management system certified to BS EN ISO 14001: 2004. The principle polymer component of the product is also manufactured under a management system certified to EN ISO 14001: 2004. Thus the insulation at the core of these panels has the potential to achieve maximum credits for responsible sourcing under Mat 4.

*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 along with confirmation of the Green Guide ratings of building elements comprising **Kingspan TEK® Building System** panels.*

# 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

Ireland – Tel: +353 (0) 42 979 5000  
– Fax: +353 (0) 42 975 4299  
– email: info@kingspantek.ie

## 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

Ireland – Tel: +353 (0) 42 979 5000  
– Fax: +353 (0) 42 975 4299  
– email: info@kingspantek.ie  
– www.kingspantek.ie/literature

## Technical Advice

The Kingspan **TEK**® Technical Services Department offers free advice regarding the performance of the Kingspan **TEK**® Building System.

The services offered include: calculation of U-values\*; analysis of condensation risk\*\*; calculation of SAP Ratings / provision of Energy Performance Certificates (EPCs) in the UK; and calculation of DEAP Ratings / provision of Building Energy Rating (BER) Certificates in the Republic of Ireland.

The department can also offer advice on: design detailing; fixing; ventilation; heating systems; BREEAM ratings; and Code for Sustainable Homes ratings.

\* Calculations performed to BS / I.S. EN ISO 6946: 2007 (Building components and building elements. Thermal resistance and thermal transmittance. Calculation method) and using the conventions set out in BR443 (Conventions for U-value calculations).

\*\* Calculations performed to BS 5250: 2002 (Code of practice for control of condensation in buildings).

Please contact the Kingspan **TEK**® Technical Service Department on the numbers below:

UK – Tel: +44 (0) 1544 387 382  
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## General Enquiries

For all other enquiries contact Kingspan on the numbers below:

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Ireland – Tel: +353 (0) 42 979 5000  
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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 UK Timber Frame Association (UKTFA)



# Kingspan®

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