

Code for Sustainable Homes 2010

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



*Low Energy -
Low Carbon Buildings*

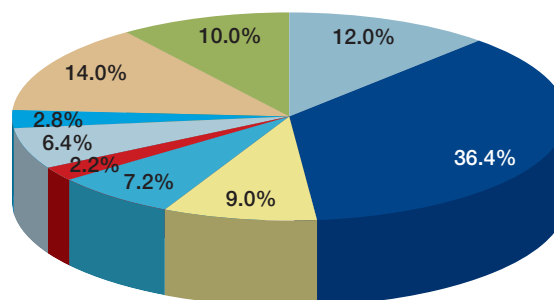
Introduction

The Code for Sustainable Homes (the Code) is an environmental assessment method for rating and certifying the performance of new homes. It is designed to encourage continuous improvement in home building. Credits are awarded in nine sections according to performance. These credits are then added together to produce a single overall rating on a scale of Level 1 to Level 6. The way to reach various Levels of the Code has been kept flexible to enable credits to be gained using different approaches to house design. However, certain minimum standards have been set at each Level in some sections, such as CO₂ emissions and water use. The current version of the Code was issued in November 2010.

The process of determining a Code rating is outlined below.

1. Check that the three universal non-creditable mandatory standards have been achieved i.e. in the areas of:
 - environmental impacts of materials;
 - management of surface water run-off from developments;
 - storage of non-recyclable waste and recyclable household waste; and
2. If any of the three universal non-creditable mandatory standards are not met, then a zero rating will result, regardless of the credits achieved.
3. The mandatory Lifetime Homes (non-creditable) requirement for Code Level 6 should be checked if Level 6 is sought.
4. The mandatory levels of CO₂ emissions (creditable) and internal water use (creditable) for the Code Level sought should be checked.
5. If all the non-creditable mandatory standards are met, but one or other of the creditable mandatory issues fails to reach the minimum for the Code Level sought, the rating achieved will be capped at the lowest level which all the mandatory issues meet. The rating is also dependent on the number of credits achieved using the process detailed as follows.
6. For each Code section a number of credits are awarded.
7. The percentage of the total number of credits available in each Code section that have been awarded is calculated.

8. The percentage of total credits awarded is then multiplied by the corresponding Code section weighting to give a section score. The diagram below shows the section weightings for the Code. The percentages reflect the relative importance of the different sections.



9. The section scores are then added together to give the overall Code score.
10. The relevant Code rating (i.e. Level 1 to Level 6) is achieved based on the overall Code score, subject to the cap detailed in point 5. A Code score of 36 is required for Level 1 and 90 for Level 6.

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

- energy and CO₂ emissions (Ene 1 – Ene 9);
- water (Wat 1 – Wat 2);
- materials (Mat 1 – Mat 3);
- surface water run-off (Sur 1 – Sur 2);
- waste (Was 1 – Was 3);
- pollution (Pol 1 – Pol 2);
- health and wellbeing (Hea 1 – Hea 4);
- management (Man 1 – Man 4); and
- ecology (Eco 1 – Eco 5).

Only three of these sections, energy and CO₂ emissions, materials and pollution, offer credits related directly to structural insulated panels. The relevant subsections are Ene 1, Ene 2, Mat 1, Mat 2 and Pol 1.

Ene 1 - Dwelling Emissions Rate

Up to 10 credits are available for a dwelling's operational CO₂ emissions. The number of credits achieved is determined by comparing the dwelling's Dwelling Emission Rate (DER) with its Target Emission Rate (TER). Credits are awarded based on the percentage improvement in DER over TER as detailed in the table below.

% Improvement of DER over TER*	Credits	Mandatory Levels
≥8%	1	Level 1
≥16%	2	
≥25%	3	Level 4
≥36%	4	
≥47%	5	
≥59%	6	
≥72%	7	
≥85%	8	
≥100%	9	Level 5
'Zero Carbon Home'	10	Level 6

* Performance requirements are equivalent to those in previous Code scheme versions, but are now measured using the ADL1A 2010 TER as the baseline.

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

Ene 2 - Fabric Energy Efficiency

Up to 9 credits are available based on the Fabric Energy Efficiency (FEE) of a dwelling (kW.h/m²/year). The FEE is calculated in SAP and shown in DER worksheet outputs. The number of credits achieved is determined by the level of FEE as detailed in the table below.

Fabric Energy Efficiency (kW.h/m ² /year) for Dwelling Type* Specified		Credits	Mandatory Levels
Apartment Blocks, Mid Terrace	End Terrace, Semi-Detached & Detached		
≤48	≤60	3	
≤45	≤55	4	
≤43	≤52	5	
≤41	≤49	6	
≤39	≤46	7	Levels 5 & 6
≤35	≤42	8	
≤32	≤38	9	

* The dwelling type must be defined according to the guidance at www.zerocarbonhub.org

Clearly, thermal insulation and air-tightness are amongst the most effective ways to improve a dwelling's Fabric Energy Efficiency. Advanced thermal insulation and air-tightness are two of the main benefits of dwelling constructed with structural insulated panels. These panels do not achieve any specific credits under this Code subsection, but their use can contribute enormously to the achievement of the available credits.

Mat 1 - Environmental Impact of Materials

Up to 15 credits are available, based on the Green Guide ratings of a building's major elements i.e. external walls, windows, roof, upper and ground floors (including separating floors) and internal walls (including separating walls). Each element is awarded points according to its Green Guide rating as shown in the table below.

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

There is a mandatory requirement with no available credits to achieve a Green Guide rating of between A+ and D for at least three of the major elements of the building envelope as described above.

The Green Guide assesses the environmental impacts of building elements assuming they contain a "generic average" insulation material.

The exception to this rule is where the insulation provides a significant additional function or where the insulation is incorporated into the construction off site 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.

However, where an HFC-blown insulation material is used, its non HFC-blown equivalent is assessed within the element to prevent double counting, as the HFC blowing agent will be penalised under Pol 1.

Mat 2 - Responsible Sourcing of Materials - Basic Building Elements

Up to 6 credits are available where evidence provided demonstrates that at least 80% by volume of the assessed materials in the following building elements are responsibly sourced:

- frame;
- ground & upper floors (including separating floors);
- roof;
- external & internal walls (including separating walls);
- foundation / substructure (excluding sub-base materials); and
- staircase.

Additionally 100% of any timber must be legally sourced.

The assessed materials are: bricks & clay tiles; resin-based composites & materials; concrete and cement based materials; glass; plastics and rubbers; metals; dressed or building stone & slate; 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	3	FSC, CSA, SFI with CoC, PEFC, Schemes compliant with BES 6001 2008 (or similar) Excellent or Very Good performance ratings
2a	2.5	Schemes compliant with BES 6001 2008 (or similar) Good performance rating
2b	2	Schemes compliant with BES 6001 2008 (or similar) Pass performance rating
3	1.5	Timber: MTCC, Verified, SGS, TFT Other materials: Certified EMS for the key Process and Supply Chain Recycled Materials with certified EMS for the Key Process
4	1	Certified EMS for key process stage

For the type of structural insulated panels manufactured by Kingspan Insulation, only the OSB facing materials are assessed under this credit. In the case of OSB, only the Tier level 1 and 3 timber certification routes allow credits. Hence the OSB must be certified by FSC, CSA, SFI with CoC, PEFC, MTCC, Verified, SGS or TFT.

For thermal insulation, Mat 2 is not relevant. Responsible sourcing of thermal insulation is not considered by the Code.

Pol 1 - Global Warming Potential (GWP) of Insulants

1 credit is available where all insulating materials in the building elements listed below only use blowing agents that have a GWP < 5 in manufacture and installation:

- roofs: including loft access
- walls: internal and external including lintels and all acoustic insulation
- floors: including ground and upper floors
- hot water cylinder: pipe insulation and other thermal stores
- cold water storage tanks: where provided
- external doors

The blowing agents listed below are deemed by the Code to satisfy this credit since their GWP is known to be sufficiently low to justify this. All are currently believed to have a GWP of less than 5.

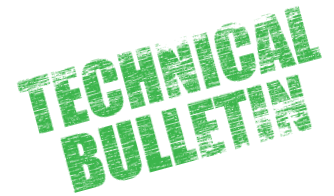
- carbon dioxide (CO₂);
- pentane (iso-pentane, cyclopentane, n-pentane); and
- isobutene.

The Code does not claim that pentane has a GWP of zero. The GWP for pentane has proved impossible to calculate to date, but is very likely to be small and therefore the Code assumes that it has a GWP of < 5.

Where any insulation material contains substances which are controlled under the Montreal Protocol (e.g. CFCs and HCFCs) or where the release of such substances forms a significant part of the manufacturing process, this credit is withheld. Such substances are prohibited within the EU and only products manufactured outside the EU are at risk of containing them.

For thermal insulation, the nature of any blowing agents used in the manufacture of those products will determine whether or not Pol 1 credits are achieved.

Kingspan TEK® Building System Panels



Green Guide Ratings - Relevant to Mat 1

Ecoprofiles, certified by BRE Certification to the 2008 BRE Environmental Profiles Methodology, have been created for building elements of which *Kingspan TEK® Building System* panels form the basis.

Details of all BRE Green Guide 2008 Summary Ratings are published in BRE's Green Book Live website. Go to www.greenbooklive.com/search/search.jsp?partid=10000 and search on the product "TEK". Click on the appropriate Appendix No. and a copy of the relevant certificate will be displayed.

The 2008 BRE Green Guide Summary Ratings for walls and roofs constructed using *Kingspan TEK® Building System* panels, as a result of the comparatively low environmental impact of the panels, are heavily influenced by the external cladding specification. Wall and roof elements of which the panels form the basis, typically achieve A+ or A Summary Ratings as shown in the table below.

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

External Wall Elements	Ecopoint Score	Element No.	Certificate Appendix No.	2008 Green Guide Summary Rating
Brickwork, cement mortar, breather membrane, <i>Kingspan TEK® Building System</i> panels, plasterboard on battens, paint	0.42	806190057	330a	A+
Pre-treated softwood weatherboarding on timber battens, breather membrane, <i>Kingspan TEK® Building System</i> panels, plasterboard on battens, paint	0.25	806210063	330b	A+
Canadian cedar cladding, breather membrane, <i>Kingspan TEK® Building System</i> panels, plasterboard on battens, paint	0.25	806210064	330c	A+
Clay tiles on timber battens, breather membrane, <i>Kingspan TEK® Building System</i> panels, plasterboard on battens, paint	0.54	806210065	330d	A
Concrete tiles on timber battens, breather membrane, <i>Kingspan TEK® Building System</i> panels, plasterboard on battens, paint	0.41	806210066	330e	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	806210062	330k	A+
Pitched Roof Elements				
<i>Kingspan TEK® Building System</i> panels, breather membrane, counterbattens, battens and concrete interlocking tiles	0.44	812411073	330f	A+
<i>Kingspan TEK® Building System</i> panels, breather membrane, counterbattens, battens and UK produced fibre cement slates	0.58	812411074	330g	A
<i>Kingspan TEK® Building System</i> panels, breather membrane, counterbattens, battens and resin bonded slates	0.76	812411075	330h	A
<i>Kingspan TEK® Building System</i> panels, breather membrane, counterbattens, battens and UK produced slates	0.67	812411076	330i	A
<i>Kingspan TEK® Building System</i> panels, breather membrane, counterbattens and UK produced clay plain tiles	0.58	812411077	330j	A



Environmental Profiles Scheme
Certification Number ENP 330

Responsible Sourcing - Relevant to Mat 2

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 TEK® Building System panels carry PEFC Chain of Custody certification in accordance with TÜV NORD CERT auditing and certification procedures and are subject to regular surveillance audits. This certification verifies that the timber content of the panels has chain of custody and is legally sourced. Thus the OSB content of the panels has the potential to achieve maximum credits for responsible sourcing under Mat 2. However, in order to realise this potential, your Kingspan TEK® Delivery Partner must also have Chain of Custody certification.



Project - Mayfield Road, Huntingdon

Client - Wherry Housing Association

Kingspan TEK® Delivery Partner - Kingspan Potton

The Kingspan TEK® Building System played a key role in meeting the challenge to construct the UK's biggest Code Level 5 development to date.

Blowing Agents - Relevant to Pol 1

Kingspan TEK® Building System panels are manufactured with blowing agents that are deemed by the Code to have a GWP < 5.

They also contain no substances which are controlled under the Montreal Protocol. They are manufactured with blowing agents that have zero Ozone Depletion Potential (ODP).

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's PEFC Chain of Custody certificate can be obtained along with confirmation of the Green Guide ratings of building elements comprising Kingspan TEK® Building System panels.

Examples of How a Code Rating is Achieved

In order for a house design to achieve Level 4 its CO₂ emissions must be 25% lower than a home built to the standard set in the 2010 Edition of Approved Document L1A to the Building Regulations. It must also be designed to use no more than around 105 litres of water per person per day. Storage of non-recyclable waste and surface water management must also be taken account of and at least three of the major elements of the building envelope must achieve a Green Guide rating of between A+ and D.

While these criteria are compulsory in order to reach Level 4, they only deliver a score of 6 in total, which means that the house design must make up the difference of 62 to reach the required score of 68. House builders and designers can achieve this in a number of ways such as improving the CO₂ emissions rate, improving the Fabric Energy Efficiency, using building elements with Green Guide ratings of A+ or A for which the components have been responsibly sourced or using an insulant with a Global Warming Potential of <5.

When it comes to achieving Level 5, a house design's CO₂ emissions must be 100% lower than a home built to the standard set in the 2010 Edition of Approved Document L1A to the Building Regulations. It must also be designed to use no more than 80 litres of water per person per day. The house would be expected to deliver similar levels of non-recyclable waste storage, surface water management, site waste management and building element Green Guide ratings as the Level 4 house.

Again, as with the Level 4 house, these measures only achieve a proportion of the required score to reach Level 5, just 14 of a total of 84. Therefore, the house design must again include a range of additional design features to improve its performance.

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
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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
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– email: info.ie@tek.kingspan.com
– www.tek.kingspan.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:

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