



Code for Sustainable Homes 2010

WHAT CREDITS CAN KINGSPAN KOOLTHERM[®], THERMA[™]
& STYROZONE[®] PRODUCTS ACHIEVE?



Low Energy –
Low Carbon Buildings

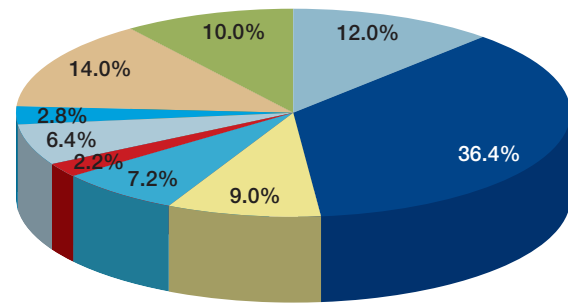
Code for Sustainable Homes 2010

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, with an addendum published in May 2014 to bring the Code into line with recent regulatory and national guidance.

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 following diagram 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 two of these sections, energy and CO₂ emissions and pollution, offer credits related directly to thermal insulation products. The relevant subsections are Ene 1, Ene 2 and Pol 1. Despite first appearances, the materials section, and in particular Mat 1 and Mat 2, do not offer credits for thermal insulation products unless they are incorporated into a structural system off site.

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 Requirement for:
≥6%	1	
≥12%	2	
≥19%	3	Level 4
≥32%	4	
≥44%	5	
≥56%	6	
≥70%	7	
≥84%	8	
≥100%	9	Level 5
Zero Net CO ₂ Emissions	10	Level 6

* Performance requirements are equivalent to those in previous Code scheme versions, but are now measured using the ADL1A 2013 England TER as the baseline.

Clearly, thermal insulation is one of the most effective ways to reduce a dwelling's operational CO₂ emissions. Insulation does not achieve any specific credits under this Code subsection, but its 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 Requirement for:
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 is one of the most effective ways to improve a dwelling's FEE. Insulation does not achieve any specific credits under this Code subsection, but its use can contribute enormously to the achievement of the available credits.

Code for Sustainable Homes 2010

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, except 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.

Where the insulation provides a significant additional function or where the insulation is incorporated into the construction off site, the "specific" insulation is listed in the building element description and its environmental impacts are 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.

For thermal insulation, Mat 1 is therefore only relevant if the thermal insulation is incorporated into a system and in this case a specific Green Guide rating will be required for the building element of which that system forms the basis.

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 each of 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 tier levels 1 to 4 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
4	1	with certified EMS for the Key Process Certified EMS for key process stage

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 the Code as responsibly sourced at Tier level 1. 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 thermal insulation, Mat 2 is not relevant. Responsible sourcing of thermal insulation is not considered by the Code. For the type of insulation products manufactured by Kingspan Insulation, only thick facing materials e.g. plywood and plasterboard are assessed under this credit. In the case of timber-based products only the Tier level 1 and 3 timber certification routes allow credits. Hence they must be Chain of Custody (CoC) certified by FSC®, CSA, SFI, PEFC, MTCC, Verified, SGS or TFT. In the case of plasterboard there are a number of alternative routes including BES 6001 certification.

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 Insulation

Responsible Sourcing - Relevant to Mat 2

Kingspan Insulation's British manufacturing facility, at which *Kingspan Therma*® TR31 is produced, carries FSC® and PEFC Chain of Custody certification. As standard, the plywood facing of *Kingspan Therma*® TR31 is FSC® certified at 70%. This certification verifies that, a minimum of 70% of the plywood facing of *Kingspan Therma*® TR31 has Chain of Custody and is legally sourced. Thus the plywood content of the product has the potential to achieve maximum credits for responsible sourcing under Mat 2.



The plasterboard used at Kingspan Insulation's British manufacturing facility, at which *Kingspan Kooltherm*® K17 Insulated Plasterboard and *Kingspan Kooltherm*® K18 Insulated Plasterboard are produced, is certified to BES 6001 Very Good. Thus the plasterboard content of the products has the potential to achieve maximum credits for responsible sourcing under Mat 2.

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 suppliers' BES 6001 and Kingspan Insulation's FSC® and PEFC Chain of Custody certificates can be obtained.

Blowing Agents - Relevant to Pol 1

All products in the *Kingspan Kooltherm*® K-range, the *Kingspan Therma*™ range and the *Kingspan Styrozone*® N-range are manufactured with blowing agents that are deemed by the Code to have, or 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).

Examples of How a Code Rating is Achieved

In order for a house design to achieve Level 4 its CO₂ emissions must be 19% lower than a home built to the standard set in the 2013 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, 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 2013 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.



The Barratt Green House

*The UK's first Level 6 house to be built by a volume house builder. This building was constructed with Kingspan **Kooltherm**® K5 External Wall Board in its walls, Kingspan **Styrozone**® in its floor and Kingspan **Thermaroof**® TR27 LPC/FM on its roof.*

Barratt Green House copyright Denis Jones.

Contact Details

Customer Service

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

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

Literature & Samples

Kingspan Insulation 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.

Available as a complete Design Manual or as individual product brochures, Kingspan Insulation technical literature is an essential specification tool. For copies please contact the Kingspan Insulation Marketing Department, or visit the Kingspan Insulation website, using the details below:

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

Tapered Roofing

For technical guidance, quotations, order placement and details of despatches please contact the Kingspan Insulation Tapered Roofing Department on the numbers below:

Tel: +44 (0) 1544 387 383
Fax: +44 (0) 1544 387 483
email: tapered@kingspaninsulation.co.uk

Technical Advice / Design

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.

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

Tel: +44 (0) 1544 387 382
Fax: +44 (0) 1544 387 482
email: technical@kingspaninsulation.co.uk
email: hvac-technical@kingspaninsulation.co.uk

General Enquiries

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

Tel: +44 (0) 1544 388 601
Fax: +44 (0) 1544 388 888
email: info@kingspaninsulation.co.uk

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Kingspan Insulation Ltd
Pembridge, Leominster, Herefordshire HR6 9LA, UK
www.kingspaninsulation.co.uk