

23.11.05

**DRAFT  
ARTICLE**

for

**INSULATION**

**December 2005 Issue**

by

Phil Heath  
Technical Manager  
Kingspan Insulation Limited  
Pembroke  
Leominster  
Herefordshire HR6 9LA

*Prepared by*

***Smith Goodfellow Limited***

*November 2005*

## 2006 – THE BIG ONE

Over recent years the construction industry has become accustomed to constant change, but in terms of how that change impacts on the way in which we think about construction, 2006 is the big one. Not only is the Energy Performance of Buildings Directive (EPBD) going to keep the energy efficiency of non-domestic buildings visible and under review from January, but the revised Approved Document L ~~Parts~~ 1A, 1B, 2A and 2B will fundamentally change the way in which energy standards can be achieved.

The area that is arguably the most affected is the non domestic market, because of the sheer complexity of the calculations to predict the rate of carbon dioxide emissions from the building - the Buildings Emission Rate (BER), which includes a whole host of elements such as the heating and lighting systems, air tightness, cold bridging etc. This then must not exceed the Target Emissions Rate (TER) for a building of that size and type.

Even with the help of the SBEM (Simplified Building Energy Method), which is a software tool developed to demonstrate a building's compliance with minimum energy performance standards and work out its Asset Rating as demanded by the EPBD, the calculation methodology is still extremely complex, with factors as diverse as position and orientation, occupancy and use coming into the equation.

As for ADL2A, there are five criteria that have to be met:

- 1) The predicted BER must not be greater than the TER.
- 2) The performance of the building fabric and the heating, hot water and fixed lighting systems should be no worse than the design limits set out in the Approved Document.
- 3) Appropriate passive control measures should be taken to limit the effects of solar gain.
- 4) The as built performance of the building ~~is should be~~ consistent with the BER.

Formatted: Indent: Left: 0 cm, Hanging: 1.25 cm

- 5) The necessary provisions for energy efficient operation of the dwelling ~~are should be~~ put into place.

Of primary concern are the first, second and fourth criteria. It is self evident that buildings must be designed to achieve at least the minimum expected energy efficiency for their size and type, and that the end product should live up to its design. In order to do this it is vital to ~~maintain-achieve~~ an optimum level of thermal performance ~~for-from~~ the building envelope. The contribution of the envelope to thermal efficiency is measured both in terms of air-permeability and in terms of its U-value. Worst possible U-value standards have been set out as per the table below:

~~The design limit parameters that have been set for this are:~~

Element	U-Value (W/m <sup>2</sup> .K)
Wall	<b>0.35</b>
Floor	<b>0.25</b>
Roof	<b>0.25</b>

~~As they stand these U-values are minimum fall back standards~~  
~~, and Buildings designed with these U-values~~ will certainly ~~not-find it hard to~~ meet the TER ~~as they stand~~. In all likelihood the industry will opt for tighter U-values, which will give a higher platform of basic building envelope performance from which to bring in the other energy saving measures and achieve the TER.

This would naturally necessitate thicker layers of insulation, and so thought needs to be given as to the most appropriate material required to achieve the best results. For example, with mineral fibre, which has a thermal conductivity of 0.03~~23~~ – 0.040 W/m.K, these thicknesses can become quite significant, possibly impinging on the useable space in the building. They can also lead to additional knock on effects in terms of longer fixings and other increased construction costs to accommodate the depth of insulation. But those wishing to follow the tried and tested route of improved U-values to achieve compliance need not worry; there are alternative materials that don't carry the same side effects.

Rigid phenolic insulation has a thermal conductivity as low as 0.022-0.021 W/m.K, it can utilise the thinnest possible insulation board to achieve required U-values, and is one of the most thermally efficient insulants commonly available today. Using the same thickness of phenolic insulation as you would need of mineral fibre to meet the minimum fallback U-values would achieve a greatly enhanced level of thermal performance over and above the minimum requirement.

Then there is the question of longevity. The EPBD requires that both the Asset rating and the Operational rating of a building is displayed. The Operational rating is subject to review whenever the building is let or sold. The obvious implications of this are that a reduction in thermal performance could lead to a drop in the value of the property and/or necessitate remedial work.

Mineral fibre can slump or sag over time, and its thermal properties can also reduce dramatically if it is exposed to moisture ingress or air movement, which Mineral fibre can be ~~would render it~~ vulnerable to these risks in ~~an~~ applications such as a cavity behind a ventilated facade.

Rigid phenolic insulation, however, is impervious to air movement and the passage of water vapour, and carries no condensation risk. It will not sag or slump and will continue to perform at the specified level over the life of the building. This long term performance means that it is a cost-effective solution, both in terms of energy saved and in durability.

Moreover, because it is lightweight and has no loose fibres, it is easy to handle and install, requiring no specialist equipment and carrying no specific health and safety risk.

Market leader Kingspan Insulation produces the rigid phenolic insulation product, Kingspan **Kooltherm®** K15 Rainscreen Board, for use behind rainscreen cladding systems. This premium performance insulation is CFC/HCFC free with zero Ozone Depletion Potential (ODP). With a thermal conductivity ~~of as low as 0.022~~ 0.021 W/m.K, Kingspan **Kooltherm®** K15 Rainscreen Board achieves required U-values with minimal thickness, thereby minimising the cost of fixings and maximising available footprint.

The rigid phenolic insulation core is faced on both sides with a low emissivity composite foil facing, which is highly resistant to the transmission of water vapour. This reflective, low emissivity surface effectively doubles the thermal resistance of the cavity in which the board is placed.

Furthermore, [Kingspan Kooltherm® K15 Rainscreen Board](#) has been tested by the BRE (Building Research Establishment) to BS 8414: Part 1, a large scale end use simulation test that measures internal and external fire spread within a complete facade construction. ~~K15~~ The board also achieves Class O/Low Risk fire rating when tested to BS 476, and has less than 5% smoke obscuration to BS 5111.

2006 might be the big year of change, but change is good, especially when the industry already has access to products and materials that can achieve high energy efficient standards and facilitate the transition to a more sustainable future, which is what these new requirements are all about.

Kingspan Insulation offers an extensive range of insulation solutions for both newbuild and refurbishment projects. Specifiers, stockists and contractors are supported with a comprehensive and free technical advisory service.

For further information please contact:

UK

Tel: 

Fax: 

e.mail: [literature.uk@insulation.kingspan.com](mailto:literature.uk@insulation.kingspan.com)

**Ireland**

Tel: [REDACTED]

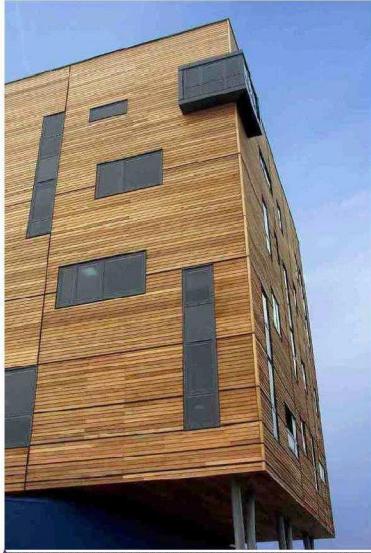
Fax: [REDACTED]

e.mail: [literature.ie@insulation.kingspan.com](mailto:literature.ie@insulation.kingspan.com)

END

Prepared by: Smith Goodfellow Limited, Macclesfield, Cheshire

### Photo & Caption



The Kingspan Kooltherm® K15 Rainscreen Board is lightweight and achieved the required U-value for the Quadrus Centre in South Tyneside. The Architect specified the material as it had the ideal properties for a built-up rainscreen system.

**Formatted:** Font: (Default) Times New Roman, (Asian) Times New Roman

**Formatted:** Justified, Line spacing: 1.5 lines

**Formatted:** Font: 12 pt, Font color: Auto

**Formatted:** Font: 12 pt, Font color: Auto

**Formatted:** Font: Bold