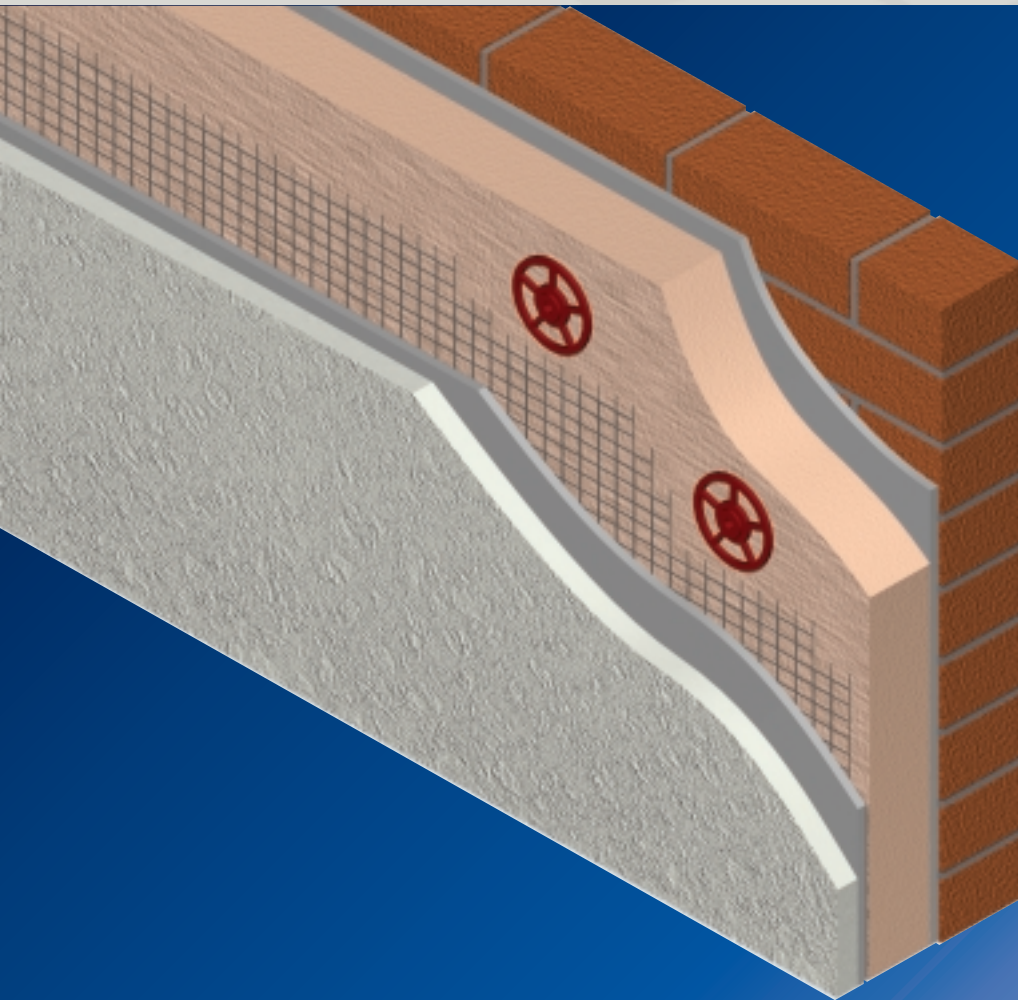


Kooltherm® K5 EWB

INSULATION FOR USE BEHIND TRADITIONAL
AND LIGHTWEIGHT POLYMER MODIFIED RENDERS



- Premium performance rigid phenolic insulation – thermal conductivity as low as 0.021 W/m-K
- Class 0 / Low Risk fire rating
- Negligible smoke obscuration
- Suitable for use behind traditional and lightweight polymer modified renders
- Transforms and upgrades the appearance of existing buildings
- Resistant to the passage of water vapour
- Easy to handle and install
- Ideal for new build and refurbishment
- Non-deleterious material
- CFC/HCFC-free with zero Ozone Depletion Potential (ODP)



Typical Design Details

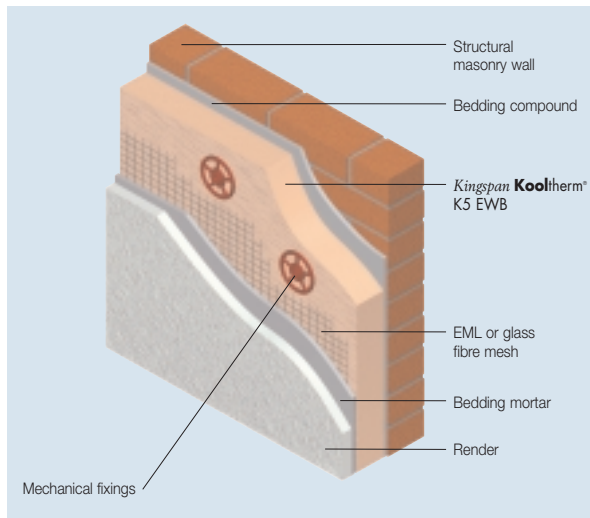


Figure 1 Insulated Render System on Masonry

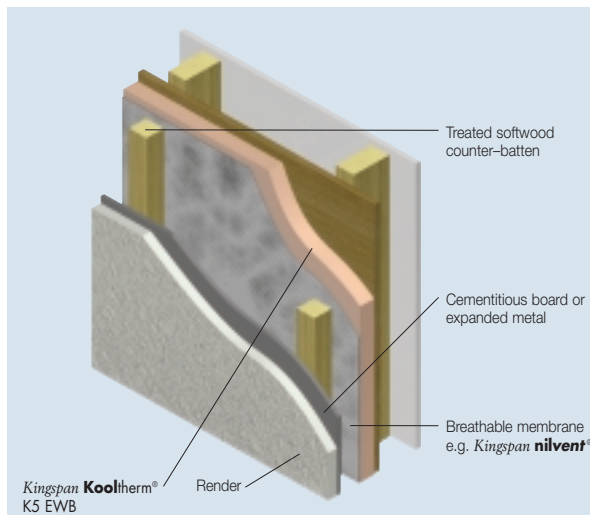


Figure 2 Insulated Render System on Timber Frame

Specification Clause

Kingspan Kooltherm® K5 EWB should be described in specifications as:-

The wall insulation shall be *Kingspan Kooltherm®* K5 EWB ____mm thick comprising a CFC/HCFC-free rigid phenolic insulation core with a tissue based facing on both sides manufactured to the highest standards under quality control systems approved to BS EN ISO 9001: 2000 by Kingspan Insulation Limited and shall be applied in accordance with the instructions issued by them.

Details also available in NBS Plus.

NBS users should refer to clause(s):

M21 210, M21 220, M21 230

(Standard and Intermediate)

M21 20 (Minor Works)



Design Considerations

Sustainability

In the past, erroneously, the relative environmental sustainability of insulation materials has been compared on the basis of embodied energy and ozone depletion potential. It is now recognised that a much wider basket of embodied environmental impacts (including those caused by their embodied energy), rather than embodied energy alone, is the only credible tool of comparison. Time has also annulled ozone depletion potential as an issue as all insulation materials are now banned from using CFC and HCFC blowing agents by law. For buildings designed to today's Building Regulations energy use standards it is now also known that the embodied environmental impacts of all of the materials and labour used to create a building are insignificant in comparison with the lifetime operational environmental impacts of that building, and so are of very limited importance. Since it is operational energy use that creates the vast majority of operational environmental impact, saving energy by specifying the lowest U-values possible is the most environmentally sustainable action to take.

However, one of the most neglected facts about environmentally sustainable buildings is that the longevity of their standards of operational energy use, and therefore the longevity of their operational environmental impacts, is critical. The performance of some insulants, such as mineral fibre, can deteriorate rapidly if exposed to water penetration, air movement or compression. This may increase operational energy use and hence compromise the environmental sustainability of the finished building to an alarming degree. Other insulation materials, such as rigid phenolic or rigid urethane, are not vulnerable to any of these problems.

In summary, designers should:

- (a) specify the lowest possible U-value regardless of insulation type;
- (b) design out the risk of their chosen insulant not performing as specified; and
- (c) if the latter is not possible, choose an insulant that is at low risk of failure e.g. a cellular plastic insulation material.

However, manufacturers should not rest on their laurels; it is a matter of social responsibility to be open and honest about the environmental impact of the manufacture of a product, and a full Life Cycle Analysis (LCA) based on a much wider basket of environmental impacts, rather than embodied energy alone, is recognised as the preferred tool to achieve this. Kingspan Insulation was the first insulation manufacturer to openly complete and publish independently certified Ecoprofiles (a type of LCA) on its product ranges. The Ecoprofile for the **Kingspan Therma™** range of rigid urethane insulation products was performed by Building Research Establishment (BRE). The product range comfortably achieves a BRE Green Guide A rating. Kingspan Insulation is currently completing a BRE Ecoprofile of its **Kingspan Kooltherm®** K-range of rigid phenolic insulation products.



But there is far more to sustainability than whether or not a product, process or company affects the environment in a positive or a negative way. A company can, and should, demonstrate its financial viability and social responsibility, as well as ensure that its materials and methods do not add unduly to the burden placed on the planet. Kingspan Insulation has now put the manufacture of its products at its Pembrige facility in Herefordshire through a rigorous independent appraisal of its economic, social, environmental and natural resource impacts using Arup's SPeAR® tool.

The results show a well balanced performance in terms of sustainability, and that Kingspan Insulation is already meeting legislation or best practice in most areas, even moving beyond best practice in some. Kingspan Insulation is the first and only construction material manufacturer to have taken this bold move and openly publish the results.

Typical Applications

Kingspan Kooltherm® K5 EWB can be mechanically fixed to masonry or timber frame walls behind either traditional or lightweight polymer modified render systems. Once installed, **Kingspan Kooltherm®** K5 EWB can exceed Building Regulations / Standards requirements for these applications.

Water Vapour Control

Surface Condensation

Surface condensation can be controlled by the selection of the correct thickness of insulation, the heating and ventilation system being designed with condensation in mind, and subsequently the combination of heating and ventilation being used correctly.

Interstitial Condensation

The Kingspan Insulation Technical Service Department (see rear cover) can provide a condensation risk analysis of your proposed design. Alternatively the designer can undertake an independent assessment by following the procedures set out in BS 5250: 2002 (Code of practice for the control of condensation in buildings).

Fire Stops

Current Building Regulations / Standards should be considered with regard to the requirements for and / or provision of fire stops.

Typical U-values

The following examples have been calculated using the Combined Method for compliance with Building Regulations / Standards revised after 2002. For reasons of comparison the internal wall finish in these examples is taken as 13 mm dense plaster unless stated otherwise. If your construction is any different, please consult the Kingspan Insulation Technical Service Department (see rear cover).

Combined Method – U-values were calculated using the method which has been adopted to bring National standards in line with the European Standard calculation method, BS / I.S. EN ISO 6946: 1997 (Building components and building elements. Thermal resistance and thermal transmittance. Calculation method).

NB when calculating U-values to BS / I.S. EN ISO 6946: 1997, the type of mechanical fixing used may change the thickness of insulation required. The effect of fixings has been ignored for the purposes of these calculations. Please contact the Kingspan Insulation Technical Service Department (see rear cover) for project calculations.

NB for the purposes of these calculations the standard of workmanship has been assumed good and therefore the correction factor for air gaps has been ignored. The figures below are for guidance only. A detailed U-value calculation together with a condensation risk analysis should be completed for each individual project. Please call the Kingspan Insulation Technical Service Department for assistance (see rear cover).

Insulated Render System on:

100 mm Timber Frame Studwork Lined with 12.5 mm Plasterboard (see Figure 2)

Insulant Thickness (mm)	U-value (W/m ² ·K)
20	0.69
25	0.58
30	0.52
40	0.42
45	0.36
50	0.33
60	0.29
65	0.27
70	0.25
75	0.24
80	0.23

215 mm Solid Aerated Concrete Block (λ -value 0.11 W/m·K) Accounting for Mortar Joints with 12.5 mm Plasterboard on Dabs

Insulant Thickness (mm)	U-value (W/m ² ·K)
20	0.36
25	0.33
30	0.31
35	0.29
40	0.27
45	0.24

Brick / Cavity / Medium Density Concrete Block (λ -value 0.51 W/m·K)

Insulant Thickness (mm)	U-value (W/m ² ·K)
20	0.63
25	0.55
30	0.49
40	0.40
45	0.35
50	0.32
55	0.30
60	0.28
65	0.26
70	0.25

Brick / Cavity / Brick

Insulant Thickness (mm)	U-value (W/m ² ·K)
20	0.64
25	0.55
30	0.49
40	0.41
45	0.35
50	0.32
55	0.30
60	0.28
65	0.26
70	0.25
75	0.23

215 mm Solid Brickwork

Insulant Thickness (mm)	U-value (W/m ² ·K)
20	0.74
25	0.63
30	0.55
40	0.44
50	0.35
55	0.32
60	0.30
70	0.26
75	0.24

103 mm Solid Brickwork Unlined

Insulant Thickness (mm)	U-value (W/m ² ·K)
20	0.85
25	0.70
30	0.61
40	0.48
45	0.40
50	0.37
55	0.34
60	0.31
70	0.27
75	0.26
80	0.24

Sitework

Insulated Render Systems

Because insulated render systems are proprietary and utilise different mechanisms for attaching insulation to the wall structure, sitework guidance should be sought from the system manufacturer.

However, in the absence of any other guidance *Kingspan Kooltherm*[®] K5 EWB insulation boards are mechanically fixed to the exterior of masonry external walls using anchor bolts, expansion fixings, proprietary fixings or bedded in render. In the case of timber frame walls the *Kingspan Kooltherm*[®] K5 EWB insulation boards are temporarily pinned in place with all joints lightly butted. A breathable membrane e.g. *Kingspan nilvent*[®] is applied over the insulation boards and temporarily stapled or pinned in place. Preservative treated softwood battens are fixed vertically at centres to coincide with the timber frame wall studs. The expanded metal / cementitious board to carry the render is then fixed to the vertical battens. Sill extenders and flashings are used around openings, although the use of rigid phenolic insulation minimises the overall thickness of the external render system.

Cutting

Cutting should be carried out either by using a fine toothed saw, or by scoring with a sharp knife, snapping the board over a straight edge and then cutting the facing on the other side. Ensure accurate trimming to achieve close-butting joints and continuity of insulation.

Fixings for Attachment of Vertical Counter Battens

Approved fixings should be applied at centres appropriate to the design of the wall and location of the building, in order to fix vertical battens through to the wall studs of a timber frame or masonry wall.

Refer to:

Ejot UK Limited	+44 (0)1977 687 040;
Helifix Limited	+44 (0)20 8735 5222;
Target Fixings Limited	+44 (0)1344 777 189; or
Wallfast Limited	+44 (0)23 9265 3330.

Kooltherm® K5 EWB

Daily Working Practice

At the completion of each day's work, or whenever work is interrupted for extended periods of time, the surface of all boards should be covered in order to provide protection from inclement weather.

Availability

Kingspan Kooltherm® K5 EWB is available through specialist insulation distributors and selected builders' merchants throughout the UK, Ireland and Europe.

Packaging

Depending on quantity, the boards are supplied in labelled packs shrink-wrapped in polythene.

Storage

The polythene packaging of Kingspan Insulation products should not be considered adequate for long term outdoor protection. Ideally, boards should be stored inside a building. If, however, outside storage cannot be avoided, then the boards should be stacked clear of the ground and covered with a polythene sheet or weatherproof tarpaulin. Boards that have been allowed to get wet should not be used.

Health and Safety

Kingspan Insulation products are chemically inert and safe to use. A leaflet on this topic which satisfies the requirements set out in the Control of Substances Hazardous to Health Regulations 1988 (COSHH) is available from the Kingspan Insulation Marketing Department (see rear cover).

Warning – do not stand on or otherwise support your weight on this board unless it is fully supported by a load bearing surface.

Product Description

The Facings

Kingspan Kooltherm® K5 EWB is faced on both sides with a tissue based facing autohesively bonded to the insulation core during manufacture.

The Core

The core of Kingspan Kooltherm® K5 EWB is a premium performance CFC/HCFC-free rigid phenolic insulant of typical density 40 kg/m³.

CFC/HCFC-free

Kingspan Kooltherm® K5 EWB is manufactured without the use of CFCs/HCFCs and has zero Ozone Depletion Potential (ODP).



Product Data

Standards and Approvals

Kingspan Kooltherm® K5 EWB is manufactured to the highest standards under a quality control system approved to BS EN ISO 9001: 2000 (Quality management systems. Requirement).



Manufactured to BS EN ISO 9001: 2000
Certificate No. 388

Standard Dimensions

Kingspan Kooltherm® K5 EWB is available in the following standard size:

Nominal Dimension	Availability
Length (m)	1.2
Width (m)	0.6
Insulant Thickness (mm)	Refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes.

Compressive Strength

The compressive strength of Kingspan Kooltherm® K5 EWB typically exceeds 150 kPa at 10% compression when tested to BS EN 826: 1996 (Thermal insulating products for building applications. Determination of compression behaviour).

Water Vapour Resistance

Modified to include board facings, the boards achieve a resistance greater than 15 MN-s/g, when tested in accordance with BS 4370-2: 1993 (Methods of test for rigid cellular materials. Methods 7 to 9).

Durability

If correctly applied, *Kingspan Kooltherm*® K5 EWB has an indefinite life. Its durability depends on the supporting structure and the conditions of its use.

Resistance to Solvents, Fungi & Rodents

The insulation core is resistant to short-term contact with petrol and with most dilute acids, alkalis and mineral oils. However, it is recommended that any spills be cleaned off fully before the boards are installed. Ensure that safe methods of cleaning are used, as recommended by the suppliers of the spilt liquid. The insulation core is not resistant to some solvent-based adhesive systems, particularly those containing methyl ethyl ketone. Adhesives containing such solvents should not be used in association with this product. Damaged boards or boards that have been in contact with harsh solvents or acids should not be used.

The insulation core and facings used in the manufacture of *Kingspan Kooltherm*® K5 EWB resist attack by mould and microbial growth, and do not provide any food value to vermin.

Fire Performance

The rigid phenolic insulation core of *Kingspan Kooltherm*® K5 EWB will achieve the results given below, which enable it to be classified by the Building Regulations as being Class 0 and as Low Risk by the Technical Standards in Scotland.

Test	Result
BS 476-6: 1989 (Fire tests on building materials and structures. Method of test for fire propagation for products)	Index of performance (I) not exceeding 12 and sub Index (I _s) not exceeding 6 (for rigid phenolic insulation core)
BS 476-7: 1997 (Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products)	Class 1 rating
BS 5111-1: 1974 (Smoke Obscuration)	< 5%

Further details of the fire performance of Kingspan Insulation products may be obtained from the Kingspan Insulation Technical Service Department (see rear cover).

Thermal Properties

The λ -values and R-values quoted are in accordance with the principles in the Harmonised European Standard BS EN 13166: 2001 (Thermal insulation products for buildings – Factory made products of phenolic foam (PF) – Specification) using so called 90 / 90 principles. Comparison with alternative products may not be appropriate unless the same procedures have been followed.

Thermal Conductivity

The boards achieve a thermal conductivity (λ -value) of 0.024 W/m·K (insulant thickness 15–24 mm), 0.023 W/m·K (insulant thickness 25–44 mm), 0.021 W/m·K (insulant thickness \geq 45 mm).

Thermal Resistance

Thermal resistance (R-value) varies with the thickness and is calculated by dividing the thickness of the board (expressed in metres) by its thermal conductivity.

Insulant Thickness (mm)	Thermal Resistance (m ² ·K/W)
20	0.80
25	1.05
30	1.30
35	1.50
40	1.70
45	2.10
50	2.35
55	2.60
60	2.85
65	3.05
70	3.30
75	3.55
80	3.80

Refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes.

Contact Details

Customer Service

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

UK	- Tel:	+44 (0) 870 850 8555
	- Fax:	+44 (0) 870 850 8666
	- email:	commercial.uk@insulation.kingspan.com
Ireland	- Tel:	+353 (0) 42 97 54200
	- Fax:	+353 (0) 42 97 54299
	- email:	commercial.ie@insulation.kingspan.com

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 on the numbers below:

UK	- Tel:	+44 (0) 870 733 8333
	- Fax:	+44 (0) 1544 387 299
	- email:	literature.uk@insulation.kingspan.com
Ireland	- Tel:	+353 (0) 42 97 54298
	- Fax:	+353 (0) 42 97 54299
	- email:	literature.ie@insulation.kingspan.com

Tapered Roofing

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

UK	- Tel:	+44 (0) 870 761 7770
	- Fax:	+44 (0) 1544 387 289
	- email:	tapered.uk@insulation.kingspan.com
Ireland	- Tel:	+353 (0) 42 97 54297
	- Fax:	+353 (0) 42 97 54296
	- email:	tapered.ie@insulation.kingspan.com

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:

UK	- Tel:	+44 (0) 870 850 8333
	- Fax:	+44 (0) 1544 387 278
	- email:	techline.uk@insulation.kingspan.com
Ireland	- Tel:	+353 (0) 42 97 54297
	- Fax:	+353 (0) 42 97 54296
	- email:	techline.ie@insulation.kingspan.com

General Enquiries

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

UK	- Tel:	+44 (0) 870 850 8555
	- Fax:	+44 (0) 870 850 8666
	- email:	info.uk@insulation.kingspan.com
Ireland	- Tel:	+353 (0) 42 97 54200
	- Fax:	+353 (0) 42 97 54299
	- email:	info.ie@insulation.kingspan.com

Kingspan Insulation Ltd. reserves the right to amend product specifications without prior notice. Product thicknesses shown in this document should not be taken as being available ex-stock and reference should be made to the current Kingspan Insulation price-list or advice sought from Kingspan Insulation's Customer Service Department (see above left). 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 as to the suitability and compliance with actual requirements, specifications and any applicable laws and regulations. For other applications or conditions of use, Kingspan Insulation offers a Technical Advisory Service (see above) the advice of which should be sought for uses of Kingspan Insulation products that are not specifically described herein. Please check that your copy of the literature is current by contacting the Kingspan Insulation Marketing Department (see left).



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