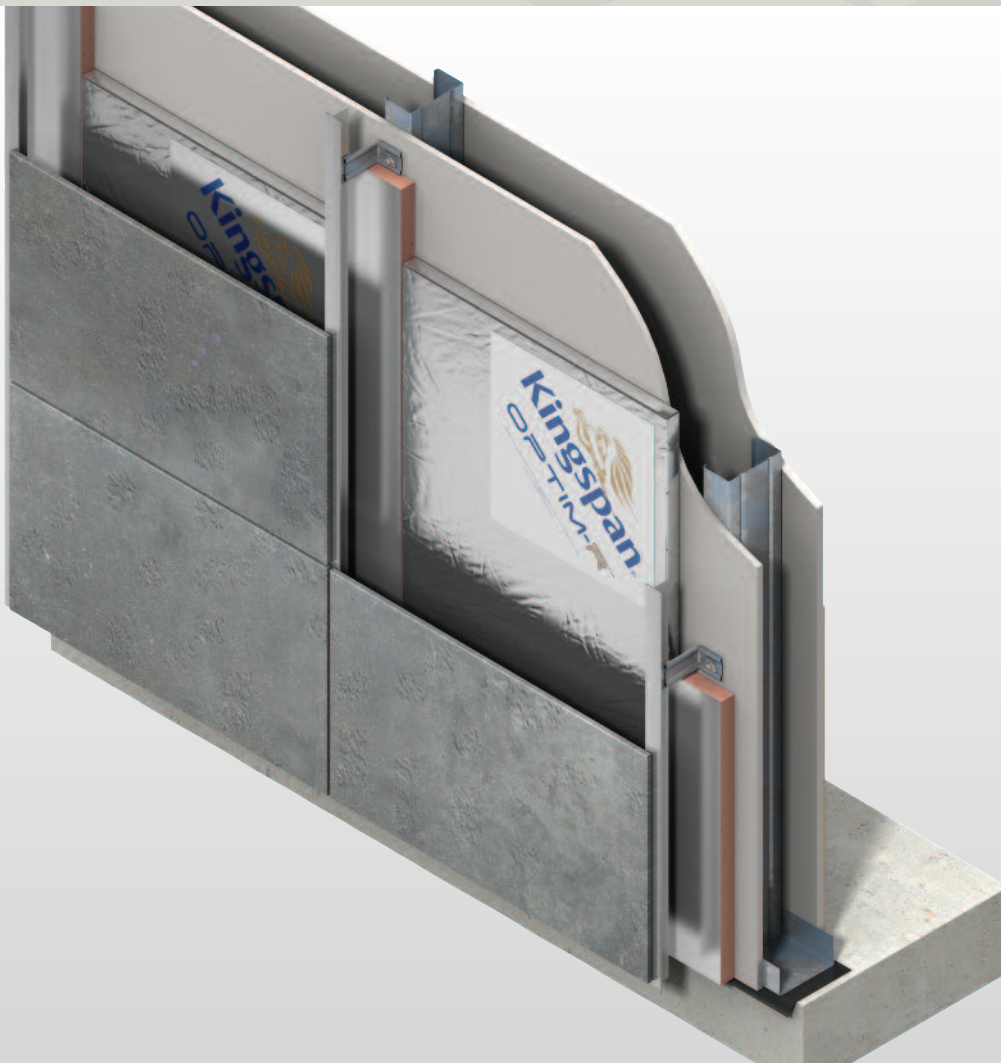




# OPTIM-R™ Rainscreen System

NEXT GENERATION INSULATION SOLUTION FOR  
RAINSCREEN CLADDING SYSTEMS



- Optimum performance rigid vacuum insulation panel – aged design value thermal conductivity 0.007 W/m-K
- Insulating performance up to five times better than other commonly available insulation materials
- Ideal for constructions where a lack of construction depth or space is an issue
- Over 90% (by weight) recyclable
- Resistant to the passage of water vapour
- Ideal for new build and refurbishment
- Non-deleterious material



*Low Energy –  
Low Carbon Buildings*

# Introduction

## The Problem

When constructing a rainscreen wall in new build situations or upgrading the thermal performance of walls in existing buildings there may be a requirement for both low U-values and the thinnest possible wall build-up.

For new-build applications, there are increasing regulatory requirements and economic reasons to improve energy efficiency. One of the approaches is to improve the thermal performance of the building fabric whilst keeping the overall construction as thin as possible. There are already high performance insulation products available that will fulfil the majority of these requirements, however in certain areas, for example where the design demands it, a new, thinner, product is needed.

In refurbishment there is arguably a greater need to keep wall build-ups as thin as possible. Space is already at a premium and there may be little space for installing new rainscreen cladding for example because of the available depth of eaves overhangs and encroachment into access routes. Deeper rainscreen cladding systems could necessitate extending eaves, longer and more costly fixings, trims and accessories, and may result in greater reveal depths, reducing natural daylight.

## The Solution

The *Kingspan OPTIM-R™ Rainscreen System* has been developed to help solve these problems. The *Kingspan OPTIM-R™ Rainscreen System* is an optimum performance next generation insulation solution from Kingspan Insulation. It comprises of rigid vacuum insulation panels with a microporous core which is evacuated, encased and sealed in a thin, gas-tight envelope, giving outstanding thermal conductivity, with the thinnest possible solution to insulation problems. The vacuum insulation panels are accompanied by premium performance rigid insulation infill panels which can be cut to fit around penetrations, brackets, reveals and where fixtures and fittings need to be installed.

In retrofit applications, the *Kingspan OPTIM-R™ Rainscreen System* provides solutions for areas that previously could have remained un-insulated because of insufficient space available. In new constructions the *Kingspan OPTIM-R™ Rainscreen System* can significantly enhance U-values in areas that would otherwise be accepted as denigrating the overall thermal performance.

With an aged design value thermal conductivity ( $\lambda$ ) of 0.007 W/m·K, the *Kingspan OPTIM-R™* element of the Rainscreen System provides an insulating performance that is up to five times better than other commonly available insulation materials.

# Design Service

The *Kingspan OPTIM-R™ Rainscreen System* comprises 2 elements: *Kingspan OPTIM-R™* panels and *Kingspan OPTIM-R™ flex* infill panels. It comes with a supporting design service which ensures the ratio of the *Kingspan OPTIM-R™* element of the Rainscreen System to *Kingspan OPTIM-R™ flex* for each project is maximised. The panel layout will be designed quickly and effectively, ready for client approval. Each layout will illustrate the size, number and location of the *Kingspan OPTIM-R™* panels. It will also illustrate the size, number and location of any *Kingspan OPTIM-R™ flex* required. The thermal bridging effect of *Kingspan OPTIM-R™ flex* will also be calculated.

For more details please contact the Kingspan Insulation Technical Service Department (see rear cover).

# Typical Constructions and U-values

## Assumptions

Because rainscreen systems are proprietary and utilise different mechanisms for attaching cladding panels to the wall structure, it is advisable to contact the Kingspan Insulation Technical Service Department (see rear cover) for specific U-value calculations.

The U-values in the tables that follow have been calculated using the methods detailed in 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). They are valid for the constructions shown in the details immediately above each table.

For the structural masonry wall examples, the internal wall finish is taken as a 3 mm skim coated 12.5 mm plasterboard on dabs, with the structural masonry wall at 200 mm. For the steel frame examples, the internal wall finish is taken to be a 3 mm skim coated 12.5 mm plasterboard, with the calcium silicate board at 9 mm.

*NB When calculating U-values to BS / I.S. EN ISO 6946: 2007, the type of discrete 'helping hand' bracket used may change the thickness of insulation required. Please contact the Kingspan Insulation Technical Service Department for assistance (see rear cover).*

*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.*

*NB The figures quoted are for guidance only. A detailed U-value calculation should be completed for each individual project.*

*NB To gain a comprehensive U-value calculation for your project please consult the Kingspan Insulation Technical Service Department for assistance (see rear cover).*

*NB For the purposes of these calculations, the bridging effect of Kingspan OPTIM-R flex has been taken to be 30%.*

## Insulated Rainscreen Cladding Systems (terracotta clay tile external finish)

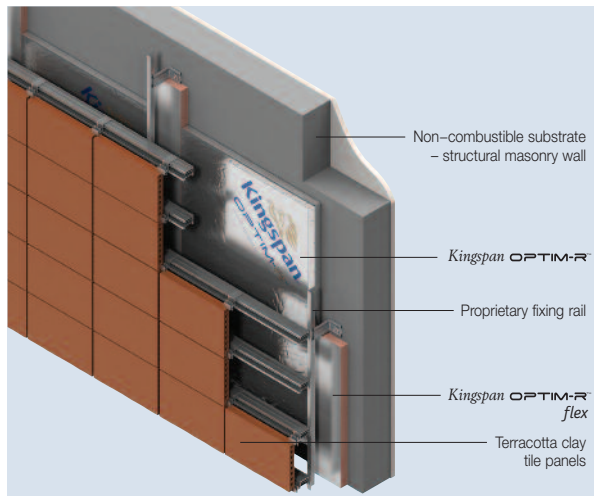


Figure 1

Insulant Thickness (mm)	U-values (W/m <sup>2</sup> ·K)
40	0.28
50	0.24
60	0.22
30 + 40	0.20
40 + 40	0.18
40 + 50	0.17
50 + 50	0.16

## Insulated Rainscreen Cladding Systems on Steel Frame

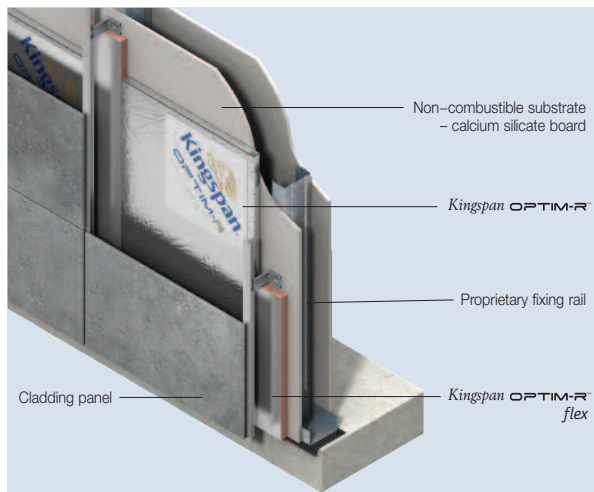


Figure 2

Insulant Thickness (mm)	U-values (W/m <sup>2</sup> ·K)
40	0.32
50	0.27
60	0.24
30 + 40	0.22
40 + 40	0.20
40 + 50	0.19
50 + 50	0.18

# Design Considerations

## Responsible Sourcing

### Responsible Sourcing

The *Kingspan OPTIM-R™ Rainscreen System* is manufactured under a management system certified to EN ISO 14001: 2004.

## Sustainability & Responsibility

Kingspan Insulation has a long-term commitment to sustainability and responsibility: as a manufacturer and supplier of insulation products; as an employer; as a substantial landholder; and as a key member of its neighbouring communities.

A report covering the sustainability and responsibility of Kingspan Insulation Ltd's British operations is available at [www.kingspaninsulation.co.uk/sustainabilityandresponsibility](http://www.kingspaninsulation.co.uk/sustainabilityandresponsibility).

## Specification Clause

The *Kingspan OPTIM-R™* element of the Rainscreen System should be described in specifications as:-

The wall insulation shall be the *Kingspan OPTIM-R™ Rainscreen System* \_\_\_ mm thick: comprising a rigid vacuum insulation panel with a microporous core which is evacuated, encased and sealed in a thin, gas-tight envelope. The product shall be manufactured under a management system certified to ISO 9001: 2008, ISO 14001: 2008 and OHSAS 18001: 2007, and installed in accordance with the instructions issued by Kingspan Insulation Limited.

## NBS Specifications

Details also available in NBS Plus.  
NBS users should refer to clause(s):  
H92 776 (Standard and Intermediate)



## Cold Bridging

The use of a neoprene / plastic gasket, between the 'helping hand' bracket and the structure, will help to mitigate the effects of cold bridging. Please contact the Kingspan Insulation Technical Service Department (see rear cover) for further information.

## Water Vapour Control / Condensation

Consideration should be given to the risk of condensation, when designing thermal elements.

A condensation risk analysis should be carried out following the procedures set out in BS 5250: 2002 (Code of practice for the control of condensation in buildings). The Kingspan Insulation Technical Service Department (see rear cover) can provide this service.

## Fire Stops

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

## Glazed Curtain Walling Systems

Please contact the Kingspan Insulation Technical Service Department (see rear cover for details) for advice regarding the suitability of the *Kingspan OPTIM-R™ Rainscreen System* in glazed applications.

## Lightning Protection

Designers should give consideration to the requirements of BS / I.S. EN 62305: 2006 (Protection against lightning).

# Sitework

## Installation

- Because rainscreen cladding systems are proprietary and utilise different mechanisms for attaching cladding panels to the wall structure, installation guidance should be sought from the system manufacturer.
- However, in the absence of any other guidance the instructions laid out below may be followed.
- The substrate against which the *Kingspan OPTIM-R™ Rainscreen System* panels are installed should be clean, dry and free from protrusions.
- The *Kingspan OPTIM-R™* element of the Rainscreen System should be installed with board edges lightly butted. Remaining areas of wall around brackets, openings, and other details which can not be insulated with the *Kingspan OPTIM-R™* element of the Rainscreen System should be in-filled with *Kingspan OPTIM-R™ flex*. Each *Kingspan OPTIM-R™ flex* panel is to be the same thickness as the *Kingspan OPTIM-R™* element of the Rainscreen System.
- *Kingspan OPTIM-R™ flex* should be cut neatly around fixings and brackets to avoid gaps.
- The *Kingspan OPTIM-R™* element of the Rainscreen System should be restrained to the substrate using a suitable proprietary adhesive. For further guidance on the specification of the proprietary adhesive please consult the Kingspan Insulation Technical Service Department (see rear cover) for assistance. *Kingspan OPTIM-R™ flex* should be restrained using mechanical fixings.
- The adhesive specification, and fixing rate, will potentially vary with the geographical location of the building, the local topography, the height and width of the wall structure, and the type of mechanisms being used to attach the cladding system.
- *Kingspan OPTIM-R™ flex* less than 300 mm in width should utilise a single row of insulation fasteners (with a suitable head or washer plate) along the centre line of the strip. Fixings within the row should be evenly distributed along the strip and located at centres no greater than 1200 mm, with a fixing located within 150 mm of each end of the strip. The requirement for additional fixings would need to be assessed on an individual project basis in accordance with BS EN 1991-1-4: 2005 (National annex to Eurocode 1, Actions on structures, General Actions, Wind Actions).
- Mechanical fixings for *Kingspan OPTIM-R™ flex* should be located greater than 50mm, but less than 150mm from the strip edge.
- Joints of the *Kingspan OPTIM-R™* element of the Rainscreen System, and at junctions between the *Kingspan OPTIM-R™* element of the Rainscreen System and *Kingspan OPTIM-R™ flex* should be taped using a minimum 75 mm wide self adhesive aluminium foil rainscreen cladding tape. In the absence of other protection, exposed edges of the *Kingspan OPTIM-R™ Rainscreen System* should be protected by a self adhesive aluminium foil tape, with a minimum 50 mm wide overlap onto the insulation board face.
- For further guidance on the specification of self adhesive aluminium foil tape and application guidance, please refer to:  
Bostik Limited +44 (0) 1785 272 727  
[www.bostik.co.uk](http://www.bostik.co.uk)  
Venture TapeEurope +44 (0) 1327 876 555  
[www.venturetape.com](http://www.venturetape.com)

# Sitework

## Fire Stopping

- Fire stopping systems are proprietary. Please contact the Kingspan Insulation Technical Service Department (see rear cover for details) for advice regarding the fire stopping strategy for your construction.

## General

- The *Kingspan OPTIM-R*™ element of the Rainscreen System should not be used in association with solvent-based adhesive systems. The *Kingspan OPTIM-R*™ element of the Rainscreen System should not be exposed to naked flames or excessive heat.

## Cutting

- The *Kingspan OPTIM-R*™ element of the Rainscreen System should not be cut or penetrated. The substrate must be clean, dry and level, and free of sharp objects or edges.
- Cutting of *Kingspan OPTIM-R flex* 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 of *Kingspan OPTIM-R flex* to achieve close-butting joints and continuity of insulation.

## Daily Working Practice

- At the completion of each day's work, or whenever work is interrupted for extended periods of time, board edges and joints should be protected from inclement weather.

## Availability

- Please contact Kingspan Insulation for availability of the *Kingspan OPTIM-R*™ Rainscreen System.

## Packaging and Storage

- The packaging of the *Kingspan OPTIM-R*™ Rainscreen System should not be considered adequate for outdoor protection. The *Kingspan OPTIM-R*™ Rainscreen System should be stored inside a building and raised off the floor.

## Health and Safety

- Kingspan Insulation products are chemically inert and safe to use.
- A Safety Information Data Sheet for this product is available from the Kingspan Insulation website [www.kingspaninsulation.co.uk/safety](http://www.kingspaninsulation.co.uk/safety) or [www.kingspaninsulation.ie/safety](http://www.kingspaninsulation.ie/safety).

*Please note that the reflective surfaces on this product are designed to enhance its thermal performance. As such, they will reflect light as well as heat, including ultraviolet light. Therefore, if this product is being installed during very bright or sunny weather, it is advisable to wear UV protective sunglasses or goggles, and if the skin is exposed for a significant period of time, to protect the bare skin with a UV block sun cream.*

# Product Details

## Composition

The *Kingspan OPTIM-R*™ element of the Rainscreen System comprises a rigid vacuum insulation panel with a microporous core which is evacuated, encased and sealed in a thin, gas-tight envelope.

*Kingspan OPTIM-R flex* comprises a premium performance rigid insulation faced on both sides with a composite foil facing.

## Standards and Approvals

The *Kingspan OPTIM-R*™ Rainscreen System is manufactured to the highest standards under a management system certified to ISO 9001: 2008 (Quality Management Systems. Requirements), ISO 14001: 2004 (Environmental Management Systems. Requirements) and OHSAS 18001: 2007 (Health and Safety Management Systems. Requirements).

## Standard Dimensions

The *Kingspan OPTIM-R*™ Rainscreen System panels are available in the following standard size(s):

Nominal Dimension		Availability
Length	(mm)	300 – 1200
Width	(mm)	300 – 600
Insulant Thickness	(mm)	20 – 60

Other sizes may be available dependent on order quantity. Please contact Kingspan Insulation for more details.

## Compressive Strength

The compressive strength of the *Kingspan OPTIM-R*™ element of the Rainscreen System typically exceeds 160 kPa at 10% compression when tested to BS / I.S. EN ISO 826: 1996 (Thermal insulating products for building application. Determination of compression behaviour).

## Durability

If installed correctly and protected from damage and penetration, the *Kingspan OPTIM-R*™ Rainscreen System can provide reliable long-term thermal performance over the lifetime of the building.

## Resistance to Solvents, Fungi & Rodents

The *Kingspan OPTIM-R*™ Rainscreen System should not be used in association with solvent-based adhesive systems. Damaged boards or boards that have been in contact with solvents or acids should not be used.

The insulation core and facings used in the manufacture of the *Kingspan OPTIM-R*™ Rainscreen System resist attack by mould and microbial growth, and do not provide any food value to vermin.

## Fire Performance

*Kingspan OPTIM-R*™ Rainscreen System can be used in multi storey buildings up to 18 metres in height. For buildings over 18 metres in height *Kingspan Kooltherm*® K15 Rainscreen Board can be used.

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

## Thermal Properties

The  $\lambda$ -values and R-values detailed below are quoted in accordance with BS / I.S. EN 12667: 2001 (Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Products of high and medium thermal resistance), with allowance for ageing and edge effect of the encapsulating film to form the design value.

### Thermal Conductivity

The *Kingspan OPTIM-R*™ element of the Rainscreen System achieves a thermal conductivity ( $\lambda$ -value) of 0.007 W/m·K (aged design value allowing for edge effect).

### Thermal Resistance

Thermal resistance (R-value) of the *Kingspan OPTIM-R*™ element of the Rainscreen System varies with thickness and is calculated by dividing the thickness of the panel (expressed in metres) by the thermal conductivity.

Insulant Thickness (mm)	Thermal Resistance (m <sup>2</sup> ·K/W)
20	2.857
25	3.571
30	4.285
40	5.714
50	7.143
60	8.571

# 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) 1544 388 601  
– Fax: +44 (0) 1544 388 888  
– email: [customerservice@kingspaninsulation.co.uk](mailto:customerservice@kingspaninsulation.co.uk)

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

## 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:

UK – Tel: +44 (0) 1544 387 384  
– Fax: +44 (0) 1544 387 484  
– email: [literature@kingspaninsulation.co.uk](mailto:literature@kingspaninsulation.co.uk)  
– [www.kingspaninsulation.co.uk/literature](http://www.kingspaninsulation.co.uk/literature)

Ireland – Tel: +353 (0) 42 979 5000  
– Fax: +353 (0) 42 975 4299  
– email: [info@kingspaninsulation.ie](mailto:info@kingspaninsulation.ie)  
– [www.kingspaninsulation.ie/literature](http://www.kingspaninsulation.ie/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:

UK – Tel: +44 (0) 1544 387 383  
– Fax: +44 (0) 1544 387 483  
– email: [tapered@kingspaninsulation.co.uk](mailto:tapered@kingspaninsulation.co.uk)

Ireland – Tel: +353 (0) 42 975 4297  
– Fax: +353 (0) 42 975 4296  
– email: [tapered@kingspaninsulation.ie](mailto:tapered@kingspaninsulation.ie)

## 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.

The Kingspan Insulation British Technical Service Department operates under a management system certified to the BBA Scheme for Assessing the Competency of Persons to Undertake U-value and Condensation Risk Calculations.



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

UK – Tel: +44 (0) 1544 387 382  
– Fax: +44 (0) 1544 387 482  
– email: [technical@kingspaninsulation.co.uk](mailto:technical@kingspaninsulation.co.uk)

Ireland – Tel: +353 (0) 42 975 4297  
– Fax: +353 (0) 42 975 4296  
– email: [technical@kingspaninsulation.ie](mailto:technical@kingspaninsulation.ie)

## General Enquiries

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

UK – Tel: +44 (0) 1544 388 601  
– Fax: +44 (0) 1544 388 888  
– email: [info@kingspaninsulation.co.uk](mailto:info@kingspaninsulation.co.uk)

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

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Kingspan Insulation Ltd is a member of:  
The National Insulation Association (NIA)



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