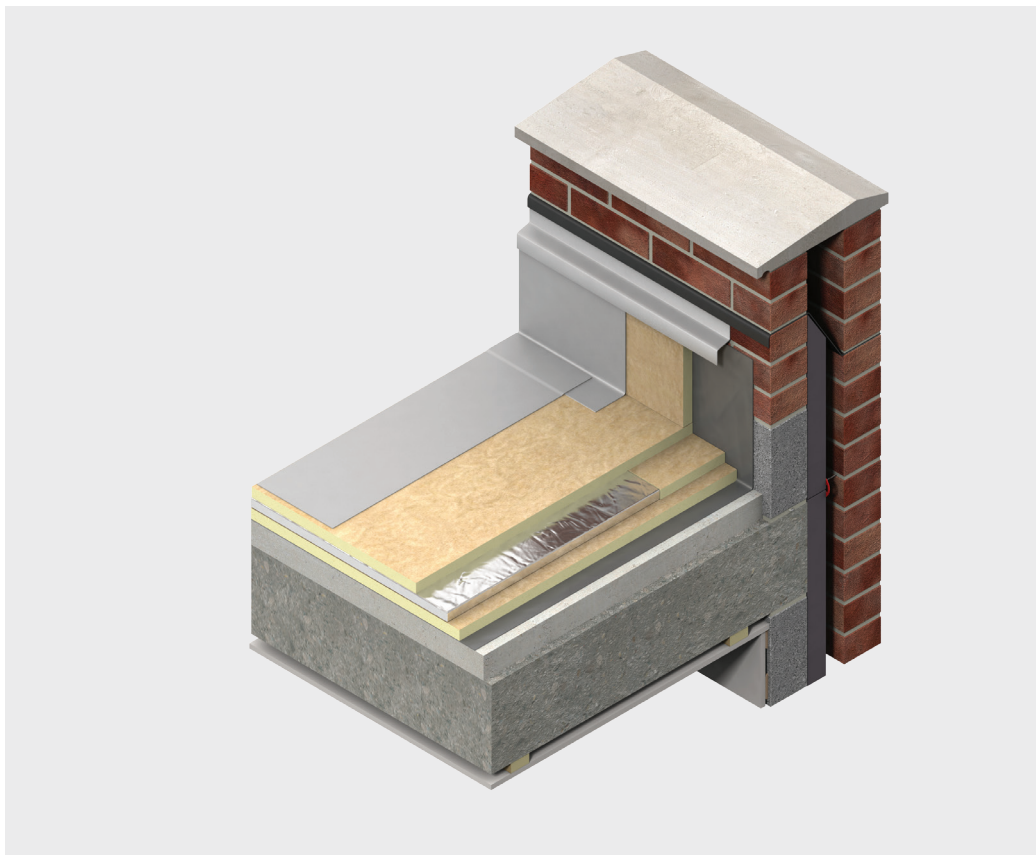


# OPTIM-R®

## Conventional Roofing System

Next generation insulation solution for flat roofs



- Optimum performance rigid vacuum insulation panel
- Insulating performance up to five times better than other commonly available insulation materials
- Resistant to the passage of water vapor
- Ideal for new construction and retrofit
- UL Classified and FM Approved\*

\*see Fire Performance section for details

# OPTIM-R®

## Introduction & Design Consideration

### The Problem

When constructing a roof in new build situations or replacing a roof in existing buildings there may be a requirement for both low U-values / high R-values and the thinnest possible roof 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 envelope 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 roof build-ups as thin as possible. In certain applications internal space may be at a premium or there may be little space for installing new roof insulation, for example in buildings with planning height restrictions.

### The Solution

The Kingspan OPTIM-R Conventional Roofing System has been developed to help solve these problems. The Kingspan OPTIM-R Conventional Roofing System is an optimum performance next generation insulation solution from Kingspan Insulation. It comprises of rigid vacuum insulation panels with a micro-porous core which is evacuated, encased and sealed in a thin, gas-tight envelope, giving outstanding thermal resistance, with the thinnest possible solution to insulation problems. The vacuum insulation panels are accompanied with rigid thermoset polyisocyanurate (PIR) insulation infill panels which can be cut to fit around problem areas such as sky lights or other roofing penetrations.

In retrofit applications, the Kingspan OPTIM-R Conventional Roofing System provides solutions for areas that previously would have remained un-insulated because of insufficient space available.

In new constructions, the Kingspan OPTIM-R Conventional Roofing System can significantly enhance U-values / R-values in areas that would otherwise be accepted as diminishing the overall thermal performance.

The high level of thermal efficiency with minimal thickness, achieved by the Kingspan OPTIM-R Conventional Roofing System provides solutions for applications where a lack of construction depth or space is an issue.

Tapered Roofing - The Kingspan Optim-R Single Ply Roofing can also be used in a tapered roofing system.

### Tapered Roofing

The Kingspan OPTIM-R Conventional Roofing System can also be used in a tapered roofing system.

### Design Services

Each Kingspan OPTIM-R system comes with a supporting design service which ensures the ratio of the Kingspan OPTIM-R to the Kingspan OPTIM-R infill and Kingspan OPTIM-R fix 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 square feet and location of the infill material. For more details please contact the Kingspan Insulation Technical Service Department.

### Typical Roofing Designs for the Kingspan OPTIM-R Roofing System

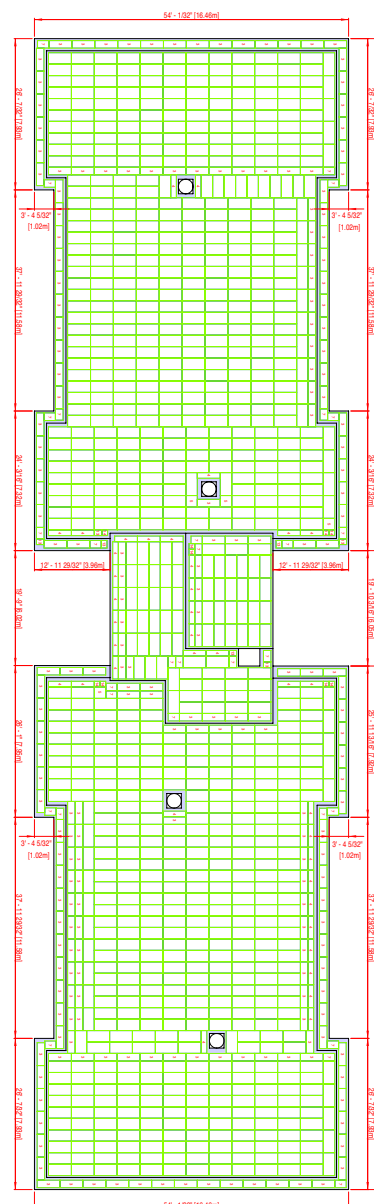


Figure 1

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# OPTIM-R®

## Design Consideration

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### Responsible Sourcing

The Kingspan OPTIM-R Conventional Roofing System is manufactured under a management system certified to ISO 14001: 2015.

### 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 neighboring communities.

A report covering the sustainability and responsibility of Kingspan Insulation Ltd's operations is available at [www.kingspan.com/group/commitments/planet-passionate](http://www.kingspan.com/group/commitments/planet-passionate)

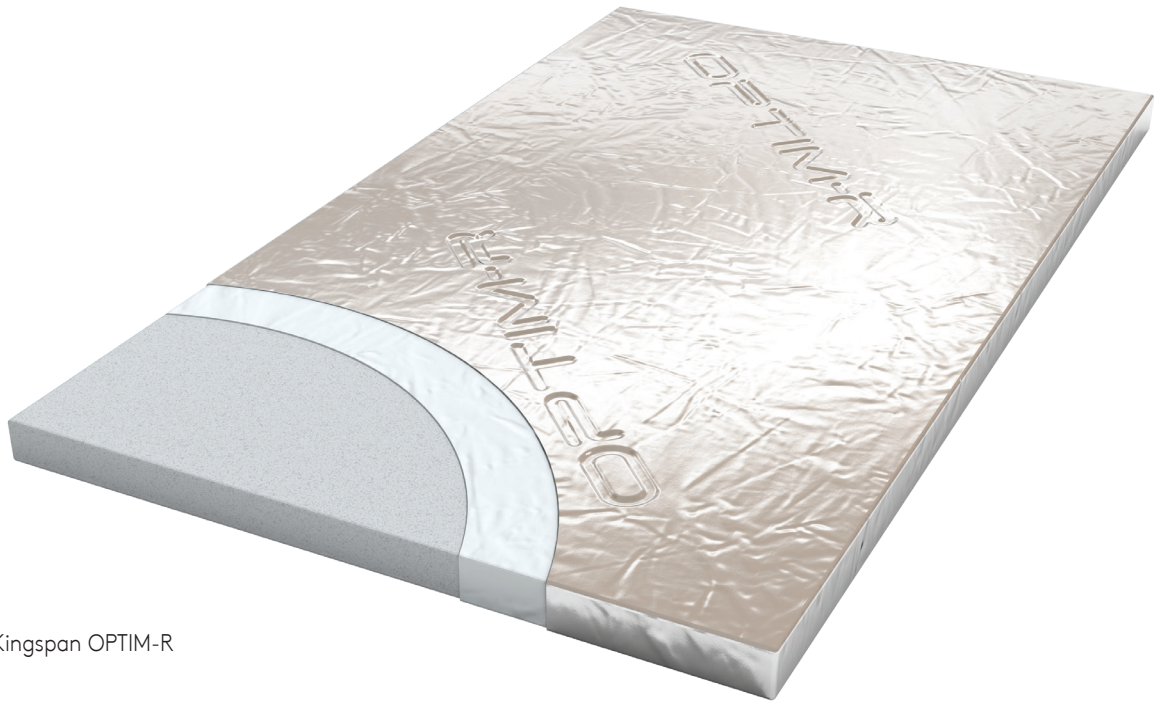
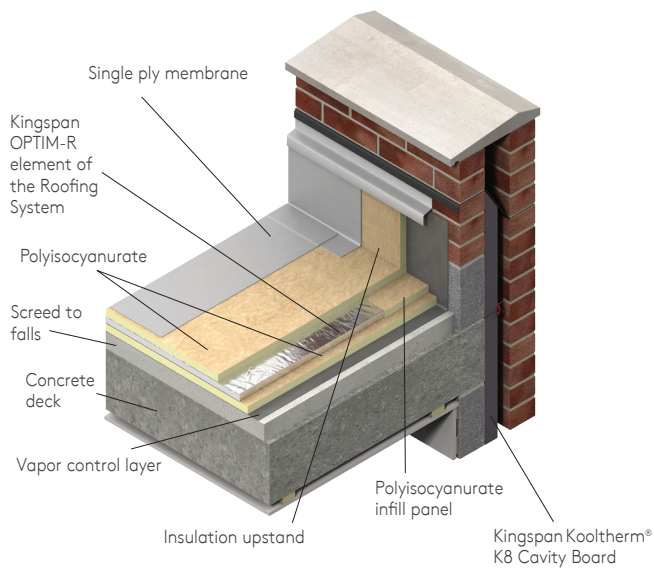


Figure 2: Kingspan OPTIM-R

# OPTIM-R®

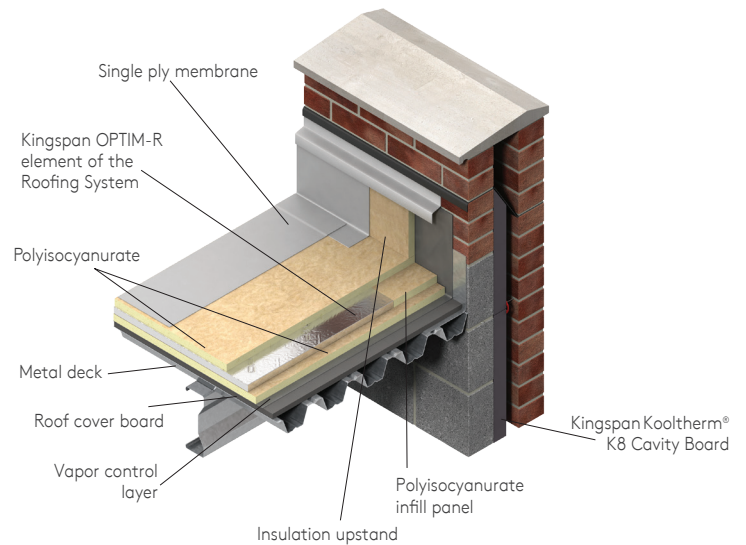
## Typical Construction

### ■ Concrete Deck Dense Concrete Deck with Suspended Ceiling



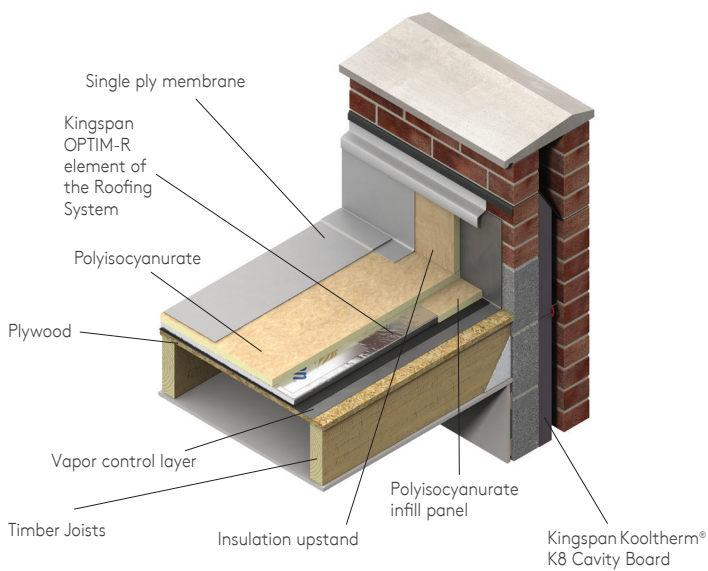
**Figure 3**  
\* Refer to Sitework.

### ■ Metal Deck Metal Deck with No Ceiling



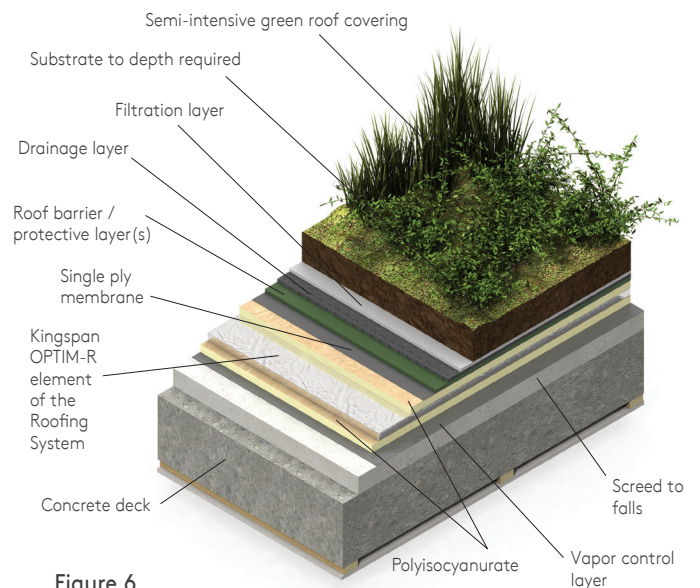
**Figure 4**  
\* Refer to Sitework.

### ■ Timber Deck Timber Deck with Drywall Ceiling



**Figure 5**  
\* Refer to Sitework.

### ■ Green Roof System Semi-intensive Green Roof Covering – Dense Concrete Deck with Suspended Ceiling



**Figure 6**  
\* Refer to Sitework.

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# OPTIM-R®

## Sitework

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### Wheeled / Foot Traffic

- The Kingspan Optim-R should not be directly walked on. A crawl board should be used during the installation process.

### General

- The Kingspan OPTIM-R panels in the Roofing System should not be used in association with solvent-based adhesive systems.
- The Kingspan OPTIM-R panels in the Roofing System should not be exposed to direct flames or excessive heat.

### Cutting

- The Kingspan OPTIM-R panels in the Roofing System should not be cut or penetrated.
- The substrate must be clean, dry and level, and free of sharp objects or edges.



### Availability

- Please contact Kingspan Insulation for availability of the Kingspan OPTIM-R Conventional Roofing System.

### Packaging and Storage

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

### Health and Safety

- Kingspan Optim-R Products are chemically inert and safe to use.
- A Safety Information Data Sheet for this product is available from the Kingspan Insulation website <https://www.kingspan.com/us/en/products/rigid-insulation/insulation-board/optim-r-panels/>

Please note that the reflective surface on this product is designed to enhance its thermal performance. As such, it will reflect light as well as heat, including ultraviolet light. Therefore, if this panel 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 sunscreen.

The reflective facing used on this product can be slippery underfoot when wet. Therefore, it is recommended that any excess material should be contained to avoid a slip hazard.

# OPTIM-R®

## Product Details

### Composition

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

### Standards and Approvals

Kingspan OPTIM-R® is manufactured to the highest standards under a management system certified to ISO 9001: 2015 (Quality Management Systems. Requirements), ISO 14001: 2015 (Environmental Management Systems. Requirements), ISO 45001: 2018 (Occupational Health and Safety Management Systems. Requirements) and ISO 50001: 2018 (Energy Management Systems. Requirements).



CERTIFIED TO: ASTM C165  
ASTM C1667 ASTM D2126



FM

Kingspan Optim-R has FM Approval for a number of thicknesses and dimensions to FM Class No. 4470 for certain single-ply, polymer-modified bitumen sheet, built-up roof (BUR) and liquid applied roof assemblies. For more details, please visit the online FM RoofNav Directory; [www.roofnav.com](http://www.roofnav.com) with a 'Product' and/or 'Assembly' search using term 'Optim-R' or consult the Kingspan Insulation Technical Services Department.

### UL

Kingspan OPTIM-R® & Optim-R® E are incorporated as a component within the UL Product IQ® directory; described within Roofing Systems under Category Code Number(CCN) (TGFU) for UL 790, Standard Test Methods for Fire Tests of Roof Coverings & Building Units under Category Code Number(CCN) of TIAR for UL 1256 : UL Standard for Fire Test of Roof Deck Constructions. Both Optim-R & Optim-R E are designated by UL as being eligible to mark as:



Further details on accredited designs can be located on <https://iq.ulprospector.com/> searching for either 'Kingspan Insulation LLC', the File No. R38653 or the 'CCN' referred to above. Alternatively please contact Kingspan Insulation's Technical Service Department (see rear cover for details)

Property	Test Method	Result
General		
Nominal Thickness (in / mm)		0.79 - 1.97 / 20 - 50
Standard Dimensions		
Width (in / mm)		11.8 - 23.6 / 300 - 600
Length (in / mm)		11.8 - 47.2 / 300 - 1200
Nominal Panel Mass (lbs per sq. ft. / kg per sq. m)		
20 mm thickness		0.82 / 4
25 mm thickness		1.02 / 5
30 mm thickness		1.23 / 6
35 mm thickness		1.43 / 7
40 mm thickness		1.64 / 8
Compressive Strength, Min. (psi) @ 10% deformation	ASTM C165	23
Dimensional Stability	ASTM D2126	
20 mm (0.79 in) - 50 mm (1.97 in)	Length max Width max	0.5 % 0.6 %
Flame Spread Index/Smoke Development Index	ASTM E84	Class B**

\* Contact Kingspan Insulation for available non-stock sizes.  
\*\* See Intertek Listing (SPEC ID: 44477) for more information

### Density

The density of Kingspan OPTIM-R® falls within the range of 10.6 - 13.10 pcf / 170 - 210 kg/m<sup>3</sup> when tested to BS EN 1602: 2013 (Thermal insulating products for building applications. Determination of the apparent density).

### Durability

If installed correctly and protected from damage and penetration, the Kingspan panels will provide reliable long-term thermal performance.

### Resistance to Solvents, Fungi & Pests

The Kingspan OPTIM-R panels should not be used in direct contact with solvent-based adhesive systems. Damaged panels or panels 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 panels resist attack by mold and microbial growth, and do not provide any food value to pests.

# OPTIM-R®

## Kingspan Insulation

### Thermal Resistance

ASTM C1667 (Standard Test Method for Using Heat Flow Meter Apparatus to Measure the Center-of-Panel Thermal Transmission Properties of Vacuum Insulation Panels) is the only test method designated by ASTM to be used specifically for testing center panel thermal resistance of Vacuum Insulated Panels. ASTM C1667 further states that Vacuum Insulated Panels fall outside the scope of test method ASTM C518. All of the below stated thermal resistance values are based on Certified ASTM C1667 testing.

Thermal resistance (R-value) of the Kingspan OPTIM-R® panels of the Roofing System varies with thickness and is calculated by dividing the thickness of the panel by its thermal conductivity.

ASTM C1667 Center Panel Thermal Resistance Properties		
Insulant Thickness		Thermal Resistance (R-value)
(in)	(mm)	ft <sup>2</sup> ·°F·hr/Btu
0.79	20	26
0.98	25	32*
1.18	30	37*
1.57	40	49*
1.97	50	60

Refer to Kingspan Insulation for current stock and non-stock sizes.

\*These values are based on linear interpolation of test results for 20mm and 50mm Optim-R boards.

Calculated Edge Effect Thermal Resistance Properties*		
Insulant Thickness		Thermal Resistance (R-value)
(in)	(mm)	ft <sup>2</sup> ·°F·hr/Btu
0.79	20	22
0.98	25	28
1.18	30	33
1.57	40	46
1.97	50	57

\* Based on ASTM C1667 Thermal Resistance Values. Edge effect R-values vary based on panel size. The listed edge effect R-values in the table are based on the average edge effect R-values from six of the most commonly used panel sizes. Refer to Kingspan Insulation for current stock and non-stock sizes.

### Company Details

Kingspan Insulation LLC is part of the Kingspan Group plc., one of Europe's leading construction product manufacturers. The Kingspan Group was formed in the late 1960s and is a publicly traded group of companies headquartered in Kingscourt, County Cavan, Ireland.

Kingspan Insulation LLC, headquartered in Atlanta, GA, is a leading manufacturer in energy efficiency and moisture management products, offering high performance insulation, building wraps and pre-insulated HVAC ductwork.

### Products & Applications

Kingspan Insulation LLC has a vast product range that includes optimum, premium and high performance rigid insulation products and moisture management products suitable for both new build and renovation in a variety of applications within both residential and non-residential buildings.

### Insulation Product Benefits

#### Kingspan Kooltherm® K-range Products

- Higher R-value per inch than any commonly used insulation
- Each product achieves the required fire performance for its intended application.
- ASTM E84 rating of 25/20 (flame/smoke).
- Manufactured with a blowing agent that has zero ODP, low GWP, HCFC and CFC free.

#### Kingspan GreenGuard® Products

- Rigid extruded polystyrene insulation (XPS) for use as general purpose insulation for roofing, wall and foundation applications requiring a minimum compressive strength.
- R-value of 5.0 per inch of thickness.
- Continuous Insulation (Ci) for above grade walls, as well as below grade walls and floors.
- Provides an extra barrier against moisture infiltration.

### All Products

- Their closed cell structure resists both moisture and water vapor ingress – a problem which can be associated with open cell materials such as mineral fiber and which can result in reduced thermal performance.
- Unaffected by air infiltration – a problem that can be experienced with mineral fiber and which can reduce thermal performance.
- Safe and easy to install.
- If installed correctly, can provide reliable long term thermal performance over the lifetime of the building.

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# Contact Details

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## USA

**Kingspan Insulation LLC**  
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F: +1 (678) 589 7325  
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[www.kingspaninsulation.us](http://www.kingspaninsulation.us)



Please scan the QR code for the most recent product information.

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For the most recent product information, please scan the QR code.

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