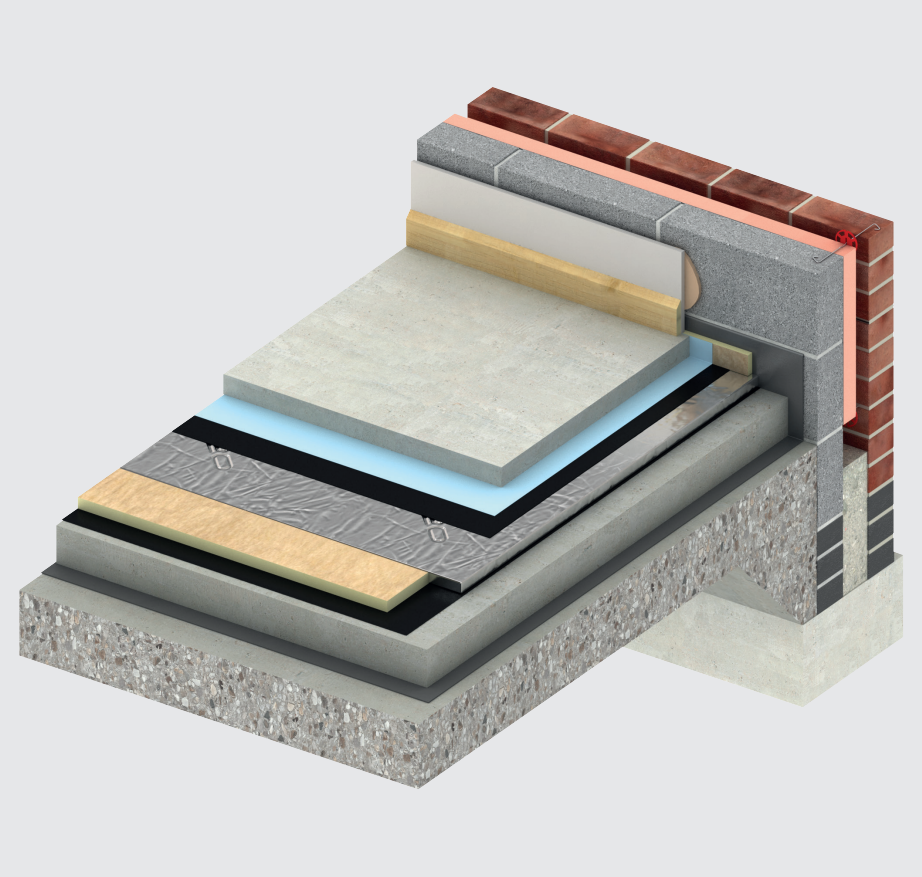
Fifth Issue I 05/2023

OPTIM-R® Flooring System

Next generation insulation solution for floors



- Optimum performance rigid vacuum insulation panel with a declared thermal conductivity of 0.007 W/mK
- Ideal for constructions where a lack of construction depth or space is an issue
- Certified by BDA Agrément®*
- Resistant to the passage of water vapour
- Ideal for new build and refurbishment
- Non-deleterious material

*Certified for thicknesses of 20 - 50 mm

Kingspan®

Introduction

The problem

When constructing a floor in new build situations or replacing a floor in existing buildings there may be a requirement for both low U-values and the thinnest possible floor build-up.

For new-build applications, there are increasing regulatory requirements and economic reasons to improve energy efficiency. One of the more efficient 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 some of these requirements, however in certain areas, for example where the design requirements are such, a new, thinner, product is needed.

In refurbishment there is arguably a greater need to keep floor build-ups as thin as possible. With space at a premium, there may be little room for installing new floor insulation. Greater thicknesses of floor insulation will necessitate the removal of a greater depth of material and may mean ground floor door lintels, radiators and skirting boards etc, all need to be raised. This could add to the cost and time of installing a replacement concrete floor.

The solution

With a declared thermal conductivity (λ) of 0.007 WmK, taking into account edge effect, Kingspan OPTIM-R® has been developed to help solve these problems. The Kingspan OPTIM-R® Flooring 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, and providing the thinnest possible solution to insulation problems. The vacuum insulation panels are accompanied by rigid thermoset insulation infill panels which can be used where the remaining dimension to infill is below 300 mm or can be cut to fit around problem areas such as penetrations or load bearing walls.

In retrofit applications, the Kingspan OPTIM-R® Flooring System provides solutions for areas that previously would have remained un-insulated because of insufficient space available or because the excavation of material is impractical.

In new constructions the Kingspan OPTIM-R® Flooring System can significantly enhance U-values in areas that would otherwise be accepted as denigrating the overall thermal performance.

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

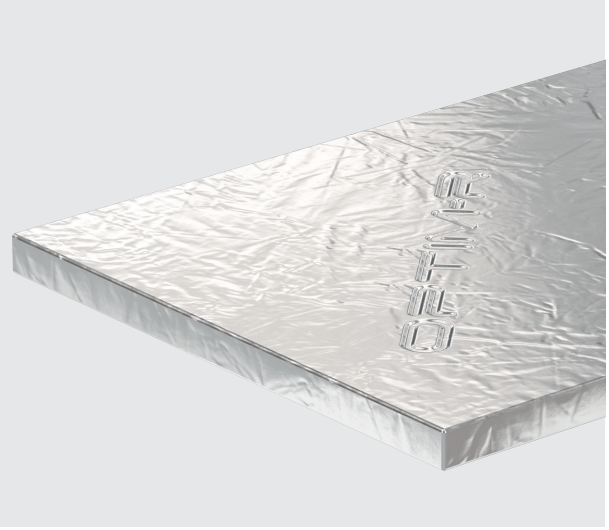


Figure 1: Kingspan OPTIM-R® vacuum insulation panel

Design service

The Kingspan OPTIM-R® Flooring System comprises 2 elements: OPTIM-R® panels and Kingspan OPTIM-R® flex infill strips. It comes with a supporting design service which ensures the ratio of OPTIM-R® panels to 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 OPTIM-R® panels. It will also illustrate the size, number and location of any OPTIM-R® flex strips required.

Examples of a typical design layout can be seen in Figures 2 & 3.

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

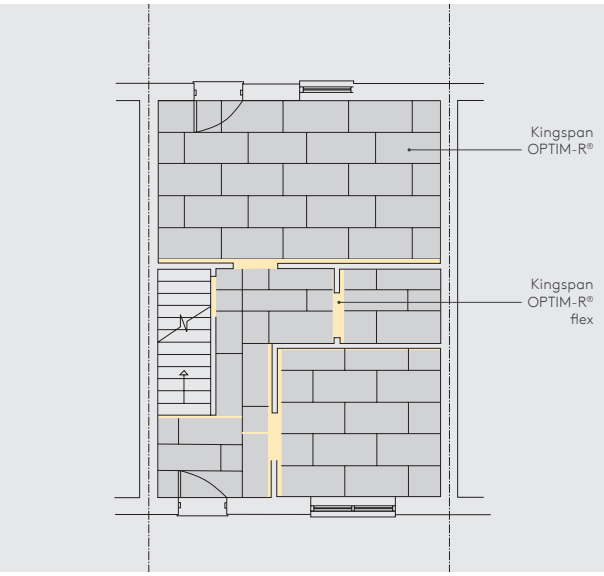


Figure 2: A typical terraced property with a solid concrete ground based floor

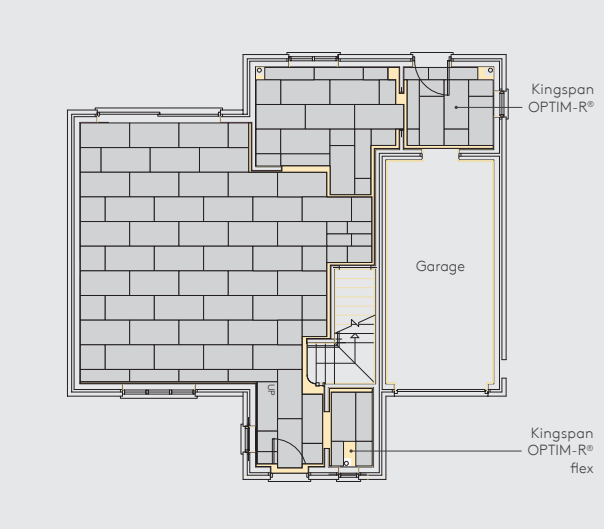


Figure 3: A typical property with a beam and dense block ground floor

Typical constructions and U-values

Assumptions

The U-values in the tables that follow have been calculated, using the method detailed in BS / I.S. EN ISO 13370: 2017 (Thermal performance of buildings. Heat transfer via the ground. Calculation methods) and using the conventions set out in BR 443 (Conventions for U-value calculations). They are valid for the constructions shown in the details immediately above each table.

Unlike roofs, walls and intermediate floors, U-value calculations for ground floors cannot be calculated with reference to the construction detail alone. Heat loss from ground floors depends upon the ratio of the exposed floor perimeter to the total floor area, the thickness of any basement wall and the depth of any basement.

Floor dimensions should be measured between the finished internal surfaces of the external walls. Non-usable heated space such as ducts and stairwells should be included when determining the area of the floor. Unheated spaces outside of the insulated fabric, such as attached garages or porches, should be excluded when determining the area of the floor, but the length of the wall between the heated building and the unheated space should be included when determining the perimeter. The floor dimensions of semi-detached, terraced or other joined premises / dwellings can be taken either as those of the premises / dwelling itself or those of the whole building. Where extensions to existing buildings are under consideration, the floor dimensions should be taken as those of the extension.

If the P/A ratio lies between two of the numbers shown in the tables that follow, for a safe estimate, please use the P/A ratio shown that is the next highest i.e. for 0.57 use 0.6.

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

NB For the purposes of these calculations, using the method as detailed in BS / I.S. EN ISO 13370: 2017, the soil has been assumed to be gravel or sand, the wall insulation is assumed to overlap the floor insulation by minimum 150 / 225* mm for a concrete floor and 200 mm for a timber floor, and the standard of workmanship has been assumed good and therefore the correction factor for air gaps has been ignored.

NB For the purposes of these calculations, the bridging effect of the Kingspan OPTIMR-R® flex has been taken to be 15%. This figure is a starting point, for accurate calculations a design will be required and the bridging effect may change the U-values achieved.

NB If your construction is different from those specified and / or to gain a comprehensive U-value calculation for your project please consult the Kingspan Insulation Technical Service Department for assistance (see rear cover).

* 150 mm applies to the UK and 225 mm to the Republic of Ireland.

Typical constructions and U-values

Beam and dense* block ground floor

Insulation below the floor screed

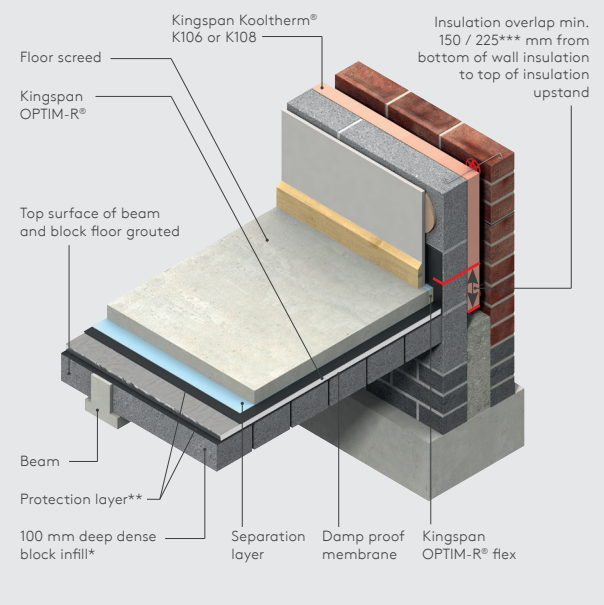


Figure 4

U-values (W/m²K) for various thicknesses of Kingspan OPTIM-R®and floor perimeter / area ratios						
Insulant thickness (mm)	Perimeter / area (m^{-1})					
	0.2	0.3	0.4	0.5	0.6	0.7
20	0.22	0.25	0.27	0.28	0.29	0.30
25	0.20	0.22	0.23	0.24	0.25	0.26
30	0.18	0.20	0.21	0.22	0.22	0.23
40	0.15	0.16	0.17	0.18	0.18	0.18
50	0.13	0.14	0.15	0.15	0.15	0.16
30 + 30****	0.12	0.12	0.13	0.13	0.13	0.13
30 + 40	0.10	0.11	0.11	0.12	0.12	0.12
40 + 40	0.09	0.10	0.10	0.10	0.10	0.11

* Calculations assume dense block infill of λ-value (1.13 W/mK).

** Refer to sitework.

*** 150 mm applies to the UK and 225 mm to the Republic of Ireland.

**** Where multiple layers of insulation of different thicknesses are used, the thickest layer should be installed as the outermost layer in the construction.

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

NB For the purposes of these calculations, the bridging effect Kingspan OPTIM-R® flex has been taken to be 15%. This figure is a starting point, for accurate calculations a design will be required and the bridging effect may change the U-values achieved.

Solid concrete ground based floors

Insulation below the floor screed

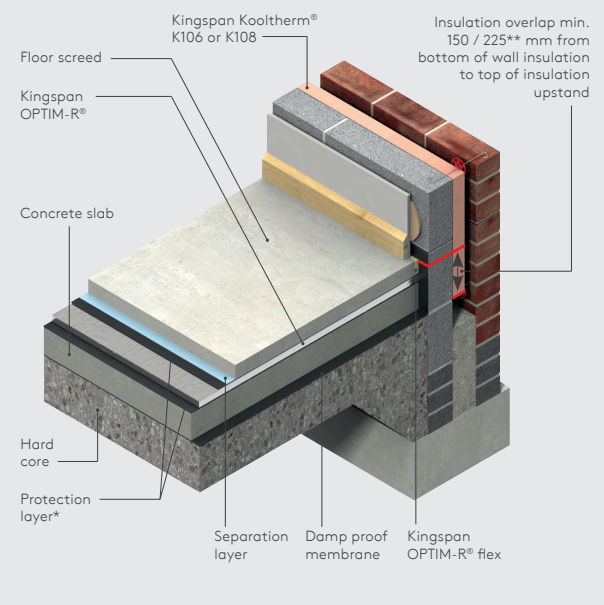


Figure 5

U-values (W/m²K) for various thicknesses of Kingspan OPTIM-R®and floor perimeter / area ratios						
Insulant thickness (mm)	Perimeter / area (m^{-1})					
	0.2	0.3	0.4	0.5	0.6	0.7
20	0.21	0.25	0.27	0.28	0.30	0.31
25	0.19	0.22	0.23	0.25	0.26	0.26
30	0.17	0.19	0.21	0.22	0.23	0.23
40	0.15	0.16	0.17	0.18	0.18	0.19
50	0.13	0.14	0.15	0.15	0.16	0.16
30 + 30***	0.11	0.12	0.13	0.13	0.13	0.14
30 + 40	0.10	0.11	0.11	0.12	0.12	0.12
40 + 40	0.09	0.10	0.10	0.10	0.11	0.11

* Refer to sitework.

** 150 mm applies to the UK and 225 mm to the Republic of Ireland.

*** Where multiple layers of insulation of different thicknesses are used, the thickest layer should be installed as the outermost layer in the construction.

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

NB For the purposes of these calculations, the bridging effect Kingspan OPTIM-R® flex has been taken to be 15%. This figure is a starting point, for accurate calculations a design will be required and the bridging effect may change the U-values achieved.

Typical constructions and U-values

Timber floating floor

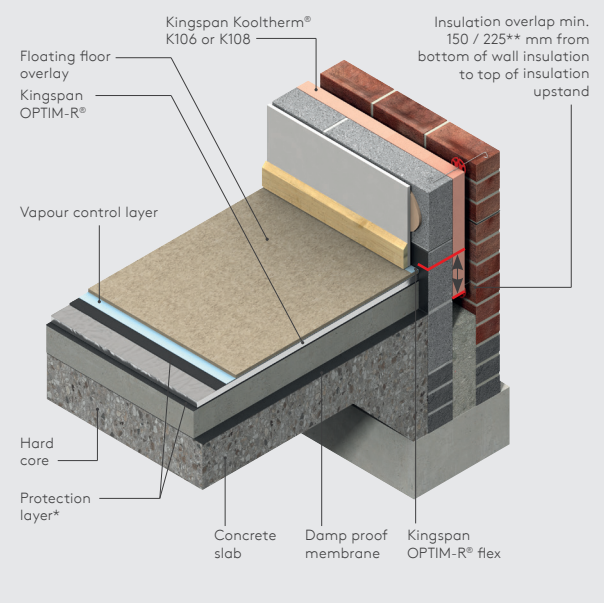


Figure 6

U-values (W/m²K) for various thicknesses of Kingspan OPTIM-R® (with an 18 mm tongue and grooved overlay)and floor perimeter / area ratios

Insulant thickness (mm)	Perimeter / area (m^{-1})					
	0.2	0.3	0.4	0.5	0.6	0.7
20	0.21	0.24	0.26	0.28	0.29	0.30
25	0.19	0.21	0.23	0.24	0.25	0.26
30	0.17	0.19	0.21	0.22	0.22	0.23
40	0.14	0.16	0.17	0.18	0.18	0.19
50	0.12	0.14	0.14	0.15	0.15	0.16

* Refer to sitework.

** 150 mm applies to the UK and 225 mm to the Republic of Ireland.

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

NB For the purposes of these calculations, the bridging effect Kingspan OPTIM-R® flex has been taken to be 15%. This figure is a starting point, for accurate calculations a design will be required and the bridging effect may change the U-values achieved.

U-values (W/m²K) for various thicknesses of Kingspan OPTIM-R® (with two layers of 10 mm gypsum fibre board overlay) and floor perimeter / area ratios

Insulant thickness (mm)	Perimeter / area (m^{-1})					
	0.2	0.3	0.4	0.5	0.6	0.7
20	0.21	0.25	0.27	0.28	0.29	0.30
25	0.19	0.22	0.23	0.25	0.26	0.26
30	0.17	0.19	0.21	0.22	0.23	0.23
40	0.14	0.16	0.17	0.18	0.18	0.19
50	0.13	0.14	0.15	0.15	0.16	0.16

* Refer to sitework.

** 150 mm applies to the UK and 225 mm to the Republic of Ireland.

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

NB For the purposes of these calculations, the bridging effect Kingspan OPTIM-R® flex has been taken to be 15%. This figure is a starting point, for accurate calculations a design will be required and the bridging effect may change the U-values achieved.

Typical constructions and U-values

Underfloor heating systems

The constructions shown in the 'Typical constructions and U-values' section can be readily converted to accommodate underfloor heating systems.

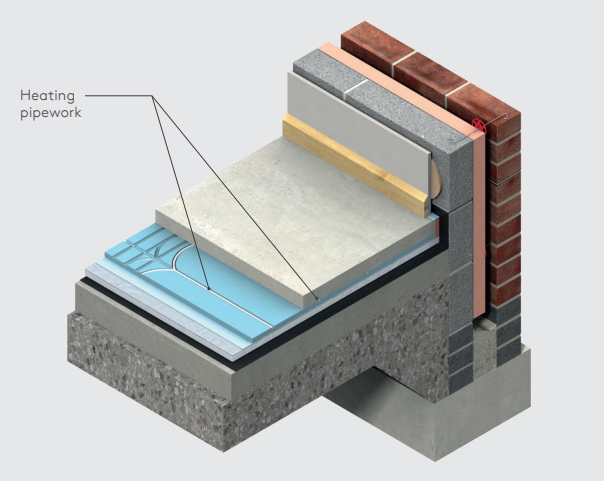


Figure 7: Intermittent heating applications - installed onto solid concrete floor underneath screed

For intermittent heating applications, where a fast response time is required, it is beneficial to have less thermal mass available to take up heat from the system and so placing the insulation layer below the floating floor but above the concrete slab (Figures 7 and 8) or beam and block floor (Figure 9) is the best solution.

The panels must not be punctured and heating pipes should be placed in a tray (Figures 7, 8 and 9).

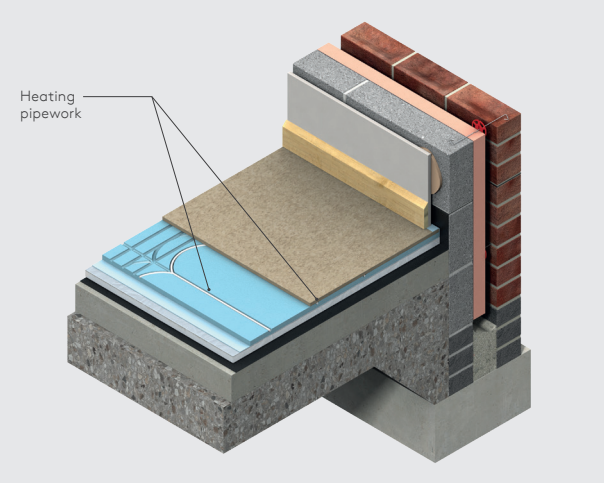


Figure 8: Intermittent heating applications - installed onto concrete floor, underneath timber floating floor

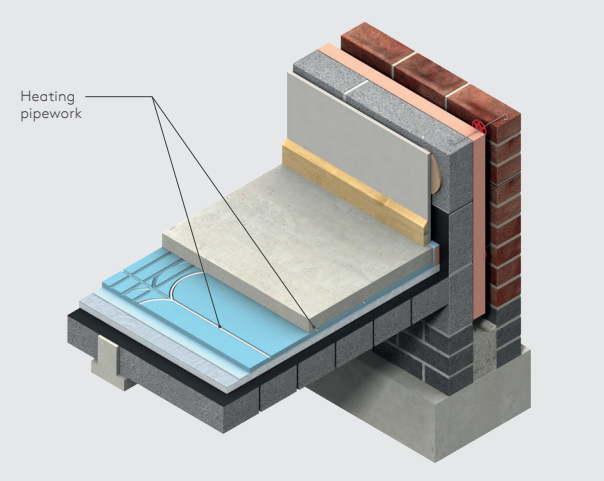


Figure 9: Intermittent heating applications - installed onto beam and block floor underneath screed

Design considerations

Heat loss and linear thermal bridging

Basic principles

Linear thermal bridging describes the heat losses that occur at junctions between elements, which is additional to the losses occurring through roofs, walls and floors. This heat loss is represented by the junction's psi (ψ) value. The lower the ψ-value, the better the performance of a junction detail. The ψ-values and lengths of linear thermal bridges are accounted for in whole building energy and carbon dioxide emissions calculations.

In a typical wall-to-ground floor junction the heat will flow through the easiest path, for example in a masonry cavity wall the linear thermal bridge is primarily the inner leaf of masonry and in a timber frame wall the linear thermal bridge is primarily the sole plate and the construction below it. These linear thermal bridges can be reduced by increasing the distance that the heat has to travel.

Approved details, such as the Acceptable Construction Details (Republic of Ireland), can uplift performance to provide a clear starting point towards achieving compliance, but can be limited in scope and applicability. Where applicable, the principles in these details are also considered good practice for refurbishment. Existing building junction losses are not typically accounted for in whole building heat loss calculations and only the risks of surface condensation and mould growth are considered.

The greatest opportunity for mitigating the impact of linear thermal bridges can come from following accurately 'modelled' details that take into account the following design considerations.

Reducing linear thermal bridging

Detailing at junctions to minimise the effects of thermal bridging and the associated risk of condensation or mould growth is important and there are some simple design considerations that can be adopted to help mitigate the risks and to reduce heat losses.

- For retrofit or refurbishment of existing buildings using the Kingspan OPTIM-R® Flooring System, achieving continuity of insulation is the best approach to limiting losses through the wall / floor junctions; failing continuity between floor and wall insulation layers, overlap of insulation layers and use of lower conductivity materials represents a good practice approach; however where neither option is possible, the risk of surface condensation will require particular consideration in determining an appropriate approach. Details and designs should be considered in the context of the property, it's construction, characteristics, condition and ventilation provisions.
- For new build applications, care is also required to ensure continuation of insulation wherever possible between the wall and floor for best thermal performance. Where this is not possible, the insulation should be overlapped and ideally, lower conductivity material introduced between.
- In order to minimise cold bridging at the edge of the floor, the distance between the top surface of the floor insulation or perimeter insulation upstand, and the bottom of the wall insulation must be a minimum of 150 / 225* mm for a concrete floor and 200 mm for a suspended timber floor. The further down the wall insulation extends past the floor insulation, the better the thermal performance of the junction between the wall and the floor.

  * 150 mm applies to the UK and 225 mm to the Republic of Ireland.
- Perimeter upstand insulation helps to reduce heat losses from the junction between the floor and external walls. The upstand insulation helps to increase the distance that the heat has to travel in order to escape through the junction, which therefore helps to reduce heat loss. Omitting this, or using a poorer performing insulation, can increase these losses.
- Using better thermally performing 'lightweight' aggregate blockwork for the inner leaf of cavity walls in adjacency to the junction with the floor can assist with lowering heat losses from the junction.
- An internal lining of insulation on the warm side of the construction can help to reduce the heat losses through the junction. The internal lining could be a wall lining for the whole wall area, such as Kingspan Kooltherm® K118 Insulated Plasterboard, or could be localised insulation behind the plasterboard to help reduce a junction's losses (and losses from any timber soleplate).
- One of the best approaches to minimising cold bridging is to use external wall insulation, making the whole wall and any junctions warm, with suitable wall insulation at the junction with the ground floor extending past the level of the floor insulation below ground level.

For further advice on details to reduce linear thermal bridging please contact the Kingspan Insulation Technical Service Department (see rear cover for details).

Design considerations

Responsible sourcing

Kingspan OPTIM-R® produced at Kingspan Insulation's Pembridge, Herefordshire manufacturing facility is manufactured under a management system certified to ISO 14001: 2015 (Environmental management systems. Requirements with guidance for use).

NB The above information is correct at the time of writing. Please confirm at the point of need by visiting the **Kingspan Insulation website**, from which copies of Kingspan Insulation's certificates can be obtained.

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 operations at its Pembridge, Herefordshire and Selby, North Yorkshire manufacturing facilities is available upon request from **literature@kingspaninsulation.co.uk.**

Specification clause

Kingspan OPTIM-R® should be described in specifications as:–

The floor insulation shall be the Kingspan OPTIM-R® Flooring 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: 2015, ISO 14001: 2015, ISO 45001: 2018 and ISO 50001: 2018; by Kingspan Insulation Limited; and installed in accordance with the instructions issued by them.

NBS specifications

Uniclass UK

Pr_25_57_06_94 Vacuum insulated panels

CAWS

E20 200, M10 290 and M13 260 (Standard and Intermediate)

E20 30, M10 40 and M13 40 (Minor Works)

Details also available at **source.thenbs.com**.

Design standards

Consideration should be given to the recommendations of BS 8102: 2009 (Code of practice for protection of buildings against water from the ground), BS 8215: 1991 (Code of practice for design and installation of damp proof courses in masonry construction), and the information given in Building Research Establishment Digest 104 (Floor Screeds).

Substrate

Kingspan OPTIM-R® is not recommended for use in direct contact with subsoil and must be positioned above the DPM.

Lightning protection

Designers should give consideration to the requirements of BS / I.S. EN 62305: 2011 (Protection against lightning).

Protection layer

Kingspan OPTIM-R® can be supplied with a bonded protection layer. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).

Sitework

Installation below a floor screed

- Concrete slabs should be allowed to dry out fully prior to the installation of the Kingspan OPTIM-R® Flooring System (average 1 day per mm of slab thickness).
- The surface of the slab should be smooth, flat and free from projections. Thorough cleaning of the floor and removal of all projections is essential. Beam and block floors should be level and grouted.
- If a damp proof membrane (minimum 300 micron / 1200 gauge polythene) is required, it should be laid with joints well lapped and folded, to prevent the passage of ground water, over the concrete slab or beam and block floor, prior to installing the Kingspan OPTIM-R® Flooring System.
- The membrane should be brought up the surrounding walls until it is sufficiently above the height of the wall DPC so that it will connect with or form the DPC.
- A protection layer should be used under the Kingspan OPTIM-R® panels. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).
- Kingspan OPTIM-R® panels should always be loose-laid, break bonded where practical, with all joints lightly butted. All OPTIM-R® panels are to be installed with the film flaps against the substrate.
- Starting at each external corner of the floor proceed to lay Kingspan OPTIM-R® across the floor area in a break bond pattern with all panel joints lightly butted (see Figures 1 & 2). Where runs of OPTIM-R® do not accurately fit the dimension of the floor the use of OPTIM-R® flex strips is required to make up this difference. Each OPTIM-R® flex strip is to be the same thickness as the OPTIM-R® panels.
- A strip of Kingspan OPTIM-R® flex (minimum 25 mm thickness) should be placed vertically around the perimeter of the floor slab in order to reduce cold bridging. The top of the vertical strip of the OPTIM-R® flex should be level with the top of the floor screed and the bottom should be level with the bottom of the horizontal floor insulation, and closely butted up to it.
- A protection layer may be used over the insulation. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).
- Insulation panels (both Kingspan OPTIM-R® and any Kingspan OPTIM-R® flex strips used) should be overlaid with a separation layer (not less than 125 micron / 500 gauge) to prevent the wet screed penetrating the joints between the boards and to act as a vapour control layer. Ensure the separation layer has 150 mm overlaps, taped at the joints, and is turned up 100 mm at the walls.

Installation below a floating floor

- Concrete slabs should be allowed to dry out fully prior to the installation of the Kingspan OPTIM-R® Flooring System (average 1 day per mm of slab thickness).
- The surface of the slab should be smooth, flat and free from projections. Thorough cleaning of the floor and removal of all projections is essential. Beam and block floors should be level and grouted. In accordance with BRE Good Building Guide 28 Part 1 (Domestic floors: construction insulation and damp-proofing), irregularities should not exceed 5 mm when measured with a 2 metre straight edge.
- A thin layer of cement / sand mortar, a levelling screed, or a proprietary levelling compound can be used to achieve a level surface. This should be allowed to set, harden and dry (approximately 1 day per mm) before proceeding further.
- If there is no damp proof membrane in the concrete floor, one (300 micron / 1200 gauge polythene) should be laid with joints well lapped and folded, to prevent the passage of ground water, over the concrete slab, or beam and block floor, prior to installing the Kingspan OPTIM-R® Flooring System.
- The membrane should be brought up the surrounding walls until it is sufficiently above the height of the wall DPC so that it will connect with or form the DPC.
- To comply with NHBC recommendations, preservative treated softwood timber battens should be positioned at doorways, access panels and to support partitions. The size of the battens selected should ensure that, when installed, the top surface of the insulation panels are flush with the top of the battens.
- A protection layer should be used under the Kingspan OPTIM-R® panels. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).
- Kingspan OPTIM-R® panels should always be loose-laid, break bonded where practical, with all joints lightly butted. All OPTIM-R® panels are to be installed with the film flaps against the substrate.
- Starting at each external corner of the floor proceed to lay Kingspan OPTIM-R® across the floor area in a break bond pattern with all panel joints lightly butted. Where runs of OPTIM-R® do not accurately fit the dimensions of the floor the use of Kingspan OPTIM-R® flex strips is required to make up this difference (see Figures 1 & 2). Each OPTIM-R® flex strip is to be the same thickness as the OPTIM-R® panels.
- A protection layer should be used over the insulation. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).
- Insulation panels (both Kingspan OPTIM-R® and any Kingspan OPTIM-R® flex strips used) should be overlaid with a separation layer (not less than 125 micron / 500 gauge), to act as a slip layer, and a vapour control layer. Ensure the polythene sheet has 150 mm overlaps, taped at the joints, and is turned up 100 mm at the walls.
- Kingspan OPTIM-R® can be used in conjunction with a number of flooring overlays, such as timber floor boards or gypsum fibre boards. For more information please contact the Kingspan Insulation Technical Service Department (see rear cover). Flooring overlays should be installed as per the manufacturer's instructions.

Sitework

Wheeled / foot traffic

- Kingspan OPTIM-R® panels should not be walked on. A protective foot or crawl board should be used during the installation process.

General

- Kingspan OPTIM-R® should not be used in association with solvent–based adhesive systems.
- Kingspan OPTIM-R® should not be exposed to naked flames or excessive heat.

Cutting

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

Availability

- Please contact Kingspan Insulation for availability of the Kingspan OPTIM-R® Flooring System.

Packaging and storage

- The packaging of the Kingspan OPTIM-R® Flooring System should not be considered adequate for outdoor protection. The OPTIM-R® Flooring 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** or **www.kingspaninsulation.ie/safety**.

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 sun cream.

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.

Product details

Composition

Kingspan OPTIM-R® panels comprise a rigid vacuum insulation panel with a microporous core which is evacuated, encased and sealed in a thin, gas-tight envelope.

The Kingspan OPTIM-R® flex strips comprise of a high performance rigid thermoset phenolic insulant, faced on both sides with a glass tissue facer.

Standards & approvals

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

The use of Kingspan OPTIM-R® is covered by BDA Agrément Certificate BAE 18-035-P-A-UK (20 - 50 mm) and is covered by ETA Certificate No. ETA-15/0090-v06.

Standard dimensions

Kingspan OPTIM-R® panels are available in the following standard size(s):

Nominal dimension		Availability
Length	(mm)	300 - 1200
Width	(mm)	300 - 600
Insulant Thickness	(mm)	20 - 50

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

Compressive strength

The compressive strength of Kingspan OPTIM-R® panels typically exceeds 150 kPa at 10% compression when tested to BS EN ISO 826: 2013 (Thermal insulating products for building applications. Determination of compression behaviour).

Durability

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

Resistance to solvents, fungi & rodents

The Kingspan OPTIM-R® Flooring 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® Flooring System resist attack by mould and microbial growth, and do not provide any food value to vermin.

Fire performance

Kingspan OPTIM-R® achieves European Classification (Euroclass) E when classified to EN 13501-1: 2018 (Fire classification of construction products and building elements. Classification using data from reaction to fire tests).

Under System 4 AVCP, Kingspan OPTIM-R flex has a Euroclass rating of F.

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

Product details

Thermal properties

The λ-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 declared value.

Thermal conductivity

Kingspan OPTIM-R® achieves a declared thermal conductivity (λ-value) of 0.007 W/mK.

Kingspan OPTIM-R flex strips achieve a thermal conductivity (λ-value) of 0.019 W/mK.

Thermal resistance

Thermal resistance (R-value) varies with thickness and is calculated by dividing the thickness of the panel (expressed in metres) by the thermal conductivity. The resulting number is rounded down to the nearest 0.05 (m^2K/W).

The thermal resistance of Kingspan OPTIM-R® panels is as follows:

Insulant thickness (mm)	Thermal resistance (m^2K/W)
20	2.85
25	3.55
30	4.25
40	5.70
50	7.10

The thermal resistance of Kingspan OPTIM-R® flex strips is as follows:

Insulant thickness (mm)	Thermal resistance (m^2K/W)
25	1.30
30	1.55
40	2.10
50	2.60
60	3.15

Contact details

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