



Kingspan Insulation

Flat Roofing Quick Guide



*Low Energy –
Low Carbon Buildings*

Kingspan Insulation Ltd reserves the right to amend product specifications without prior notice. The information contained in the document is given in good faith and applies to the uses described. Recommendations for use should be verified as to the suitability and compliance with actual requirements, specifications and any applicable laws and regulations. Kingspan Insulation recommend using the Technical Advice service (see back cover).

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Product Selector

Space Restricted Roofing Solutions	Fully Adhered Single-Ply, and Cold Liquid-Applied Waterproofing Systems
Tapered Roofing Systems	Fully Adhered Single-Ply, Mastic Asphalt and Cold Liquid-Applied Waterproofing Systems
	Mechanically Fixed Single-Ply Waterproofing
	Fully Bonded Torch Applied Multi-Layer Bituminous Waterproofing
Warm Flat Roofing	Mechanically Fixed Single-Ply Waterproofing
	Fully Adhered Single-Ply Waterproofing
	Partially Bonded Built-up Felt and Mastic Asphalt Waterproofing
	Fully Bonded Torch-applied Multilayer Bituminous Felt Waterproofing
	Cold Liquid-Applied Waterproofing
Protected Membrane Roofing	Protected Membrane Flat Roofs and Green Roofs
Car Park Decks	Car Park Decks

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Product Name	Distinguishing Factors
Kingspan OPTIM-R™ Roofing System	Optimum performance vacuum insulated panel providing slim insulation solutions
Kingspan Thermataper® TT47 LPC/FM	Available in 1:30 (1:60 x 2), 1:40 (1:80 x 2), 1:60 and 1:80 falls
Kingspan Thermataper® TT46 LPC/FM	Available in 1:30, 1:40, 1:60 and 1:80 falls Available premitered
Kingspan Thermataper® TT44	Available in 1:60 fall
Kingspan Thermaroof® TR26 LPC/FM	High performance rigid thermoset polyisocyanurate (PIR) insulant with low emissivity composite foil facings
Kingspan Thermaroof® TR27 LPC/FM	High performance rigid thermoset polyisocyanurate (PIR) insulant with coated glass tissue facings
Kingspan Thermaroof® TR27 LPC/FM	High performance rigid thermoset polyisocyanurate (PIR) insulant with coated glass tissue facings
Kingspan Thermaroof® TR24	High performance rigid thermoset polyisocyanurate (PIR) insulant with coated glass tissue facings & bitumen coated glass tissue.
Kingspan Thermaroof® TR27 LPC/FM	High performance rigid thermoset polyisocyanurate (PIR) insulant with coated glass tissue facings.
Kingspan Styrozone® N300	A thermally superior extruded polystyrene with a compressive strength of 300 KPa
Kingspan Styrozone® N500 R	A high density extruded polystyrene with a compressive strength of 500 KPa
Kingspan Styrozone® N700 R	A high density extruded polystyrene with a compressive strength of 700 KPa

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Kingspan OPTIM-R™ Roofing System

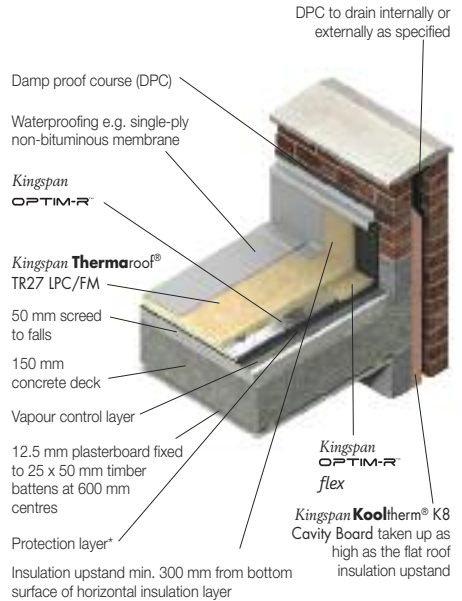
NEXT GENERATION INSULATION SOLUTION FOR FLAT ROOFS

Introduction

The **Kingspan OPTIM-R™ Roofing System** is an optimum performance next generation insulation solution from Kingspan Insulation. It is ideal for both new build and refurbishment when there is a requirement for both low U-values and the thinnest possible roof build-up.

The **Kingspan OPTIM-R™ Roofing System**, when used in conjunction with an overlay of **Kingspan Therma[®]roof TR27 LPC/FM**, is suitable for use with most fully adhered single-ply waterproofing membranes and some cold applied waterproofing systems.

The **Kingspan OPTIM-R™ Roofing System** can also be used in a tapered roofing scheme.



*Refer to Sitework

Product Data

Thermal Conductivity	0.007 W/m-K
Thermal Performance	Please contact Kingspan Insulation Technical Department for a detailed U-value calculation
Composition	Rigid vacuum insulation panel with a microporous core which is evacuated, encased and sealed in a thin, gas-tight envelope
Board size	Product Length: 300 – 1200 mm Product Width: 300 – 600 mm
Thickness Available	20 – 40 mm
Fire Performance	Meets the building regulation requirements for the applications intended

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Benefits

Retrofit

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

New Build

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

Space

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

Performance

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

Composition

The *Kingspan OPTIM-R™ Roofing System* 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 conductivity, with the thinnest possible solution to insulation problems.

Problem areas

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 roof lights or ventilator kerbs.

Design Service

Kingspan OPTIM-R™ comes with a supporting design service which ensures the ratio of the *Kingspan OPTIM-R™* element of the Roofing 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* panels required.

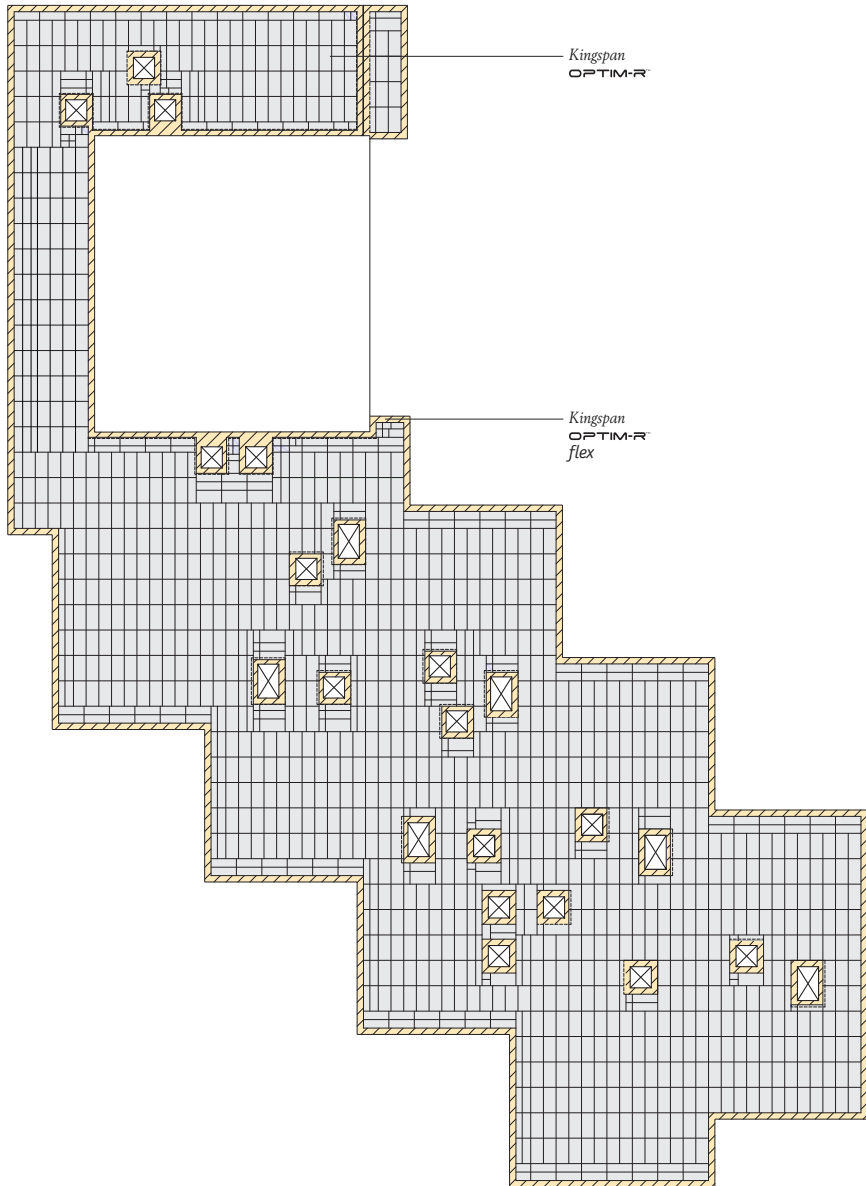
Condensation Risk Analysis

Included in the design service is the calculation of condensation risk in accordance with BS 5250: 2002 (Code of practice for control of condensation in buildings). This ensures that any predicted dew point is above the vapour control layer at the point of minimum thickness of the *Kingspan OPTIM-R™ Roofing System*, whilst also ensuring any condensation risk is within the limits given in BS 5250: 2002.

For more details please contact the Kingspan Insulation Technical Service Department.

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Kingspan OPTIM-R[®] Roofing System



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Sitework

Installation over Concrete Decks

- Concrete decks should be clean, dry, without projections (including fixing heads etc.), steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- In order to ensure an adequate bond between the concrete deck and the vapour control layer, the concrete deck should be suitably primed, in accordance with the primer manufacturer's instructions, prior to the application of the adhesive system, used to bond the vapour control layer to the deck.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- An optional protection layer may be used under the *Kingspan OPTIM-R™ Roofing System*. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).
- The *Kingspan OPTIM-R™* element of the Roofing System should be laid chessboard pattern where practical, with joints lightly butted. There should be no gaps at abutments.
- Where runs of the *Kingspan OPTIM-R™* element of the Roofing System do not accurately fit the dimension of the roof, the use of *Kingspan OPTIM-R™ flex* is required to make up this difference. Each *Kingspan OPTIM-R™ flex* panel is to be the same thickness as the *Kingspan OPTIM-R™* element of the Roofing System.
- Both the *Kingspan OPTIM-R™* element of the Roofing System and the *Kingspan OPTIM-R™ flex* should be bonded down using an appropriate proprietary adhesive system. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).
- At the perimeter of the roof and where upstands or any other penetrations (e.g. roof-lights or ventilator kerbs) are present, *Kingspan OPTIM-R™ flex* panels should be laid abutting these areas, in strips no less than 200 mm wide, to take account of building tolerances and to provide a zone to allow for peel restraint mechanical fixing of the membrane should it be required. Refer to the waterproofing manufacturer for guidance on appropriate peel restraint detailing.
- The *Kingspan OPTIM-R™ flex* should be laid as soon as possible to avoid exposure of the *Kingspan OPTIM-R™* element of the Roofing System to direct foot traffic.
- The *Kingspan Thermaroof®* TR27 LPC/FM or its tapered equivalent *Kingspan Therma taper®* TT47 LPC/FM should be bonded to the upper surface of the *Kingspan OPTIM-R™* element of the Roofing System using an appropriate proprietary adhesive system prior to the application of the waterproof covering.
- Subject to project requirements, a 25mm thick *Kingspan Thermaroof®* TR27 LPC/FM upstand should be used around the perimeter of the roof on the internal façade of parapets.

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Kingspan **OPTIM-R**™ Roofing System

- A minimum distance of 300 mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- The waterproofing membrane is installed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

Installation over Plywood Decks

- Plywood decks should be clean, dry, without projections (including fixing heads etc.), steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- In order to ensure an adequate bond between the plywood deck and the vapour control layer, the plywood deck should be suitably primed, in accordance with the primer manufacturer's instructions, prior to the application of the adhesive system, used to bond the vapour control layer to the deck.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- An optional protection layer may be used under the *Kingspan OPTIM-R*™ Roofing System. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).
- The *Kingspan OPTIM-R*™ element of the Roofing System should be laid chessboard pattern where practical, with joints lightly butted. There should be no gaps at abutments.
- Where runs of the *Kingspan OPTIM-R*™ element of the Roofing System do not accurately fit the dimension of the roof, the use of *Kingspan OPTIM-R flex* is required to make up this difference. Each *Kingspan OPTIM-R flex* panel is to be the same thickness as the *Kingspan OPTIM-R*™ element of the Roofing System.
- Both the *Kingspan OPTIM-R*™ element of the Roofing System and the *Kingspan OPTIM-R flex* should be bonded down using an appropriate proprietary adhesive system. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).
- At the perimeter of the roof and where upstands or any other penetrations (e.g. roof-lights or ventilator kerbs) are present, *Kingspan OPTIM-R flex* should be laid abutting these areas, in strips no less than 200 mm wide, to take account of building tolerances and to provide a zone to allow for peel restraint mechanical fixing of the membrane should it be required. Refer to the waterproofing manufacturer for guidance on appropriate peel restraint detailing.
- The *Kingspan OPTIM-R flex* should be laid as soon as possible to avoid exposure of the *Kingspan OPTIM-R*™ element of the Roofing System to direct foot traffic.

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- The *Kingspan Therma*roof® TR27 LPC/FM or its tapered equivalent *Kingspan Therma*taper® TT47 LPC/FM should be bonded to the upper surface of the *Kingspan OPTIM-R*™ element of the Roofing System using an appropriate proprietary adhesive system prior to the application of the waterproof covering.
- Subject to project requirements, a 25mm thick *Kingspan Therma*roof® TR27 LPC/FM upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300 mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- The waterproofing membrane is installed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

Installation over Metal Decks, Existing Flat Roofs and Existing Composite Roof Panels

- The *Kingspan OPTIM-R*™ Roofing System is suitable for use over metal decks, existing flat roofs and existing composite roof panels. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).

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Kingspan OPTIM-R™ Roofing System

General Considerations

- The *Kingspan OPTIM-R™* element of the Roofing System should not be used in association with solvent-based adhesive systems.
- The *Kingspan OPTIM-R™* element of the Roofing System should not be exposed to naked flames or excessive heat.
- The *Kingspan OPTIM-R™* element of the Roofing System should not be walked on. A protective foot or crawl board should be used during the installation process.
- The *Kingspan OPTIM-R™ flex* and the *Kingspan Thermaroof® TR27* LPC/FM overlay may be walked on.



Daily Working Practice

- Whenever work is interrupted for extended periods of time, a night joint must be made in order to prevent water penetration into the roof construction.

Cutting

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

Packaging and Storage

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

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Tapered Roofing Systems

DESIGN SERVICE

Efficiency by Design

Kingspan ThermaTaper[®] LPC/FM Systems come with a supporting design service. This ensures that the most cost-effective solution for a roof is identified and that the end result is a tapered system design which meets the roof's rainwater run-off and insulation requirements.

Board Layout & Falls Design

The design of the board layout and falls of a successful *Kingspan ThermaTaper*[®] LPC/FM System must take several factors into account:

- the position of the roof outlets.
- the extent of water run-off required.
- the dimensions of the roof.
- the presence of any existing falls or steps on the roof.
- the location and dimensions of permanent projections such as roof lights, vents etc., and perimeter restrictions.

Normally, for new roofs, this information can be most simply acquired from an architects drawing.

The board layout and falls can be designed quickly and effectively, ready for client approval. The design will illustrate the required direction of drainage and will also take into account U-value requirements, condensation risk and minimum / maximum site restrictions. Client amendments or revisions can be easily incorporated. Wind uplift and corresponding restraint requirements for insulation boards can be calculated if necessary.

Once the final design has been accepted and the *Kingspan ThermaTaper*[®] LPC/FM System is ordered, a working drawing will be produced on waterproof paper. This drawing will clearly set out the fall pitch, fall direction, and will clearly match the markings on the boards. Installation of *Kingspan ThermaTaper*[®] LPC/FM System is simple using these easy to follow drawings and, to facilitate installation, each board type is packed separately in labelled shrink wrapped packs.

Condensation Risk Analysis

Included in the design service is the calculation of condensation risk in accordance with BS 5250: 2002 (Code of practice for control of condensation in buildings). This ensures that any predicted dew point is above the vapour control layer at the point of minimum thickness of the *Kingspan ThermaTaper*[®] LPC/FM System, whilst also ensuring any condensation risk is within the limits given in BS 5250: 2002.

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Tapered Roofing Systems

Waste Reduction

Kingspan ThermaTaper[®] LPC/FM System are available in the following ways:

Single Pick

Boards are delivered in exact quantities (as opposed to pack quantities) significantly reducing on site wastage from excess boards. This is only available for *Kingspan ThermaTaper*[®] TT47 LPC/FM with a 1:60 fall.

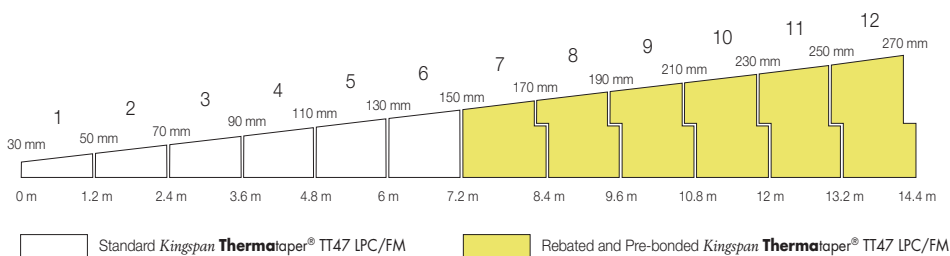
Pre-mitred

Pre-mitred boards reduce waste from the installation process. Insulation boards are pre-cut by Kingspan Insulation in its factory to make mitred hip and valley boards. These are single picked to match the tapered system design so as to reduce waste from cutting hips and valleys on site. Both (hip and valley) halves of the cut board are used and the only waste is the dust generated by the cutting process. This is a distinct advantage when boards are cut on site where up to 50% of the cut boards could be wasted, depending on the particulars of the specific board layout and falls design.

Rebated and Pre-bonded

Factory made hips and valleys are adhesively bonded to the required packer boards by Kingspan Insulation in its factory. The rebated and pre-bonded boards remove the need for staggering boards and on-site adhesives. This provides a more effective adhesive bonding whilst reducing wastage, costs and installation time. This is only available for *Kingspan ThermaTaper*[®] TT47 LPC/FM with a 1:60 fall.

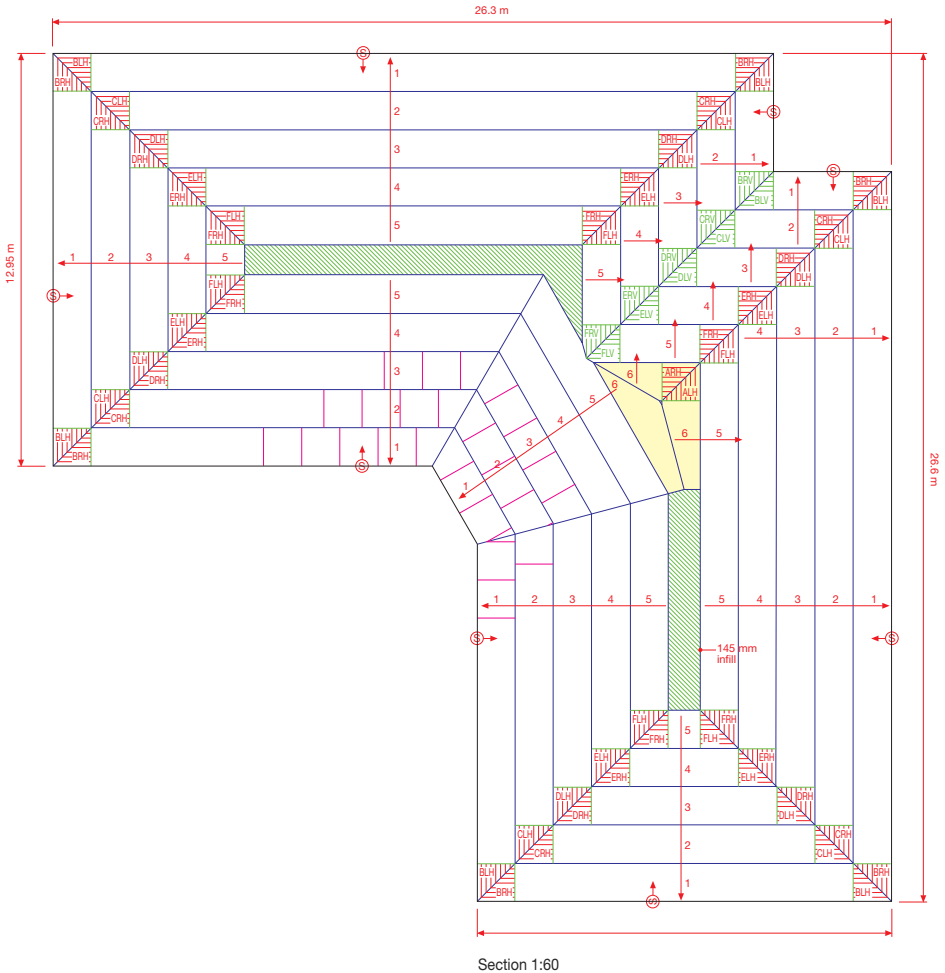
Rebated and pre-bonded tapered below the roof build up



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Calculation of U-values

U-values for *Kingspan Thermataper*® LPC/FM System are calculated, under a management system certified to the BBA Scheme for Assessing the Competency of Persons to Undertake U-value and Condensation Risk Calculations, in accordance with Annex C of BS EN ISO 6946: 2007 (Building components and building elements – Thermal resistance and thermal transmittance – Calculation method). Annex C outlines the calculation procedure to determine the total thermal transmittance of tapered insulation – termed the ‘Annex C U-value’.



Tapered Roofing Systems

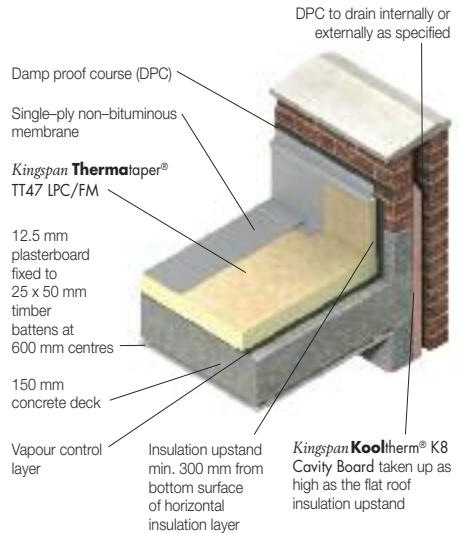
FULLY ADHERED SINGLE-PLY, PARTIALLY BONDED BUILT-UP FELT, MASTIC ASPHALT AND COLD LIQUID-APPLIED WATERPROOFING

Introduction

Kingspan Thermataper® TT47 LPC/FM is recommended for use under fully adhered single-ply waterproofing, partially bonded built-up felt and mastic asphalt and for use under cold liquid-applied waterproofing systems.

Kingspan Thermataper® TT47 LPC/FM is a high performance rigid thermoset insulation core that is manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP) which can be bonded to the existing deck / vapour control layer or mechanically fixed. The fire rating depends on the waterproofing system specified. Ideal for new build and refurbishment and under Green Roofs.

Kingspan Thermataper® TT47 LPC/FM is available premitred, rebated pre-bonded and single pick. **Kingspan Thermataper® TT47 LPC/FM** rebated pre-bonded and **Kingspan Thermataper® TT47 LPC/FM** single pick are only available for a 1:60 fall.



Product Data

Thermal Conductivity	0.026 W/m·K (insulant thickness < 80 mm) 0.025 W/m·K (insulant thickness 80 – 119 mm) 0.024 W/m·K (insulant thickness ≥ 120 mm)
Thermal Performance	Please contact Kingspan Insulation Technical Department for a detailed U-value calculation
Facings	Coated glass tissue
Core	High performance rigid thermoset polyisocyanurate (PIR) insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP)
Board Size	1.2 x 1.2 m
Falls Available	Systems with a 1:30 & 1:40 fall 60 mm minimum Systems with a 1:60 & 1:80 fall 30 mm minimum All systems Unlimited Maximum
Fire Performance	Meets the building regulation requirements for the applications intended
BRE 2008 Green Guide Summary Rating*	A

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Installation Details

- Concrete decks should be clean, level, dry and without large projections, steps or gaps.
- If the insulation boards are to be bonded down, in order to ensure an adequate bond between the vapour control layer and the concrete deck, the concrete or screeded surface should be suitably primed, in accordance with the primer manufacturer's instructions, prior to the application of the hot bitumen, or suitable alternative proprietary adhesive system, used to bond the vapour control layer to the deck.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of *Kingspan Thertape*® TT47 LPC/FM should be bonded down by laying into hot bitumen (max. temperature 240°C) mopped or poured over the vapour control layer, or with the use of a suitable alternative proprietary adhesive system.
- Alternatively, the insulation boards should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixings').
- Insulation boards should, wherever possible, be laid break-bonded and with joints lightly butted. There should be no gaps at abutments.
- Roof-light or ventilator kerbs etc. should always be insulated to the same standard as the general roof area i.e. to the Annex C U-value of the tapered system.
- A 25 mm thick *Kingspan Thermo*roof® TR27 LPC/FM upstand should be used around the perimeter of the roof on the internal façade of parapets.
- The waterproofing membrane is installed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.
- A minimum distance of 300 mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.

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Tapered Roofing Systems

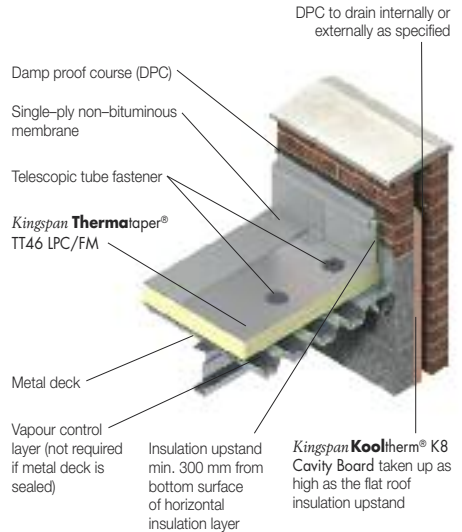
MECHANICALLY FIXED SINGLE PLY WATERPROOFING

Introduction

Kingspan Thermataper® TT46 LPC/FM is recommended for use under mechanically fixed single-ply waterproofing.

Kingspan Thermataper® TT46 LPC/FM is a high performance rigid thermoset insulation core that is manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP) which is compatible with most mechanically fixed single-ply waterproofing membranes. Its fire rating is dependent on the specification of the water proofing system. Ideal for fast track building programmes and under Green Roofs.

Kingspan Thermataper® TT46 LPC/FM is available premitred.



Product Data

Thermal Conductivity	0.022 W/m·K
Thermal Performance	Please contact Kingspan Insulation Technical Department for a detailed U-value calculation
Facings	Composite foil
Core	High performance rigid thermoset polyisocyanurate (PIR) insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP)
Board Size	1.2 x 1.2 m
Falls Available	Systems with a 1:30 & 1:40 fall 60 mm minimum Systems with a 1:60 & 1:80 fall 30 mm minimum All systems Unlimited Maximum
Fire Performance	Meets the building regulation requirements for the applications intended
BRE 2008 Green Guide Summary Rating*	A+

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Installation Details

- Where an FM or LPCB approved construction is required, please refer to 'LPCB & FM Certification' on page 13 of the full literature.
- Metal decks should be level, clean, dry, and without large projections, steps or gaps.
- If using a sealed metal deck there is no requirement for a separate vapour control layer.
- If the metal deck is not sealed the vapour control layer should be loose-laid.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of *Kingspan Thermaaper*[®] TT46 LPC/FM should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixing').
- Insulation boards should, wherever possible, be laid break-bonded and with joints lightly butted. There should be no gaps at abutments.
- Roof-light or ventilator kerbs etc. should always be insulated to the same standard as the general roof area i.e. to the Annex C U-value of the tapered system.
- A 25 mm thick *Kingspan Thermaroof*[®] TR26 FM upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300 mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- The waterproofing membrane is also mechanically fixed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

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Tapered Roofing Systems

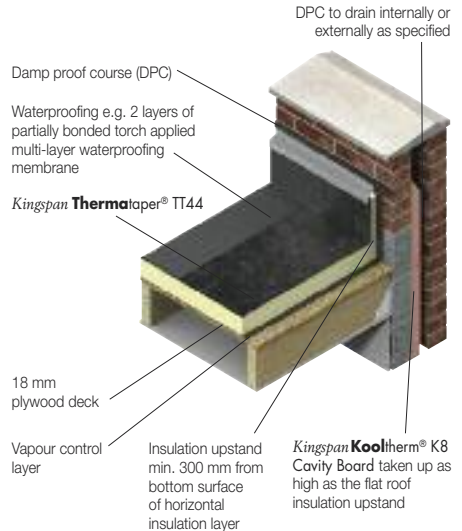
FULLY BONDED TORCH APPLIED MULTI-LAYER BITUMINOUS WATERPROOFING

Introduction

Kingspan ThermaTaper® TT44 is recommended for use with fully bonded torch-applied multi-layer bituminous felt waterproofing systems.

Kingspan ThermaTaper® TT44 is a high performance rigid thermoset insulation core manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

Ideal for both new build and refurbishment applications.



Product Data

Thermal Conductivity	0.026 W/m·K (insulant thickness < 80 mm) 0.025 W/m·K (insulant thickness 80 – 119 mm) 0.024 W/m·K (insulant thickness ≥ 120 mm)
Thermal Performance	Please contact Kingspan Insulation Technical Department for a detailed U-value calculation
Upper Facing	Bitumen coated glass tissue with a thermofusible polypropylene fleece
Lower Facing	Coated glass tissue
Core	High performance rigid thermoset polyisocyanurate (PIR) insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP)
Board Size	1.2 x 0.6 m
Falls Available	Systems with a 1:30 & 1:40 fall 60 mm minimum Systems with a 1:60 & 1:80 fall 30 mm minimum All systems Unlimited Maximum
Fire Performance	Meets the building regulation requirements for the applications intended
BRE 2008 Green Guide Summary Rating*	A

Visit www.kingspaninsulation.ie to download the full product brochure, order samples and learn about case studies

TAPERED ROOFING SYSTEMS SITEWORK

Installation Details

- Plywood decks should be clean, level, dry, and without large projections, steps or gaps.
- If the insulation boards are to be bonded down, in order to ensure an adequate bond between the vapour control layer and the plywood deck, the plywood should be suitably primed, in accordance with the primer manufacturer's instructions, prior to the application of the hot bitumen, or suitable alternative proprietary adhesive system, used to bond the vapour control layer to the deck.
- If the insulation boards are to be mechanically fixed, the vapour control layer should be loose-laid.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of **Kingspan ThermaTaper® TR24** should be bonded down by laying into hot bitumen (max. temperature 240°C) mopped or poured over the vapour control layer, or with the use of a suitable alternative proprietary adhesive system.
- Alternatively, the insulation boards should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixings').
- Insulation boards should always be laid break -bonded, either with their long edges at right angles to the edge of, or diagonally across the roof, and with joints lightly butted. There should be no gaps at abutments.
- Roof-light or ventilator kerbs etc. should always be insulated to the same standard as the general roof area i.e. to the Annex C U-value of the tapered system.
- A 25 mm thick **Kingspan ThermaTaper® TR24** upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300 mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- The waterproofing membrane is installed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.



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Tapered Roofing Systems

MECHANICAL FIXING PATTERNS

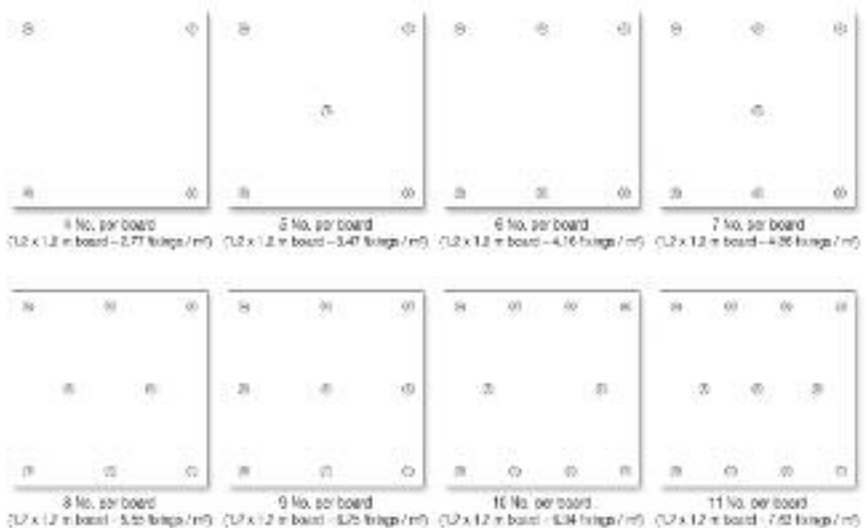
The recommended fixing patterns for *Kingspan ThermaTaper*[®] TT44 LPC/FM, *Kingspan ThermaTaper*[®] TT46 LPC/FM and *Kingspan ThermaTaper*[®] TT47 LPC/FM are shown below. The number of mechanical fixings required to fix the boards vary with the geographical location of the building, the local topography and the height and width of the roof concerned with the deck type.

The images below show recommended fixing patterns, the number of fixings used and the resulting fixing density (number of fixings per m²). For further fixing patterns please see the full literature.

Kingspan ThermaTaper[®] TT44 LPC/FM



Kingspan ThermaTaper[®] TT46 LPC/FM / *Kingspan ThermaTaper*[®] TT47 LPC/FM



NB Mechanical fixings e.g. telescopic tube fasteners, must be arranged in an even pattern. Fasteners at board edges must be located > 50 mm and < 150 mm from edges and corners of the board and not overlap board joints. A minimum of 4 fixings are required to secure a 1.2 m x 0.6 m insulation board to the deck, a minimum of 5 fixings are required to secure a 1.2 x 1.2 m insulation board to the deck and a minimum of 6 fixings are required to secure a 2.4 x 1.2 m insulation board to the deck. The requirement for additional fixings should be assessed in accordance with BS 6339-2: 1997 (Loadings for buildings. Code of practice for wind loads) or BS/IS. EN 1991. 9.4.2005 (National annex to Eurocode 1. Actions on structures, general actions, wind actions).

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Tapered Roofing Systems

THERMATAPER SYSTEM GUIDE

Pre Delivery

- Ensure that your drawing is the latest revision and is relevant to the roof being insulated.
- Check that any rainwater outlets, roof lights, obstructions such as tank rooms and dimensions on the drawing correspond to the roof. Should there be any discrepancy contact the Kingspan Insulation Tapered Roofing Department.

Delivery

- It is essential that quantities are checked against the delivery note upon receipt for the roof phase/area required.
- Ensure provisions are made to offload the delivery vehicle.

Storage

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

Installation

- Ensure that vapour control layers (if required) are installed following the manufacturers guidance.
- Surfaces should be level, clean, dry, and without large projections, steps or gaps before commencing installation.
- Ridges, hips and valleys will be marked on the drawings, together with the suggested starting points for the laying of the boards.
- Kingspan Thermataper should be cut 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.
- Any significant off cuts should be retained as they should, where possible, be used elsewhere on the scheme.
- The flat packer boards (if required) should be laid so that where possible the joints are staggered with the tapered boards on top.
- At locations where a sudden change in insulation thickness is evident, exposed edges of insulation boards should be protected with a hard edge to prevent damage.
- At the completion of each day's work, or whenever work is interrupted for extended periods of time, a night joint must be made in order to prevent water penetration into the roof construction.

Following Trades

- The roof must be adequately protected when building works are being carried out on or over the roof surface. This is best achieved by close boarding. The completed roof must not be used for storage of heavy building components.

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Warm Flat Roofing

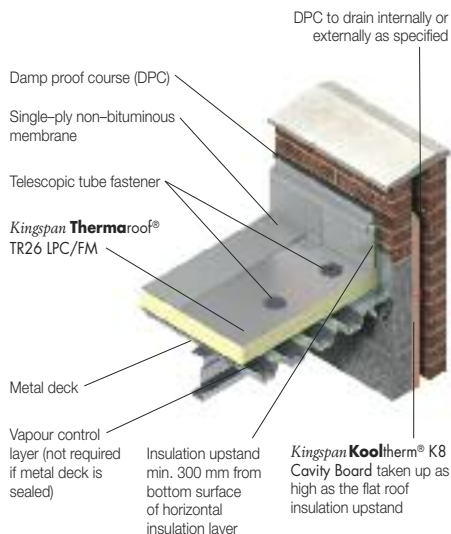
MECHANICALLY FIXED SINGLE PLY WATERPROOFING

Introduction

*Kingspan Therma*roof® TR26 LPC/FM is a high performance rigid thermoset insulant that is compatible with most mechanically fixed single-ply waterproofing systems (including FM Approved systems).

Ideal for fast track building programmes and under Green Roofs.

*Kingspan Therma*roof® TR26 LPC/FM is recommended for use in standard mechanically fixed single-ply waterproofing systems where LPCB and FM certification is required.



Product Data

Thermal Conductivity	0.022 W/m·K
Thermal Performance	Please contact Kingspan Insulation Technical Department for a detailed U-value calculation
Facings	Composite foil
Core	High performance rigid thermoset polyisocyanurate (PIR) insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP)
Board Size	1.2 x 2.4 m
Thickness Available	25 – 150 mm Please refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes
Fire Performance	Meets the building regulation requirements for the applications intended
BRE 2008 Green Guide Summary Rating*	A+

*Kingspan Therma*roof® TR26 LPC/FM is also available in a tapered version called *Kingspan Therma*taper® TT46 LPC/FM

Visit www.kingspaninsulation.ie to download the full product brochure, order samples and learn about case studies

MECHANICALLY FIXED SINGLE PLY WATERPROOFING

Installation Details

- Metal decks should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- If using a sealed metal deck there is no requirement for a separate vapour control layer.
- If the metal deck is not sealed the vapour control layer should be loose-laid.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of **Kingspan Thermaroof® TR26 LPC/FM** should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixings').
- Insulation boards should always be laid break-bonded, either with their long edges at right angles to the trough openings, or diagonally across the corrugation line, and with joints lightly butted. There should be no gaps at abutments.
- Roof-light or ventilator kerbs etc. should always be insulated with the same thickness of **Kingspan Thermaroof® TR26 LPC/FM** as the general roof area.
- A 25 mm thick **Kingspan Thermaroof® TR26 LPC/FM** upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300 mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- The waterproofing membrane is also mechanically fixed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

⚠ *Do not stand on or otherwise support your weight on this board unless it is fully supported by a load bearing surface.*



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Warm Flat Roofing

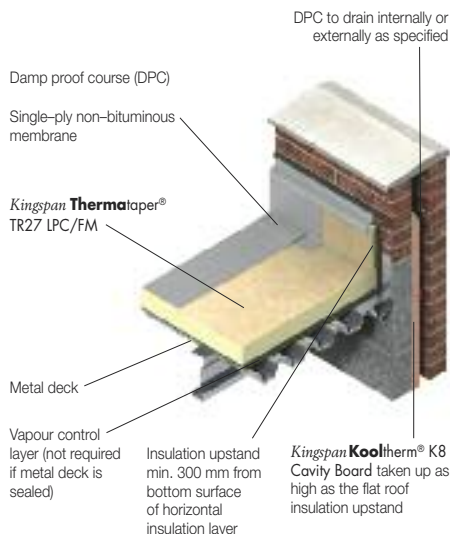
FULLY ADHERED SINGLE PLY WATERPROOFING

Introduction

*Kingspan Therma*roof® TR27 LPC/FM is a high performance rigid thermoset insulation that is compatible with most fully adhered single-ply waterproofing systems.

*Kingspan Therma*roof® TR27 LPC/FM is ideal for fast track building programmes and under Green Roofs.

*Kingspan Therma*roof® TR27 LPC/FM is recommended for use in flat roof system build up's where LPCB and FM Certification is required.



Product Data

Thermal Conductivity	0.026 W/m·K (insulant thickness < 80 mm) 0.025 W/m·K (insulant thickness 80 – 119 mm) 0.024 W/m·K (insulant thickness ≥ 120 mm)
Thermal Performance	Please contact Kingspan Insulation Technical Department for a detailed U-value calculation
Facings	Coated glass tissue
Core	High performance rigid thermoset polyisocyanurate (PIR) insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP)
Board Size	1.2 x 1.2 m and 1.2 x 2.4 m
Thickness Available	25 – 30 mm (1.2 x 2.4 m boards) 40 – 140 mm (1.2 x 1.2 m boards) Please refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes
Fire Performance	Meets the building regulation requirements for the applications intended
BRE 2008 Green Guide Summary Rating*	A

*Kingspan Therma*roof® TR27 LPC/FM is also available in a tapered version called *Kingspan Therma*paper® TT47 LPC/FM

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Installation Details

- Metal decks should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- If using a sealed metal deck there is no requirement for a separate vapour control layer.
- If the metal deck is not sealed, and the insulation boards are to be bonded down, in order to ensure an adequate bond between the metal deck and the vapour control layer, the metal deck should be suitably primed, in accordance with the primer manufacturer's instructions, prior to the application of the hot bitumen, or suitable alternative proprietary adhesive system, used to bond the vapour control layer to the deck.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- The insulation boards should be bonded down by laying into hot bitumen (max. temperature 240°C) mopped or poured over the vapour control layer / sealed metal deck, or with the use of a suitable alternative proprietary adhesive system.
- Insulation boards should always be laid break-bonded, either with their long edges at right angles to the trough openings, or diagonally across the corrugation line, and with joints lightly butted. There should be no gaps at abutments.
- Roof-light or ventilator kerbs etc. should always be insulated with the same thickness of *Kingspan Thermo*roof® TR27 LPC/FM as the general roof area.
- A 25 mm thick *Kingspan Thermo*roof® TR27 LPC/FM upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300 mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- The waterproofing membrane is installed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

⚠ *Do not stand on or otherwise support your weight on this board unless it is fully supported by a load bearing surface.*



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Warm Flat Roofing

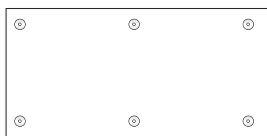
MECHANICAL FIXING PATTERNS

(Kingspan Thermaroof TR26 & TR27 LPC/FM)

The recommended fixing patterns for *Kingspan Thermaroof*[®] TR26 LPC/FM and *Kingspan Thermaroof*[®] TR27 LPC/FM are shown below. The number of mechanical fixings required to fix the boards will vary with the geographical location of the building, the local topography and the height and width of the roof concerned, along with the deck type.

The images below show a selection of recommended fixing patterns, the number of fixings used and the resulting fixing density (number of fixings per m²). For further fixing patterns please see the full literature.

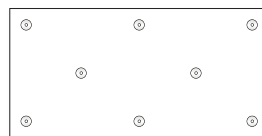
Kingspan Thermaroof[®] TR26 LPC/FM



6 No. per board
(2.4 x 1.2 m board – 2.08 fixings / m²)

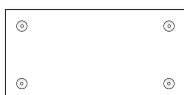


7 No. per board
(2.4 x 1.2 m board – 2.43 fixings / m²)



8 No. per board
(2.4 x 1.2 m board – 2.77 fixings / m²)

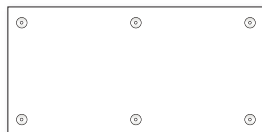
Kingspan Thermaroof[®] TR27 LPC/FM



4 No. per board
(1.2 x 0.6 m board – 5.55 fixings / m²)

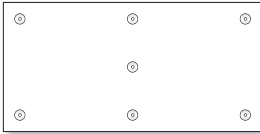


5 No. per board
(1.2 x 0.6 m board – 6.94 fixings / m²)
(1.2 x 1.2 m board – 3.47 fixings / m²)

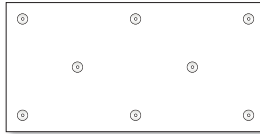


6 No. per board
(1.2 x 0.6 m board – 8.33 fixings / m²)
(1.2 x 1.2 m board – 4.16 fixings / m²)
(2.4 x 1.2 m board – 2.08 fixings / m²)

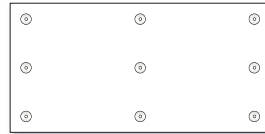
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7 No. per board
 (1.2 x 0.6 m board – 9.72 fixings / m²)
 (1.2 x 1.2 m board – 4.86 fixings / m²)
 (2.4 x 1.2 m board – 2.43 fixings / m²)



8 No. per board
 (1.2 x 0.6 m board – 11.11 fixings / m²)
 (1.2 x 1.2 m board – 5.55 fixings / m²)
 (2.4 x 1.2 m board – 2.77 fixings / m²)



9 No. per board
 (1.2 x 0.6 m board – 12.50 fixings / m²)
 (1.2 x 1.2 m board – 6.25 fixings / m²)
 (2.4 x 1.2 m board – 3.12 fixings / m²)

NB Mechanical fixings e.g. telescopic tube fasteners, must be arranged in an even pattern. Fasteners at board edges must be located > 50 mm and < 150 mm from edges and corners of the board and not overlap board joints.

A minimum of 4 fixings are required to secure a 1.2 m x 0.6 m insulation board to the deck, a minimum of 5 fixings are required to secure a 1.2 x 1.2 m insulation board to the deck and a minimum of 6 fixings are required to secure a 2.4 x 1.2 m insulation board to the deck.

The requirement for additional fixings should be assessed in accordance with BS 6339-2: 1997 (Loadings for buildings. Code of practice for wind loads) or BS/IS.EN 1991. 9.4.2005 (National annex to Eurocode 1. Actions on structures, general actions, wind actions).

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Warm Flat Roofing

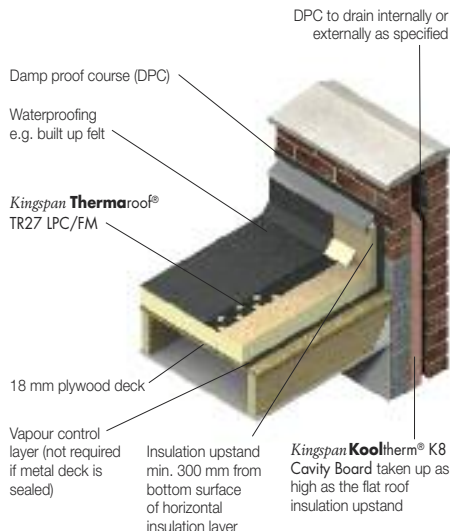
PARTIALLY BONDED BUILT-UP FELT AND MASTIC ASPHALT WATERPROOFING

Introduction

*Kingspan Therma*roof® TR27 LPC/FM can be used in partially bonded built-up felt and mastic asphalt waterproofing systems. Used in conjunction with a separate bituminous vapour control layer, warm roof insulation can be provided over roof decks up to 10° pitch.

*Kingspan Therma*roof® TR27 LPC/FM is a high performance rigid thermoset insulation core manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

Ideal for both new build and refurbishment applications, as well as Green Roofs.



Product Data

Thermal Conductivity	0.026 W/m·K (insulant thickness < 80 mm) 0.025 W/m·K (insulant thickness 80 – 119 mm) 0.024 W/m·K (insulant thickness ≥ 120 mm)
Thermal Performance	Please contact Kingspan Insulation Technical Department for a detailed U-value calculation
Facings	Coated glass tissue
Core	High performance rigid thermoset polyisocyanurate (PIR) insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP)
Board Size	1.2 x 1.2 m and 1.2 x 2.4 m
Thickness Available	25 – 30 mm (1.2 x 2.4 m boards) 40 – 140 mm (1.2 x 1.2 m boards) Please refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes
Fire Performance	Meets the building regulation requirements for the applications intended
BRE 2008 Green Guide Summary Rating*	A

*Kingspan Therma*roof® TR27 LPC/FM is also available in a tapered version called *Kingspan Therma*taper® TT47 LPC/FM

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Installing over Plywood Decks

- Plywood decks should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- If the insulation boards are to be bonded down, in order to ensure an adequate bond between the plywood deck and the vapour control layer, the plywood surface should be suitably primed, in accordance with the primer manufacturer's instructions, prior to the application of the hot bitumen, or suitable alternative proprietary adhesive system, used to bond the vapour control layer to the deck.
- Alternatively, the vapour control layer can be nailed to the deck, in which case the nail heads will become sealed with the subsequent bonding of the insulation boards to the vapour control layer.
- If the insulation boards are to be mechanically fixed, the vapour control layer should be loose-laid.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of **Kingspan Thermaroof® TR27 LPC/FM** should be bonded down by laying into hot bitumen (max. temperature 240°C) mopped or poured over the vapour control layer, or with the use of a suitable alternative proprietary adhesive system.
- Alternatively, the insulation boards should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixings').
- Insulation boards should always be laid break-bonded, either with their long edges at right angles to the edge of, or diagonally across the roof, and with joints lightly butted. There should be no gaps at abutments.
- Joints between insulation boards should not coincide with those between the plywood sheets.
- Roof-light or ventilator kerbs etc. should always be insulated with the same thickness of **Kingspan Thermaroof® TR27 LPC/FM** as the general roof area.
- A 25 mm thick **Kingspan Thermaroof® TR27 LPC/FM** upstand should be used around the perimeter of the roof on the internal façade of parapets.
- The waterproofing membrane is installed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

⚠ *Do not stand on or otherwise support your weight on this board unless it is fully supported by a load bearing surface.*



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Warm Flat Roofing

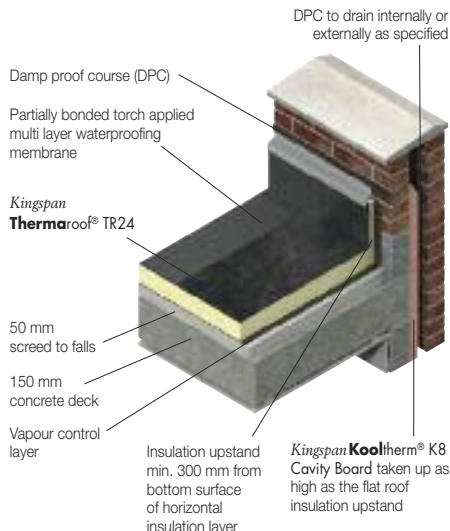
FULLY BONDED TORCH-APPLIED MULTI-LAYER BITUMINOUS WATERPROOFING

Introduction

*Kingspan Therma*roof® TR24 is recommended for use with fully bonded torch-applied multi-layer bituminous felt waterproofing systems.

*Kingspan Therma*roof® TR24 is a high performance rigid thermoset insulation core manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

Ideal for both new build and refurbishment applications.



Product Data

Thermal Conductivity	0.026 W/m·K (insulant thickness < 80 mm) 0.025 W/m·K (insulant thickness 80 – 119 mm) 0.024 W/m·K (insulant thickness ≥ 120 mm)
Thermal Performance	Please contact Kingspan Insulation Technical Department for a detailed U-value calculation
Upper Facing	Bitumen coated glass tissue with a thermofusible polypropylene fleece
Lower Facing	Coated glass tissue
Core	High performance rigid thermoset polyisocyanurate (PIR) insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP)
Board Size	1.2 x 1.2 m
Thickness Available	25 – 140 mm Please refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes
Fire Performance	Meets the building regulation requirements for the applications intended
BRE 2008 Green Guide Summary Rating*	A

*Kingspan Therma*roof® TR24 is also available in a tapered version called *Kingspan Therma*loper® TT44

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Installation Details

- Concrete decks should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- If the insulation boards are to be bonded down, in order to ensure an adequate bond between the vapour control layer and the concrete deck, the concrete or screeded surface should be suitably primed, in accordance with the primer manufacturer's instructions, prior to the application of the hot bitumen, or suitable alternative proprietary adhesive system, used to bond the vapour control layer to the deck.
- If the insulation boards are to be mechanically fixed, the vapour control layer should be loose-laid.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of **Kingspan Thermaroof® TR24** should be bonded down by laying into hot bitumen (max. temperature 240°C) mopped or poured over the vapour control layer, or with the use of a suitable alternative proprietary adhesive system.
- Alternatively, the insulation boards should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixings').
- Insulation boards should always be laid break-bonded, either with their long edges at right angles to the edge of, or diagonally across the roof, and with joints lightly butted. There should be no gaps at abutments.
- Roof-light or ventilator kerbs etc. should always be insulated with the same thickness of **Kingspan Thermaroof® TR24** as the general roof area.
- A 25 mm thick **Kingspan Thermaroof® TR24** upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300 mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- The waterproofing membrane is installed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

⚠ *Do not stand on or otherwise support your weight on this board unless it is fully supported by a load bearing surface.*



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Warm Flat Roofing

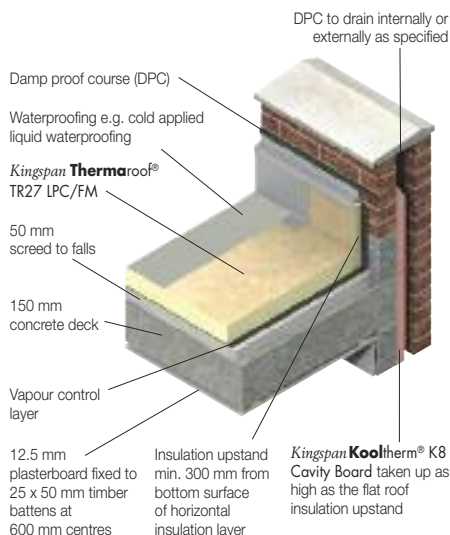
COLD LIQUID-APPLIED WATERPROOFING

Introduction

*Kingspan Therma*roof® TR27 LPC/FM is recommended for use under cold liquid applied waterproofing systems.

*Kingspan Therma*roof® TR27 LPC/FM is a high performance rigid thermoset insulation core manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

*Kingspan Therma*roof® TR27 LPC/FM is ideal for fast track building programmes and green roofs.



Product Data

Thermal Conductivity	0.026 W/m·K (insulant thickness < 80 mm) 0.025 W/m·K (insulant thickness 80 – 119 mm) 0.024 W/m·K (insulant thickness ≥ 120 mm)
Thermal Performance	Please contact Kingspan Insulation Technical Department
Facings	Coated glass tissue
Core	High performance rigid thermoset polyisocyanurate (PIR) insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP)
Board Size	1.2 x 1.2 m and 1.2 x 2.4 m
Thickness Available	25 – 30 mm (1.2 x 2.4 m boards) 40 – 140 mm (1.2 x 1.2 m boards) Please refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes
Fire Performance	Meets the building regulation requirements for the applications intended
BRE 2008 Green Guide Summary Rating*	A

*Kingspan Therma*roof® TR27 LPC/FM is also available in a tapered version called *Kingspan Therma*taper® TT47 LPC/FM.

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Installation Details



- Concrete decks should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- If the insulation boards are to be bonded down, in order to ensure an adequate bond between the vapour control layer and the concrete deck, the concrete or screeded surface should be suitably primed, in accordance with the primer manufacturer's instructions, prior to the application of the hot bitumen, or suitable alternative proprietary adhesive system, used to bond the vapour control layer to the deck.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of *Kingspan Thermaroof*® TR27 LPC/FM should be bonded down following manufactures instructions.
- Insulation boards should always be laid break-bonded, either with their long edges at right angles to the edge of, or diagonally across the roof, and with joints lightly butted. There should be no gaps at abutments.
- Roof-light or ventilator kerbs etc. should always be insulated with the same thickness of *Kingspan Thermaroof*® TR27 LPC/FM as the general roof area.
- A 25 mm thick *Kingspan Thermaroof*® TR27 LPC/FM upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300 mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- The waterproofing membrane is installed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards..

⚠ *Do not stand on or otherwise support your weight on this board unless it is fully supported by a load bearing surface.*

Visit www.kingspaninsulation.ie to download the full product brochure, order samples and learn about case studies

Protected Membrane Roofing

PROTECTED MEMBRANE FLAT ROOFS & GREEN ROOFS

Introduction

Kingspan Styrozone[®] N 300 R is recommended for use in protected membrane flat roofs and roof gardens.

Kingspan Styrozone[®] N 300 R is a high performance rigid extruded polystyrene insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP). It has a smooth, dense skin on both faces.

Kingspan Styrozone[®] N 300 R is ideal for both new build and refurbishment applications.



Product Data

Thermal Conductivity*	0.036 W/m·K (insulant thickness < 60 mm) 0.038 W/m·K (insulant thickness > 60 mm)
Thermal Performance	Please contact Kingspan Insulation Technical Department for a detailed U-value calculation
Core	High performance rigid extruded polystyrene insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP)
Board Size	1.25 x 0.6 m
Thickness Available	<i>Kingspan Styrozone</i> [®] N 300 R: 30 – 180 mm Please refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes
Fire Performance	Meets the building regulation requirements for the applications intended
Compressive Strength	300 kPa at 10% compression when tested to EN 826: 1996

*Design thermal conductivity values. Adjusted in accordance with EN ISO 10456: 2007

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Installation Details

- Start laying the *Kingspan Styrozone*[®] insulation boards from the point of access to the roof.
 - Insulation boards should always be loose-laid break-bonded, either with their long edges at right angles to the edge of, or diagonally across the roof, and with joints lightly butted. There should be no gaps at abutments.
 - If two or more layers of insulation are required, they should be horizontally offset relative to each other so that, as far as possible, the board joints in any two adjacent layers do not coincide with each other.
 - Roof-light or ventilator kerbs, gutter etc. should always be insulated (*Kingspan Purlcrete*[®]chevron with a separate backing layer of *Kingspan Styrozone*[®]) to the same U-value as the general roof area.
 - A *Kingspan Purlcrete*[®]chevron upstand should be used around the perimeter of the roof on the internal façade of parapets.
 - A minimum distance of 300 mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
 - Boards can be laid in any weather but, due to the light weight of the boards, care must be taken in windy conditions.
- ⚠ *Do not stand on or otherwise support your weight on this board unless it is fully supported by a load bearing surface.*

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Protected Membrane Roofing

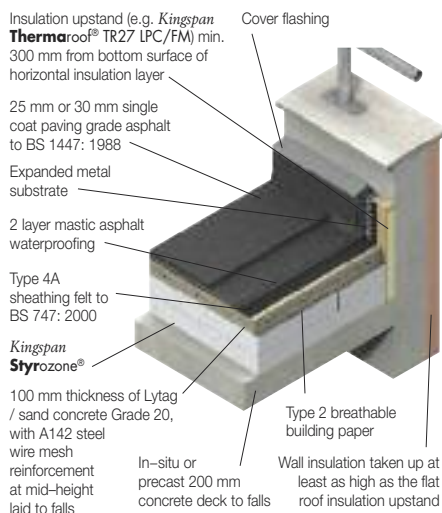
LOADING BAYS, SERVICE DECKS AND COMMERCIAL VEHICLES

Introduction

Kingspan Styrozone[®] N 500 R / *Kingspan Styrozone*[®] N 700 R are recommended for use in protected membrane car park decks.

Kingspan Styrozone[®] N 500 R / *Kingspan Styrozone*[®] N 700 R are high performance rigid extruded polystyrene insulants that are manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP) and have a smooth, dense skin on both sides.

Ideal for both new build and refurbishment applications.



Product Data

Thermal Conductivity* <i>Kingspan Styrozone</i> [®] N 500 R <i>Kingspan Styrozone</i> [®] N 700 R	0.034 W/m·K (insulant thickness ≤ 50 mm) 0.036 W/m·K (insulant thickness > 50 mm)
Thermal Performance	Please contact Kingspan Insulation Technical Department for a detailed U-value calculation
Core	High performance rigid extruded polystyrene insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and has a smooth, dense skin on both faces
Board Size	1.25 x 0.6 m
Thickness Available	<i>Kingspan Styrozone</i> [®] N 500 R: 50 – 120 mm <i>Kingspan Styrozone</i> [®] N 700 R: 50 mm Please refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes
Fire Performance	Meets the building regulation requirements for the applications intended
Compressive Strength	<i>Kingspan Styrozone</i> [®] N 500 R: 500 kPa <i>Kingspan Styrozone</i> [®] N 700 R: 700 kPa At 10% compression when tested to EN 826: 1996

*Declared in accordance with EN 13164: 2012

For light commercial vehicles (Non HGV), parking decks and cars please see the full product literature or contact the Kingspan Insulation Technical Department.

Visit www.kingspaninsulation.ie to download the full product brochure, order samples and learn about case studies

Installation Details

- Concrete decks should be clean, dry, without large projections, steps or gaps.
- Start laying the **Kingspan Styrozone**® insulation boards from the point of access to the roof.
- Insulation boards should always be loose-laid break-bonded, either with their long edges at right angles to the edge of, or diagonally across the roof, and with joints lightly butted. There should be no gaps at abutments.
- If two or more layers of insulation are required, they should be horizontally offset relative to each other so that, as far as possible, the board joints in any two adjacent layers do not coincide with each other.
- Roof-light or ventilator kerbs etc. should always be insulated with **Kingspan Thermaroof**® TR27 LPC/FM to the same U-value as the general roof area.
- A 25 mm thick **Kingspan Thermaroof**® TR27 LPC/FM upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300 mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- Boards can be laid in any weather but, due to the light weight of the boards, care must be taken in windy conditions.

⚠ *Do not stand on or otherwise support your weight on this board unless it is fully supported by a load bearing surface.*



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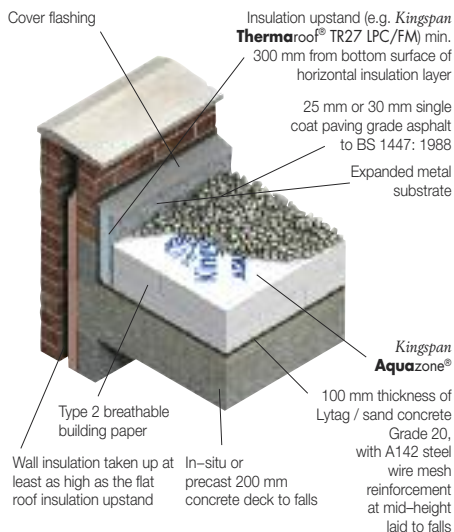
Water-Infiltration Membrane

INVERTED ROOFS FINISHED WITH GRAVEL BALLAST

Introduction

Kingspan Aquazone® is a high performance non-woven polyethylene membrane. It is suitable for use on inverted roofs finished with gravel ballast, green roof systems and concrete pavers on appropriate supports.

Kingspan Aquazone® can be installed over **Kingspan Styrozone®** insulation on inverted roofs. It can dramatically minimise the cooling effect associated with rainwater flowing down through the insulation and draining away. It can significantly reduce the insulation thicknesses required to achieve specified U-values.



Product Data

General	
Roll Length (m)	100
Roll Width (m)	3
Thickness (mm)	0.17
Weight (kg/m ²)	0.06
Weight per Roll (kg)	20
Water Vapour Transmission (S _d) (BS EN ISO 12572)	0.01

Water Penetration

The product has been tested in accordance with ETAG 031 Annex D*.

The following f.x. values have been verified for use in U-value calculations:

f.x. = 0.0012 (paving slabs on supports)

f.x. = 0.0010 (gravel or green roof system)

(*BBA Report No. 47517)

Fire

Reaction to fire (EN 11925-2) Class E (tested onto a **Styrozone®**/ XPS substrate)

Inverted roofs ballasted with a non-combustible material will typically achieve an FAA rating when tested to BS 476: Part 3: 1958

Visit www.kingspaninsulation.ie to download the full product brochure, order samples and learn about case studies

Description

Kingspan Aquazone® is a high performance non-woven polyethylene membrane. It is suitable for use on inverted roofs finished with gravel ballast, green roof systems and concrete pavers on appropriate supports.

Kingspan Aquazone® can be installed over *Kingspan Styrozone*® insulation on inverted roofs. It can dramatically minimise the cooling effect associated with rainwater flowing down through the insulation and draining away. It can significantly reduce the insulation thicknesses required to achieve specified U-values.

Application

Kingspan Aquazone® should be loose-laid over the insulation. Where one run of membrane overlaps another, there should be minimum 300 mm side and end laps. Upper layers of the membrane should be laid over lower layers to ensure water penetration is minimised. At junctions, e.g. upstands, parapets and penetrations, *Kingspan Aquazone*® should be turned up to finish above the surface of the ballast layer. *Kingspan Aquazone*® should be star-cut and dressed down at drainage outlets. *Kingspan Aquazone*® should be turned up at the edges of the roof insulation and sealed under the flashing.

Kingspan Insulation recommends that roofs be designed such that they avoid standing water.

General

Resistance to Solvents, Fungi & Rodents

Kingspan Aquazone® resists attack by mould and fungus growth, and will not encourage insect attack.

Cutting

Cutting should be carried out using a sharp knife.

Durability

Kingspan Aquazone® is UV-resistant and can be safely exposed on site for a period not exceeding 4 months.

Packaging and Storage

The polyethylene packaging of Kingspan Insulation products, which is recyclable, should not be considered adequate for outdoor protection. Ideally, rolls should be stored inside a building. If, however, outdoor storage cannot be avoided, then the rolls should be stored on their sides, on a clean dry surface, and covered with an opaque polythene sheet or weatherproof tarpaulin.

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Kingspan Insulation

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

Kingspan Insulation Ltd has a vast product range. Kingspan Insulation Ltd products are suitable for both new build and refurbishment in a variety of applications within both domestic and non-domestic buildings.

Insulation for:

- Pitched Roofs
- Flat Roofs
- Green Roofs
- Cavity Walls
- Solid Walls
- Timber and Steel Framing
- Insulated Cladding Systems
- Insulated Render Systems
- Floors
- Soffits
- Ductwork

Further Solutions:

- Insulated Dry Lining
- Tapered Roofing Systems
- Cavity Closers
- Kingspan KoolDuct Pre-Insulated Ducting
- Kingspan Nilvent Breathable Membranes
- Kingspan TEK Building System

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. 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 for 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 Services, 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 this literature is current by contacting the Kingspan Insulation Marketing Department.

Health and Safety

Please note that the reflective surface used on some Kingspan Insulation products is designed to enhance its thermal performance. As such, it will reflect light as well as heat, including ultraviolet light. Therefore, if these products are 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 UK block sun cream.

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

Warning – do not stand on or otherwise support your weight on any of these products unless it is fully supported by a load bearing surface.

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The Kingspan Insulation Product Range

Kingspan **OPTIM-R™**

- Optimum performance next generation insulation solution
- Declared (aged) thermal conductivity of 0.007 W/m·K
- Provides an insulating performance that is up to five times better than other commonly available insulation materials
- High levels of thermal efficiency with minimal thickness
- Non-combustible core
- Ideal for constructions where a lack of construction depth or space is an issue
- Available in a range of sizes and thicknesses
- Suitable for use in a variety of OEM applications

Kingspan **Kooltherm®** K-range Products

- Premium performance rigid thermoset insulation
- Thermal conductivities as low as 0.020 W/m·K
- Class 0 fire rated insulation core
- Negligible smoke obscuration
- Resistant to passage of water vapour
- Easy to handle and install
- Non-deleterious material
- Manufactured with a blowing agent that has zero ODP and low GWP

Kingspan **Therma™** Range Products

- High performance rigid thermoset insulation
- Thermal conductivities as low as 0.022 W/m·K
- Unaffected by air infiltration
- Resistant to the passage of water vapour
- Easy to handle and install
- Non-deleterious
- Manufactured with a blowing agent that has zero ODP and low GWP

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The Kingspan Insulation Product Range

Kingspan **Styrozone**[®] Range Products

- High performance rigid extruded polystyrene insulation
- Thermal conductivities as low as 0.031 W/m·K
- High compressive strength
- Resistant to the passage of water vapour
- Easy to handle and install
- Non-deleterious material
- Manufactured with a blowing agent that has zero ODP

All Products

- Their closed cell structure resists both moisture and water vapour ingress – a problem which can be associated with open cell materials such as mineral fibre and which can result in reduced thermal performance.
- Unaffected by air infiltration – a problem that can be experienced with mineral fibre and which can reduce thermal performance
- Safe and easy to install – non-fibrous
- If installed correctly, can provide reliable long term thermal performance over the lifetime of the building
- Thermal conductivity ranging from 0.031 W/m·K - 0.037 W/m·K
- Cost effective
- Available in various grades of compressive strength
- CFC and HCFC free and manufactured with Zero Ozone Depletion Potential
- Safe and easy to install
- Thermal performance is sustainable over the lifespan of the building

Kingspan **Aerobord**[™] Range Products

- Thermal conductivity ranging from 0.031 W/mK - 0.037 W/mK
- Cost effective
- Available in various grades of compressive strength
- CFC and HCFC free and manufactured with Zero Ozone Depletion Potential
- Safe and easy to install
- Thermal performance is sustainable over the lifespan of the building

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Notes

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Contact Details

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email: info@kingspaninsulation.ie

Technical Advice / Design

Kingspan Insulation supports all of its products with a comprehensive Technical Advisory Service for specifiers, stockists and contractors.

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