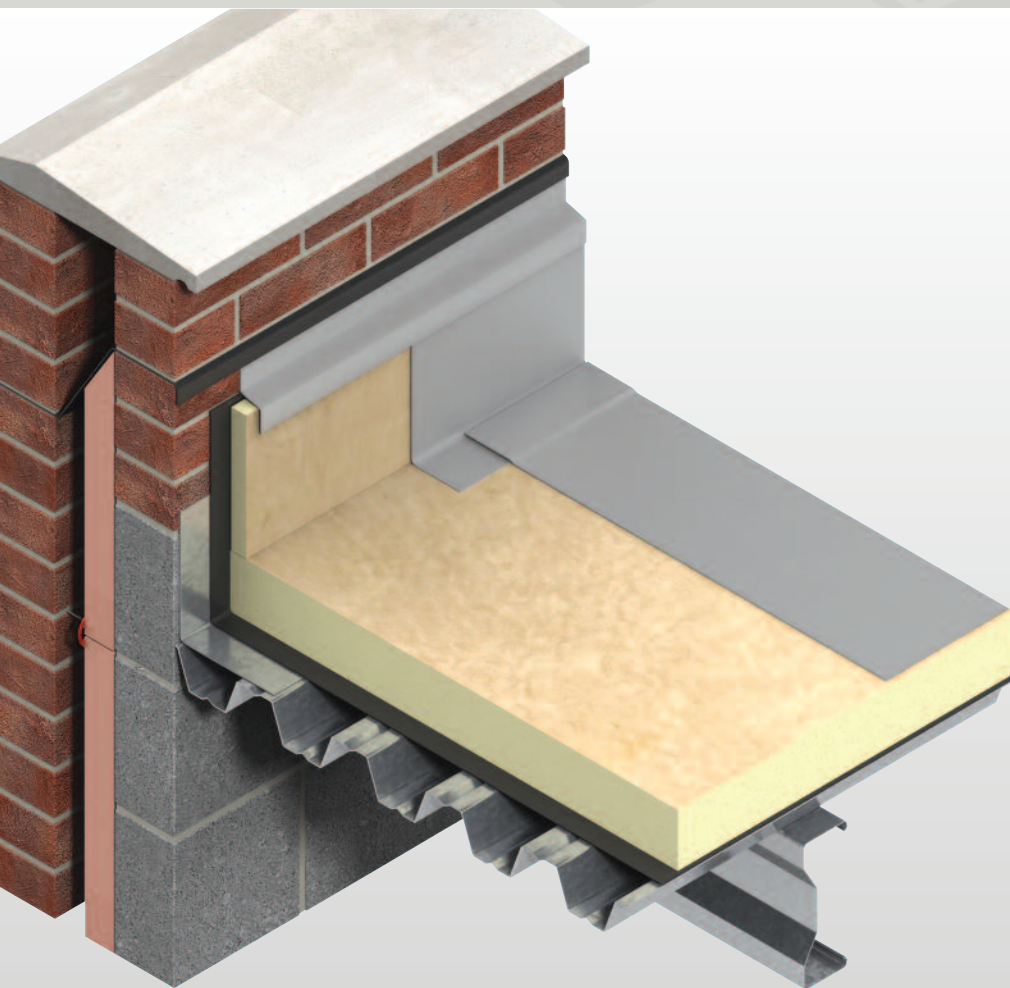




# Thermarroof® TR27 LPC/FM

INSULATION FOR FLAT ROOFS WATERPROOFED WITH FULLY ADHERED SINGLE-PLY, PARTIALLY BONDED BUILT-UP FELT, MASTIC ASPHALT AND COLD LIQUID APPLIED WATERPROOFING



- High performance rigid thermoset insulation – thermal conductivities as low as 0.024 W/m-K
- LPCB approved to LPS 1181: Part 1
- FM approved for Class 1 steel deck roof assemblies
- Fully compatible with single-ply non-bituminous membranes that are fully bonded with solvent based adhesive systems
- Fully compatible with most bitumen based and mastic asphalt waterproofing systems
- Compatible with most green roof systems
- Resistant to the passage of water vapour
- Easy to handle and install
- Ideal for new build and refurbishment
- Non-deleterious material
- Manufactured with a blowing agent that has zero ODP and low GWP



LPS 1181: Part 1  
Certificate No. 388b/01



APPROVED  
Class 1 Roof  
Construction



*Low Energy –  
Low Carbon Buildings*

# Typical Constructions and U-values

## Assumptions

The U-values in the tables that follow have been calculated, under a management system certified to the BBA Scheme for Assessing the Competency of Persons to Undertake U-value and Condensation Risk Calculations, using the method detailed in BS / I.S. EN ISO 6946: 2007 (Building components and building elements. Thermal resistance and thermal transmittance. Calculation method) and using the conventions set out in BR443 (Conventions for U-value calculations). They are valid for the constructions shown in the details immediately above each table.



These examples are based on **Kingspan Thermaroof® TR27 LPC/FM** waterproofed using either a fully adhered single-ply membrane, mastic asphalt, partially bonded built-up felt, or under a cold liquid applied waterproofing system. The insulation board is: fully bonded to a sealed metal deck, or a vapour control layer, which has itself been fully bonded to the type of deck stated for each application; or mechanically fixed through a sealed metal deck, or a vapour control layer, which has itself been loose-laid directly over the type of deck stated for each application. The ceiling, where applicable, is taken to be a 3 mm skim coated 12.5 mm plasterboard with a cavity between it and the underside of the deck.

*NB When calculating U-values to BS EN ISO 6946: 2007, the type of mechanical fixing used may change the thickness of insulation required. These calculations assume telescopic tube fasteners with a thermal conductivity of 1.00 W/m·K or less, the effect of which is insignificant.*

*NB For the purposes of these calculations the standard of workmanship has been assumed good and therefore the correction factor for air gaps has been ignored.*

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

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

## U-value Table Key

Where an **X** is shown, the U-value is higher than the worst of the maximum new build area weighted average U-values allowed by the 2010 Editions of Approved Documents L to the Building Regulations (England & Wales), the 2010 Editions of Technical Handbooks Section 6 (Scotland), the 2006 Editions of Technical Booklets F (Northern Ireland), or the 2008 Editions of Technical Guidance Documents L\* (Republic of Ireland).

\* Excluding Change of Use and Material Alterations.

## Concrete Deck

### Dense Concrete Deck with Suspended Ceiling

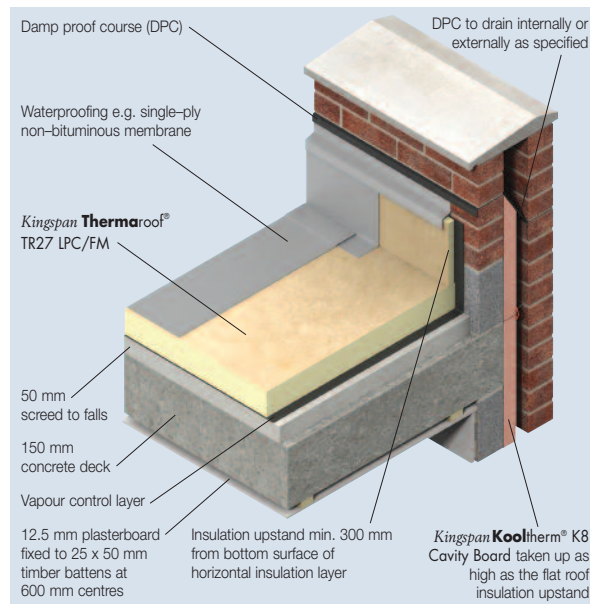


Figure 1

U-values (W/m <sup>2</sup> ·K) for Various Thicknesses of Insulation and Waterproofing Systems			
Insulant Thickness (mm)	Waterproofing System		
	Partially Bonded Built-Up Felt	Mastic Asphalt	Fully Adhered Single-Ply / Cold Liquid Applied
80	X	X	X
85	0.25	0.25	0.25
90	0.24	0.24	0.24
100	0.22	0.22	0.22
110	0.20	0.20	0.20
115	0.19	0.19	0.19
120	0.18	0.18	0.18
125	0.17	0.17	0.17
130	0.17	0.17	0.17
135	0.16	0.16	0.16
140	0.16	0.16	0.16
145	0.15	0.15	0.15
150	0.15	0.15	0.15
80 + 80	0.14	0.14	0.14
85 + 90*	0.13	0.13	0.13
90 + 100*	0.12	0.12	0.12
100 + 110*	0.11	0.11	0.11
100 + 120*	0.10	0.10	0.10

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

## Timber Deck

### Timber Deck with Plasterboard Ceiling

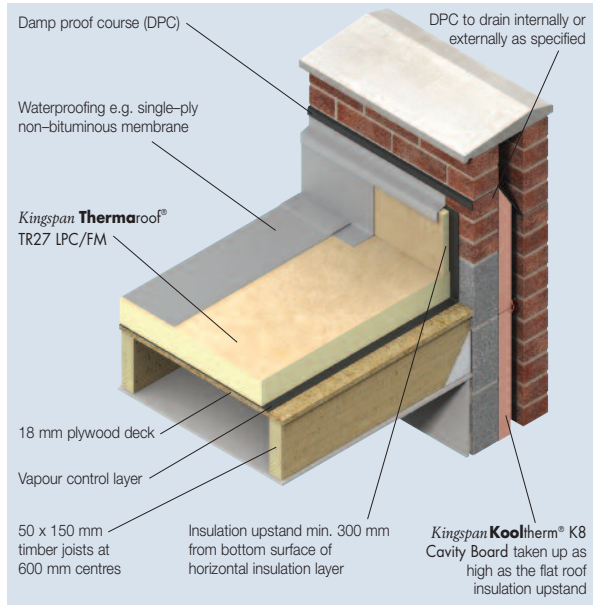


Figure 2

## Metal Deck

### Metal Deck with No Ceiling

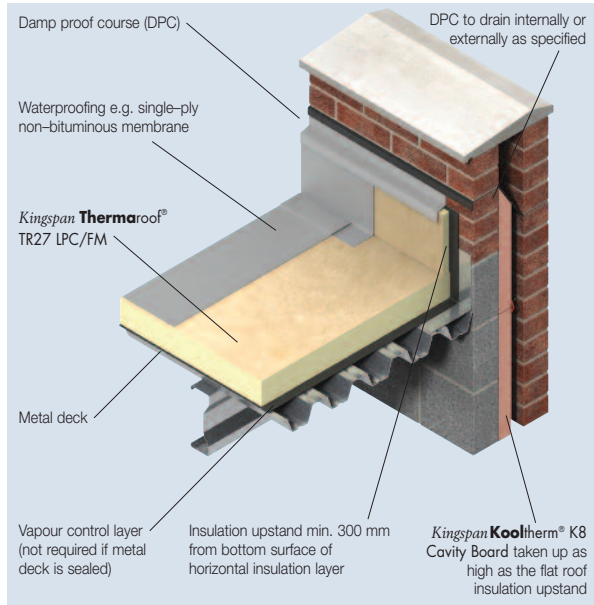


Figure 3

U-values (W/m<sup>2</sup>·K) for Various Thicknesses of Insulation and Waterproofing Systems

Insulant Thickness (mm)	Waterproofing System		
	Partially Bonded Built-Up Felt	Mastic Asphalt	Fully Adhered Single-Ply / Cold Liquid Applied
80	X	X	X
85	0.25	0.25	0.25
90	0.24	0.24	0.24
100	0.22	0.22	0.22
110	0.20	0.20	0.20
115	0.19	0.19	0.19
120	0.18	0.18	0.18
125	0.17	0.17	0.17
130	0.17	0.17	0.17
135	0.16	0.16	0.16
140	0.16	0.16	0.16
145	0.15	0.15	0.15
150	0.15	0.15	0.15
80 + 80	0.14	0.14	0.14
80 + 90*	0.13	0.13	0.14
85 + 90*	0.13	0.13	0.13
90 + 100*	0.12	0.12	0.12
100 + 110*	0.11	0.11	0.11
100 + 120*	0.10	0.10	0.10

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

U-values (W/m<sup>2</sup>·K) for Various Thicknesses of Insulation and Waterproofing Systems

Insulant Thickness (mm)	Waterproofing System		
	Partially Bonded Built-Up Felt	Mastic Asphalt	Fully Adhered Single-Ply / Cold Liquid Applied
90	X	X	X
95	0.25	0.25	0.25
100	0.24	0.24	0.24
110	0.22	0.22	0.22
120	0.19	0.19	0.19
125	0.19	0.19	0.19
130	0.18	0.18	0.18
135	0.17	0.17	0.17
140	0.17	0.17	0.17
145	0.16	0.16	0.16
150	0.16	0.16	0.16
80 + 80	0.15	0.15	0.15
80 + 90*	0.14	0.14	0.14
90 + 95*	0.13	0.13	0.13
100 + 100	0.12	0.12	0.12
100 + 110*	0.11	0.11	0.11
110 + 120*	0.10	0.10	0.10

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

# Green Roof Systems

## Extensive Green Roof Covering – Metal Deck with No Ceiling

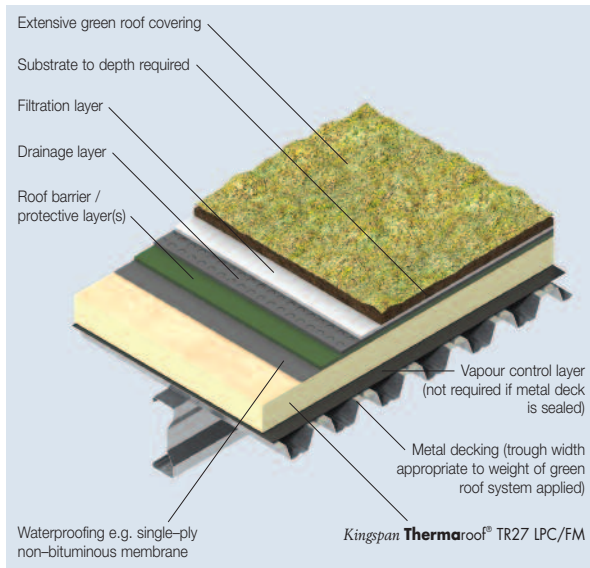


Figure 4

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

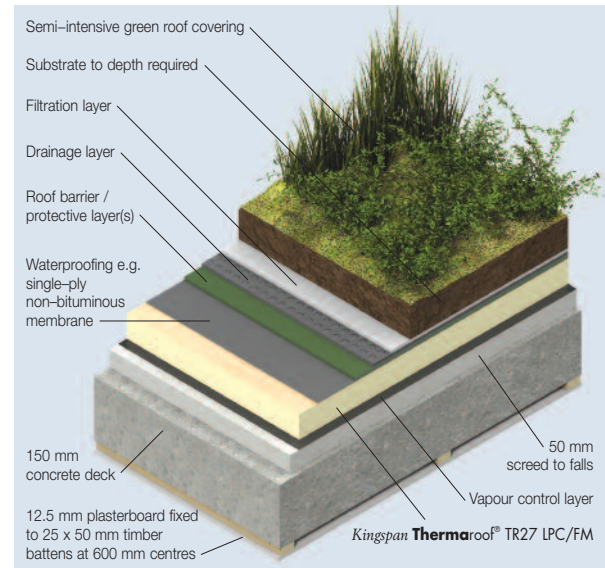


Figure 5

U-values (W/m <sup>2</sup> ·K) for Various Thicknesses of Insulation and Waterproofing Systems			
Insulant Thickness (mm)	Waterproofing System		
	Partially Bonded Built-Up Felt	Mastic Asphalt	Fully Adhered Single-Ply / Cold Liquid Applied
90	X	X	X
95	0.25	0.25	0.25
100	0.24	0.24	0.24
110	0.22	0.22	0.22
120	0.19	0.19	0.19
125	0.19	0.19	0.19
130	0.18	0.18	0.18
135	0.17	0.17	0.17
140	0.17	0.17	0.17
145	0.16	0.16	0.16
150	0.16	0.16	0.16
80 + 80	0.15	0.15	0.15
80 + 90*	0.14	0.14	0.14
90 + 95*	0.13	0.13	0.13
100 + 100	0.12	0.12	0.12
100 + 110*	0.11	0.11	0.11
110 + 120*	0.10	0.10	0.10

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

U-values (W/m <sup>2</sup> ·K) for Various Thicknesses of Insulation and Waterproofing Systems			
Insulant Thickness (mm)	Waterproofing System		
	Partially Bonded Built-Up Felt	Mastic Asphalt	Fully Adhered Single-Ply / Cold Liquid Applied
80	X	X	X
85	0.25	0.25	0.25
90	0.24	0.24	0.24
100	0.22	0.22	0.22
110	0.20	0.20	0.20
115	0.19	0.19	0.19
120	0.18	0.18	0.18
125	0.17	0.17	0.17
130	0.17	0.17	0.17
135	0.16	0.16	0.16
140	0.16	0.16	0.16
145	0.15	0.15	0.15
150	0.15	0.15	0.15
80 + 80	0.14	0.14	0.14
85 + 90*	0.13	0.13	0.13
90 + 100*	0.12	0.12	0.12
100 + 110*	0.11	0.11	0.11
100 + 120*	0.10	0.10	0.10

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

# Design Considerations

## Linear Thermal Bridging

Reasonable provision must be made to limit the effects of cold bridging. The design should ensure that roof-light or ventilator kerbs etc. are always 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. Wall insulation should also be carried up into parapets as high as the flat roof insulation upstand. Please contact the Kingspan Insulation Technical Service Department (see rear cover) for further advice.

## Environmental Impact & Responsible Sourcing

### Green Guide Rating

An Ecoprofile, certified by BRE Certification to the 2008 BRE Environmental Profiles Methodology, has been created for **Kingspan Thermaroof® TR27 LPC/FM** produced at Kingspan Insulation's British manufacturing facilities. The BRE has assigned the product a 2008 Green Guide Summary Rating of A.



Environmental Profiles Scheme  
Certificate Number ENP 409

### Responsible Sourcing

**Kingspan Thermaroof® TR27 LPC/FM** is manufactured under a management system certified to BS / I.S. EN ISO 14001: 2004. The principle polymer components of the product are also manufactured under management systems certified to EN ISO 14001: 2004.

NB The above information is correct at the time of writing. Please confirm at the point of need by contacting Kingspan Insulation's Technical Service Department (see rear cover), from which copies of Kingspan Insulation and its suppliers' ISO 14001 certificates can be obtained along with confirmation of Kingspan Insulation's products' Green Guide ratings.

## Sustainability & Responsibility

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

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

## Specification Clause

**Kingspan Thermaroof® TR27 LPC/FM** should be described in specifications as:-

The roof insulation shall be **Kingspan Thermaroof® TR27 LPC/FM** \_\_\_mm thick: comprising a high performance rigid thermoset insulation core faced on both sides with a coated glass tissue facing. The product shall be manufactured: with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP); in accordance with the requirements of BS 4841-3 and BS 4841-4; under a management system certified to BS / I.S. EN ISO 9001: 2008, BS / I.S. EN ISO 14001: 2004 and BS / I.S. OHSAS 18001: 2007; by Kingspan Insulation Limited; and installed in accordance with the instructions issued by them.

## NBS Specifications

Details also available in NBS Plus.

NBS users should refer to clause(s):

J21 420, J21 430, J31 335

(Standard and Intermediate)

J21 10 (Minor Works)



## Wind Loading

Wind loadings should be assessed in accordance with BS 6399-2: 1997 (Loadings for buildings. Code of practice for wind loads) or BS / I.S. EN 1991-1-4: 2005 (National Annex to Eurocode 1 Actions on Structures. General Actions. Wind Actions) taking into account:

- length / width / height of the building;
- orientation of the building;
- wind speed;
- aspect (e.g. on a hill side); and
- topographical value of the surrounding area.

## Falls

The fall on a flat roof, constructed using *Kingspan Therma*roof® TR27 LPC/FM, is normally provided by the supporting structure being directed towards the rainwater outlets. The fall should be smooth and steep enough to prevent the formation of rainwater ponds. In order to ensure adequate drainage, BS 6229: 2003 (Flat roofs with continuously supported coverings. Code of practice) recommends uniform gradients of not less than 1 in 80. However, because of building settlement, it is advisable to design in even greater falls. These can be provided by a *Kingspan Therma*taper® LPC/FM tapered roofing system (see below).

## Tapered Roofing

*Kingspan Therma*roof® TR27 LPC/FM is also available in a tapered version, *Kingspan Therma*taper® TT47 LPC/FM, comprising 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), faced on both sides with a coated glass tissue facing. *Kingspan Therma*taper® TT47 LPC/FM comes 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 a roof's rainwater run-off and insulation requirements. Further details of *Kingspan Therma*taper® TT47 LPC/FM are available from the Kingspan Insulation Tapered Roofing Department (see rear cover), which should be consulted as early as possible in the process of designing a roof.

## Roof Waterproofing

*Kingspan Therma*roof® TR27 LPC/FM is suitable for use with most fully adhered single-ply waterproofing membranes. When using *Kingspan Therma*roof® TR27 LPC/FM with fully adhered single-ply waterproofing membranes, the joints between boards and cut edges, immediately below the waterproofing membrane, must be taped with a min. 50 mm wide foil tape. Please contact the Kingspan Insulation Technical Service Department (see rear cover) to check waterproofing membrane and proprietary adhesive system compatibility. Advice should be sought, from the appropriate waterproofing membrane manufacturer, in relation to the requirement for the use of a fleece backed membrane with the waterproofing membrane in question.

*Kingspan Therma*roof® TR27 LPC/FM is also suitable for use with most bitumen based waterproofing systems including high performance types which incorporate a Type 3G perforated base layer to BS 747: 2000 (Reinforced bitumen sheets for roofing. Specification). The 3G felt layer should be laid dry and loose, mineral face down with a fully bonded perimeter zone.

Partially bonded built-up felt waterproofing should be laid, where applicable, in accordance with BS 8217: 2005 (Reinforced bitumen membranes for roofing. Code of practice).

*Kingspan Therma*roof® TR27 LPC/FM is also suitable for use with mastic asphalt waterproofing systems. Mastic asphalt waterproofing should be laid, where applicable, in accordance with BS 8218: 1998 (Code of practice for mastic asphalt roofing). Mastic asphalt should always be laid over an isolating layer of loose-laid Type 4A sheathing felt to BS 747: 2000 (Reinforced bitumen sheets for roofing. Specification).

The exposed face of insulation upstands, at parapets and abutments, must be lined with 18 mm exterior grade plywood, prior to the mastic asphalt waterproofing being laid. The plywood is used as an anchor point for the expanded metal substrate onto which the vertical mastic asphalt is laid.

When *Kingspan Therma*roof® TR27 LPC/FM is to be used to insulate balconies, waterproofed with mastic asphalt with a porous promenade tile overlay, a 20 mm cork roofboard should be bitumen bonded to the *Kingspan Therma*roof® TR27 LPC/FM prior to laying the Type 4A sheathing felt and mastic asphalt.

*Kingspan Therma*roof® TR27 LPC/FM is also suitable for use with some cold liquid applied waterproofing systems. When using *Kingspan Therma*roof® TR27 LPC/FM with cold liquid applied waterproofing systems, a carrier membrane for the waterproofing must be installed over the insulation boards. Advice should be sought, from the waterproofing system manufacturer, about the specification of the carrier membrane and the compatibility of the waterproofing system with *Kingspan Therma*roof® TR27 LPC/FM. For further advice please contact the Kingspan Insulation Technical Service Department (see rear cover).

NB *Kingspan Therma*roof® TR27 LPC/FM is also suitable for use with mechanically fixed single-ply waterproofing membranes.

## Water Vapour Control

*Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM should be installed over a separate vapour control layer, in new build roofs, unless it is being used in conjunction with a sealed metal deck. Regardless of the deck type it is recommended that a condensation risk analysis is carried out for every project.

For refurbishment projects, involving the addition of insulation to existing insulated flat roofs, or roofs constructed of insulated steel faced composite panels, it is imperative that a U-value calculation and condensation risk analysis is carried out for every project, in order to ensure that the correct thickness of insulation is installed to achieve the required thermal performance, whilst avoiding interstitial condensation.

In refurbishment projects, where *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM is to be installed over an existing bituminous waterproofing membrane, the membrane can be used as a vapour control layer, as long as it is in a good water tight condition. Where this is not the case, a separate vapour control layer should be installed.

The type of separate vapour control layer required will be dependent upon the chosen method of fixing the insulation boards.

For mechanically fixed applications, a minimum vapour control layer should consist of a 1000 gauge (250 micron) polythene sheet, with all joints lapped and then sealed with double sided self adhesive tape.

For applications where the insulation boards are to be bonded to the vapour control layer, a minimum vapour control layer should consist of a coated roofing felt complying with Type 3B to BS 747: 2000 (Reinforced bitumen sheets for Roofing. Specification), or S1P1 to BS 8747: 2007 (Reinforced bitumen membranes (RBMs) for roofing. Guide to selection and specification), or any appropriate metal-cored vapour control layer.

Where the separate vapour control layer is to be bonded, allowance should be made for adequate bonding of the vapour control layer to the substrate, so as to provide a suitable surface upon which to lay the insulation boards and sufficient resistance to wind up-lift (see 'Wind Loading').

## Roof Loading / Traffic

*Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM is suitable for use on access roof decks subject to limited foot traffic.

Where inappropriate foot traffic is liable to occur, it is recommended that, for roofs waterproofed with mastic asphalt, a 20 mm cork roofboard is bitumen bonded to the *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM prior to waterproofing, and the roof surface is protected by promenade tiles.

Where inappropriate foot traffic is liable to occur, it is recommended that, for roofs waterproofed with partially bonded built-up felt, the roof surface is protected by promenade tiles.

Where inappropriate foot traffic is liable to occur, it is recommended that, for roofs waterproofed with fully adhered single-ply or cold liquid applied waterproofing systems, the roof surface is protected by specially constructed walk-ways.

For further advice on the acceptability of specific foot traffic regimes, please contact the Kingspan Insulation Technical Service Department (see rear cover).

## Green Roofs

*Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM is suitable for use under most green roof systems.

Green roof systems are a specialist design area. When designing a loose-laid insulated green roof assembly consideration needs to be given to the following.

Green roof systems are required to have a minimum dry weight of 80 kg/m<sup>2</sup> to ballast the insulation boards beneath them. However, the total required dry weight will depend upon wind uplift, which in turn will vary with the geographical location of the building, local topography, and the height and width of the roof concerned. The necessity for any additional dry weight should be assessed in accordance with BS 6399-2: 1997 (Loading for Buildings. Code of practice for wind loads) or BS / I.S. EN 1991-1-4: 2005 (National Annex to Eurocode 1 Actions on structures. General Actions. Wind Actions).

When installing a loose-laid insulated green roof assembly, any insulation must be immediately over-laid with the green roof system, which must meet all of the requirements outlined above.

Where these requirements cannot be ensured, the insulation must be mechanically fixed (see Sitework). For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).

# Sitework

## Board Size Selection

- If consideration is being given to bonding *Kingspan Thermo*roof® TR27 LPC/FM, either in hot bitumen or with the use of a suitable alternative proprietary adhesive system, it is recommended that 1.2 x 0.6 m boards (in Britain) or 1.2 x 1.2 m boards (in Ireland) are used.
- All sizes of board are suitable for mechanical fixing.

## Installing over Metal Decks

- Where an FM or LPCB approved construction is required, please refer to 'LPCB & FM Certification' on page 14.
- 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.
- If the metal deck is not sealed, and 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 Thermo*roof® TR27 LPC/FM should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixings').
- Alternatively, 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 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.

## Installing over Concrete Decks

- 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 Thermo*roof® 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.



- 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.

## 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.

## Installing over Existing Flat Roofs

- The existing waterproofing membrane surface should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- Where the existing waterproofing membrane is not fit for purpose as a vapour control layer, and the new insulation boards are to be bonded down, a separate vapour control layer should be bonded to it with hot bitumen, or suitable alternative proprietary adhesive system. 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 new 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.

- Roof-light or ventilator kerbs etc. should always insulated with the same thickness of *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM as the general roof area.
- A 25 mm thick *Kingspan Thermaroof*<sup>®</sup> 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.

## Installing over Existing Composite Panel Roofs

- If the existing profile provides inadequate support for the insulation boards, the existing roof should be over-boarded, e.g. with plywood, prior to their installation.
- Boards of *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM should be secured to the deck using mechanical fixings. Please refer to the Kingspan Insulation Technical Advice Service (see rear cover) for advice on fixing specification.
- Insulation boards should always be laid break-bonded and with joints lightly butted. There should be no gaps at abutments. If the existing roof has been over-boarded, then insulation boards should be laid with their long edges at right angles to the edge of, or diagonally across the roof. If not, they should be laid either with their long edges at right angles to the trough openings, or diagonally across the corrugation line.
- Roof-light or ventilator kerbs etc. should always insulated with the same thickness of *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM as the general roof area.
- 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.

## Mechanical Fixings

- The number of mechanical fixings required to fix *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM 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.
- A minimum of 4 fixings are required to secure 1.2 x 0.6 m boards of *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM to the deck.
- A minimum of 5 fixings are required to secure 1.2 x 1.2 m boards of *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM to the deck.
- A minimum of 6 fixings are required to secure 2.4 x 1.2 m boards of *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM to the deck.
- The requirement for additional fixings should be assessed in accordance with BS 6399-2: 1997 (Loadings for buildings. Code of practice for wind loads) or BS / I.S. EN 1991-1.4: 2005 (National Annex to Eurocode 1. Actions on structures, General Actions, Wind Actions).
- Mechanical fixings must be arranged in an even pattern.
- Fasteners at insulation board edges must be located > 50 and < 150 mm from edges and corners of the board and not overlap board joints.
- Please refer to page 13 for recommended fixing patterns.
- Each fixing should incorporate a square or circular plate washer (min. 50 x 50 mm or 50 mm diameter).
- If two layers of insulation are to be installed, the base layer should be mechanically fixed with minimum 1 No. fixing in the centre of the insulation board before fixing the top layer as described above.
- Where alternative mechanical fixing systems are specified, such as bar fixing systems, the specified system must give similar restraint to the insulation board as would be attained by the use of conventional telescopic tube fasteners.

## Installing in Two Layers

- In situations where two layers of insulation are required, both layers should be installed in the same manner, as detailed in the preceding sections. However, if mechanical fixing methods are to be employed, refer to 'Mechanical Fixings' for guidance on the number of fixings to be used in each layer.
- In all cases, the layers should be horizontally offset relative to each other so that, as far as possible, the board joints in the two adjacent layers do not coincide with each other (see Figure 6).

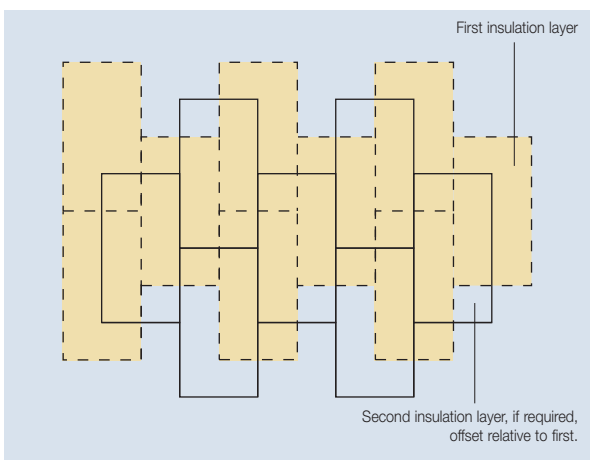


Figure 6 Offsetting of Multiple Insulation Layers

## General

### 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 such as bricks or air conditioning equipment.

### Reflective Coatings

- Bitumen based built up waterproofing systems laid over *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM should always incorporate a solar reflective layer such as chippings or a specialist coating.

### Daily Working Practice

- 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.

### Cutting

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

### Availability

- *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM is available through specialist insulation distributors and selected roofing merchants throughout the UK and Ireland.

### Packaging and Storage

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

### Health and Safety

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

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

# Mechanical Fixing Patterns

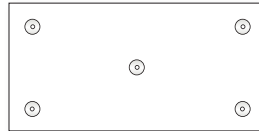
## Recommended Fixing Patterns

The recommended fixing patterns for *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM are shown below. The number of fixings necessary should be assessed in accordance with BS 6399-2: 1997 (Loadings for buildings. Code of practice for wind loads) or BS / I.S. EN 1991-1.4: 2005 (National Annex to Eurocode 1. Actions on structures, General Actions, Wind Actions).

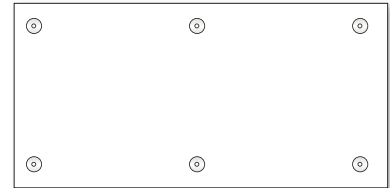
The images below show recommended fixing patterns, the number of fixings used and the resulting fixing density (number of fixings per m<sup>2</sup>).



4 No. per board  
(1.2 x 0.6 m board – 5.55 fixings / m<sup>2</sup>)

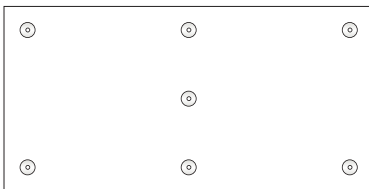


5 No. per board  
(1.2 x 0.6 m board – 6.94 fixings / m<sup>2</sup>)  
(1.2 x 1.2 m board – 3.47 fixings / m<sup>2</sup>)

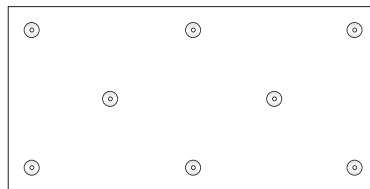


6 No. per board  
(1.2 x 0.6 m board – 8.33 fixings / m<sup>2</sup>)  
(1.2 x 1.2 m board – 4.16 fixings / m<sup>2</sup>)  
(2.4 x 1.2 m board – 2.08 fixings / m<sup>2</sup>)

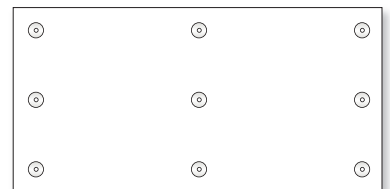
*A minimum of 4 fixings are required to secure a 1.2 m x 0.6 m insulation board to the deck, a minimum of 5 fixings are required to secure a 1.2 x 1.2 m insulation board to the deck and a minimum of 6 fixings are required to secure a 2.4 x 1.2 m insulation board to the deck. Therefore, of the two fixing patterns above, that on the left can only be applied for a 1.2 x 0.6 m insulation board and that on the right for a 1.2 x 0.6 m insulation board or a 1.2 x 1.2 m insulation board.*



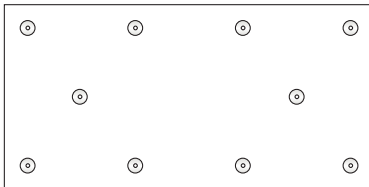
7 No. per board  
(1.2 x 0.6 m board – 9.72 fixings / m<sup>2</sup>)  
(1.2 x 1.2 m board – 4.86 fixings / m<sup>2</sup>)  
(2.4 x 1.2 m board – 2.43 fixings / m<sup>2</sup>)



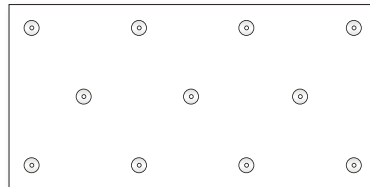
8 No. per board  
(1.2 x 0.6 m board – 11.11 fixings / m<sup>2</sup>)  
(1.2 x 1.2 m board – 5.55 fixings / m<sup>2</sup>)  
(2.4 x 1.2 m board – 2.77 fixings / m<sup>2</sup>)



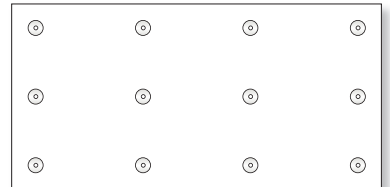
9 No. per board  
(1.2 x 0.6 m board – 12.50 fixings / m<sup>2</sup>)  
(1.2 x 1.2 m board – 6.25 fixings / m<sup>2</sup>)  
(2.4 x 1.2 m board – 3.12 fixings / m<sup>2</sup>)



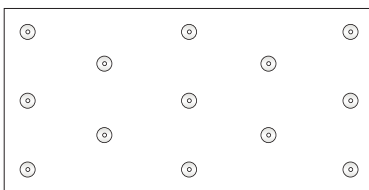
10 No. per board  
(1.2 x 0.6 m board – 13.88 fixings / m<sup>2</sup>)  
(1.2 x 1.2 m board – 6.94 fixings / m<sup>2</sup>)  
(2.4 x 1.2 m board – 3.47 fixings / m<sup>2</sup>)



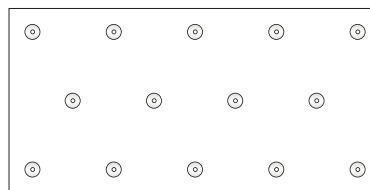
11 No. per board  
(1.2 x 0.6 m board – 15.27 fixings / m<sup>2</sup>)  
(1.2 x 1.2 m board – 7.63 fixings / m<sup>2</sup>)  
(2.4 x 1.2 m board – 3.81 fixings / m<sup>2</sup>)



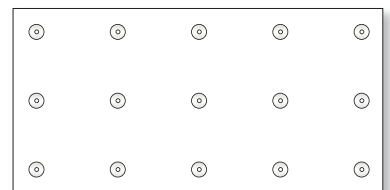
12 No. per board  
(1.2 x 0.6 m board – 16.66 fixings / m<sup>2</sup>)  
(1.2 x 1.2 m board – 8.33 fixings / m<sup>2</sup>)  
(2.4 x 1.2 m board – 4.16 fixings / m<sup>2</sup>)



13 No. per board  
(1.2 x 0.6 m board – 18.05 fixings / m<sup>2</sup>)  
(1.2 x 1.2 m board – 9.02 fixings / m<sup>2</sup>)  
(2.4 x 1.2 m board – 4.51 fixings / m<sup>2</sup>)



14 No. per board  
(1.2 x 0.6 m board – 19.44 fixings / m<sup>2</sup>)  
(1.2 x 1.2 m board – 9.72 fixings / m<sup>2</sup>)  
(2.4 x 1.2 m board – 4.86 fixings / m<sup>2</sup>)



15 No. per board  
(1.2 x 0.6 m board – 20.83 fixings / m<sup>2</sup>)  
(1.2 x 1.2 m board – 10.41 fixings / m<sup>2</sup>)  
(2.4 x 1.2 m board – 5.20 fixings / m<sup>2</sup>)

*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.*

# Product Details

## The Facings

*Kingspan Therma*roof® TR27 LPC/FM is faced on both sides with a coated glass tissue, autohesively bonded to the insulation core during manufacture.

## The Core

The core of *Kingspan Therma*roof® TR27 LPC/FM is manufactured with



**Nilflam**® technology, a 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).



## Standards and Approvals

*Kingspan Therma*roof® TR27 LPC/FM is manufactured to the highest standards in accordance with the requirements of both BS 4841-3 (Rigid polyisocyanurate (PIR) and polyurethane (PUR) products for building end-use applications. Specification for laminated boards (roofboards) with auto-adhesively or separately bonded facings for use as roofboard thermal insulation under built-up bituminous roofing membranes) and BS 4841-4 (Rigid polyisocyanurate (PIR) and polyurethane (PUR) products for building end-use applications. Specification for laminated boards (roofboards) with auto-adhesively or separately bonded facings for use as roofboard thermal insulation under single-ply roofing membranes).

*Kingspan Therma*roof® TR27 LPC/FM is also manufactured to the highest standards under a management system certified to BS / I.S. EN ISO 9001: 2008 (Quality management systems. Requirements), BS / I.S. EN ISO 14001: 2004 (Environmental Management Systems. Requirements) and BS / I.S. OHSAS 18001: 2007 (Health and Safety Management Systems. Requirements).

*Kingspan Therma*roof® TR27 LPC/FM, produced at Kingspan Insulation's Pembridge and Selby manufacturing facilities, is covered by BBA Certificate 06/4372.



## Standard Dimensions

*Kingspan Therma*roof® TR27 LPC/FM is available in the following standard size(s):

Nominal Dimension		Availability		
Length	(m)	1.2*	1.2**	2.4
Width	(m)	0.6*	1.2**	1.2
Insulant Thickness	(mm)	Refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes.		

\* for product produced at Kingspan Insulation's British manufacturing facilities only.

\*\* for product produced at Kingspan Insulation's Irish manufacturing facility only.

## Compressive Strength

The compressive strength of *Kingspan Therma*roof® TR27 LPC/FM typically exceeds 150 kPa at 10% compression, when tested to BS / I.S. EN 826: 1996 (Thermal insulating products for building applications. Determination of compression behaviour).

## Water Vapour Resistivity

The product typically achieves a resistivity greater than 300 MN-s/g-m, when tested in accordance with BS EN 12086: 1997 / I.S. EN 12086: 1998 (Thermal insulating products for building applications. Determination of water vapour transmission properties). *Kingspan Therma*roof® TR27 LPC/FM should always be installed over a vapour control layer or sealed metal deck (see 'Water Vapour Control' on page 7).

## Durability

If correctly installed, *Kingspan Therma*roof® TR27 LPC/FM can have an indefinite life. Its durability depends on the supporting structure and the conditions of its use.

## Resistance to Solvents, Fungi & Rodents

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

The insulation core and facings used in the manufacture of *Kingspan Therma*roof® TR27 LPC/FM resist attack by mould and microbial growth, and do not provide any food value to vermin.

## Fire Performance

*Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM, when subjected to the British Standard fire test, specified in the table below, will achieve the result shown, when waterproofed with a single-ply waterproofing membrane.

Test	Result
BS 476-3: 2004 (External fire exposure roof test)	Dependent on single-ply membrane adopted

*Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM, when subjected to the British Standard fire test, specified in the table below, will achieve the result shown when waterproofed with 3 layer built-up felt and a loading coat of 10 mm chippings. For specifications without the chippings please consult the manufacturer of the mineral surfaced cap sheet for their fire classification details.

Test	Result
BS 476-3: 2004 (External fire exposure roof test)	FAA Rating

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

## LPCB & FM Certification

### FM Certification

*Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM is certified as achieving Class 1 Insulated Steel Deck Pass to Factory Mutual Research Standards 4450: 1989 (Approval Standard for Class 1 Insulated Steel Deck Pass) and 4470: 2010 (Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 Non-combustible Roof Deck Construction), subject to the conditions of approval as a roof insulation product for use in Class 1 roof constructions as described in the current edition of the Factory Mutual Research Approval Guide.



### LPCB Certification

Metal deck roofing constructions incorporating *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM, produced at Kingspan Insulation's Pembridge and Castleblayney manufacturing facilities, have been successfully tested to LPS 1181: Part 1 (Requirements and Tests for Built-up Cladding and Sandwich Panel Systems for use as the External Envelope of Buildings). The table below indicates the LPCB listed approvals for *Kingspan Thermaroof*<sup>®</sup> TR27 LPC/FM.

For further details please contact the Kingspan Insulation Technical Service Department (see rear cover) or alternatively search for "*Thermaroof*<sup>®</sup> TR27 LPC/FM" or approval reference number 388b/02 on [www.redbooklive.com](http://www.redbooklive.com).

Product	Thickness (mm)	Vapour Control	Grade	LPCB Ref No.
<i>Kingspan Thermaroof</i> <sup>®</sup> TR27 LPC/FM	30 – 120 in a single layer	Sealed metal deck or separate vapour control layer	EXT – B	388b/02



LPS 1181: Part 1  
Certificate No. 388b/02

## Thermal Properties

The  $\lambda$ -values and R-values detailed below are quoted in accordance with BS / I.S. EN 13165: 2008 (Thermal insulation products for buildings – Factory made rigid polyurethane foam (PUR) products – Specification).

### Thermal Conductivity

The boards achieve a thermal conductivity ( $\lambda$ -value) of: 0.025 W/m·K (insulant thickness 80 – 119 mm); and 0.024 W/m·K (insulant thickness  $\geq$  120 mm).

### Thermal Resistance

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

Insulant Thickness (mm)	Thermal Resistance (m <sup>2</sup> ·K/W)
80	3.20
85	3.40
90	3.60
95	3.80
100	4.00
110	4.40
120	5.00
125	5.20
130	5.40
135	5.60
140	5.80
145	6.00
150	6.25

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

# Kingspan Insulation

## Company Details

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

Kingspan Insulation Ltd is a market leading manufacturer of premium and high performance rigid insulation products and insulated systems for building fabric and building services applications.

## Products & Applications

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 nilveni**® Breathable Membranes
- **Kingspan TEK**® Building System

## Insulation Product Benefits

### *Kingspan Kooltherm*® K-range Products

- With a thermal conductivity of 0.020–0.023 W/m·K these are the most thermally efficient insulation products commonly used.
- The thinnest commonly used insulation products for any specific U-value.
- Rigid thermoset insulation core is Class 0, as defined by the Building Regulations in England, Wales & Ireland, and Low Risk, as defined by the Building Standards in Scotland.
- Rigid thermoset insulation core achieves the best possible rating of < 5% smoke obscuration when tested to BS 5111: Part 1: 1974.
- Manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

### *Kingspan Therma*™ Range Products

- With a thermal conductivity of 0.022–0.027 W/m·K these are amongst the more thermally efficient insulation products commonly used.
- Each product achieves the required fire performance for its intended application.
- Manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

### *Kingspan Styrozone*® Range Products

- Rigid extruded polystyrene insulation (XPS) has the necessary compressive strength to make it the product of choice for specialist applications such as heavy duty flooring, car park decks and inverted roofing.
- Each product achieves the required fire performance for its intended application.
- Manufactured with a blowing agent that has zero Ozone Depletion Potential (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.

# Contact Details

## Customer Service

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

UK	- Tel:	+44 (0) 1544 388 601
	- Fax:	+44 (0) 1544 388 888
	- email:	customerservice@kingspaninsulation.co.uk
Ireland	- Tel:	+353 (0) 42 979 5000
	- Fax:	+353 (0) 42 975 4299
	- email:	info@kingspaninsulation.ie

## Literature & Samples

Kingspan Insulation produces a comprehensive range of technical literature for specifiers, contractors, stockists and end users. The literature contains clear 'user friendly' advice on typical design; design considerations; thermal properties; sitework and product data.

Available as a complete Design Manual or as individual product brochures, Kingspan Insulation technical literature is an essential specification tool. For copies please contact the Kingspan Insulation Marketing Department, or visit the Kingspan Insulation website, using the details below:

UK	- Tel:	+44 (0) 1544 387 384
	- Fax:	+44 (0) 1544 387 484
	- email:	literature@kingspaninsulation.co.uk
	- www.kingspaninsulation.co.uk/literature	
Ireland	- Tel:	+353 (0) 42 979 5000
	- Fax:	+353 (0) 42 975 4299
	- email:	info@kingspaninsulation.ie
	- www.kingspaninsulation.ie/literature	

## Tapered Roofing

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

UK	- Tel:	+44 (0) 1544 387 383
	- Fax:	+44 (0) 1544 387 483
	- email:	tapered@kingspaninsulation.co.uk
Ireland	- Tel:	+353 (0) 42 975 4297
	- Fax:	+353 (0) 42 975 4296
	- email:	tapered@kingspaninsulation.ie

## Technical Advice / Design

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

This includes a computer-aided service designed to give fast, accurate technical advice. Simply phone the Kingspan Insulation Technical Service Department with your project specification. Calculations can be carried out to provide U-values, condensation / dew point risk, required insulation thicknesses etc... Thereafter any number of permutations can be provided to help you achieve your desired targets.

The Kingspan Insulation Technical Service Department can also give general application advice and advice on design detailing and fixing etc... Site surveys are also undertaken as appropriate.

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



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

UK	- Tel:	+44 (0) 1544 387 382
	- Fax:	+44 (0) 1544 387 482
	- email:	technical@kingspaninsulation.co.uk
Ireland	- Tel:	+353 (0) 42 975 4297
	- Fax:	+353 (0) 42 975 4296
	- email:	technical@kingspaninsulation.ie

## General Enquiries

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

UK	- Tel:	+44 (0) 1544 388 601
	- Fax:	+44 (0) 1544 388 888
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