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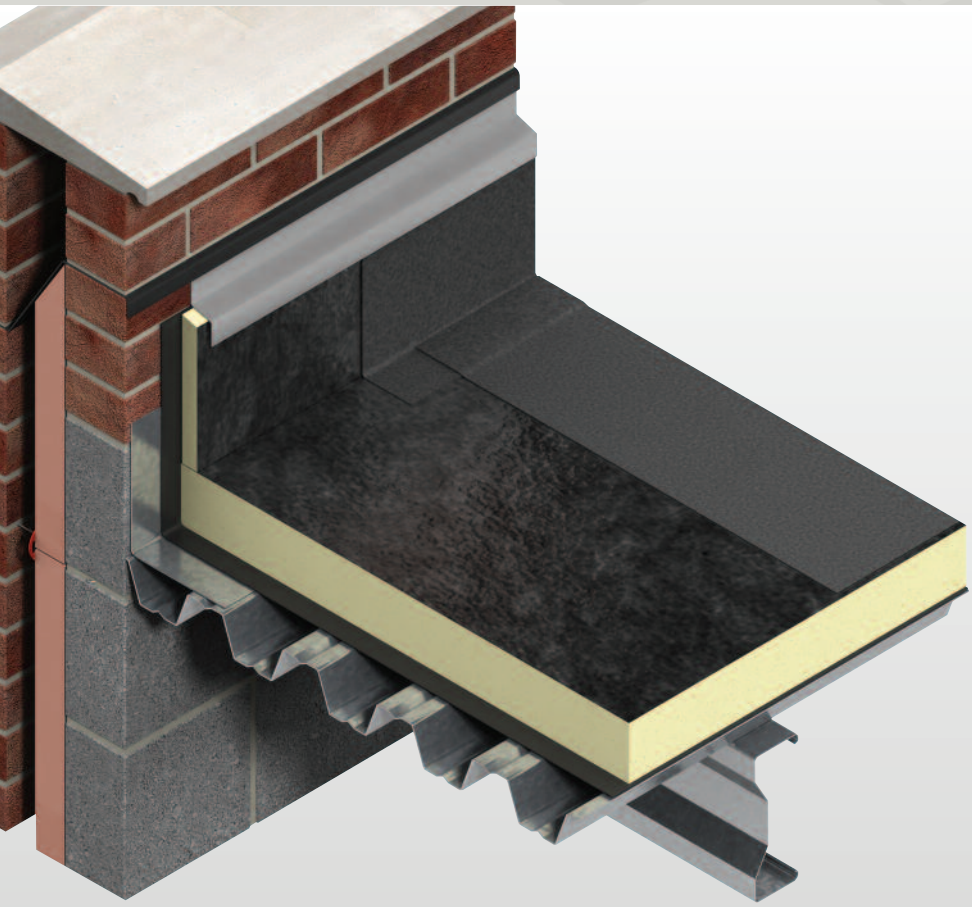
Thermaroof® TR24

INSULATION FOR FLAT ROOFS WATERPROOFED WITH FULLY BONDED TORCH APPLIED MULTI-LAYER BITUMINOUS WATERPROOFING



- High performance rigid thermoset insulation – thermal conductivity 0.024 – 0.026 W/m·K
- Compatible with majority of torch applied waterproofing 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

Kingspan®

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 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* **Therma**roof® TR24, waterproofed using fully bonded torch applied multi-layer bituminous waterproofing. 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. 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 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 ✗ 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), and the 2010 Editions of Technical Handbooks Section 6 (Scotland).

Concrete Deck

Dense Concrete Deck with Suspended Ceiling

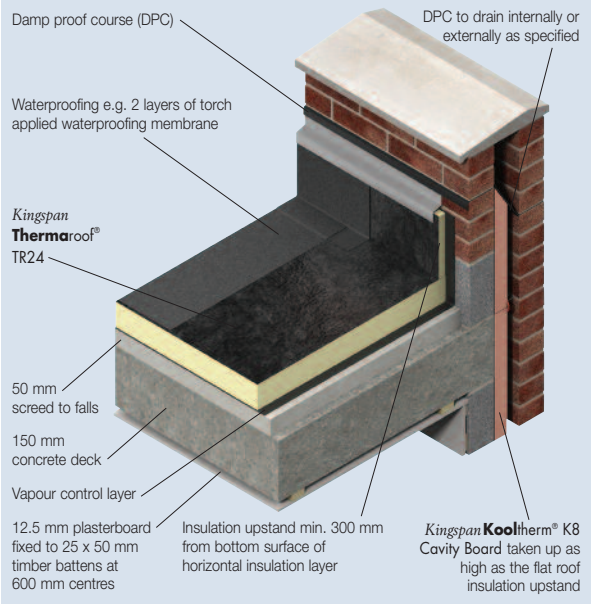


Figure 1

Packer Board* Thickness (mm)	Product Thickness of *Kingspan* **Therma**roof® TR24	U–value (W/m²·K)
0	80	✗
0	85	0.25
0	90	0.24
0	100	0.22
0	110	0.20
0	115	0.19
0	120	0.18
0	125	0.17
0	130	0.17
0	135	0.16
0	140	0.16
0	145	0.15
0	150	0.15
80	80	0.14
85	90	0.13
90	100	0.12
100	110	0.11
100	120	0.10

** The packer board is taken to be Kingspan* **Therma**roof® TR27 LPC/FM. *Please refer to the relevant Kingspan Insulation literature for details of this product.*

Timber Deck

Timber Deck with Plasterboard Ceiling

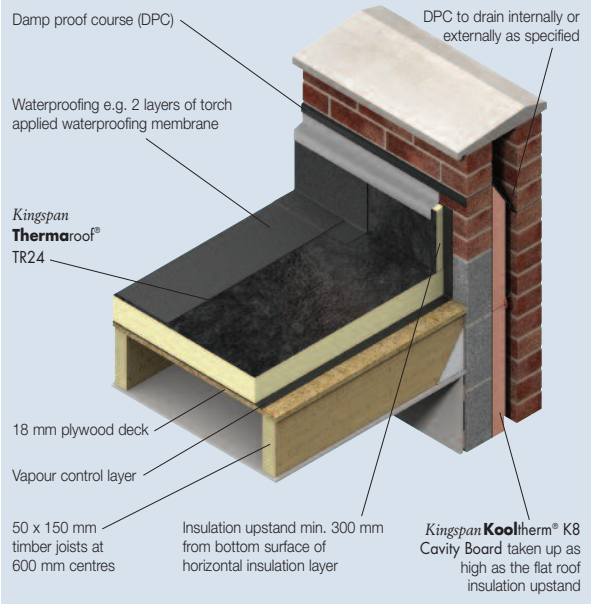


Figure 2

Packer Board* Thickness (mm)	Product Thickness of *Kingspan* **Therma**roof® TR24	U–value (W/m²·K)
0	80	✗
0	85	0.25
0	90	0.24
0	100	0.22
0	110	0.20
0	115	0.19
0	120	0.18
0	125	0.17
0	130	0.17
0	135	0.16
0	140	0.16
0	145	0.15
0	150	0.15
80	80	0.14
80	90	0.13
85	90	0.13
90	100	0.12
100	110	0.11
100	120	0.10

** The packer board is taken to be Kingspan* **Therma**roof® TR27 LPC/FM. *Please refer to the relevant Kingspan Insulation literature for details of this product.*

Metal Deck

Metal Deck with No Ceiling

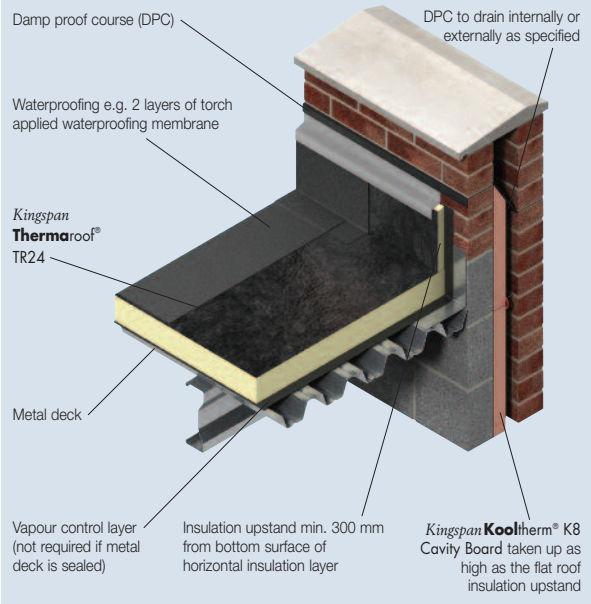


Figure 3

Packer Board* Thickness (mm)	Product Thickness of *Kingspan* **Therma**roof® TR24	U–value (W/m²·K)
0	90	✗
0	95	0.25
0	100	0.24
0	110	0.22
0	120	0.20
0	125	0.19
0	130	0.18
0	135	0.17
0	140	0.17
0	145	0.16
0	150	0.16
80	80	0.15
80	90	0.14
90	95	0.13
100	100	0.12
100	110	0.11
110	120	0.10

** The packer board is taken to be Kingspan* **Therma**roof® TR27 LPC/FM. *Please refer to the relevant Kingspan Insulation literature for details of this product.*

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* **Therma**roof® TR24 as the general roof area. A 25 mm thick *Kingspan* **Therma**roof® 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. 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

Kingspan **Therma**roof® TR24 correspond(s) to the BRE Global Green Guide online generic specification `Rigid urethane (pentane blown) - density 32 kg/m³' (ref. 815320017) which achieves a 2008 Green Guide Summary Rating of A.

Responsible Sourcing

Kingspan **Therma**roof® TR24 is manufactured under a management system certified to BS 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.

Specification Clause

Kingspan **Therma**roof® TR24 should be described in specifications as:–

The roof insulation shall be *Kingspan* **Therma**roof® TR24 ____mm thick: comprising a high performance rigid thermoset insulation core faced with a bitumen coated glass tissue finished with a thermofusible polypropylene fleece on its upper surface and a mineralised glass tissue on its lower surface. 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; under a management system certified to BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS 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):
J41 420 (Standard and Intermediate)
J41 10 (Minor Works)

Wind Loadings

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® TR24, 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 pools. 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® tapered roofing system (see below).

Tapered Roofing

Kingspan **Therma**roof® TR24 is also available in a tapered version, *Kingspan* **Therma**taper® TT44, 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 the underside with a mineralised glass tissue autohesively bonded to the insulation core during manufacture. The top surface is finished with a bitumen coated glass tissue finished with a thermofusible polypropylene fleece. *Kingspan* **Therma**taper® TT44 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® TT44 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® TR24 is designed for use in conjunction with most fully bonded torch applied multi-layer bituminous waterproofing. When applying waterproofing, torch with minimum heat at all times. Torch the roll of waterproofing felt using flame/edge guards at all times. Do not directly apply the torch to the insulation facing. The waterproofing membrane should be installed in accordance with the membrane manufacturer's instruction. For further advice please contact the Kingspan Insulation Technical Service Department (see rear cover).

Water Vapour Control

Kingspan **Therma**roof® TR24 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* **Therma**roof® TR24 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 **Therma**roof® TR24 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 the roof surface is protected by promenade tiles. For further advice on the acceptability of specific foot traffic regimes, please contact the Kingspan Insulation Technical Service Department.

Sitework

Installing over Metal Decks

- 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* **Therma**roof® TR24 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* **Therma**roof® TR24 as the roof area.
- A 25 mm thick *Kingspan* **Therma**roof® 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.

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* **Therma**roof® 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* **Therma**roof® TR24 as the general roof area.
- A 25 mm thick *Kingspan* **Therma**roof® 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.

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* **Therma**roof® 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 insulated with the same thickness of *Kingspan* **Therma**roof® TR24 as the general roof area.
- A 25 mm thick *Kingspan* **Therma**roof® 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.

Sitework

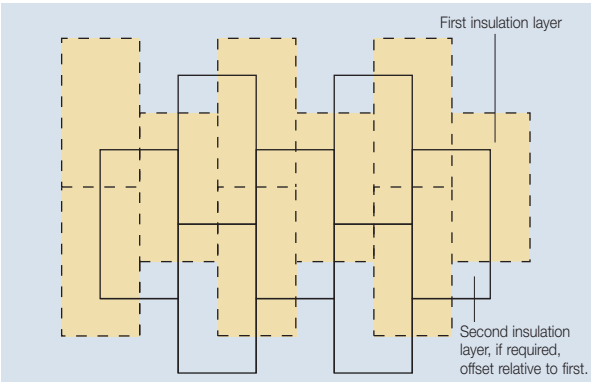
Mechanical Fixings

- The number of mechanical fixings required to fix *Kingspan* **Therma**roof® TR24 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* **Therma**roof® TR24 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 9 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 4).



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 the direct storage of heavy building components such as bricks or air conditioning equipment.

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* **Therma**roof® TR24 is available through specialist insulation distributors and selected roofing merchants throughout the UK.

Packaging and Storage

- The polyethylene polythene 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.

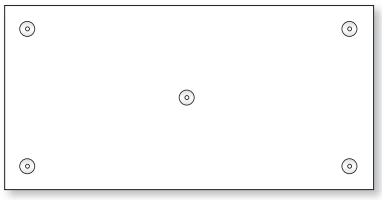
Warning – do not stand on or otherwise support your weight on this product unless it is fully supported by a load bearing surface.

Mechanical Fixing Patterns

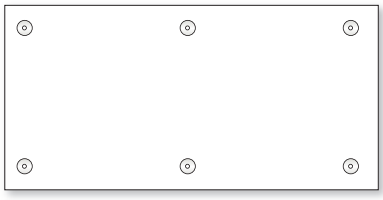
Recommended Fixing Patterns

Alternatively, the insulation boards should be secured to the deck using mechanical fixings. The recommended fixing patterns for *Kingspan* **Therma**roof® TR24 is shown below. The number of fixings necessary should also 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 the minimum recommended fixing patterns, the number of fixings used and the resulting fixing density (number of fixings per m²).

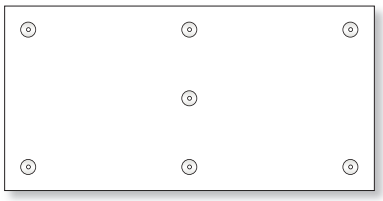
4 No. per board
(1.2 x 0.6 m board – 5.55 fixings / m²)



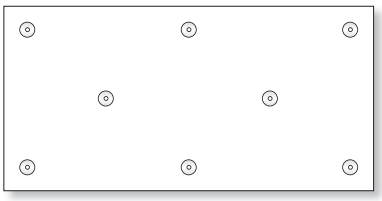
5 No. per board
(1.2 x 0.6 m board – 6.94 fixings / m²)



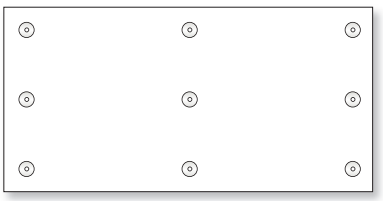
6 No. per board
(1.2 x 0.6 m board – 8.33 fixings / m²)



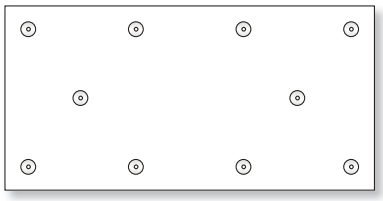
7 No. per board
(1.2 x 0.6 m board – 9.72 fixings / m²)



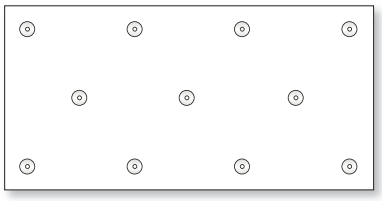
8 No. per board
(1.2 x 0.6 m board – 11.11 fixings / m²)



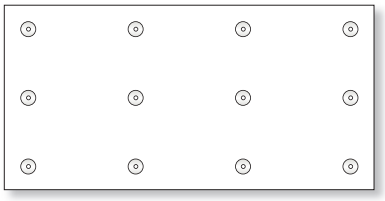
9 No. per board
(1.2 x 0.6 m board – 12.50 fixings / m²)



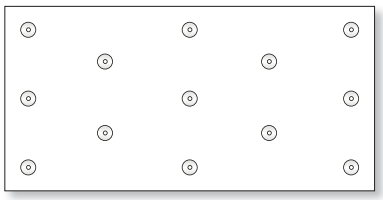
10 No. per board
(1.2 x 0.6 m board – 13.88 fixings / m²)



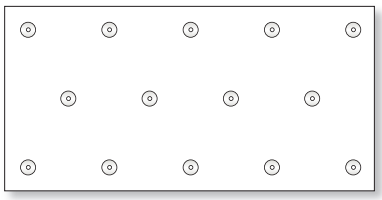
11 No. per board
(1.2 x 0.6 m board – 15.27 fixings / m²)



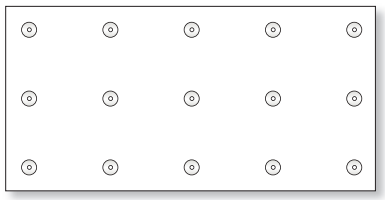
12 No. per board
(1.2 x 0.6 m board – 16.66 fixings / m²)



13 No. per board
(1.2 x 0.6 m board – 18.05 fixings / m²)



14 No. per board
(1.2 x 0.6 m board – 19.44 fixings / m²)



15 No. per board
(1.2 x 0.6 m board – 20.83 fixings / m²)

Product Details

The Upper Facing

The upper facing of *Kingspan* **Therma**roof® TR24 is bitumen coated glass tissue finished with a thermofusible polypropylene fleece, autohesively bonded to the insulation core during manufacture.

The Core

The core of *Kingspan* **Therma**roof® TR24 is manufactured with **Nil*flam***® 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).

zero O.D.P

The Lower Facing

The lower facing of *Kingspan* **Therma**roof® TR24 is a mineralised glass tissue autohesively bonded to the insulation core during manufacture.

Standards & Approvals

Kingspan **Therma**roof® TR24 is manufactured to the highest standards under a management system certified to BS EN ISO 9001: 2008 (Quality Management Systems. Requirements), BS EN ISO 14001: 2004 (Environmental Management Systems. Requirements) and BS OHSAS 18001: 2007 (Health and Safety Management Systems. Requirements.)

Standard Dimensions

Kingspan **Therma**roof® TR24 is available in the following standard size:

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

Compressive Strength

The compressive strength of *Kingspan* **Therma**roof® TR24 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® TR24 should always be installed over a vapour control layer or sealed metal deck (see 'Water Vapour Control' on page 5).

Durability

If correctly installed, *Kingspan* **Therma**roof® TR24 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 suppliers of the spilt 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® TR24 resist attack by mould and microbial growth and do not provide any food value to vermin.

Fire Performance

Kingspan **Therma**roof® TR24, when subjected to the British Standard fire test specified in the table below, will achieve the result shown, when waterproofed with 2 layer built–up felt and a loading coat of 12.5 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).

Thermal Properties

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

Thermal Conductivity

The boards achieve a thermal conductivity (λ–value) of:
0.026 W/m·K (insulant thickness < 80mm)
0.025 W/m·K (insulant thickness 80 – 119 mm)
0.024 W/m·K (insulant thickness ≥ 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^2·K/W).

Product Thickness (mm)	Thermal Resistance (m^2.K/W)
25	0.96
30	1.15
40	1.54
50	1.92
60	2.31
80	3.20
100	4.00
120	5.00
140	5.83
150	6.25

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

Insulation Product Benefits

Kingspan **Kool**therm® 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 **Styr**ozone® 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:

Tel: +44 (0) 1544 388 601
Fax: +44 (0) 1544 388 888
email: customerservice@kingspaninsulation.co.uk

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:

Tel: +44 (0) 1544 387 384
Fax: +44 (0) 1544 387 484
email: literature@kingspaninsulation.co.uk
www.kingspaninsulation.co.uk/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:

Tel: +44 (0) 1544 387 383
Fax: +44 (0) 1544 387 483
email: tapered@kingspaninsulation.co.uk

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:

Tel: +44 (0) 1544 387 382
Fax: +44 (0) 1544 387 482
email: technical@kingspaninsulation.co.uk

General Enquiries

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

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email: info@kingspaninsulation.co.uk

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 (see above left). 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 Service (see above), 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 (see left).

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

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