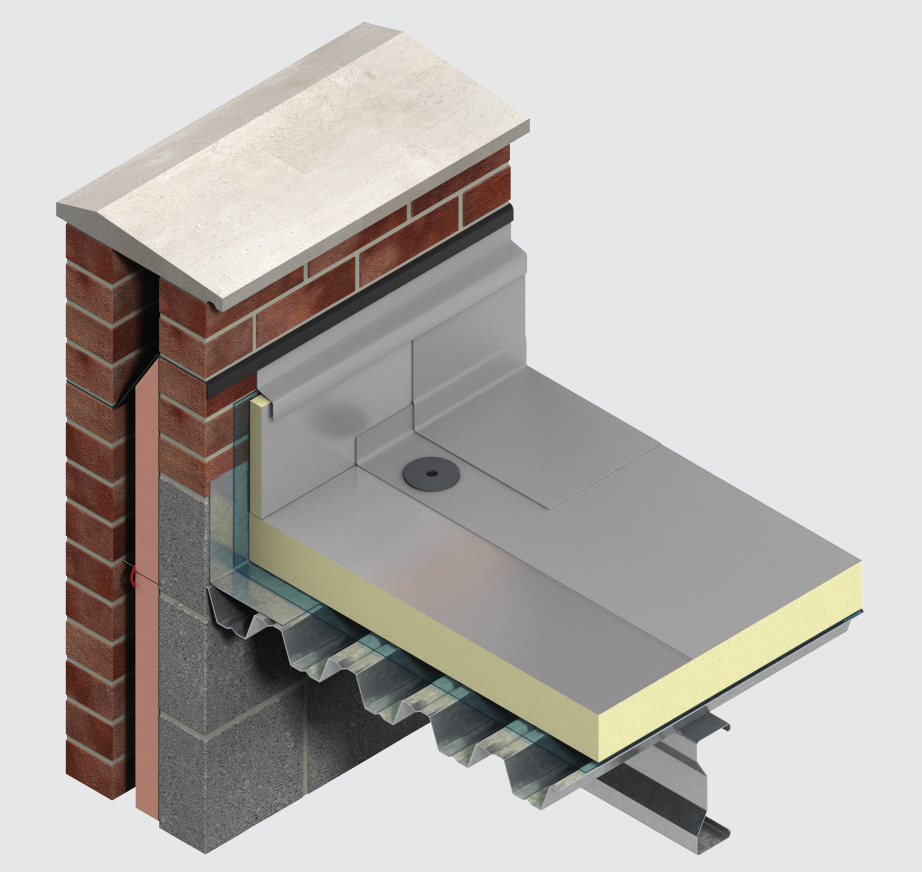
Fourteenth Issue | 09/2024

Thermaroof® TR26

Insulation for flat roofs waterproofed with mechanically fixed single-ply waterproofing



- High performance rigid thermoset polyisocyanurate (PIR) insulation - thermal conductivity 0.022 W/mK
- For FM approval see page 14
- Fully compatible with most mechanically fixed single-ply waterproofing systems
- Compatible with most green roof systems
- Installation technique is ideal for fast track building programmes
- Resistant to the passage of water vapour
- Easy to handle and install compared to some other commonly used insulants
- Ideal for new build and refurbishment

Kingspan®

Typical constructions and U-values

Assumptions

The U-values in the tables that follow have been calculated using the method detailed in BS EN ISO 6946: 2017 (Building components and building elements. Thermal resistance and thermal transmittance. Calculation methods), and using the conventions set out in BR 443 (Conventions for U-value calculations). They are valid for the constructions shown in the details immediately above each table.

These examples are based on Kingspan Thermaroof® TR26, waterproofed using a mechanically fixed single-ply membrane. The Thermaroof® TR26 insulation board is fully bonded to a sealed metal deck or alternatively a vapour control layer. These layers have themselves been fully bonded to the type of deck listed 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: 2017, 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/mK 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 and a condensation risk analysis should be completed for each project.

NB If your construction is different for 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 for details).

U-value table key

Further information on the applicable notional and area weighted average limiting U-values is available in the relevant geographical documentation:

- Approved Documents L to the Building Regulations for England;
- Approved Documents L to the Building Regulations for Wales;
- Technical Handbooks Section 6 to the Building Standards for Scotland;
- Technical Booklets F1 & F2 to the Building Regulations for Northern Ireland; and
- Technical Guidance Document L (Dwellings) and Technical Guidance Document L (Buildings other than Dwellings) to the Building Regulations for the Republic of Ireland.

Concrete deck

Dense concrete deck with suspended ceiling

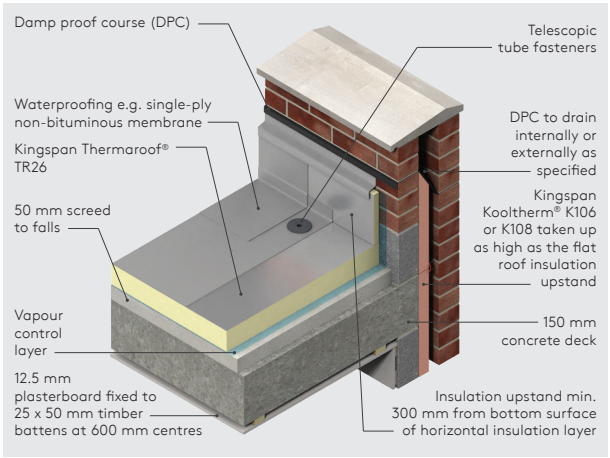


Figure 1

Insulant thickness (mm)	U-values (W/m²K)
70	0.27
80	0.24
90	0.22
100	0.20
110	0.18
120	0.17
130	0.16
140	0.14
150	0.14
160	0.13
90 + 90	0.11
100 + 100	0.10

NB Some values may have been omitted from the table because they do not meet the most common minimum requirements.

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

Typical constructions and U-values

Timber deck

Timber deck with plasterboard ceiling

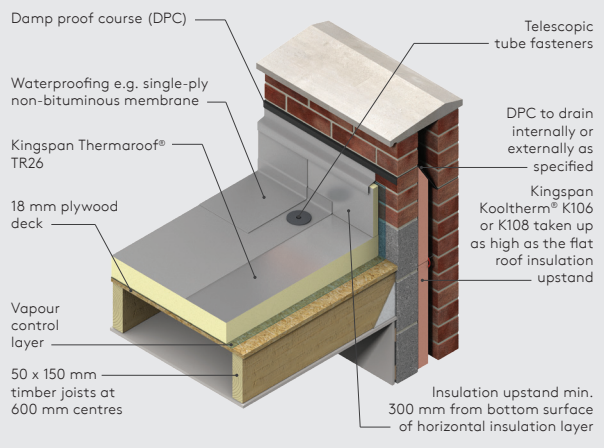


Figure 2

Insulant thickness (mm)	U-values (W/m²K)
70	0.27
80	0.24
90	0.22
100	0.20
110	0.18
120	0.17
130	0.16
140	0.14
150	0.14
160	0.13
90 + 90	0.11
100 + 100	0.10

NB Some values may have been omitted from the table because they do not meet the most common minimum requirements.

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

Metal deck

Metal deck with no ceiling

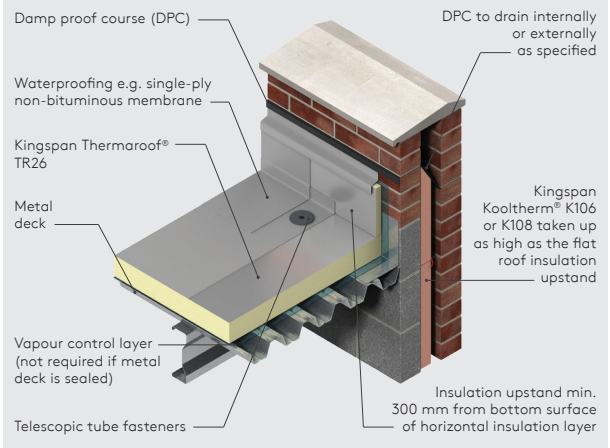


Figure 3

Insulant thickness (mm)	U-values (W/m²K)
80	0.26
90	0.24
100	0.21
110	0.19
120	0.18
130	0.17
140	0.15
150	0.14
160	0.13
90 + 90	0.12
100 + 100	0.11
105 + 105	0.10

NB Some values may have been omitted from the table because they do not meet the most common minimum requirements.

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

Typical constructions and U-values

Green roof systems

Extensive green roof covering - metal deck with no ceiling

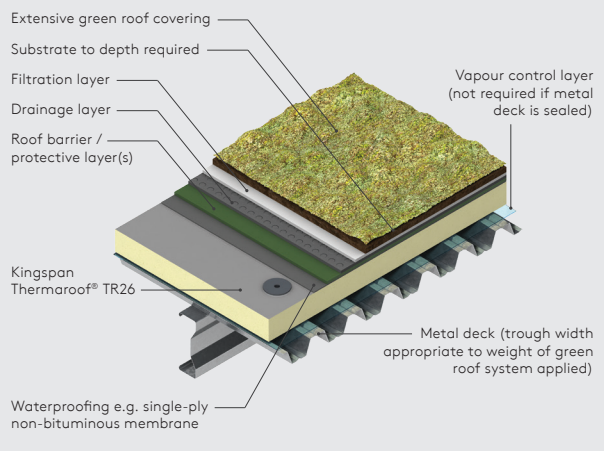


Figure 4

Insulant thickness (mm)	U-values (W/m²K)
80	0.26
90	0.24
100	0.21
110	0.19
120	0.18
130	0.17
140	0.15
150	0.14
160	0.13
90 + 90	0.12
105 + 105	0.10

NB Some values may have been omitted from the table because they do not meet the most common minimum requirements.

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

Semi-intensive green roof covering - dense concrete deck with suspended ceiling

Figure 5

Insulant thickness (mm)	U-values (W/m²K)
70	0.27
80	0.24
90	0.22
100	0.20
110	0.18
120	0.17
130	0.16
140	0.14
150	0.14
160	0.13
90 + 90	0.11
100 + 100	0.10

NB Some values may have been omitted from the table because they do not meet the most common minimum requirements.

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

Design considerations

Linear thermal bridging

Basic principles

Linear thermal bridging describes the heat loss / gain that occurs at junctions between elements e.g. where an external wall meets the roof, or at junctions around openings in the building fabric where the thermal insulation layer is discontinuous e.g. sills, jambs and lintels.

Interruptions within the insulation layer by materials with poorer insulating properties can result in a thermal bridge, which in turn can lead to problems of condensation and mould growth, especially if there is a drop in surface temperature.

The heat flow at these junctions and opening locations, over and above that through the adjoining plane elements, is the linear thermal transmittance of the thermal bridge: measured in W/mK; referred to as a 'psi-value'; and expressed as a 'Ψ-value'.

The lower the Ψ-value, the better the performance. Ψ-values are taken into account in the calculation methodologies e.g. the Standard Assessment Procedure (SAP), that are used to assess the operational CO_2 emissions and, where applicable, the fabric energy efficiency of buildings, primary energy or delivered energy rates.

Ψ-values can comprise either, or a combination of, calculated and assumed values.

Reducing linear thermal bridging

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

- Care is required to ensure continuation of insulation wherever possible between the wall and roof for best thermal performance. Where this is not possible, the roof and wall insulation should be overlapped and ideally, insulation material introduced between.
- Parapet detailing can represent a good, low heat loss approach, with insulation continuity maintained using an insulated upstand to reduce cold bridging. A minimum 25 mm thick Kingspan Thermaroof® TR26 upstand should be used around the perimeter of the roof on the internal façade of parapets. The upstand should extend a minimum of 150 mm above the roof insulation and achieve a minimum distance of 300 mm between the top of the insulation upstand and the bottom of the horizontal roof insulation. Wall insulation should be carried up into parapets at least as high as the flat roof insulation upstand.
- Lightweight aggregate blockwork to the inner leaf of wall constructions can help to improve thermal performance at junctions generally and where used for the inner leaf of parapet walls it can help to reduce losses.
- Where a parapet construction is not used, to achieve best performance, the roof insulation should be carried over the wall plate to meet and extend past the wall insulation layer. For a timber warm roof construction, the first joist zone above the wall plate can be filled with insulation for best performance and to maintain thermal continuity.
- For best thermal performance, roof-lights and ventilator kerbs should be insulated with the same thickness of Kingspan Thermaroof® TR26 as the general roof area.
- Where guttering is incorporated within a flat roof construction, this should be accounted for within the overall thermal design of the roof via an area–weighted calculation for the whole roof; the risk of localised interstitial condensation from reduced insulation provision at the gutter should be considered.

Design considerations

Environmental impact & responsible sourcing

Environmental Product Declaration

An Environmental Product Declaration (EPD), certified by BRE Global to the BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to BS EN 15804: 2012 + A1: 2013, has been created for Kingspan Thermaroof® TR26 produced at Kingspan Insulation's Pembridge (Herefordshire), Selby (North Yorkshire) and Castleblayney (Co. Monaghan) manufacturing facilities.

Responsible sourcing

Kingspan Thermaroof® TR26 produced at Kingspan Insulation's Pembridge (Herefordshire), Selby (North Yorkshire) and Castleblayney (Co. Monaghan) manufacturing facilities is manufactured under a management system certified to ISO 14001: 2015.

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

Sustainability & responsibility

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

A report covering the sustainability and responsibility of Kingspan Insulation Ltd's operations at its Pembridge (Herefordshire) and Selby (North Yorkshire) manufacturing facilities is available upon request from **literature@kingspaninsulation.co.uk**

Specification clause

Kingspan Thermaroof® TR26 should be described in specifications as:-

The roof insulation shall be Kingspan Thermaroof® TR26 ____mm thick: comprising a rigid thermoset polyisocyanurate insulation core faced on both sides with a low emissivity composite foil facing. The product shall be manufactured in accordance with the requirements of BS EN 13165: 2012 + A2: 2016; under a management system certified to ISO 9001: 2015, ISO 14001: 2015, ISO 45001: 2018, ISO 50001: 2018 and ISO 37301: 2021; by Kingspan Insulation Limited; and installed in accordance with the instructions issued by them.

Product classifications

Uniclass UK

Pr_25_71_63_66 Polyisocyanurate (PIR) foam boards

CAWS

J42 110, J42 430, J42 420 (Standard and Intermediate)
J42 10, J42 27 (Minor Works)

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

Building Information Modelling (BIM)

BIM objects for Kingspan Thermaroof® TR26 can be downloaded using the Kingspan BIM Designer Software Tool available at **www.kingspaninsulation.co.uk/tr26**.

Wind loadings

Wind loadings should be assessed in accordance with BS EN 1991-1-4: 2005 + A1: 2010 (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 Thermaroof® TR26, 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: 2018 (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 Thermataper® tapered roofing system (see below).

Tapered roofing

Kingspan Thermaroof® TR26 is also available in a tapered version, Kingspan Thermataper® TT46, comprising a rigid thermoset polyisocyanurate insulation core, faced on both sides with a low emissivity composite foil facing. Kingspan Thermataper® TT46 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 Thermataper® TT46 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.

Design considerations

Roof waterproofing

Kingspan Thermaroof® TR26 is suitable for use with most mechanically fixed single–ply waterproofing membranes.

NB Kingspan Thermaroof® TR26 is not suitable for use with bitumen based built-up waterproofing systems or mastic asphalt. Kingspan Thermaroof® TR27 can be used instead in these applications.

Water vapour control

Kingspan Thermaroof® TR26 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® TR26 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.

A minimum separate 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.

Roof loading / traffic

Kingspan Thermaroof® TR26 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 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).

Spanning on metal decks

Insulation boards should comply with the minimum thicknesses shown in the table below, when used over metal decks with trough openings.

Trough opening (mm)	Minimum insulant thickness (mm)
≤ 75	25
76-100	30
101-125	35
126-150	40
151-175	45
176-200	50
201-225	55
226-250	60

Green roofs

Kingspan Thermaroof® TR26 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^2 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 EN 1991-1-4: 2005 + A1: 2010 (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).

Lightning protection

Building designers should give consideration to the requirements of BS EN 62305: 2011 (Protection against lightning).

Sitework

Installing over metal decks

- Where an FM Approved construction is required, please refer to 'FM Approval' 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 the vapour control layer should be loose-laid.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of Kingspan Thermaroof® TR26 should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixings').
- Insulation boards should always be laid break-bonded, either with their long edges at right angles to the trough openings, or diagonally across the corrugation line, and with joints lightly butted. There should be no gaps at abutments.
- Roof-light or ventilator kerbs etc. should always be insulated with the same thickness of Kingspan Thermaroof® TR26 as the general roof area.
- A 25 mm thick Kingspan Thermaroof® TR26 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.
- For roofs without parapets, a timber edging batten of the same height of the insulation is to be used to fix the fascia board to the gutter system. Please contact the membrane manufacturer for more details.
- The waterproofing membrane is mechanically fixed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

Installing over concrete decks

- Where an FM Approved construction is required, please refer to 'FM Approval' on page 14.
- Concrete decks should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- The vapour control layer should be loose-laid over the deck.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of Kingspan Thermaroof® TR26 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® TR26 as the general roof area.
- A 25 mm thick Kingspan Thermaroof® TR26 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.
- For roofs without parapets, a timber edging batten of the same height of the insulation is to be used to fix the fascia board to the gutter system. Please contact the membrane manufacturer for more details.
- The waterproofing membrane is mechanically fixed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

Sitework

Installing over plywood decks

- Timber decks should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- The vapour control layer should be temporarily stapled or nailed to the deck.
- Where one run of the specified vapour control layer laps another, there should be minimum 150 mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of Kingspan Thermaroof® TR26 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® TR26 as the general roof area.
- A 25 mm thick Kingspan Thermaroof® TR26 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.
- For roofs without parapets, a timber edging batten of the same height of the insulation is to be used to fix the fascia board to the gutter system. Please contact the membrane manufacturer for more details.
- The waterproofing membrane is mechanically fixed in accordance with the membrane manufacturer's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

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, a separate vapour control layer should be loose-laid over it.
- 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® TR26 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® TR26 as the general roof area.
- A 25 mm thick Kingspan Thermaroof® TR26 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.
- For roofs without parapets, a timber edging batten of the same height of the insulation is to be used to fix the fascia board to the gutter system. Please contact the membrane manufacturer for more details.
- 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

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® TR26 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® TR26 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® TR26 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 6 fixings are required to secure boards of Kingspan Thermaroof® TR26 to the deck.
- The requirement for additional fixings should be assessed in accordance with BS EN 1991-1-4: 2005 + A1: 2010 (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 mm and < 150 mm from edges and corners of the board and not overlap board joints.
- Please refer to page 12 for recommended fixing patterns.
- Each fixing should incorporate a square or circular plate washer (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 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.
- For details on fixings refer to:

Ejot UK Limited **www.ejot.co.uk**	+44 (0) 1977 687 040
Fixfast **www.fixfast.com**	+44 (0) 1732 882 387
MAK Fasteners **www.makfasteners.com**	+44 (0) 161 866 8164 +353 (0) 1 451 9004
SFS Intec **www.sfsintec.biz/uk**	+44 (0) 330 0555 888

Sitework

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).

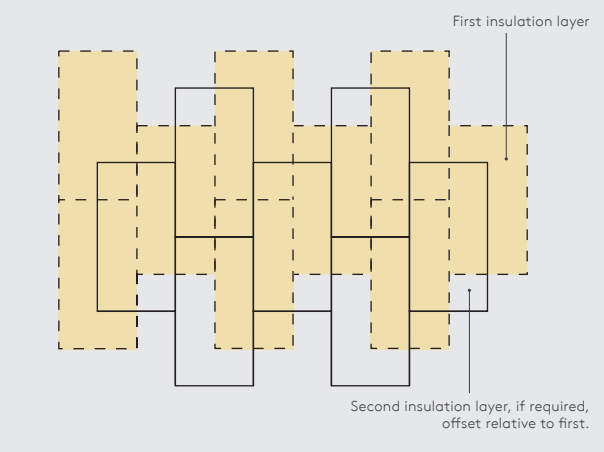


Figure 6 - Offsetting of multiple insulation layers

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.

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® TR26 is available through specialist insulation distributors and selected roofing merchants throughout Great Britain 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** or **www.kingspaninsulation.ie/safety**.

Please note that the reflective surface on this product is designed to enhance its thermal performance. As such, it will reflect light as well as heat, including ultraviolet light. Therefore, if this board is being installed during very bright or sunny weather, it is advisable to wear UV protective sunglasses or goggles, and if the skin is exposed for a significant period of time, to protect the bare skin with a UV block sun cream.

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

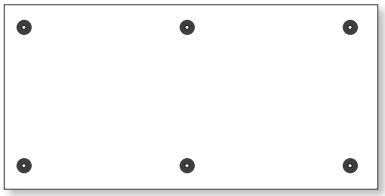
Warning - do not stand on or otherwise support your weight on this board unless it is fully supported by a load bearing surface.

Mechanical fixing patterns

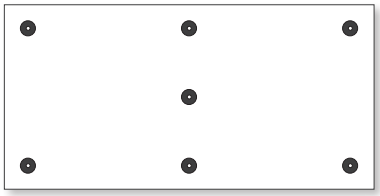
Recommended fixing patterns

The recommended fixing patterns for Kingspan Thermaroof® TR26 are shown below. The number of fixings necessary should be assessed in accordance with BS EN 1991–1–4: 2005 + A1: 2010 (National Annex to Eurocode 1. Actions on structures. General Actions. Wind Actions).

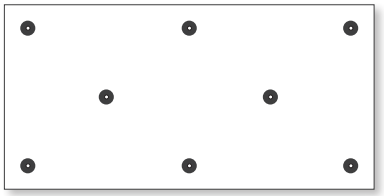
The images below show recommended fixing patterns, the number of fixings used and the resulting fixing density (number of fixings per m^2).



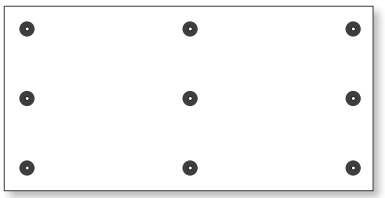
6 No. per board
(2.4 x 1.2 m board - 2.08 fixings / m^2)



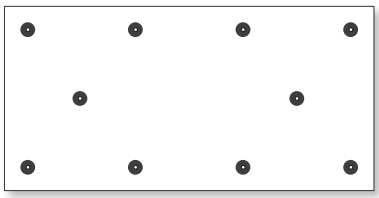
7 No. per board
(2.4 x 1.2 m board - 2.43 fixings / m^2)



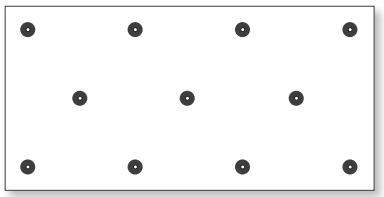
8 No. per board
(2.4 x 1.2 m board - 2.77 fixings / m^2)



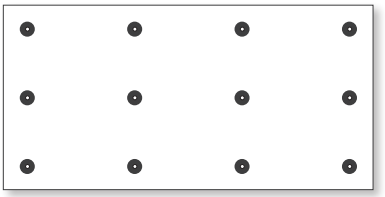
9 No. per board
(2.4 x 1.2 m board - 3.12 fixings / m^2)



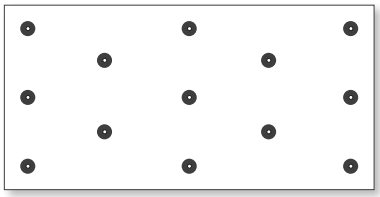
10 No. per board
(2.4 x 1.2 m board - 3.47 fixings / m^2)



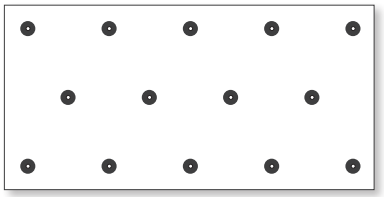
11 No. per board
(2.4 x 1.2 m board - 3.81 fixings / m^2)



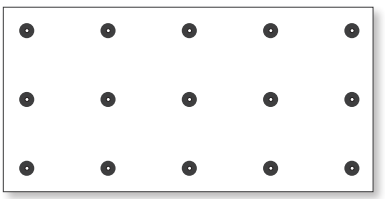
12 No. per board
(2.4 x 1.2 m board - 4.16 fixings / m^2)



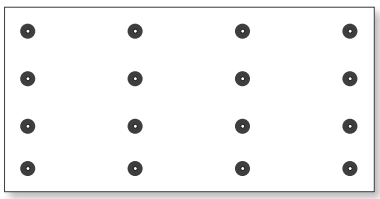
13 No. per board
(2.4 x 1.2 m board - 4.51 fixings / m^2)



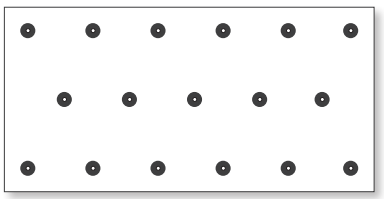
14 No. per board
(2.4 x 1.2 m board - 4.86 fixings / m^2)



15 No. per board
(2.4 x 1.2 m board - 5.20 fixings / m^2)



16 No. per board
(2.4 x 1.2 m board - 5.55 fixings / m^2)



17 No. per board
(2.4 x 1.2 m board - 5.90 fixings / m^2)

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 Thermaroof® TR26 is faced on both sides with a low emissivity composite foil, autohesively bonded to the insulation core during manufacture.

The core

The core of Kingspan Thermaroof® TR26 is a fibre-free rigid thermoset polyisocyanurate (PIR) insulant.

Fibre-free Core

Standards & approvals

Kingspan Thermaroof® TR26 is manufactured to the highest standards in accordance with the requirements of BS EN 13165: 2012 + A2: 2016 (Thermal insulation products for buildings. Factory made rigid polyurethane foam (PU) products. Specification).

Kingspan Thermaroof® TR26 is also manufactured under a management system certified to ISO 9001: 2015 (Quality Management System), ISO 14001: 2015 (Environmental Management System), ISO 45001: 2018 (Occupational Health and Safety Management System), ISO 50001: 2018 (Energy Management System) and ISO 37301: 2021 (Compliance Management System).

The current manufactured range (in thicknesses of 25 - 160 mm) produced at Kingspan Insulation's Pembridge (Herefordshire) and Selby (North Yorkshire) manufacturing facilities is covered by BBA Certificate 16/5332.

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 16/5332

Standard dimensions

Kingspan Thermaroof® TR26 is available in the following standard size(s):

Nominal dimension		Availability
Length	(mm)	2400
Width	(mm)	1200
Insulant thickness	(mm)	Refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes.

Compressive stress

The average compressive stress of Kingspan Thermaroof® TR26 exceeds 150 kPa at 10% compression, when tested to BS EN 826: 2013 (Thermal insulating products for building applications. Determination of compression behaviour).

Water vapour resistivity

When tested in accordance with BS EN 12086 (Thermal insulating products for building applications. Determination of water vapour transmission properties), Thermaroof® TR26 produced at Kingspan Insulation's Pembridge (Herefordshire), Selby (North Yorkshire) and Castleblayney (Co. Monaghan) manufacturing facilities achieves a resistance of 300 MNs/g for the insulation core and 80 MNs/g for the composite foil-facing. Kingspan Thermaroof® TR26 Systems 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 Thermaroof® TR26 will remain effective for the life of the building. 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 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 Thermaroof® TR26 resist attack by mould and microbial growth, and do not provide any food value to vermin.

Product details

Fire performance

For guidance regarding the fire safety requirements of the Building Regulations / Standards, refer to the relevant Technical Bulletins and links to Government websites at **www.kingspaninsulation.co.uk/fireregulations**.

Under System 4 AVCP, Kingspan Thermaroof® TR26 has a Euroclass rating of F.

There can be materials placed above the insulation layer within a roofing system including, but not limited to, waterproofing materials, reinforcement layers, primers and carrier membranes. These additional materials complete the roofing system. As such, the fire performance of a roofing system is predominantly determined by these finishes in combination with the insulation.

Compliance for meeting the fire safety requirements of the Building Regulations / Standards can be evaluated by testing the fire performance of the roofing system. The most commonly used route to compliance involves testing the full roofing system and uses test method CEN / TS 1187: 2012 Test 4 (Test methods for external fire exposure to roofs), see below table. External roof exposure testing is typically carried out by the waterproofing manufacturer / system supplier, due to the complexities of the roofing system outlined above.

NB Test evidence to demonstrate compliance with the fire safety requirements of the Building Regulations / Standards incorporating Kingspan Thermaroof® TR26 within a roof system should be provided by the chosen waterproofing system supplier. Without the required classification for the proposed roof system, achieved through either an external roof exposure test or an overlay of inorganic material, the use of Kingspan Thermaroof® TR26 must be restricted to at least 20 metres in England and 24 metres in Scotland, or more from any point of the relevant boundary.

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

FM Approval

Kingspan Thermaroof® TR26 is available with FM Approval to FM 4470 (Examination Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Non-combustible Roof Deck Construction) April 2022, subject to conditions of approval.
Product manufactured at the Pembridge (Herefordshire) and Castleblayney (Co. Monaghan) sites, in individual layers of 40 - 160 mm or multi-layers of up to 280 mm (with any combination respecting the minimum and maximum single layers) are covered by the FM Approval. Please contact Kingspan Insulation's Technical Service Department (see rear cover for details).

Not all thicknesses and roof deck constructions are covered by the FM Approval. Further details of the current FM Approved thicknesses and roof deck constructions can be located on **www.fmapprovals.com/roofnav** or **www.roofnav.com**
by searching 'Kingspan Therma'. Alternatively please contact Kingspan Insulation's Technical Service Department (see rear cover for details).

Thermal properties

The λ-values and R-values detailed below are quoted in accordance with BS EN 13165: 2012 + A2: 2016 (Thermal insulation products for buildings. Factory made rigid polyurethane foam (PU) products. Specification).

Thermal conductivity

The boards achieve a thermal conductivity (λ-value) of 0.022 W/mK.

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^2K/W).

Insulant thickness (mm)	Thermal resistance (m^2K/W)
25	1.10
40	1.80
50	2.25
60	2.70
70	3.15
80	3.60
90	4.05
100	4.50
110	5.00
120	5.45
130	5.90
140	6.35
150	6.80
160	7.25

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

About 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 rigid insulation products and insulated systems for building fabric and building services applications.

Products & solutions

Rigid insulation products for building fabric applications, including roofs, walls and floors.

- Kingspan AlphaCore® - microporous silica-based insulation.
- Kingspan OPTIM-R® - vacuum insulation panel (VIP) systems.
- Kingspan Kooltherm® - phenolic insulation.
- Kingspan Therma™ - PIR insulation.
- K-Roc® - rock mineral fibre insulation.
- Kingspan GreenGuard® - extruded polystyrene insulation (XPS).
- Kingspan TEK® - structural insulated panels (SIPs).
- Cavity closers - PVC-U extrusions with an insulation core.
- Membranes - for pitched roofs and walls.

Services

Our support services provide fast and accurate advice no matter what your role is. Visit our website to access the following services.

- U-value calculations - free, quick and easy U-value calculations with our U-value Calculator.
- Help and advice on your projects, including stockists, how to guides, regulatory guidance and e-learning.
- Building Information Modelling (BIM) - download BIM objects for our products.
- Tapered roofing service - Kingspan Insulation's tapered roofing systems come with a supporting design service to ensure the most cost-effective solution for a roof is identified.
- CPDs - Kingspan Insulation offer a number of free CPD seminars for architects and specifiers covering a wide range of industry topics. CPDs can be booked or a range of online learning courses can be found online.

Planet Passionate

Planet Passionate is our 10 year global sustainability programme that aims to tackle three big global challenges: climate change, circularity and protection of the natural world.

Through our measurable targets across four focus areas (carbon, energy, circularity and water), we are committed to delivering the following by 2030:

- Energy: powering 60% of all Kingspan operations directly from renewable energy with a minimum of 20% of this energy generated on manufacturing sites.
- Carbon: achieving net zero carbon manufacturing and a 50% reduction in product CO_2 intensity from primary supply partners.
- Circularity: upcycling of 1 billion PET bottles per annum into our manufacturing processes plus zero company waste to landfill across all sites.
- Water: harvesting 100 million litres of rainwater annually on our sites.

Contact details

Great Britain

Kingspan Insulation Ltd
Pembridge | Leominster
Herefordshire | HR6 9LA

T: +44 (0) 1544 388 601
E: info@kingspaninsulation.co.uk
www.kingspaninsulation.co.uk

For individual department contact details please visit
www.kingspaninsulation.co.uk/contact

Ireland

Kingspan Insulation Ltd
Castleblayney | County Monaghan

T: +353 (0) 42 979 5000
E: info@kingspaninsulation.ie
www.kingspaninsulation.ie

For individual department contact details please visit
www.kingspaninsulation.ie/contact

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