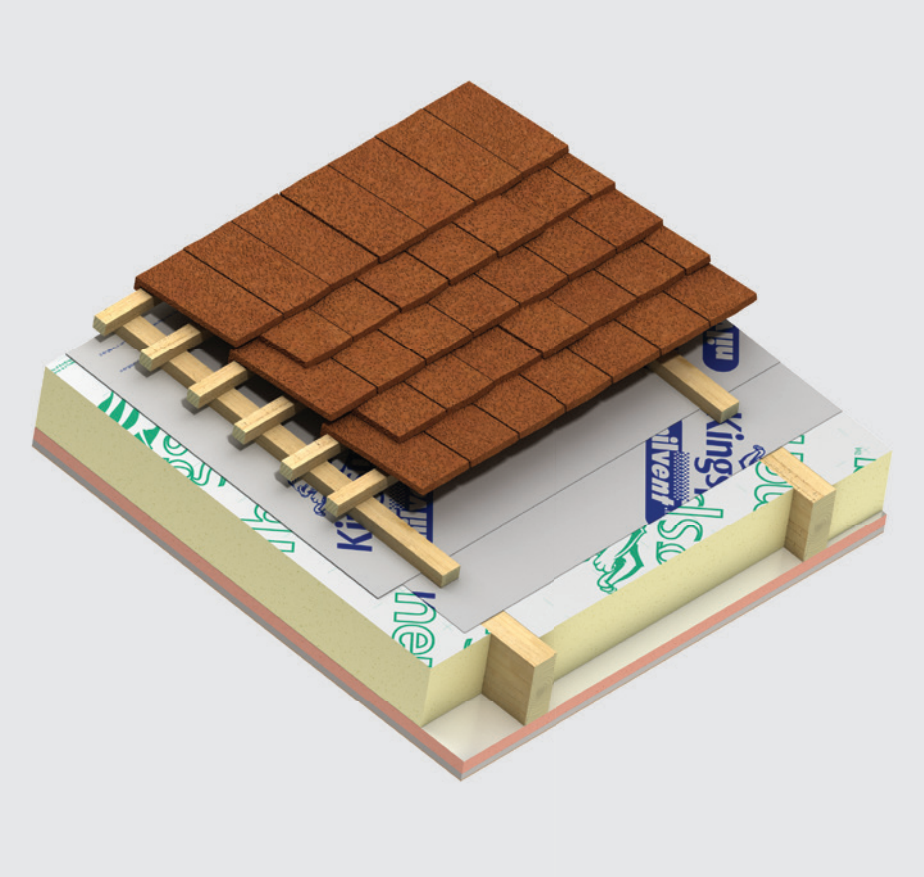
Eighth Issue | 09/2021

Thermapitch® TP10

Insulation for tiled or slated pitched warm roof spaces



- High performance rigid thermoset insulation - thermal conductivity 0.022 W/mK
- Unaffected by air infiltration
- 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
- Robust Details for Part E of the Building Regulations (England & Wales)

Fibre-free Core

Kingspan®

Typical constructions and U-values

Assumptions

The U-values in the tables that follow have been calculated using the method detailed in BS / I.S. EN ISO 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.

NB Calculations assume that the insulation core of Kingspan Kooltherm® K118 Insulated Plasterboard has a thermal conductivity of 0.018 W/mK.

NB When calculating U-values to BS / I.S. EN ISO 6946: 2017, the type of mechanical fixing used may change the thickness of insulation required. The effect of fixings for Kingspan Kooltherm® K118 in the U-value calculations for Figures 1a, 1b, 1c, 1d, 2a, 2b, 4a & 4c is insignificant as the insulation layer penetrated is not the main insulation layer. The U-value calculations for Figures 3a & 3b assume that over rafter layers of insulation are fixed using stainless steel fixings with a cross sectional area 7.90 mm^2, with 3.7 fasteners per m^2 (insulant thickness 0-40 mm), 6.2 per m^2 (insulant thickness 41-60 mm), 8.3 per m^2 (insulant thickness 61-80 mm) and 10.0 per m^2 (insulant thickness 81-100 mm). The U-value calculations for Figures 3a & 3b also assume that over rafter layers of insulation are fixed using stainless steel fixings with a cross sectional area 9.1 mm^2, with 11.1 fasteners per m^2 (insulant thickness 101-125 mm). Please contact the Kingspan Insulation Technical Service Department (see rear cover) for project calculations.

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

Image key

1 In Figures 1a & 3a the breathable sarking membrane can be placed over the counter-battens, draped to provide for drainage and overlain with tile / slate battens. This will yield a marginally better U-value but it will be more difficult to seal the breathable sarking membrane effectively.

2 The requirement for a vapour control layer and / or under tile ventilation should be assessed to BS 5250: 2021. Vapour check plasterboard or a separate vapour control layer can be used as preferred (see 'Design Considerations - Vapour Control Layer').

3 Kingspan Kooltherm® K118 contains an integral vapour control layer (see 'Design Considerations - Vapour Control Layer').

4 If tiles are to be used then this normally necessitates the use of counter–battens and tiling battens over the breathable sarking membrane to allow for water drainage and attachment of the tiles.

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:

- 2013 editions of Approved Documents L to the Building Regulations for England;
- 2014 editions of Approved Documents L to the Building Regulations for Wales;
- 2020 editions of Technical Handbooks Section 6 to the Building Standards for Scotland;
- 2012 editions of Technical Booklets F1 & F2 to the Building Regulations for Northern Ireland; and
- 2019 edition of Technical Guidance Document L (Dwellings) and 2017 edition of Technical Guidance Document L (Buildings other than Dwellings) to the Building Regulations for the Republic of Ireland.

Where an ♦ is shown, the combination of insulation products may result in an interstitial condensation risk and so the calculations have been excluded.

Typical constructions and U-values

Unventilated - insulation between & under rafters at 600 mm centres (recommended for new build or re-roofing)

Fully filled insulation between rafters - no sarking board

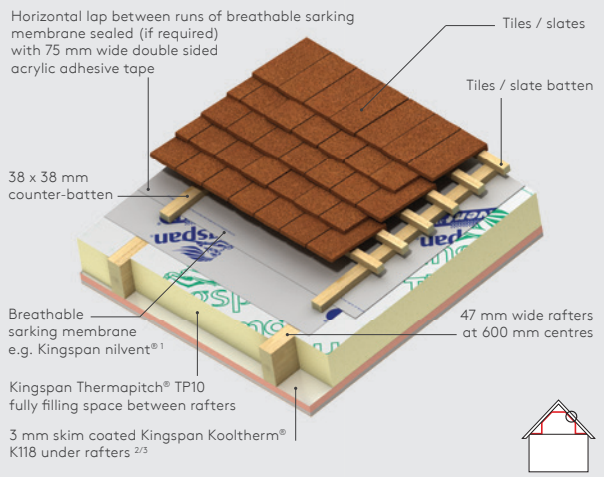


Figure 1a

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K118 assuming rafters of depth shown fully filled with Kingspan Thermapitch® TP10			
Rafter depth (mm)	Product thickness of Kingspan Kooltherm® K118 (mm)		
	32.5	57.5	72.5
100	0.21	0.16	0.14
125	0.18	0.14	0.12
150	0.15	0.12	0.11

* Product thickness = insulant thickness + 12.5 mm plasterboard.

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

Fully filled insulation between rafters - 18 mm sarking board

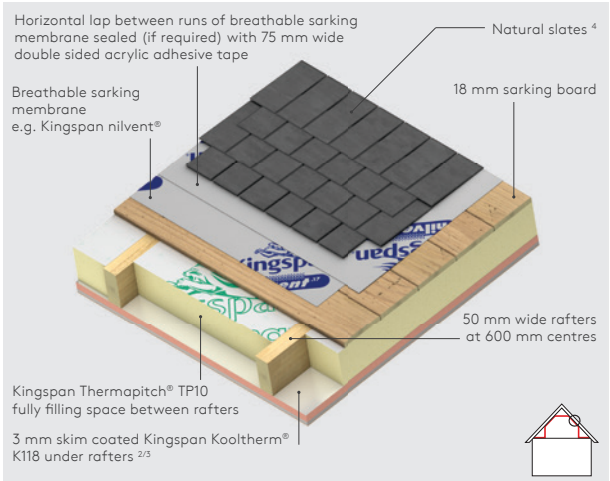


Figure 1b

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K118 assuming rafters of depth shown fully filled with Kingspan Thermapitch® TP10			
Rafter depth (mm)	Product thickness of Kingspan Kooltherm® K118 (mm)		
	32.5	57.5	72.5
100	0.20	0.16	0.14
125	0.17	0.14	0.12
150	0.15	0.12	0.11

* Product thickness = insulant thickness + 12.5 mm plasterboard.

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

Typical constructions and U-values

Partially filled insulation between rafters - no sarking board

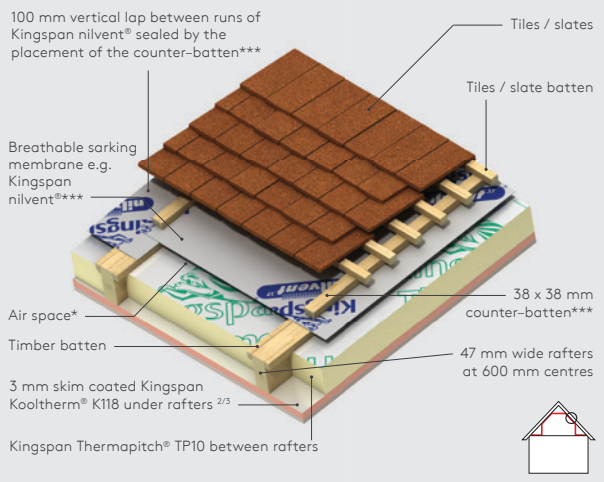


Figure 1c

Partially filled insulation between rafters - 18 mm sarking board

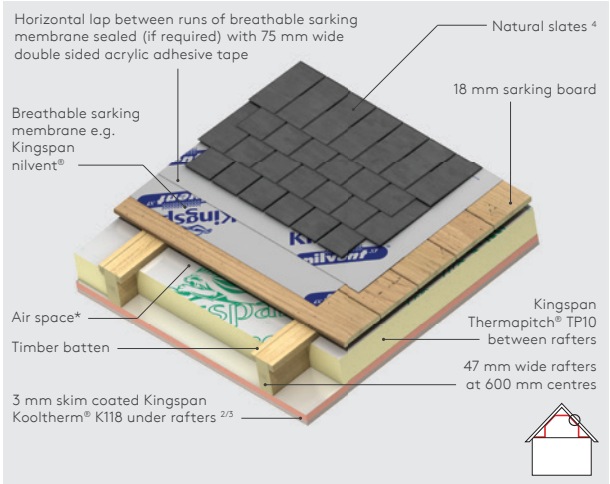


Figure 1d

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K118 assuming rafters of depth shown partially filled with Kingspan Thermapitch® TP10			
Thickness of Kingspan Thermapitch® TP10 (mm)	Product thickness of Kingspan Kooltherm® K118 (mm)		
	32.5	57.5	72.5
100 mm deep rafters			
50	✗	♦	♦
55	✗	0.19	♦
60	0.26	0.19	♦
70	0.24	0.18	♦
75	0.23	0.17	0.15
125 mm deep rafters			
50	✗	♦	♦
55	✗	0.19	♦
60	✗	0.19	♦
70	0.24	0.17	♦
75	0.23	0.17	0.15
80	0.22	0.16	0.14
90	0.20	0.16	0.14
100	0.19	0.15	0.13
150 mm deep rafters			
50	✗	♦	♦
55	✗	0.19	♦
60	✗	0.18	♦
70	0.24	0.17	♦
75	0.23	0.17	0.15
80	0.22	0.16	0.14
90	0.20	0.16	0.14
100	0.19	0.15	0.13
110	0.18	0.14	0.13
120	0.17	0.13	0.12
125	0.16	0.13	0.12

* A minimum 13 mm air space must be maintained above the insulation in order to claim the maximum thermal resistance in the cavity.

** Product thickness = insulant thickness + 12.5 mm plasterboard.

*** If sealing the roof is deemed to be unimportant, it is possible to lay the breathable membrane in horizontal runs, draped between rafters. This negates the requirement for counter battens. The U-values shown above remain valid.

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

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K118 assuming rafters of depth shown partially filled with Kingspan Thermapitch® TP10			
Thickness of Kingspan Thermapitch® TP10 (mm)	Product thickness of Kingspan Kooltherm® K118 (mm)		
	32.5	57.5	72.5
100 mm deep rafters			
50	✗	♦	♦
55	✗	0.19	♦
60	0.25	0.18	♦
70	0.23	0.17	♦
75	0.22	0.17	0.15
80	0.21	0.16	0.14
90	0.20	0.16	0.14
125 mm deep rafters			
50	✗	♦	♦
55	✗	0.19	♦
60	0.25	0.18	♦
70	0.23	0.17	♦
75	0.22	0.17	0.15
80	0.21	0.16	0.14
90	0.20	0.15	0.14
100	0.19	0.15	0.13
110	0.18	0.14	0.13
150 mm deep rafters			
50	✗	♦	♦
55	✗	0.19	♦
60	0.25	0.18	♦
70	0.23	0.17	♦
75	0.22	0.17	0.15
80	0.21	0.16	0.14
85	0.20	0.16	0.14
90	0.20	0.15	0.14
100	0.19	0.15	0.13
110	0.18	0.14	0.12
120	0.17	0.13	0.12
125	0.16	0.13	0.12
130	0.16	0.13	0.12
140	0.15	0.12	0.11

* A minimum 13 mm air space must be maintained above the insulation in order to claim the maximum thermal resistance in the cavity.

** Product thickness = insulant thickness + 12.5 mm plasterboard.

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

Typical constructions and U-values

Ventilated - insulation between & under rafters at 400 mm centres (recommended for loft conversion where re-roofing is not intended)

No sarking board

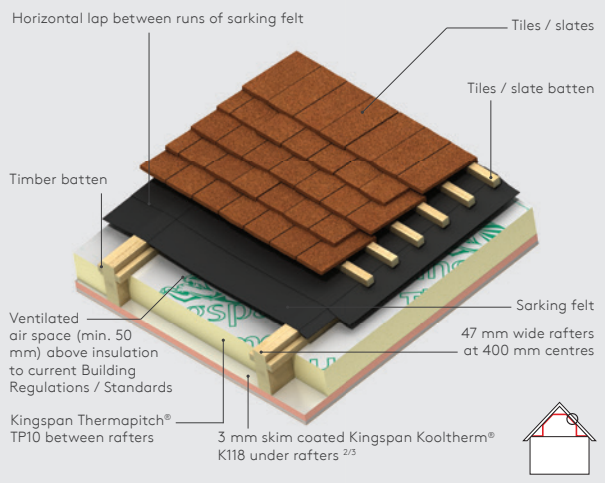


Figure 2a

18 mm sarking board

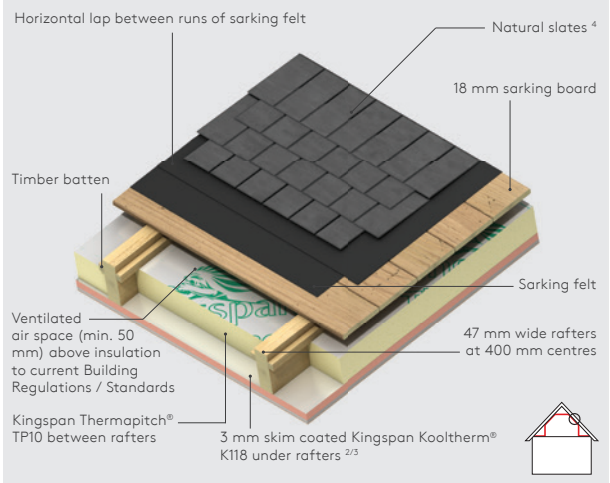


Figure 2b

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K118 assuming rafters of depth shown partially filled with Kingspan Thermapitch® TP10		
Thickness of Kingspan Thermapitch® TP10 (mm)	Product thickness of Kingspan Kooltherm® K118 (mm)	
	57.5	72.5
125 mm deep rafters		
50	♦	♦
55	0.21	♦
60	0.20	♦
70	0.19	♦
75	0.18	0.16
150 mm deep rafters		
50	♦	♦
55	0.21	♦
60	0.20	♦
70	0.19	♦
75	0.18	0.16
80	0.17	0.15
90	0.16	0.14
100	0.16	0.14

* Product thickness = insulant thickness + 12.5 mm plasterboard.

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

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K118 assuming rafters of depth shown partially filled with Kingspan Thermapitch® TP10		
Thickness of Kingspan Thermapitch® TP10 (mm)	Product thickness of Kingspan Kooltherm® K118 (mm)	
	57.5	72.5
125 mm deep rafters		
50	♦	♦
55	0.21	♦
60	0.20	♦
70	0.19	♦
75	0.18	0.16
150 mm deep rafters		
50	♦	♦
55	0.21	♦
60	0.20	♦
70	0.19	♦
75	0.18	0.16
80	0.17	0.15
90	0.16	0.14
100	0.16	0.14

* Product thickness = insulant thickness + 12.5 mm plasterboard.

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

Typical constructions and U-values

Unventilated - insulation between & over rafters at 600 mm centres (recommended for new build or re-roofing)

No sarking board

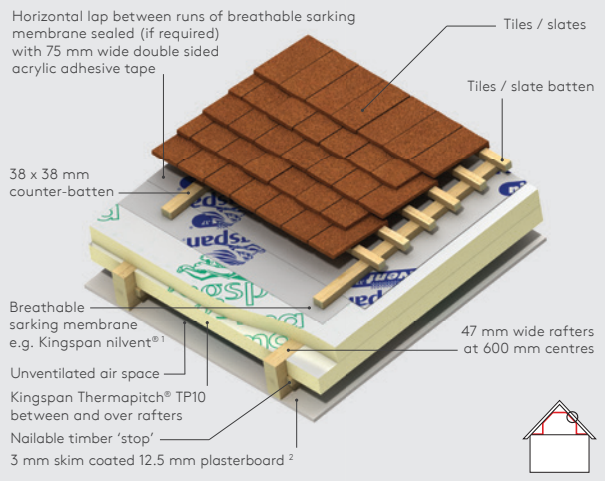


Figure 3a

U-values (W/m²K) for various thicknesses of Kingspan Thermapitch® TP10 and different rafter depths			
Thickness of Kingspan Thermapitch® TP10 (mm)	Rafter depth (mm)		
	100	125	150
35 + 40*	✗	✗	✗
40 + 40	0.25	0.25	0.25
50 + 50	0.21	0.21	0.21
60 + 60	0.18	0.18	0.18
70 + 70	0.16	0.16	0.15
75 + 75	0.15	0.15	0.15
80 + 80	0.14	0.14	0.14
90 + 90	0.13	0.12	0.12
100 + 100	0.12	0.11	0.11
100 + 110*	0.11	0.11	0.11
100 + 120*	0.11	0.10	0.10
100 + 125*	0.11	0.10	0.10

* First thickness refers to thickness between rafters, second thickness over rafters.

The thermal resistance of the over rafter layer of insulation must be ≥ that of the between rafter layer so as to avoid condensation.

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

18 mm sarking board

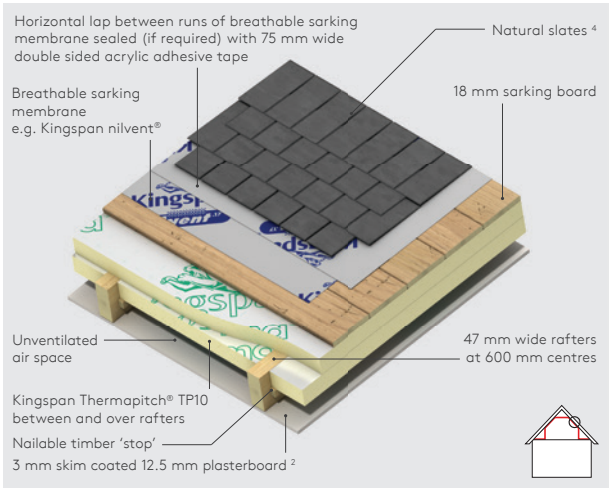


Figure 3b

U-values (W/m²K) for various thicknesses of Kingspan Thermapitch® TP10 and different rafter depths			
Thickness of Kingspan Thermapitch® TP10 (mm)	Rafter depth (mm)		
	100	125	150
35 + 35	✗	✗	✗
35 + 40*	✗	0.25	0.25
40 + 40	0.25	0.24	0.24
50 + 50	0.20	0.20	0.20
60 + 60	0.18	0.18	0.17
70 + 70	0.15	0.15	0.15
75 + 75	0.15	0.14	0.14
80 + 80	0.14	0.14	0.14
90 + 90	0.12	0.12	0.12
100 + 100	0.12	0.11	0.11
100 + 110*	0.11	0.11	0.11
100 + 120*	0.11	0.10	0.10
100 + 125*	0.11	0.10	0.10

* First thickness refers to thickness between rafters, second thickness over rafters.

The thermal resistance of the over rafter layer of insulation must be ≥ that of the between rafter layer so as to avoid condensation.

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

Typical constructions and U-values

Ventilated and unventilated - dwarf wall and loft floor / ceiling level insulation

Dwarf wall - insulation between studs and inside studs

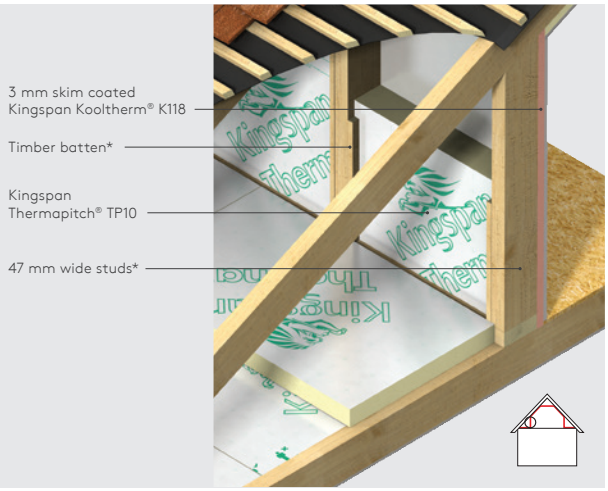


Figure 4a

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K118 assuming studs shown filled with various thicknesses of Kingspan Thermapitch® TP10

Thickness of Kingspan Thermapitch® TP10 (mm)	Product thickness of Kingspan Kooltherm® K118 (mm)			
	32.5		57.5	
	Stud centres (mm)		Stud centres (mm)	
	400	600	400	600
Ventilated construction				
30	✗	✗	💧	💧
35	✗	✗	💧	💧
40	0.35	0.34	💧	💧
50	0.32	0.30	💧	💧
55	0.30	0.29	0.21	0.21
60	0.29	0.28	0.21	0.20
70	0.27	0.25	0.19	0.19
75	0.26	0.24	0.19	0.18
80	0.25	0.24	0.18	0.18
90	0.23	0.22	0.17	0.17
100	0.22	0.21	0.16	0.16
110	0.21	0.19	0.16	0.15
120	0.19	0.18	0.15	0.14
125	0.19	0.18	0.15	0.14
130	0.18	0.17	0.14	0.14
140	0.18	0.16	0.14	0.13
150	0.17	0.16	0.13	0.13
Unventilated construction				
25	✗	0.35	💧	💧
30	0.35	0.33	💧	💧
35	0.33	0.32	💧	💧
40	0.31	0.30	💧	💧
50	0.29	0.27	💧	💧
55	0.28	0.26	0.20	0.19
60	0.26	0.25	0.19	0.19
70	0.25	0.23	0.18	0.17
75	0.24	0.22	0.18	0.17
80	0.23	0.22	0.17	0.17
90	0.21	0.20	0.16	0.16
100	0.20	0.19	0.16	0.15
110	0.19	0.18	0.15	0.14
120	0.18	0.17	0.14	0.14
125	0.18	0.17	0.14	0.13
130	0.17	0.16	0.14	0.13
140	0.17	0.15	0.13	0.13
150	0.16	0.15	0.13	0.12

* Where the insulation between studs exceeds the depth of the stud, the stud must be battened out to correspond with the thickness of insulation and horizontal timber 'stop' battens must be fixed to the outer surface of the stud to provide a 'stop' for the insulation boards so that they can finish flush with the inner surface of the timber studs.

** Product thickness = insulant thickness + 12.5 mm plasterboard.

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

Typical constructions and U-values

Loft floor or flat ceiling - insulation between and over joists

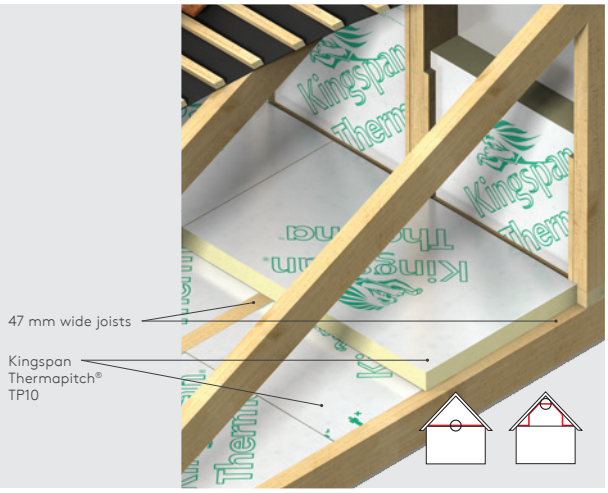


Figure 4b

U-values (W/m²K) for various thicknesses of Kingspan Thermapitch® TP10 installed between and over joists of depths and centres shown

Thickness of Kingspan Thermapitch® TP10 (mm)	Joist centres (mm)			
	400		600	
	Ventilated construction	Unventilated construction	Ventilated construction	Unventilated construction
100 mm deep joists				
100 + 100	0.12	0.12	0.12	0.11
100 + 110*	0.11	0.11	0.11	0.11
100 + 120*	0.11	0.11	0.10	0.10
100 + 125*	0.11	0.10	0.10	0.10
100 + 130*	0.10	0.10	0.10	0.10
125 mm deep joists				
125 + 125	0.10	0.10	0.09	0.09
150 mm deep joists				
150 + 150	0.08	0.08	0.08	0.08

* First thickness refers to thickness between rafters, second thickness over rafters.

The thermal resistance of the over rafter layer of insulation must be ≥ that of the between rafter layer so as to avoid condensation.

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

Loft floor or collar tie - insulation between and under joists

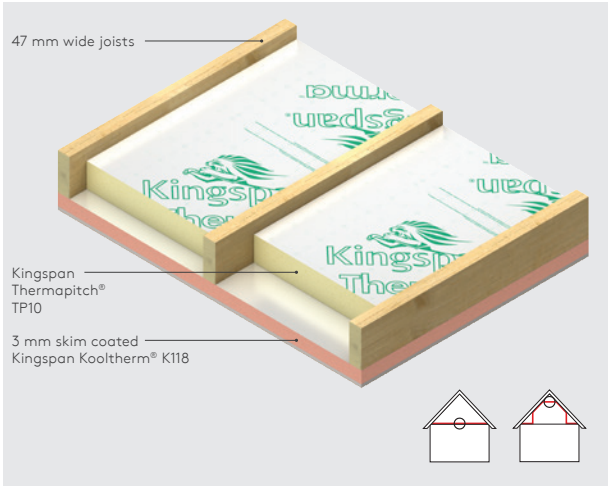


Figure 4c

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K118 assuming joists at centres shown with various thicknesses of Kingspan Thermapitch® TP10 installed between joists

Thickness of Kingspan Thermapitch® TP10 (mm)	Thickness of Kingspan Kooltherm® K118 (mm)			
	57.5		72.5	
	Joist centres (mm)		Joist centres (mm)	
	400	600	400	600
Ventilated construction				
50	♦	♦	♦	♦
55	0.21	0.20	♦	♦
60	0.20	0.20	♦	♦
70	0.19	0.18	♦	♦
75	0.19	0.18	0.16	0.15
80	0.18	0.17	0.16	0.15
90	0.17	0.16	0.15	0.14
100	0.16	0.15	0.14	0.14
110	0.15	0.15	0.14	0.13
120	0.15	0.14	0.13	0.12
125	0.14	0.14	0.13	0.12
130	0.14	0.13	0.13	0.12
140	0.14	0.13	0.12	0.11
150	0.13	0.12	0.12	0.11

* Product thickness = insulant thickness + 12.5 mm plasterboard.

NB Where the insulation between joists exceeds the depth of the joist and access to the loft space is required, the joists must be battened out to correspond with the thickness of insulation and a protective layer (e.g chipboard / OSB) fixed over the insulation.

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

Typical constructions and U-values

U-values (W/m^2K) for various thicknesses of Kingspan Kooltherm® K118 assuming joists at centres shown with various thicknesses of Kingspan Thermapitch® TP10 installed between joists				
Thickness of Kingspan Thermapitch® TP10 (mm)	Thickness of Kingspan Kooltherm® K118 (mm)			
	57.5		72.5	
	Joist centres (mm)		Joist centres (mm)	
	400	600	400	600
Unventilated construction				
50	♦	♦	♦	♦
55	0.20	0.20	♦	♦
60	0.20	0.19	♦	♦
70	0.18	0.18	♦	♦
75	0.18	0.17	0.16	0.15
80	0.17	0.17	0.15	0.15
90	0.17	0.16	0.14	0.14
100	0.16	0.15	0.14	0.13
110	0.15	0.14	0.13	0.13
120	0.14	0.14	0.13	0.12
125	0.14	0.13	0.12	0.12
130	0.14	0.13	0.12	0.12
140	0.13	0.12	0.12	0.11
150	0.13	0.12	0.11	0.11

* Product thickness = insulant thickness + 12.5 mm plasterboard.

NB Where the insulation between joists exceeds the depth of the joist and access to the loft space is required, the joists must be battened out to correspond with the thickness of insulation and a protective layer (e.g chipboard / OSB) fixed over the insulation.

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

Linear thermal bridging at wall to pitched roof junctions

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.

ψ-values can comprise either, or a combination of, approved, calculated or 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.

- For junctions between external walls and roof constructions, continuity and overlap of insulation layers is the key to minimising heat losses.
- Insulated plasterboard can be used on the inner blockwork leaf to improve eaves and gable performance.
- Increasing the insulation depth between and under rafters can help to improve eaves performance, although this may influence the truss design (stub end trusses can create additional depth at eaves).
- Care is required to ensure continuation of insulation to the soffit and into the eaves for best thermal performance.
- Lightweight aggregate blockwork to the inner leaf can help improve gable performance.
- For best gable junction thermal performance, it is important not to omit perimeter insulation between the first roof truss and the wall, or to stop cavity wall insulation short of the roof insulation.

The details in the images that follow (Figures 5a - 9b) are designed to reflect Approved Construction Details (England & Wales / Scotland / Northern Ireland) and Accredited Construction Details (Republic of Ireland), collectively referred to here as ACDs.

Typical constructions and U-values

Unventilated - insulation between & under rafters (recommended for new build or re-roofing)

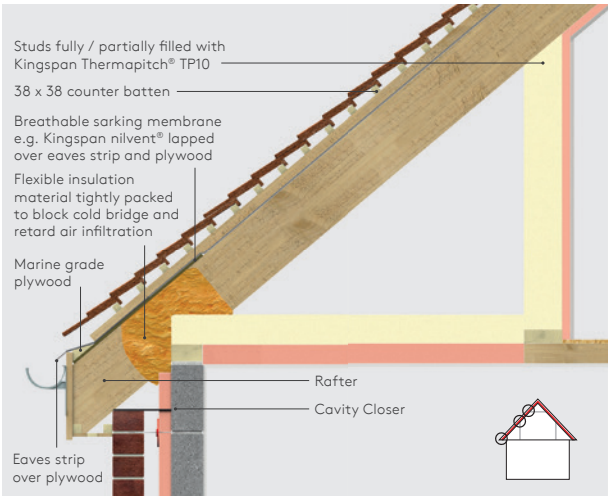


Figure 5a - Overhanging eaves detail

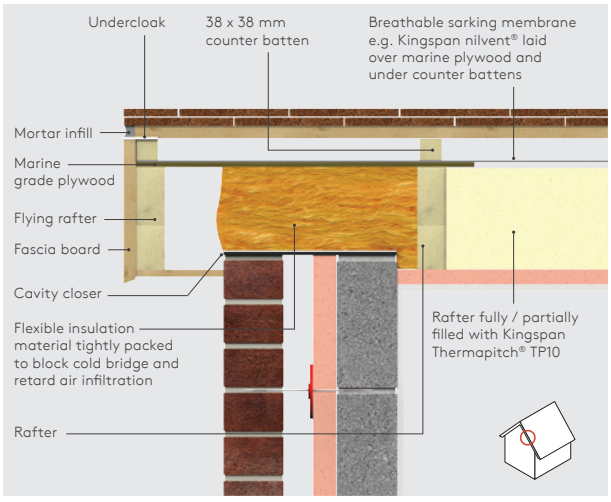


Figure 5b - Eaves detail

Ventilated - insulation between & under rafters (recommended for loft conversion where re-roofing is not intended)

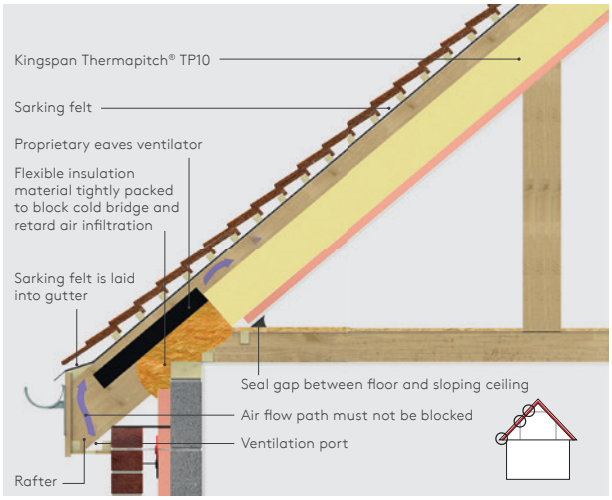


Figure 6a - Overhanging eaves detail

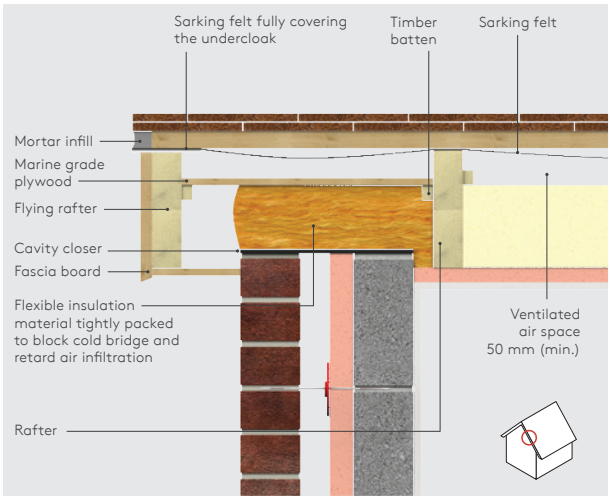


Figure 6b - Eaves detail

Typical constructions and U-values

Unventilated - insulation between & over rafters (recommended for new build or re-roofing)

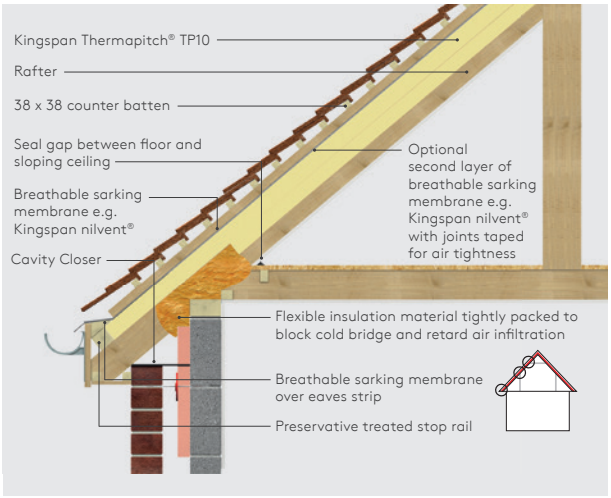


Figure 7a - Overhanging eaves detail

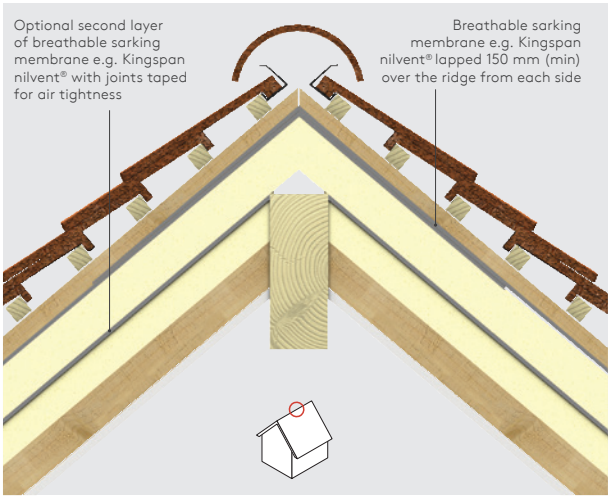


Figure 7b - Ridge detail

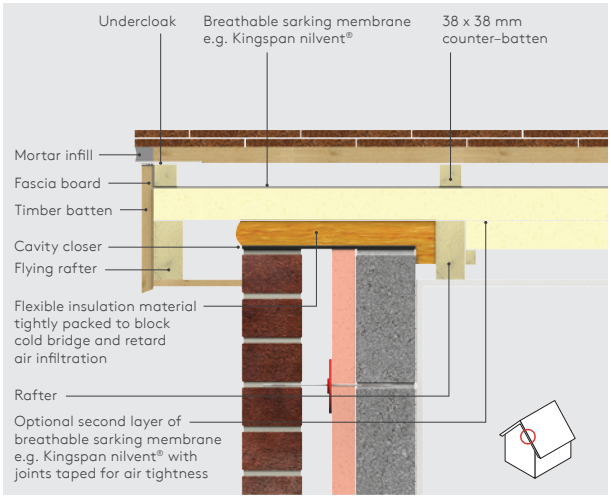


Figure 7c - Eaves detail

Typical constructions and U-values

Loft floor insulation - insulation between and over joists

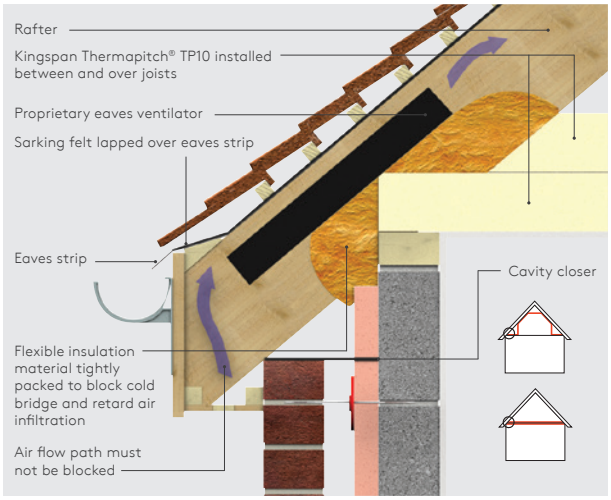


Figure 8a - Ventilated loft floor detail at eaves

Loft floor insulation - insulation between and under joists

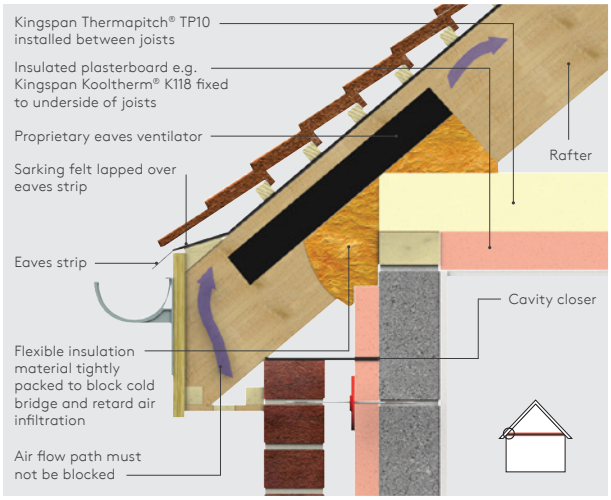


Figure 9a - Ventilated loft floor detail at eaves

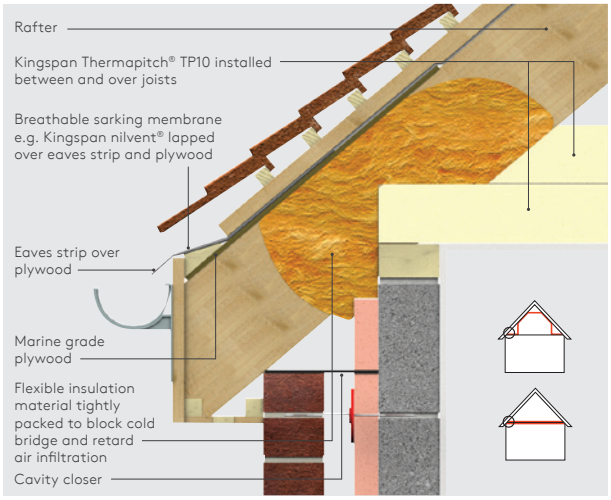


Figure 8b - Unventilated loft floor detail at eaves

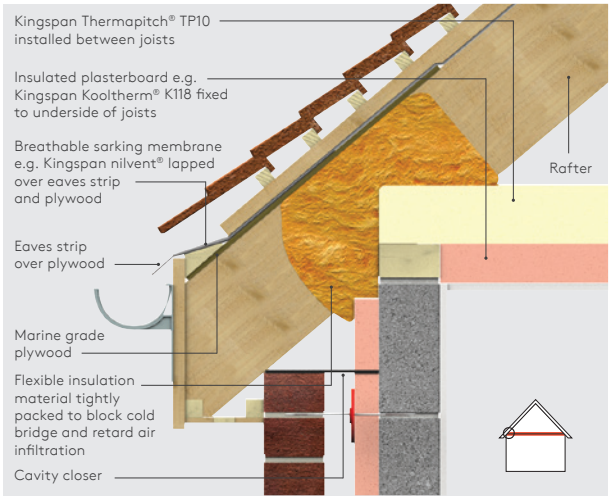


Figure 9b - Unventilated loft floor detail at eaves

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 EN 15804: 2012 + A1: 2013, has been created for Kingspan Thermapitch® TP10 produced at Kingspan Insulation's Pembridge (Herefordshire), Selby (North Yorkshire) and Castleblayney manufacturing facilities.

Responsible sourcing

Kingspan Thermapitch® TP10 produced at Kingspan Insulation's Pembridge, Herefordshire and Selby, North Yorkshire manufacturing facilities is certified to BES 6001 (Framework Standard for the Responsible Sourcing of Construction Products) 'Excellent'.

BES 6001
Responsible Sourcing
www.greenbooklive.com

Kingspan Thermapitch® TP10 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 a copy 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 at **www.kingspaninsulation.co.uk/sustainabilityandresponsibility**.

NBS specifications

Details also available in NBS Source.
NBS users should refer to clause:
K11 695, P10 140 (Standard and Intermediate)
K11 55 (Minor Works)
Pr_25_71_63_66 Polyisocyanurate (PIR) foam boards (Uniclass 2015)

Specification clause

Kingspan Thermapitch® TP10 should be described in specifications as:-

The rafter / joist level insulation shall be Kingspan Thermapitch® TP10 ____ mm thick: comprising a high performance fibre-free rigid thermoset polyisocyanurate (PIR) insulation core faced on both sides with a low emissivity composite foil 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 / I.S. EN 13165: 2012 + A2: 2016; under a management system certified to ISO 9001: 2015, ISO 14001: 2015, ISO 45001: 2018 and ISO 50001: 2018; by Kingspan Insulation Limited; and installed in accordance with the instructions issued by them.

Building Information Modelling (BIM)

Kingspan Insulation's BIM objects can be downloaded in Revit and in IFC formats. For more information please visit **www.kingspaninsulation.co.uk/bim**.

Insulation at rafter level - choice of build up

Unventilated and ventilated constructions

There is generally a choice between unventilated and ventilated constructions, except in the case of refurbishment / loft conversions. In these instances, unless the whole roof is to be stripped or unless there is a breathable sarking membrane already in situ, it is impossible to use an unventilated roof, because a breathable sarking membrane cannot be installed.

Position of insulation

Dependent on the designed U-value of the construction and the available rafter depth and headroom, different approaches can be taken.

In most cases, approaches with layers of insulation between and over rafters are likely to yield very tall fascia boards and so, generally, between and under rafter insulation approaches are probably more desirable e.g. Figures 1 and 2. The exception to the rule is when very low U-values are required, in which case headroom may become an issue for between and under rafter solutions, so between and over rafter solutions may be more practical.

Unventilated roof - ventilation considerations

Unventilated roof approaches create a warm pitched roof space which does not require cross ventilation. Research suggests that sealing an unventilated roof yields a more energy efficient roof, as the impacts of ventilation and incidental infiltrating cold air can be minimised. Therefore, if creating an unventilated roof, it is preferable to fully seal all joints in the breathable sarking membrane (see 'Position of Breathable Sarking Membrane' below). Any water vapour reaching the breathable sarking membrane escapes without condensing. There is then adequate air movement beneath the tiles to dissipate this water vapour to the outside atmosphere. Tape for sealing joints in the breathable sarking membrane should be specified in accordance with the recommendations of the breathable membrane manufacturer.

The requirement for a vapour control layer and / or under-tile ventilation should be assessed to BS 5250: 2021 (Management of moisture in buildings. Code of practice).

Design considerations

Ventilated roof - ventilation considerations

In these cases the Building Regulations / Standards require a 50 mm ventilation air gap between the insulation and the sarking felt, so as to avoid condensation.

The requirement for a vapour control layer should be assessed to BS 5250: 2021.

Vapour control layer

If required, the vapour resistance of the roof lining can be increased by the use of a vapour check plasterboard*, the use of Kingspan Kooltherm® K118, which contains an integral vapour control layer*, the use of a layer of polythene sheeting*, or by the application of two coats of Gyproc Drywall Sealer.

* With appropriate detailing at joints, penetrations and roof perimeters.

Breathable sarking membrane

BS 5250: 2021 recommends that low resistance breathable sarking membranes for use in unventilated systems must not have a vapour resistance that exceeds 0.25 MNs/g, e.g. Kingspan nilvent®.

Position of breathable sarking membrane

The sealing of breathable sarking membrane joints with tape is considerably easier to achieve if the membrane is installed on a continuous surface (Figures 1a, 1b, 1d, 3a & 3b).

In these cases the breathable sarking membrane is installed under the counter-battens (which provide a channel for water drainage) or, in situations with a sarking board under a natural slated roof, the breathable sarking membrane is installed directly under the slates (as neither tile battens nor counter-battens are used).

Generally, when a continuous surface is available, it will prove easier to install the breathable sarking membrane in horizontal runs, whilst still enabling easy sealing between runs.

In roofs with no continuous surface (Figure 1c), it is preferable, though more difficult, to install the breathable sarking membrane in vertical runs with junctions between runs sealed by counter-battens placed over the laps in rafter positions. The breathable sarking membrane is installed taut as the counter–batten provides a space for water drainage.

Recommended solutions for new build / re-roofing

The ideal solution for new build or re-roofing projects is, therefore, between and under rafter insulation with a continuous surface for the breathable sarking membrane so that it can be installed in horizontal runs under counter-battens with laps sealed with tape (Figures 1a, 1b & 1d).

The next best solution is, therefore, between and under rafter insulation with no continuous surface for the breathable sarking membrane, and the breathable sarking membrane installed in vertical runs with laps sealed under counter-battens (Figure 1c).

Where very low U-values are required, for new build or re-roofing projects, the ideal solution is between and over rafter insulation with the breathable sarking membrane installed in horizontal runs under counter battens with laps sealed with tape (Figures 3a & 3b).

Insulating at ceiling level - choice of build up

When insulating at ceiling level in a pitched roof with loft insulation between and over joists (Figures 4b, 8a & 8b) it is vital to ensure the continuity of insulation at the specified R-value right to the eaves. This can be difficult because of the angle of pitch of the roof and the position of the rafters can prevent the insulation laid over the joists from being fitted all the way to the eaves. The use of Kingspan Thermapitch® TP10 in between joists and Kingspan Kooltherm® K118 below joists (Figures 4c, 9a & 9b) allows continuity of insulation and can minimise heat loss from this linear thermal bridge.

Mansard roofs / walls

Kingspan Thermapitch® TP10 can be used for the construction of insulated tiled or slated mansard roofs / walls. Design and installation guidance is as for pitched roofs.

Fire stops

Current Building Regulations / Standards should be considered with regard to the requirements for, and provision of, fire stops.

Reference should also be made to 'Structural Timber Buildings Fire Safety in Use Guidance Volume 2 - Cavity Barriers and Fire Stopping' by the Structural Timber Association.

For specialist advice, including configuration and installation, refer to:

Kingspan Technical Insulation Ltd
www.kingspanpassivefireprotection.co.uk
+44 (0) 1524 388 898

Acoustics

Kingspan Thermapitch® TP10 can be used in masonry separating wall room-in-roof junctions as detailed in the Robust Details for Building Regulations (England & Wales) Part E-WM-1 to E-WM-6, E-WM-8 and E-WM-10.

Lightning protection

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

Sitework

Over rafter insulation

General

- A preservative treated stop rail should be secured to the rafters at the eaves.
- Kingspan Thermapitch® TP10 may be laid either across or down the line of the rafters and should be laid lightly butted and preferably break bonded.
- All board joints running from eaves to ridge must occur over rafters.
- Ensure continuity of insulation at the ridge of the roof.
- There is no necessity to tape board joints.

Over rafter insulation without a sarking board

- Lay 38 x 38 mm treated softwood counter-battens in line with the rafters.
- Secure the counter-battens to the rafters by fixing through both the counter-battens and the insulation boards.

Over rafter insulation with slates fixed directly into a sarking board

- Overlay the insulation boards with the sarking board.
- Secure the sarking board and insulation boards to the rafters by fixing through both the sarking board and the insulation.

Over rafter insulation with a sarking board and tiles on tiling battens and counter-battens

- Overlay the insulation boards with the sarking board, and lay 38 x 38 mm treated softwood counter-battens in line with the rafters.
- Secure the counter-battens to the rafters by fixing through the counter-batten, the sarking board and the insulation.

Fixings for over rafter insulation

- Approved fixings should be applied at centres appropriate to the design of the roof and location of the building.

  Refer to:

Ancon Building Products **www.ancon.co.uk**	+44 (0) 114 275 5224
Helifix Limited **www.helifix.co.uk**	+44 (0) 20 8735 5222
MAK Fasteners **www.makfasteners.com**	+353 (0) 1 451 99 00
Target Fixings Limited **www.targetfixings.com**	+44 (0) 1635 58 00 88
Wallfast Limited **www.wallfast.co.uk**	+44 (0) 23 9229 8443

Between rafter insulation

Between rafter insulation partially filled flush to the top surface of rafters

- If Kingspan Thermapitch® TP10 is to be installed between and over rafters, the between rafter layer must be flush with the top of the rafters in order to prevent the risk of air movement between the two layers of insulation boards.
- If the between rafter layer of insulation is to be fitted from the outside, install the insulation with the use of timber ‘stop’ battens.
- Push insulation, trimmed to suit rafter spacings, between the rafters so they are flush with the top surface of the rafters.
- Side-nail treated softwood battens to the rafters to hold the boards in place.

Between rafter insulation partially filled flush to the bottom surface of rafters

- Kingspan Thermapitch® TP10 installed between rafters must be flush with the bottom of the rafters in order to prevent the risk of air movement between the boards and the ceiling.
- Where the insulation between rafters is to be flush with the bottom of the rafters but does not fill the full rafter depth, install the insulation, trimmed to suit rafter spacings, with the aid of treated softwood battens nailed to the side of the rafters to provide a ‘stop’ above the insulation.
- The battens should be in the appropriate position to ensure the insulation is flush with the bottom of the rafters.
- An additional restraint to the insulation boards will be provided by Kingspan Kooltherm® K118 fixed to the inside face of the rafters.

Between rafter insulation fully filling the depth of the rafters

- Where the insulation between rafters fully fills the rafter depth, simply install the correct thickness of insulation, trimmed to suit rafter spacings, in such a manner that it is flush with the bottom and top of the rafters.

Sitework

Between joist insulation

- Kingspan Thermapitch® TP10 installed between joists must be flush with the bottom of the joists in order to prevent the risk of air movement between the boards and the ceiling.
- Install the correct thickness of insulation, trimmed to suit rafter spacings, in such a manner that it is flush with the bottom of the joists.
- The insulation must not be used as a weight bearing surface and, if the thickness of insulation exceeds the depth of the joists, batten out the joists such that they stand proud of the insulation.
- Where there is no over joist insulation, and the loft is to be used for storage, 9 mm (min.) plywood / chipboard / OSB should be mechanically fixed over the joists. Where pedestrian access is required, 18 mm (min.) plywood / chipboard / OSB should be installed instead.

Over joist insulation

- If Kingspan Thermapitch® TP10 is to be installed between and over joists, the between joist layer must fully fill the joist depth, so that it is flush with the bottom and the top of the joists, in order to prevent the risk of air movement either above or below the insulation boards. It must not stand proud above the joists, otherwise a gap would be created over the joists themselves.
- The insulation over joists must be tapered so it fits snugly under rafters at the eaves.
- The insulation must not be used as a weight bearing surface. If loft storage, or pedestrian access to the loft area, is necessary, it is recommended that one of the following options is adopted.
- Where the loft is to be used for storage, 9 mm (min.) plywood / chipboard / OSB should be mechanically fixed over the joists, with the over joist insulation layer laid on top. Where pedestrian access is required, a further layer of 18 mm (min.) plywood / chipboard / OSB should also be installed over the insulation boards.
- A proprietary insulated loft storage, or pedestrian access, board can be installed.
- Alternatively, treated softwood battens should be laid perpendicular to the joists, at 600 mm (max.) centres, and fixed to them. The depth of the battens should be ≥ to that of the over joist insulation layer. The over joist insulation layer is installed between the battens following the guidance for between joist insulation (above). 18 mm (min.) plywood / chipboard / OSB should be mechanically fixed over the battens.

Between dwarf wall stud insulation

- Kingspan Thermapitch® TP10 installed between studs must be flush with the inside surface of the studs in order to prevent the risk of air movement between the boards and plasterboard / insulated plasterboard.
- Nail treated softwood battens to the side of studs to provide a ‘stop’ and prevent the insulation boards moving within the stud cavity.
- This ‘stop’ should be positioned such that the insulation boards finish flush with the inside surface of the studs.
- If the insulation boards are thicker than the timber studs fix appropriately sized treated softwood battens to the back of the studs and fix timber ‘stop’ straps diagonally to the battens in an appropriate pattern to hold the insulation boards in place. Each board must be restrained by a minimum of two diagonal straps.
- Insulation boards may be temporarily held in place with large headed clout nails fixed through the ‘stop’ battens / straps.
- The boards will be further restrained by the plasterboard / insulated plasterboard lining fixed to the inside face of the timbers.
- To avoid air leakage, any penetrations through the insulation (electrical sockets, plumbing and wiring etc) should be sealed with flexible sealant or equivalent, or a combination of flexible polyurethane foam and flexible sealant or equivalent.

Under rafter / joist or inside dwarf wall studs insulation

- Please refer to literature for Kingspan Kooltherm® K118. This literature is available from the Kingspan Insulation Marketing Department or from the Kingspan Insulation website (see rear cover for details).

General

Fitting Insulation Boards Between Rafters / Joists / Studs

- Measure the distance between the rafters / joists / studs before cutting the boards as spacings can vary.
- Ensure that insulation boards are lightly butted and that there is a tight fit between the insulation and the rafters / joists / studs.
- Fill all gaps with expanding urethane sealant.

Sitework

Surface treatment

- Kingspan Thermapitch® TP10 is not intended to provide an internal finish and should be underlined with a suitable building board.

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.

Daily working practice

- At the completion of each day's work, or whenever work is interrupted for extended periods of time, board edges and joints should be protected from inclement weather.

Availability

- Kingspan Thermapitch® TP10 is available through specialist insulation distributors and selected builders' and 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, outdoor storage cannot be avoided the boards should be stacked clear of the ground and covered with an opaque polythene sheet or weatherproof tarpaulin. Boards that have been allowed to get wet should not be used.

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 surfaces on this product are designed to enhance its thermal performance. As such, they will reflect light as well as heat, including ultraviolet light. Therefore, if this product 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 facings 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 product unless it is fully supported by a load bearing surface.

Product details

The facings

Kingspan Thermapitch® TP10 is faced on both sides with a low emissivity composite foil, autohesively bonded to the insulation core during manufacture. This reflective, low emissivity surface improves the thermal resistance of any unventilated cavity adjacent to the board.

The core

The core of Kingspan Thermapitch® TP10 is manufactured with Nilflam® technology, a high performance fibre-free 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 Thermapitch® TP10 is manufactured to the highest standards in accordance with the requirements of BS / I.S. EN 13165: 2012 + A2: 2016 (Thermal insulation products for buildings. Factory made rigid polyurethane foam (PU) products. Specification).

Kingspan Thermapitch® TP10 is also manufactured to the highest standards under a management system certified to ISO 9001: 2015 (Quality Management Systems. Requirements), ISO 14001: 2015 (Environmental Management Systems. Requirements), ISO 45001: 2018 (Occupational Health and Safety Management Systems. Requirements with guidance for use) and ISO 50001: 2018 (Energy Management Systems. Requirements with guidance for use).

The use of Kingspan Thermapitch® TP10 (in thicknesses of 20 - 140 mm) produced at Kingspan Insulation's Pembridge, Herefordshire and Selby, North Yorkshire manufacturing facilities is covered by BBA Certificate 14/5133, and that produced at Kingspan Insulation's Castleblayney manufacturing facility (in thicknesses of 25 - 150 mm) by NSAI Agrément Certificate 03/0196.

Standard dimensions

Kingspan Thermafloor® TF70 is available in the following standard size:

Nominal Dimension		Availability
Length	(m)	2.4
Width	(m)	1.2
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 Thermapitch® TP10 typically exceeds 140 kPa at 10% compression when tested to BS / I.S. EN 826: 2013 (Thermal insulating products for building applications. Determination of compression behaviour).

Water vapour resistance

The product typically achieves a resistance far greater than 100 MNs/g, when tested in accordance with BS / I.S. EN 12086: 2013 (Thermal insulating products for building applications. Determination of water vapour transmission properties).

Durability

If correctly installed, Kingspan Thermapitch® TP10 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 Thermapitch® TP10 resist attack by mould and microbial growth, and do not provide any food value to vermin.

Fire performance

Kingspan Thermapitch® TP10 produced at Kingspan Insulation's Pembridge (Herefordshire), Selby (North Yorkshire) and Castleblayney (Co. Monaghan) manufacturing facilities has a Euroclass rating of F.

Kingspan Thermapitch® TP10 when used within a pitched roof construction can meet the national requirements for external fire exposure when installed below an appropriate roof covering. For more information please consult with the tile / slate manufacturer.

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

Product details

Thermal properties

The λ-values and R-values detailed below are quoted in accordance with BS / I.S. EN 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
30	1.35
40	1.80
50	2.25
55	2.50
60	2.70
70	3.15
75	3.40
80	3.60
85	3.85
90	4.05
100	4.50
110	5.00
120	5.45
125	5.65
130	5.90
140	6.35
150	6.80
165	7.50

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

Contact details

Great Britain

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