Insulation

Kooltherm® K12 Framing Board

Insulation for Timber and Steel Framing Systems

- Premium performance rigid thermoset insulation - thermal conductivity as low as 0.021 W/mK
- Can be used between studs or as an insulating sheathing
- Suitable for use with timber frame and steel frame wall construction
- Unaffected by air infiltration
- Resistant to the passage of water vapour
- Easy to handle and install
- Ideal for new build or refurbishment
- Ideal for Modern Methods of Construction (MMC)
- Non-deleterious material
- Manufactured with a blowing agent that has zero ODP and low GWP

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.

Unless otherwise stated both the timber and steel frame U-values quoted are based on an internal construction comprising a 3 mm plaster skim on 15 mm plasterboard. The external finishes are as specified in the examples themselves.

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® K18 Insulated Plasterboard has been ignored in these calculations, as the insulation layer penetrated is not the main insulation layer. For the purposes of timber frame calculations which feature insulating sheathing, the use of stainless steel fasteners of cross sectional area 7.45 mm² has been assumed at a density of 4.4 per m². For steel frame calculations featuring insulating sheathing, the use of carbon steel fasteners of cross sectional area 14.8 mm² has been assumed at a density of 4.5 per m².

NB For calculations which feature insulation between timber frame studs / timber battens, a 15% bridging factor has been assumed. The thermal conductivity of the timber has been assumed to be 0.12 W/mK.

NB Calculations assume that a foil faced breathable membrane yields an airspace thermal resistance of 0.54 m²K/W. Calculations assume that a 4 mm foil faced bubble breathable membrane yields a combined product and airspace thermal resistance of 0.79 m²K/W.

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).

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:

- 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; and
- 2012 editions of Technical Booklets F1 & F2 to the Building Regulations for Northern Ireland.

Reburbishment - Internal Dry Lining

Plasterboard Fixed to Timber Framework on Solid Brick Wall

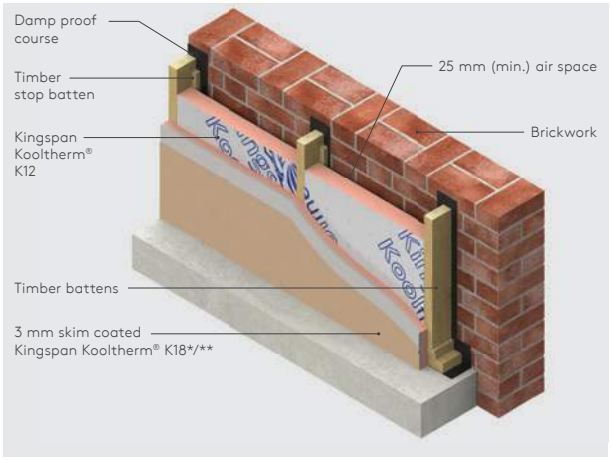

Figure 1

U-values (W/m²K) for various thicknesses of insulation, stud depth, and standard breather membrane		
Thickness of Kingspan Kooltherm® K12 framing board between studs (mm)	Thickness of Kingspan Kooltherm® K18*** framing board inside studs (mm)	U-values (W/m²K)
100mm Deep Timber Studs		
80	42.5	0.20
80	52.5	0.18
80	62.5	0.16
80	72.5	0.15
80	82.5	0.14
80	92.5	0.13
80	102.5	0.12
80	112.5	0.12
140mm Deep Timber Studs		
120	37.5	0.17
120	42.5	0.16
120	52.5	0.15
120	62.5	0.14
120	72.5	0.13
120	82.5	0.12
120	92.5	0.11
120	102.5	0.11
120	112.5	0.10

* Calculations which feature insulation between studwork only, assume the use of 15 mm plasterboard and a polythene sheet vapour control layer in order to minimise the risk of condensation (see 'Design Considerations - Water Vapour Control').

** Kingspan Kooltherm® K18 contains an integral vapour control layer in order to minimise the risk of condensation (see 'Design Considerations - Water Vapour Control').

*** Product thicknesses = 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

Timber Frame Wall with 102.5 mm Brickwork Outer Leaf

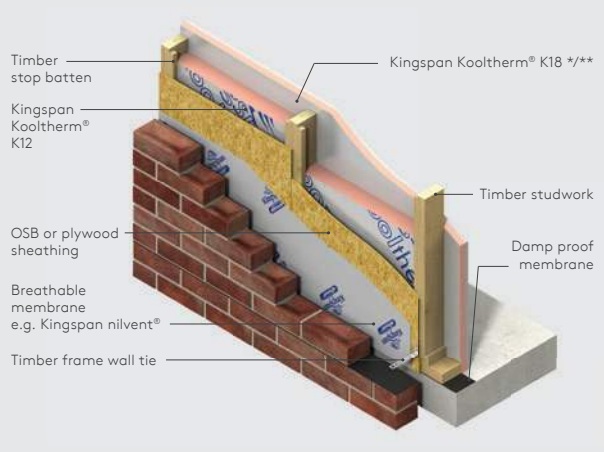

Figure 2

U-values (W/m^2K) for various thicknesses of insulation and stud depth	
Thickness of Kingspan Kooltherm® K12 Framing Board (mm)	U-values (W/m^2K)
100mm Deep Timber Studs	
50 + 50	0.17
60 + 60	0.15
70 + 70	0.14
80 + 80	0.12
140mm Deep Timber Studs	
80 + 80	0.12
90 + 90	0.11
100 + 100	0.10
120 + 120	0.09

Insulation Between Timber Frame Studs with Kingspan Kooltherm® K18 Insulated Plasterboard Fixed Internally

U-values (W/m^2K) for various thicknesses of insulation, stud depth, standard breather membrane		
Thickness of Kingspan Kooltherm® K12 framing board between studs (mm)	Thickness of Kingspan Kooltherm® K18*** framing board inside studs (mm)	
100mm Deep Timber Studs		
80	42.5	0.20
80	52.5	0.18
80	62.5	0.16
80	72.5	0.15
80	82.5	0.14
80	92.5	0.13
80	102.5	0.12
80	112.5	0.12
140mm Deep Timber Studs		
120	37.5	0.17
120	42.5	0.16
120	52.5	0.15
120	62.5	0.14
120	72.5	0.13
120	82.5	0.12
120	92.5	0.11
120	102.5	0.11
120	112.5	0.10

* Calculations which feature insulation between studwork only, assume the use of 15 mm plasterboard and a polythene sheet vapour control layer in order to minimise the risk of condensation (see 'Design Considerations - Water Vapour Control').

** Kingspan Kooltherm® K18 contains an integral vapour control layer (see 'Design Considerations - Water Vapour Control').

*** Product thicknesses = 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

Insulation Between Timber Frame Studs and Insulated Sheathing

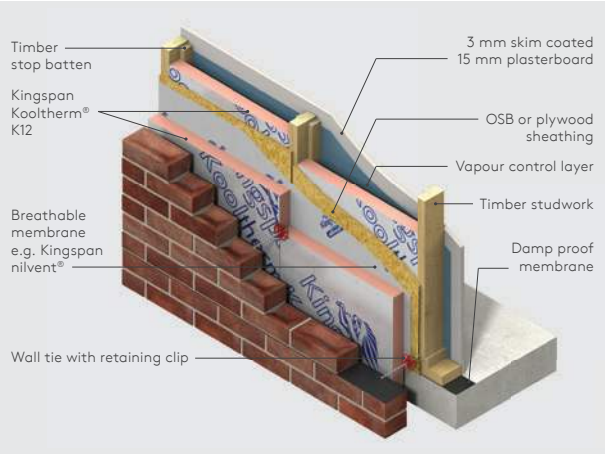

Figure 3

U-values for various thicknesses of insulation and stud depths	
Thickness of Kingspan Kooltherm® K12 framing board (mm)	**U-values (W/m^2K)**
100 mm Deep Timber Studs	
50 + 50	0.17
60 + 60	0.15
70 + 70	0.14
80 + 80	0.12
140 mm Deep Timber Studs	
80 + 80	0.12
90 + 90	0.11
100 + 100	0.10
120 + 120	0.09

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

Typical Constructions and U-values

Timber Frame Wall with 20 mm Cement Rendered 100 mm Dense Blockwork Outer Leaf*

Insulation Between Timber Frame Studs with Kingspan Kooltherm® K18 Insulated Plasterboard fixed internally

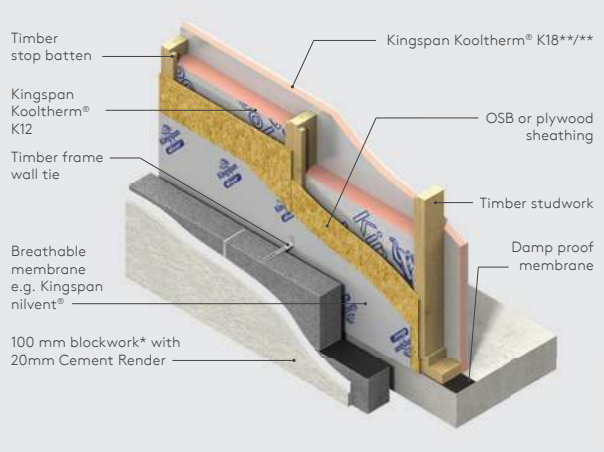

Figure 4

U-values (W/m²K) for various thicknesses of insulation, stud depth and standard breather membrane		
Thickness of Kingspan Kooltherm® K12 framing board between studs (mm)	Thickness of Kingspan Kooltherm® K18*** framing board inside studs (mm)	U-values (W/m²K)
100mm Deep Timber Studs		
80	42.5	0.20
80	52.5	0.18
80	62.5	0.16
80	72.5	0.15
80	82.5	0.14
80	92.5	0.13
80	102.5	0.12
80	112.5	0.12
140mm Deep Timber Studs		
120	37.5	0.17
120	42.5	0.16
120	52.5	0.15
120	62.5	0.14
120	72.5	0.13
120	82.5	0.12
120	92.5	0.11
120	102.5	0.11
120	112.5	0.10

* Calculations assume dense block of λ-value 1.13 W/mK.

** Calculations which feature insulation between studwork only, assume the use of 15 mm plasterboard and a polythene sheet vapour control layer in order to minimise the risk of condensation (see 'Design Considerations - Water Vapour Control').

*** Kingspan Kooltherm® K18 contains an integral vapour control layer (see 'Design Considerations - Water Vapour Control').

**** Product thicknesses = 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

Insulation Between Timber Frame Studs and Insulated Sheathing

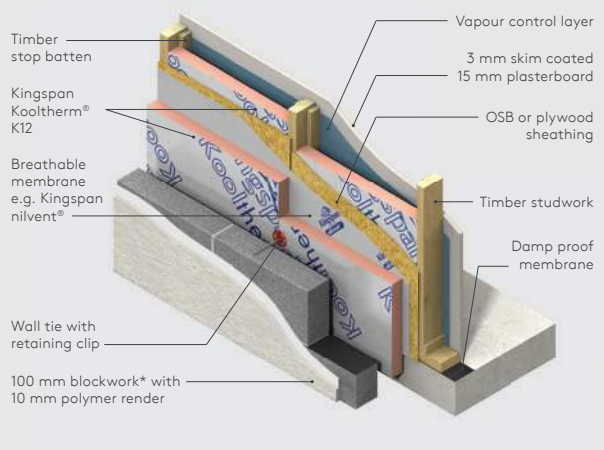

Figure 5

U-values (W/m^2K) for various thicknesses of insulation and stud depths	
Thickness of Kingspan Kooltherm® K12 (mm)	U-values (W/m^2K)
89 mm Deep Timber Studs	
25 + 25	0.24
40 + 40	0.18
50 + 50	0.16
60 + 60	0.14
140 mm Deep Timber Frrame Studs	
25 + 25	0.24
40 + 40	0.18
50 + 50	0.15
60 + 60	0.13

* Calculations assume dense block of λ-value 1.13 W/mK.

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

Design Considerations

Heat Loss and Linear Thermal Bridging

Basic Principles

When insulation is installed between a timber or steel frame, the effect of repeating thermal bridges (frame, studwork or noggins) that bridge the insulation layer with poorer conductivity materials, must be considered. For a typical timber frame wall, this can represent 15% of the internal surface area of the building, which will significantly affect the overall U-value. The effect of this bridging can be reduced or avoided by installing an additional layer of insulation either to the internal side of the frame, or sheathing the construction on the cold side.

Linear thermal bridging describes the additional heat losses or gains that occur at junctions between elements e.g. where a timber framed wall meets the ground or intermediate floor, 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 internal surface 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 CO2 emissions and, where applicable, the fabric energy efficiency of buildings.

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

Approved details, such as the Accredited Construction Details (England & Wales / Scotland / Northern Ireland) and Acceptable Construction Details (Republic of Ireland), collectively referred to here as ACDs, can uplift performance to provide a clear starting point towards achieving compliance, but they are limited in scope and applicability. The greatest opportunity for mitigating the impact of linear thermal bridges can come from following accurately 'modelled' details that take into account the following design considerations.

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 for best thermal performance. Where this is not possible, insulation layers should be overlapped and, ideally, insulation material introduced between.
- The best approach to minimise cold bridging from junctions is to sheath the frame construction and junctions externally with Kingspan Kooltherm® K12.
- An internal lining of insulation on the warm side of the construction, such as Kingspan Kooltherm® K18, can also help to reduce heat losses; alternatively, localised losses can be minimised using a thin insulation layer behind the internal wall lining adjacent to the soleplate.
- Prevention of thermal bridging should be considered when designing sills, jambs and lintels.
- Heat–loss from junctions around window or door openings can be further reduced by insulating the reveal. The key factor is the thermal resistance (R-value) of the insulation layer. Reveals should be designed to accommodate 32.5 mm (min.) of Kingspan Kooltherm® K18.
- The application of internal insulation above and below an intermediate or separating floor reduces the overall heat loss through the wall, but can increase the losses through the junction; to reduce this heat loss, a minimum thickness of 150 mm of insulation should be included within the intermediate / separating floor void adjacent to the rim-board. The intermediate or separating floor junction heat-losses can also be addressed through insulated sheathing with Kingspan Kooltherm® K12 on the cold side of the frame.
- In order to minimise cold bridging at the edge of ground floors, the distance between the top surface of the floor insulation or perimeter insulation upstand, and the bottom of the wall insulation must be a minimum of 150 / 225* mm. The further appropriate wall insulation extends past the floor insulation, the better the thermal performance of the junction between the wall and the floor.

  * 150 mm applies to the UK and 225 mm to the Republic of Ireland.

- For junctions between the external walls and roof constructions, continuity and overlap of insulation layers is the key to minimising heat losses from the junctions. Refer to Kingspan Kooltherm® K18 literature for further design considerations.

For further advice on details to reduce linear thermal bridging please contact the Kingspan Insulation Technical Service Department (see rear cover for details).

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 Kooltherm K12 produced at Kingspan Insulation's Castleblayney manufacturing facility.

Specification Clause

Kingspan Kooltherm® K12 should be described in specifications as:–

The stud wall insulation shall be Kingspan Kooltherm® K12 Framing Board ____ mm thick: comprising a premium performance fibre-free rigid thermoset phenolic 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); 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.

Water Vapour Control / Condensation

Consideration should be given to the risk of condensation, when designing thermal elements.

Condensation can be controlled, in constructions containing Kingspan Kooltherm® K12, by ensuring there is a layer of high vapour resistance on the warm side of the insulation layer. If required, the vapour resistance of the wall lining can be increased by the use of a vapour check plasterboard*, the use of Kingspan Kooltherm® K18 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 wall perimeters.

A condensation risk analysis should be carried out following the procedures set out in BS 5250: 2011 + A1: 2016 (Code of practice for the control of condensation in buildings). The Kingspan Insulation Technical Service Department (see rear cover) can provide this service.

Fire Stops & Cavity Barrier Strategy

Current guidance to the Building Regulations should be considered with regard to the performance requirements for, and the provision of fire stops and cavity barriers. For specialist advice, including configuration and installation, refer to:

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

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.

Lightning Protection

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

Sitework

Introduction

- Installation advice, for different applications of Kingspan Kooltherm® K12, is listed below. Where constructions include a combination of applications, e.g. 'Insulation Between Timber Frame Studs and Insulated Sheathing', refer to both relevant sections. Regardless of whether insulation is being installed between and outside, or between and inside timber studs, the two layers should always be fixed so that there are no air spaces between them in construction.

External Masonry

Timber Frame Wall with Insulation Between Studs

- **If insulation boards are to be fitted so that they are flush with the inside surface of the timber studs**, nail treated softwood battens to the side of the studs, to provide a 'stop' to prevent the insulation boards from moving within the stud cavity.
- This 'stop' should be positioned to allow the insulation boards to finish flush with the inside surface of the studs.
- Insulation boards may be temporarily held to the 'stop' battens with large headed clout nails.
- The boards will be further restrained by the plasterboard / insulated plasterboard lining, fixed to the inside face of the studs.
- 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.
- Any remaining gaps between boards / sheets of insulation should be filled with flexible sealant or equivalent, or a combination of flexible polyurethane foam and flexible sealant or equivalent.
- **If the insulation boards are to be fitted so that they are flush with the outside surface of the timber studs**, tight up against the pre-installed OSB or plywood sheathing, insulation boards must be cut and fitted in the spaces between the studs.
- Once the boards are fitted in place, nail treated softwood battens to the side of the studs, to provide a 'stop' to prevent the insulation boards from moving within the stud cavity.
- When utilising Kingspan Kooltherm® K12 **between studwork with no insulated sheathing**, a vapour control layer should be installed. This can be provided by vapour check plasterboard*, Kingspan Kooltherm® K18*, 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 wall perimeters.
- In all cases, measure the distance between studs before cutting Kingspan Kooltherm® K12 to size, as spacings can vary.
- Ensure there is a tight fit between the boards and the adjoining studs and other timbers, and fill all gaps with expanding urethane sealant.
- Ensure that the boards are lightly butted, and continuity of insulation is maintained.
- The outer leaf of masonry may be constructed in the conventional manner, using appropriate wall ties to hold the two wall leaves together.

Timber Frame Wall with Insulating Sheathing

- Kingspan Kooltherm® K12 should be fixed to the external surface of the timber frame structure (outside of any breathable membrane, OSB or plywood sheathing), and restrained in accordance with the timber frame manufacturers recommendations. However, in the absence of other guidance please note the following.
- Ensure that the boards are lightly butted and continuity of insulation is maintained.
- Large headed galvanised clout nails may be used as temporary fixings prior to the insulation boards being tied into the masonry leaf with an appropriate timber frame wall tie.
- Always ensure that fixings are coincident with the underlying timber studs, head rails and sole plates.
- The outer leaf of masonry may be constructed in the conventional manner, using appropriate wall ties to hold the two wall leaves together.

Timber Frame Wall Tie Manufacturers

Ancon Building Products **www.ancon.co.uk**	+44 (0) 1142 755 224
Cullen **www.cullen-bp.co.uk**	+44 (0) 1592 771 132
Helifix Limited **www.helifix.co.uk**	+44 (0) 2087 355 222
MAK Fasteners **www.makfasteners.com**	+353 (0) 1 451 99 00
Simpsons **www.strongtie.co.uk**	+44 (0) 1827 255 600

Steel Frame Wall with Insulating Sheathing

- Kingspan Kooltherm® K12 should be fixed to the outside of the steel frame construction, ensuring vertical board joints coincide with a vertical steelwork member.
- Fixings should be in accordance with the steel frame manufacturer's recommendations.
- Ensure that the boards are lightly butted and continuity of insulation is maintained.
- Advice should be sought from the appropriate steel frame manufacturer, for recommendations on suitable wall tie specification. In the absence of any other guidance refer to:

Ancon Building Products **www.ancon.co.uk**	+44 (0) 1142 755 224

Sitework

Ventilated Cladding

Timber Frame Wall with Insulation Between Studs

- **If insulation boards are to be fitted so that they are flush with the inside surface of the timber studs**, nail treated softwood battens to the side of the studs, to provide a 'stop' to prevent the insulation boards from moving within the stud cavity.
- This 'stop' should be positioned to allow the insulation boards to finish flush with the inside surface of the studs.
- Insulation boards may be temporarily held to the 'stop' battens with large headed clout nails.
- The boards will be further restrained by the plasterboard / insulated plasterboard lining, fixed to the inside face of the studs.
- 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.
- Any remaining gaps between boards / sheets of insulation should be filled with flexible sealant or equivalent, or a combination of flexible polyurethane foam and flexible sealant or equivalent.
- **If the insulation boards are to be fitted so that they are flush with the outside surface of the timber studs**, tight up against pre-installed OSB or plywood sheathing, insulation boards must be cut and fitted in the spaces between the studs.
- Once the boards are fitted in place, nail treated softwood battens to the side of the studs, to provide a 'stop' to prevent the insulation boards from moving within the stud cavity.
- When utilising Kingspan Kooltherm® K12 between studwork with no insulated sheathing, a vapour control layer should be installed. This can be provided by vapour check plasterboard*, Kingspan Kooltherm® K18*, 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 wall perimeters.
- **In all cases**, measure the distance between studs before cutting Kingspan Kooltherm® K12 to size, as spacings can vary.
- Ensure there is a tight fit between the boards and the adjoining studs and other timbers, and fill all gaps with expanding urethane sealant.
- A breathable membrane, e.g. Kingspan nilvent®, is fitted to the OSB or plywood sheathing / exterior of the insulated frame, and temporarily stapled or pinned in place.
- Preservative treated battens are fixed vertically to the wall structure, through the breathable membrane, ensuring that the battens and fixings are coincident with the underlying timber studs, head rails and sole plates.
- When selecting the type of fixing and fixing frequency for the battens, consideration must be given to the weight of cladding to be fixed to them.
- If the cladding system is to be tile hung, horizontal tiling battens can then fixed to the vertical battens, and the tiles fixed to them.
- Alternatively, timber cladding can be fixed directly to the vertical battens.
- If the cladding system is to be finished with render, the render carrier (e.g. calcium silicate board, expanded metal lath) can be fixed directly to the vertical battens.
- Installation advice should be sought from the breathable membrane manufacturer, and the ventilated cladding system should be secured in accordance with its manufacturer's recommendations.

Timber Frame Wall with Insulating Sheathing

- Kingspan Kooltherm® K12 should be fixed to the external surface of the timber frame structure (outside of any breathable membrane, OSB or plywood sheathing), and restrained in accordance with the timber frame manufacturers recommendations. However, in the absence of other guidance please note the following.
- Ensure that the boards are lightly butted and continuity of insulation is maintained.
- Large headed galvanised clout nails may be used as temporary fixings for insulation boards.
- A breathable membrane, e.g. Kingspan nilvent®, is fitted over the insulation, and temporarily stapled or pinned in place.
- Preservative treated softwood battens are fixed vertically to the wall structure, through the insulation sheathing, and breathable membrane, ensuring that the battens and fixings are coincident with the underlying timber studs, head rails and sole plates.
- When selecting the type of fixing and fixing frequency for the battens, consideration must be given to the weight of cladding to be fixed to them.
- If the cladding system is to be tile hung, horizontal tiling battens can then fixed to the vertical battens, and the tiles fixed to them.
- Alternatively, timber cladding can be fixed directly to the vertical battens.
- If the cladding system is to be finished with render, the render carrier (e.g. calcium silicate board, expanded metal lath) can be fixed directly to the vertical battens.
- Installation advice should be sought from the breathable membrane manufacturer, and the ventilated cladding system should be secured in accordance with its manufacturer's recommendations.

Sitework

Internal Dry Lining with Insulation Between Timber Framework

- The timber framework, backed with strips of damp proof course (DPC), should be mechanically fixed to the masonry wall.
- The timbers should be deep enough to accommodate the required thickness of insulation and a 25 mm (min.) air space between the insulation and the masonry.
- To avoid insulation boards moving within the timber framework cavity, nail treated softwood battens to the side of the timber members to provide a 'stop'.
- This 'stop' should be positioned to allow the insulation boards to finish flush with the inner surface of the timbers.
- Measure the distance between timber members before cutting Kingspan Kooltherm® K12 to size, as spacings can vary.
- Insulation boards may be temporarily held to the 'stop' battens with large headed clout nails.
- Ensure there is a tight fit between the boards and the adjoining timbers, and fill all gaps with expanding urethane sealant.
- 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.
- Any remaining gaps between boards / sheets of insulation should be filled with flexible sealant or equivalent, or a combination of flexible polyurethane foam and flexible sealant or equivalent.
- When utilising Kingspan Kooltherm® K12 between timbers, a vapour control layer should be installed. This can be provided by vapour check plasterboard*, Kingspan Kooltherm® K18*, 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 wall perimeters.

Inside Studs / Timbers Layer of Insulation

- Please refer to the literature for Kingspan Kooltherm® K18 for fixing instructions. This literature is available from the Kingspan Insulation Marketing Department or from the Kingspan Insulation website (see rear cover for details).

General

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 Kooltherm® K12 is available through specialist insulation distributors and selected builders' merchants throughout Ireland and Northern 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 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.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 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 Kooltherm® K12 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 Kooltherm® K12 is a premium performance fibre-free rigid thermoset phenolic insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

Standards & Approvals

Kingspan Kooltherm® K12 is 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) and ISO 50001: 2018 (Energy Management Systems. Requirements with Guidance for Use).

The use of Kingspan Kooltherm® K12 (in thicknesses of 25 - 140 mm) is covered by BBA Certificate 16/5299, and by NSAI Agrément Certificate 09/0329.

Standard Dimensions

Kingspan Kooltherm® K12 is available in the following standard size(s):

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 Kooltherm® K12 typically exceeds 100 kPa when tested to BS / I.S. EN 826: 2013 (Thermal insulating products for building applications. Determination of compression behaviour).

Durability

If correctly installed, Kingspan Kooltherm® K12 can have an indefinite life. Its durability depends on the supporting structure and the conditions of its use.

Resistance to Solvents, Fungi & Rodents

The insulation core is resistant to short-term contact with petrol and with most dilute acids, alkalis and mineral oils. However, it is recommended that any spills be cleaned off fully before the boards are installed. Ensure that safe methods of cleaning are used, as recommended by the suppliers of the 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 Kooltherm® K12 resist attack by mould and microbial growth, and do not provide any food value to vermin.

Product Details

Fire Performance

Kingspan Kooltherm® K12 has a Euroclass rating of F.

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

Thermal Properties

The λ-values and R-values detailed below are quoted in accordance with BS / I.S. EN 13166: 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 (insulant thickness 25 - 44 mm); and

0.021 W/mK (insulant thickness ≥ 45 mm).

Thermal Resistance

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

Insulant Thickness (mm)	Thermal Resistance (m^2K/W)
25	1.10
30	1.35
40	1.80
50	2.35
60	2.85
70	3.30
80	3.80
90	4.25
100	4.75
110	5.20
120	5.70
125	5.95
130	6.15
140	6.65
150	7.10

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

Contact Details

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