



NSAI
Agrément

**IRISH AGRÉMENT BOARD
CERTIFICATE NO. 09/0329**

Kingspan Insulation, Castleblayney,
Co. Monaghan, Ireland.
Tel: +353 (0)42 9795000 Fax: +353 (0)42 9754299
Email: info@insulation.kingspan.com
Website: www.kingspaninsulation.ie

Kingspan Kooltherm K3, K7, K8, K12, K17 & K18 Insulation Products

**Isolation de murs
Wärmedämmung**

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are '**proper materials**' suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997 to 2017**.

PRODUCT DESCRIPTION:

This Certificate relates to the following products:

- Kooltherm K3 Floorboard (Detail Sheet 1)
- Kooltherm K7 Pitched Roof Board (Detail Sheet 2)
- Kooltherm K8 Cavity Board (Details Sheet 3)
- Kooltherm K12 Framing Board (Detail Sheet 4)
- Kooltherm K17 Insulated Drylining Board for Plaster-Dab/Adhesive Bonding (Detail Sheet 5)
- Kooltherm K18 Insulated Drylining Board for Mechanical Fixing (Detail Sheet 6)

MANUFACTURE AND MARKETING:

These products are manufactured and marketed by:

Kingspan Insulation Ltd.,
Castleblayney,
County Monaghan,
Ireland.

Tel: +353 42 9795000

Fax: +353 42 9754299

Email: info@insulation.kingspan.com

Website: www.kingspaninsulation.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, the Kingspan Kooltherm range of insulation products described in this general Certificate when used in conjunction with the relevant Detail Sheet, and if used in accordance with this Certificate, meet the requirements of the Building Regulations 1997 - 2017 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

REQUIREMENT:

Part D – Materials and Workmanship

D3 – The Kingspan Kooltherm products as certified in this Certificate comprise proper materials fit for their intended use (See Part 4 of this Certificate).

D1 – The Kingspan Kooltherm products, as certified in this Certificate, meet the requirements of the building regulations for workmanship.

Part B – Fire Safety

Part B Vol 2 – Fire Safety

B2 & B7 – Internal Fire Spread (Linings)

The Kingspan Kooltherm products are considered to be NPD to IS EN 13501-1:2007+A1:2009 *Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests*.

B3 & B8 – Internal Fire Spread (Structure)

The relevant Kingspan Kooltherm products referred to in this Certificate carry an NPD rating.

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture

The Kingspan Kooltherm products referred to in this Certificate when installed in compliance with the conditions indicated in Part 3 of the relevant Detail Sheet will not promote the passage of moisture and will minimise the risk of surface of interstitial condensation.

Part J – Heat Producing Appliances

J3 – Protection of Building

The Kingspan Kooltherm products referred to in this Certificate, if used in accordance with this Certificate, meet the requirements of the Building Regulations 1997 to 2017.

Part L – Conservation of Fuel and Energy

L1 – Conservation of fuel and energy

Based on the measured thermal conductivity of the Kingspan Kooltherm products referred to in this Certificate and detailed in the relevant Detail Sheet meet current 'U-value' requirements (see Section 4.4 of this Certificate).

2.1 PRODUCT DESCRIPTION

Each of the Kingspan Kooltherm products is given a detailed description in the relevant Detail Sheet.

2.2 DELIVERY, STORAGE AND MARKING

Kingspan Kooltherm products are supplied palletised in labelled packs and shrink wrapped in polyethylene. Each pack carries a label with the product description, product characteristics (λ and R values), manufacturer's name, NSAI Agrément identification mark and NSAI Agrément Certificate number for the system.

The product packaging must not be considered adequate for outside protection. Ideally, boards should be stored inside the building. If stored outside, the products should be stacked flat on a level base raised off the ground on skids and should be covered with a polythene sheet or protected with weatherproof tarpaulins. The boards must not be exposed to a naked flame or other ignition sources.

On-site trimming of boards where necessary to maintain continuity of insulation around doors, windows or other openings is easily executed using a fine tooth saw or by cutting through the insulation, and paper backing of any plasterboard layer, then snapping the board face down over a straight edge and cutting the paper facing of the plasterboard on the other side.

Tapered edged boards are jointed and finished in accordance with standard dry lining procedure offering a surface suitable for paper hanging and paint finishes.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and air tightness performance. Ensure accurate trimming to achieve close butting joints and continuity of insulation.

Adequate protection and safety precautions should be taken.

3.1 GENERAL

This matter is dealt with for each product in their Detail Sheet.

4.1 BEHAVIOUR IN FIRE

Each Detail Sheet contains the relevant information.

4.2 WATER PENETRATION

The Kingspan Kooltherm products referred to in this Certificate are of a closed cell structure, which does not allow water uptake by capillary action. When used in accordance with this Certificate, the products present no significant risk of water penetration.

4.3 THERMAL INSULATION

The aged/design thermal conductivity ' λ ' value' of the Kingspan Kooltherm products referred to in this Certificate, when measured in accordance with I.S. EN 12667:2001 *Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method – Products of high and medium thermal resistance*, is contained in each Detail Sheet. The high thermal resistance of Kingspan Insulation products ensures that cold bridging and extra heat loss around the edges of openings can be avoided.

Lintel jamb and cill designs similar to those shown in Diagram 3 of the TGD to Part L of the Building Regulations 1997 to 2017 will be satisfactory to limit thermal bridging.

Uncontrolled leakage of air through the fabric of a building and/or cracks in and around door and window frames, sills, jambs etc. can occur due to wind pressure or air movement due to thermal effects. Details of how to avoid the infiltration of cold air are given in TGD to Part L of the Building Regulations 1997 to 2016, Section 1.6 Page 14.

The required maximum U-values for external walls and roofs can be obtained from the relevant Detail Sheet.

4.4 LIMITING THERMAL BRIDGING

The linear thermal transmittance ' ψ ' (Psi) describes the heat loss associated with junctions and around openings. Junction design used with the Kingspan Kooltherm products have been assessed and when detailed in accordance with this Certificate can meet the requirements of Table D2 of TGD to Part L of the Building Regulations 1997 to 2017.

When **all** bridged junctions within a building comply with the requirements of Table D2 of TGD to Part L, the improved ' γ ' factor of 0.08 can be entered into the DEAP building energy rating (BER) calculation. If **all** junctions can be shown to be equivalent or better than Acceptable Construction Details published by the DECLG, then the values published in Table D2 apply.

Where either of the above options are shown to be valid, or when the required values cannot be achieved, all relevant details should be recorded on the 'Certificate of Compliance' for that project for use in future BER calculations.

' ψ ' values for other junctions outside the scope of this Certificate should be assessed in accordance with BRE IP1/06 *Assessing the effects of thermal bridging at junctions and around openings* and BRE BR 497 *Conventions for calculating linear thermal transmittance and temperature factors* in accordance with Appendix D of TGD to Part L of the Building Regulations 1997 to 2017.

As per Acceptable Construction Details, a minimum thermal resistance of 0.6m²K/W should be provided at window reveals, heads and sills.

4.5 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with the ETCI publication ET 207 *Guide to the National Rules for Electrical Installations as Applicable to Domestic Installations*. It is recommended that cables should not be buried in the insulation and carried in a conduit. In relation to recessed spotlights and other luminaries, ET 207 requires they be not less than the minimum distances from combustible materials as specified in clause 559.3.2 of the TCI National rules of the Electro Technical Council of Ireland (ET 101). For extra low voltage (ELV) it is recommended that only surface mounted ELV lighting be permitted in conjunction with Kooltherm K17 and K18.

4.6 CONDENSATION RISK

The Kingspan Kooltherm products referred to in this Certificate have a high vapour resistance and are therefore unlikely to be affected by surface or interstitial condensation, provided all joints between boards are filled and taped in accordance with standard dry lining practice. Interstitial condensation analysis for average winter environmental conditions for cavity wall constructions indicate no condensation risk. When insulating buildings the recommendations of BS 5250: 2011+A1:2016 '*Code of Practice for control of condensation in buildings*' should be followed to minimise the risk of condensation within the building elements and structures.

4.7 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS

The Kingspan Kooltherm products referred to in this Certificate do not promote infestation, as there is no food value in the materials used. They also resist attack by mould and microbial growth. The insulation core is resistant to dilute acids, alkalis, mineral oil and petrol. It 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 the boards. Boards which have been in contact with harsh solvents, petrol, mineral oil or acids or boards that have been damaged in any other way should not be used.

4.8 WALL MOUNTED FITTINGS

This matter is dealt with in the Detail Sheets.

4.9 MAINTENANCE

This matter is dealt with in the Detail Sheets.

4.10 DURABILITY

The Kingspan Kooltherm products referred to in this Certificate are rot-proof and durable.

4.11 CE MARKING

The manufacturer has taken responsibility of CE marking the Kingspan Kooltherm in accordance with harmonised European Standard IS EN 13166:2012+A2:2016 *Thermal insulation products for buildings – Factory made phenolic foam (PF) products - Specification*. An asterisk (*) appearing in this Certificate indicates that data shown is an essential characteristic of the product and declared in the manufacturers Declaration of Performance (DoP).

Reference should be made to the latest version of the manufacturer's DoP for current information on any essential characteristics declared by the manufacturer.

5.1 National Standards Authority of Ireland ("NSAI") following consultation with NSAI Agrément has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:

- (a) the specification of the product is unchanged.
- (b) the Building Regulations 1997 to 2017 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.
- (c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.
- (d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.
- (e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.
- (f) the registration and/or surveillance fees due to NSAI Agrément are paid.

5.2 The NSAI Agrément mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the NSAI Agrément mark and certification number and must remove them from the products already marked.

5.3 In granting Certification, the NSAI makes no representation as to;

- (a) the absence or presence of patent rights subsisting in the product/process; or
- (b) the legal right of the Certificate holder to market, install or maintain the product/process; or
- (c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.

5.4 This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.

5.5 Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act 2005, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.

5.6 The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.

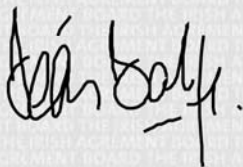
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

NSAI Agrément

This Certificate No. **09/0329** is accordingly granted by the NSAI to **Kingspan Insulation Ltd.** on behalf of NSAI Agrément.

Date of Issue: **February 2009**

Signed



Seán Balfe
Director of NSAI Agrément

Readers may check that the status of this Certificate has not changed by contacting NSAI Agrément, NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. www.nsai.ie

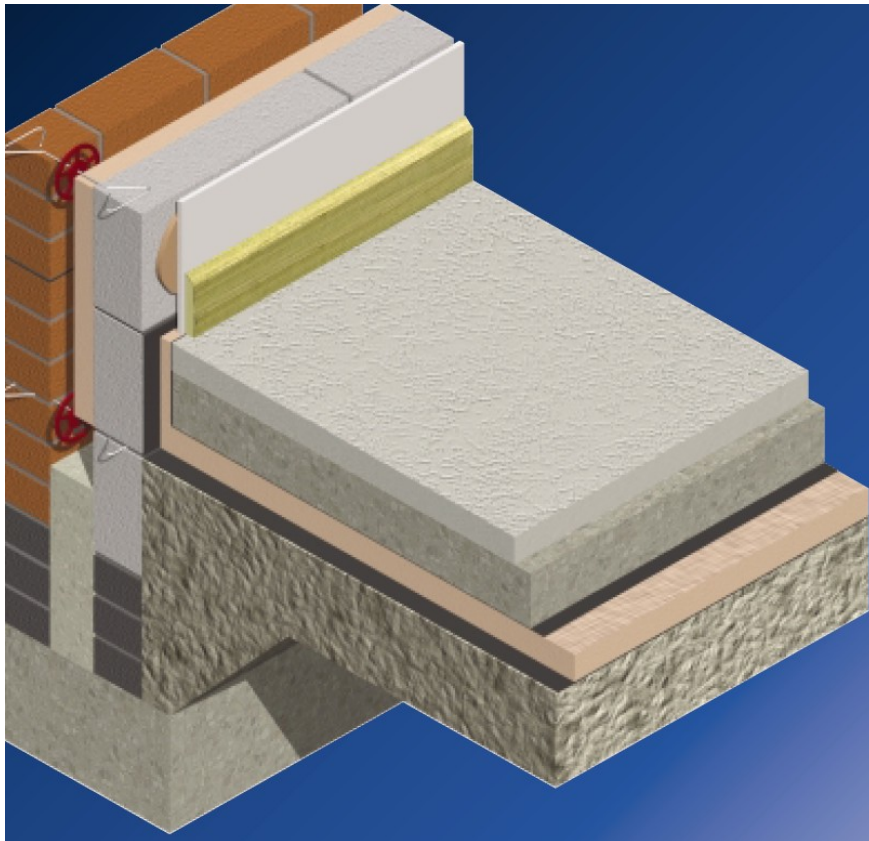
Revisions:

16th January 2018: References to Building Regulations and standards updated, product specifications updated to reflect manufacturer's DoP.

14th January 2021: General revision.



Kingspan Kooltherm K3 Floorboard



PRODUCT DESCRIPTION:

This Detail Sheet relates to Kingspan Kooltherm K3 Floorboard, as defined in NSAI Agrément Certificate 09/0329.

USE:

Kingspan Kooltherm K3 Floorboard is used for the thermal insulation in ground supported and suspended floors and may be installed:

- Below a concrete floor slab;
- Below a cement based floor screed on a concrete slab with a hardcore base;
- Between the joists of a suspended timber floor.

MANUFACTURE AND MARKETING:

The product is manufactured and marketed by:

Kingspan Insulation Ltd.,
Castleblayney,
County Monaghan,
Ireland.
Tel: +353 42 9795000
Fax: +353 42 9754299
Email: info@insulation.kingspan.com
Website: www.kingspaninsulation.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Kingspan Kooltherm K3 Floorboard, when used in conjunction with this Detail Sheet and NSAI Agrément Certificate 09/0329, meets the requirements of the Building Regulations 1997 - 2017 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

This matter is dealt with in NSAI Agrément Certificate 09/0329.

2.1 PRODUCT DESCRIPTION

This Detail Sheet relates to the Kingspan Kooltherm K3 Floorboard, comprising rigid phenolic insulation board manufactured in accordance with I.S. EN 13166: 2012+A2:2016 *Thermal insulation products for buildings – Factory made products of phenolic foam (PF) – Specification*. Kingspan Kooltherm K3 Floorboard is faced on both sides with a low emmissivity composite foil autohesively bonded to the insulation core during manufacture. This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K3 Floorboards are CFC and HCFC free and therefore have zero ozone depletion potential (zero ODP).

Table 1 shows the Kingspan Kooltherm K3 Floorboard product range.

Length	2400mm
Width	1200mm
Thickness	25 – 100mm*
* Other thicknesses are available	

Table 1: Product Range

2.2 MANUFACTURE

Kingspan Kooltherm K3 Floorboard is manufactured from a formulation of chemicals, which are distributed onto low emissivity composite foil facers subsequently autohesively bonded to the insulation core during manufacture.

2.3 INSTALLATION

2.3.1 General

Consideration should be given to the recommendations of CP 102:1973 *Code of practice for protection of buildings against water from the ground*.

Un-reinforced floor screeds can be used in conjunction with Kingspan Kooltherm K3 Floorboard in most applications.

Where the board is to be laid over a site fabricated concrete floor slab, the slab should be allowed to dry out fully prior to the application of Kingspan Kooltherm K3 Floorboard. For those applications where the insulation and DPM are below the slab, construction water should be allowed to dry out, e.g. by delaying the installation of the floor finish.

Surface condensation is unlikely to occur on the floor surface if the Kingspan Kooltherm K3 Floorboard is laid over the slab due to the fast thermal response of the construction.

Kingspan Kooltherm K3 Floorboard is not recommended for use in direct contact with subsoil and must be used over the DPM. The surface of slabs should be smooth and free of projections. Beam and block floors should be

level and grouted. Rough cast slabs should be levelled using thin sand blinding to ensure boards are continuously supported.

2.3.2 Laying Below the Floor Slab

After the site has been prepared and foundations where appropriate built to DPC level, the DPM (minimum 300 micron/1200 gauge polythene) should be laid over the well compacted hardcore, sand blinded, with joints well lapped and folded to prevent the passage of ground water. The membrane should be brought up the surrounding foundation walls until it is sufficiently above the height of the wall DPC so that it will connect with or form the DPC. The Kingspan Kooltherm K3 Floorboard should be laid break-bonded with the joints tightly butted. A strip of the boarding should be placed vertically around the perimeter of the floor slab in order to prevent cold bridging of the slab. Boards are overlaid with a separating layer of building paper to BS 1521:1994 *Specification for waterproof building papers*, Grade B1F or polythene sheet (not less than 125 micron/500 gauge). The subsequent application of the concrete slab and screed or other flooring material is similar to those laid over an un-insulated floor.

2.3.3 Laying Below the Floor Screed

Kingspan Kooltherm K3 Floorboard is laid loose over the concrete floor slab or beam and block floor with the necessary water and vapour proof protection. Board joints should be tightly butted, staggered, and laid to a break-bonded pattern. The floor slab should be uniformly flat without steps or gaps to provide continuous bearing support to the insulation board. Beam and block floors should be level and grouted. A thin section of board should be used around the perimeter of the floor area being insulated. This should be placed vertically against the abutting wall so that it connects with the insulation laid over the slab and protects the edge of the screed, so preventing cold bridging of the floor screed. Boards are overlaid with a separating layer of building paper to BS 1521:1994, Grade B1F or polythene sheet (not less than 125 micron/500 gauge) between the screed and the insulation board to prevent the wet screed penetrating the joints between the boards. Use a sand and cement screed laid to a minimum thickness of 65mm for domestic construction and 75mm elsewhere.

2.3.4 Laying in Suspended Timber Floors

The application of Kingspan Kooltherm K3 Floorboard in suspended floor constructions should be carried out before commencement of floor boarding. Kingspan Kooltherm K3 Floorboard should be cut to fit snugly between joists. It should be supported on softwood timber battens, proprietary galvanised steel saddle clips or galvanised nails partially driven into the side of the joists. Battens/nails should be placed at an appropriate height to suit the thickness of board being used and nails should remain 40mm proud of the joist.

The boards should then be laid between the joists so that they are supported by the battens/nails. Any narrow

gaps between a joist and perimeter wall should be insulated by specially cut pieces of board. They should be supported on blocks nailed to the underside of the joists. Where water services, including central heating pipes, run below the floor boards the location of the Kingspan Kooltherm K3 Floorboard insulation can be lowered to create an insulated duct for the services. Access from beneath the floor may later be obtained by removal of the batten/nail supports, from the underside.

Kingspan Kooltherm K3 Floorboard is not suitable for placing over timber joists.

2.3.5 Laying Between Battens Under Timber Floor

The subfloor should be level and flat. Kingspan Kooltherm K3 Floorboard should be cut to fit snugly between battens. Any narrow gaps between battens and perimeter wall should be insulated by specially cut pieces of board. Board joints should be tightly butted.

3.1 GENERAL

Kingspan Kooltherm K3 Floorboard, when installed in accordance with this Detail Sheet, is effective in reducing the 'U' value (thermal transmittance) of new and existing floor constructions.

Ground supported floors incorporating Kingspan Kooltherm K3 Floorboard must include a suitable damp proof membrane laid in accordance with CP 102:1973.

Suspended concrete ground floors incorporating Kingspan Kooltherm K3 Floorboard must include suitable ventilation.

3.2 FLOOR LOADING

The design loadings for self contained single family dwelling units are defined in IS EN 1991-1-1:2002+NA:2013 *Eurocode 1: Actions on structures – Part 1-1: General actions – Densities, self-weight, imposed loads for buildings (including Irish National Annex 2013)*.

Kingspan Kooltherm K3 Floorboard supported by chipboard or OSB laid over joists or a screed can support these design loadings without undue deflection.

Where Kingspan Kooltherm K3 Floorboard is used under a concrete slab, resistance to concentrated and distributed loads is a function of the slab specification.

3.3 UNDERFLOOR HEATING SYSTEMS

For a solid concrete floor, the position of the insulation is important in either exposing the thermal mass of the concrete floor to the heat provided by the system, or isolating the thermal mass from it.

For a 24 hour heating cycle, allowing the heat from the underfloor heating system to penetrate the concrete slab will provide a more even heating regime over a 24 hour period. For intermittent heating cycles where a fast response time is required, it is beneficial to have less thermal mass available to take up heat from the system and so placing the insulation layer below the screed or timber floor but above the concrete slab or beam and block floor is the best solution.

Underfloor heating systems can also be accommodated in suspended timber floors. This arrangement has low thermal mass and so is more suited to intermittent heating cycle applications.

3.4 WATERPROOFING

If an overlay of chipboard, OSB or similar material is to be used in bathrooms or kitchens, a continuous waterproof finish (e.g. vinyl) must be provided to protect it. Please note that OSB or similar material must be laid over joists and not directly overlaid onto the insulation.

4.1 BEHAVIOUR IN FIRE

The boards when in proximity to a constructional hearth must be protected by 250mm of solid concrete or as detailed in Diagram 4 of TGD J: Heat Producing Appliances.

Kingspan Kooltherm K3 Floorboard is classified as NPD to EN 13501-1. The boards are combustible and must be protected from naked flames and other ignition sources during and after installation.

Toxicity – Negligible when used in a ground floor construction.

Kingspan Kooltherm K3 Floorboard is manufactured without the use of CFC's and HCFC's, there is no release of such gas on burning.

4.2 STRENGTH

Kingspan Kooltherm K3 Floorboard exceeds 150kPa at 10% yield and when installed in accordance with the manufacturer's instructions, and this Certificate, will resist the loads likely to be met in service.

4.3 RESISTANCE TO MOISTURE

Kingspan Kooltherm K3 Floorboard will not allow moisture to cross the floor construction provided it is installed in accordance with this Detail Sheet.

4.4 CONDENSATION RISK

Kingspan Kooltherm K3 Floorboard has a water vapour resistance greater than 100MNs/g when tested in accordance with BS 4370-2:1993 *Methods of test for rigid cellular materials – Methods 7 to 9*. It has significant resistance to the passage of water vapour when used in ground floor construction using a suitable damp proof membrane.

Capillary Action – The closed cell structure does not allow water uptake by capillary action.

4.5 THERMAL INSULATION

The aged thermal conductivity ' $\lambda_{90/90}$ ' value of Kingspan Kooltherm K3 Floorboard, when measured in accordance with IS EN 12667:2001 is 0.022W/mK for thickness of 15-24mm, 0.021W/mK for 25-44mm, and 0.020W/mK for thickness of 45mm or greater. The required maximum U-values for ground floors can be obtained with Kingspan Kooltherm K3 Floorboard constructions as indicated in Table 2.

The DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* should also be referred to.

4.6 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy

- Compressive and cross-breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

4.7 OTHER INVESTIGATIONS

- Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Kooltherm K3 Floorboard does not contain CFC or HCFC gas.
- The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.
- A condensation risk analysis was performed.

Property	Declared Value
Reaction to Fire*	NPD
Thermal Conductivity*	15-44mm: 0.021W/mK 45-120mm: 0.020 W/mK 121-159mm: 0.021 W/mK
Compressive Strength*	CS(Y)100
Tensile Strength*	TR60

Table 3: Physical Properties of Kingspan Kooltherm K3 Floorboard

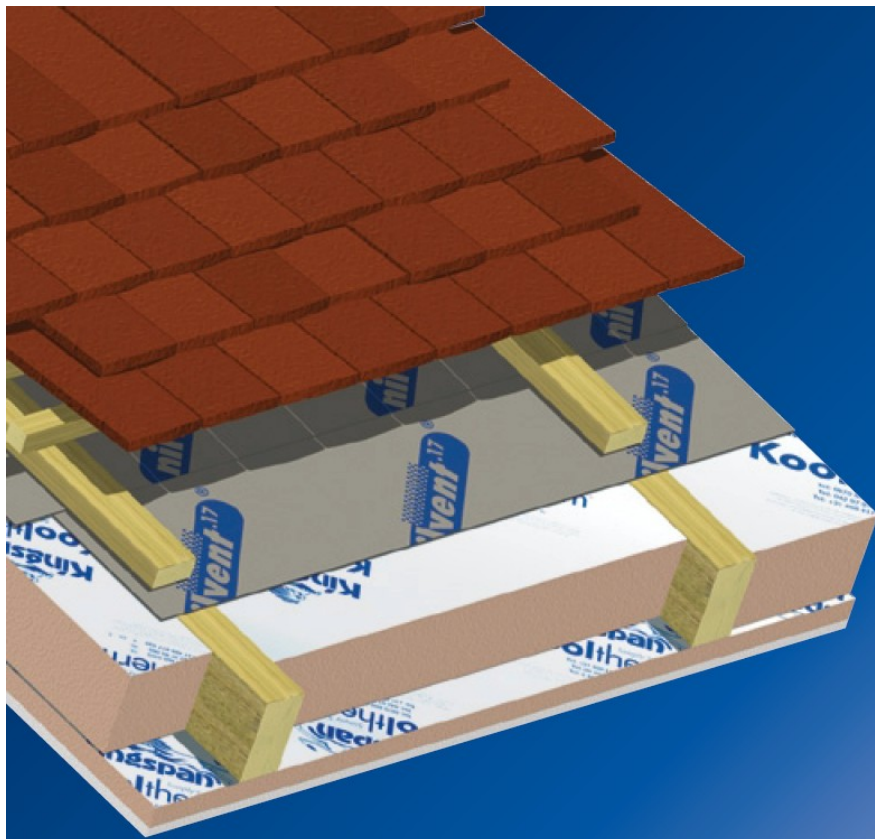
Typical thicknesses to achieve 0.25 W/m ² K – Solid Concrete Ground Floor									
P/A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
	25	40	45	50	55	60	60	60	65
Typical thicknesses to achieve 0.25 W/m ² K – Beam & Dense Block Floor									
P/A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
	35	45	50	55	55	60	60	60	60
Typical thicknesses to achieve 0.25 W/m ² K – Suspended Timber Ground Floor									
P/A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
	45	60	70	75	80	85	90	90	90
Typical thicknesses to achieve 0.25 W/m ² K – Timber Floor on Battens									
P/A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
	25	45	60	65	70	75	80	80	85

Perimeter/Area

Above values are based on assuming the soil to be clay or silt, the wall insulation overlaps the floor insulation by 200mm, and correction factor for air gaps has been ignored as standard of workmanship has been assumed good.

Table 2: Ground Floor Construction Typical U Values

Kingspan Kooltherm K7 Pitched Roof Board



PRODUCT DESCRIPTION:

This Detail Sheet relates to Kingspan Kooltherm K7 Pitched Roof Board, as defined in IAB Certificate 09/0329.

USE:

The product is used for the thermal insulation of pitched and tiled roofs constructed in accordance with SR 82:2017 *Slating and tiling – Code of Practice*. It can be used between, between and under, over or between and over rafters. It also facilitates the control of surface and interstitial condensation in roofs.

MANUFACTURE AND MARKETING:

The product is manufactured and marketed by:

Kingspan Insulation Ltd.,
Castleblayney,
County Monaghan,
Ireland.
Tel: +353 42 9795000
Fax: +353 42 9754299
Email: info@insulation.kingspan.com
Website: www.kingspaninsulation.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Kingspan Kooltherm K7 Pitched Roof Board, when used in conjunction with this Detail Sheet and NSAI Agrément Certificate 09/0329, meets the requirements of the Building Regulations 1997 - 2017 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

This matter is dealt with in NSAI Agrément Certificate 09/0329.

2.1 PRODUCT DESCRIPTION

This Detail Sheet relates to the Kingspan Kooltherm K7 Pitched Roof Board, comprising rigid phenolic insulation board manufactured in accordance with I.S. EN 13166:2012+A2:2016. Kingspan Kooltherm K7 Pitched Roof Board is faced on both sides with a low emissivity composite foil autohesively bonded to the insulation core during manufacture. This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K7 Pitched Roof Boards are CFC and HCFC free and therefore have zero ozone depletion potential (zero ODP).

Table 1 shows the Kingspan Kooltherm K7 Pitched Roof Board product range.

Length	2400mm
Width	1200mm
Thickness	25 – 100mm*
* Other thicknesses are available	

Table 1: Product Range

2.2 MANUFACTURE

Kingspan Kooltherm K7 Pitched Roof Board is manufactured from a formulation of chemicals, which are distributed onto low emissivity composite foil facers subsequently autohesively bonded to the insulation core during manufacture.

2.3 INSTALLATION

2.3.1 General

Installation must be in accordance with the relevant clauses of ICP 2: 2002 and the manufacturers instructions and can be carried out in all conditions normal for roof construction.

Kingspan Kooltherm K7 Pitched Roof Board is light to handle and can be easily cut or shaped. The boards will not support the weight of operatives and care must be taken during tiling as indicated in the Company's Safety Notes.

Where the board is installed in Traditional and Timber Frame Construction cavity barriers at the junction of the external wall and roof space should be provided in accordance with the requirements of Part B of the Building Regulations 1997 to 2017.

2.3.2 Procedure – Over Rafter Layer of Insulation

Boards are laid on to rafters starting at the stop rail and working towards the ridge so they cover the whole roof area. They should be tightly butted and fixed in a staggered pattern. Board joints should be butted over rafters, not mid-span. It is important to ensure a tight fit between boards, boards and rafters and other detailed elements. At ridges and verges, boards should be cut to achieve a close butt joint.

Treated counter battens are fixed above the insulation boards down the line of each rafter run from eaves to ridge using helical fixings at a minimum spacing of 300mm centres. A minimum 37mm fixing penetration into the rafter should be maintained. Short lengths of counter batten should be tightly butted.

Kooltherm K7 board should be tightly butted. They may be laid either across of down the line of the rafters and should preferably be laid break bonded in order to help improve the racking strength of the roof. All board joints running from eaves to ridge must occur over rafters. There is no necessity to tape board joints. A preservative treated stop rail should be secured to the rafters close to the eaves.

2.3.3 Procedure – Between Rafter Layer of Insulation

In cases where the insulation between rafters is to be flush with the top of the rafters but does not fill the full rafter depth, install the insulation by the use of nailable sarking clips. These clips are driven into the upper surface of each rafter at one metre intervals up the roof slope. The clips then support lengths of Kingspan Kooltherm K7 Pitched Roof Board suitably trimmed to size and placed between the rafters.

If 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 with the aid of battens nailed to the side of the rafters. The battens should be in the appropriate position to ensure the insulation is flush with the bottom of the rafters.

Where the insulation between rafters fully fills the rafter depth, install the correct thickness of insulation in such a manner that it is flush with the bottom of the rafters.

In all cases, ensure that insulation boards are tightly butted and that there is a tight fit between the insulation and the rafters. All gaps must be filled with expanding urethane sealant.

2.3.4 Procedure – Between and Over Rafter Layer of Insulation

Kingspan Kooltherm K7 Pitched Roof Boards are cut to fit tightly between rafters and are supported on stop battens or galvanised metal angles. Over rafter boards are laid to cover the whole roof area with the joints staggered and tightly butted. The boards are secured to counter battens running down the length of the rafters and fixed at a minimum spacing of 300mm centres through the counter batten and insulation.

2.3.5 Finishing

In accordance with the Building Regulations 1997 to 2017, a 50mm ventilation space should be maintained between the sarking board and the insulation in Cold Roof construction, unless a vapour permeable membrane is used allowing for a reduction in the recommended airspace (refer to manufacturer's instructions and conditions of the certificate for the membrane).

Slating and tiling is installed in accordance with SR 82:2017. When the relevant space is to be used as a living area, Kingspan Kooltherm K7 Pitched Roof Board should be covered with internal lining panels appropriate to the application and required decoration.

During installation, boards must not be walked on except

Part Three / Design Data

3

3. GENERAL

Kingspan Kooltherm K7 Pitched Roof Board when installed in accordance with this Detail Sheet is effective in reducing the 'U' value (thermal transmittance) of new and existing pitched roof constructions. It is essential that such roofs are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.

Roofs subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with ICP 2:2002.

When installed in accordance with this Certificate, Kingspan Kooltherm K7 Pitched Roof Board will contribute to the buckling and racking strength of the roof as described in ICP 2:2002. However, it is not recommended that they be considered as an alternative to cross bracing.

over supporting timbers. The boards have insufficient nail holding ability to be considered as an alternative to timber sarking.

Roof tile underlays must be approved by the manufacturer or be the subject of a current NSAI Agrément Certificate for such use. Underlays should be installed in accordance with, and within the limits of that Certificate.

Moisture entering the roof must be minimised using a minimum of 500 gauge polyethylene with sealed gaps, placed under the inclined ceiling. Gaps in the ceiling should be minimised and service openings should be sealed.

Part Four / Technical Investigations

4

4.1 BEHAVIOUR IN FIRE

Kingspan Kooltherm K7 Pitched Roof Board is classified as NPD to EN 13501-1. The boards are combustible and must be protected from naked flames and other ignition sources during and after installation.

Toxicity – Negligible when used in a protected roof situation.

Kingspan Kooltherm K7 Pitched Roof Board is manufactured without the use of CFC's and HCFC's, there is no release of such gas on burning.

4.2 STRENGTH

Kingspan Kooltherm K7 Pitched Roof Board when installed in accordance with the manufacturer's instructions, and this Certificate, will resist the loads likely to be met during installation and in service.

4.3 RESISTANCE TO WIND LOAD

The resistance to wind uplift depends on many factors peculiar to each project. The effect of wind loading should be calculated in accordance IS EN 1991-1-4:2005+A1:2010 *Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions (including Irish National Annex*, using the appropriate basic wind speed shown on the map in Diagram 15 of TGD to Part A of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K7 Pitched Roof Board, when installed in accordance with section 1.3 of this Detail Sheet, will have sufficient resistance to wind uplift.

4.4 RESISTANCE TO MOISTURE

Kingspan Kooltherm K7 Pitched Roof Board will not be adversely affected by rain during installation for a limited time scale or by wind driven snow or rain penetrating the tiling in service.

4.5 CONDENSATION RISK

Kingspan Kooltherm K7 Pitched Roof Board has a water vapour resistance greater than 100MNs/g when tested in accordance with BS 4370-2:1993. The Certificate holder should be contacted for the purpose of calculating a project specific condensation risk analysis. The risk of condensation on the underside of the sarking will be minimal under normal conditions of use.

4.6 THERMAL INSULATION

The aged thermal conductivity ' $\lambda_{90/90}$ ' value of Kingspan Kooltherm K7 Pitched Roof Board, when measured in accordance with IS EN 12667:2001 is 0.022W/mK for thickness of 15-24mm, 0.021W/mK for 25-44mm, and 0.020W/mK for thickness of 45mm or greater. The required maximum U-values for pitched roofs can be obtained with Kingspan Kooltherm K7 Pitched Roof Board constructions.

The DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* should also be referred to.

4.7 MAINTENANCE AND REPAIR

Damaged boards can be easily replaced prior to the installation of counter battens.

4.8 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

4.9 OTHER INVESTIGATIONS

- Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Kooltherm K7 Pitched Roof Board does not contain CFC or HCFC gas.
- The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.
- A condensation risk analysis was performed.

Property	Declared Value
Reaction to Fire*	NPD
Thermal Conductivity*	15-44mm: 0.021W/mK 45-120mm: 0.020 W/mK 121-159mm: 0.021 W/mK
Compressive Strength*	CS(Y)120
Tensile Strength*	TR60

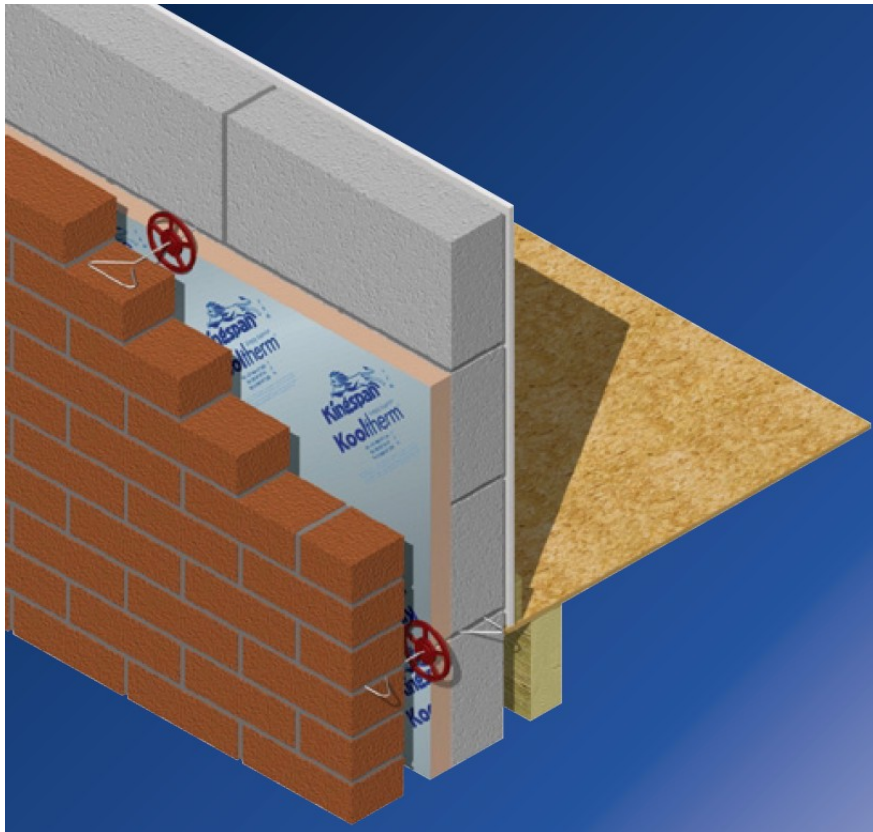
Table 2: Physical Properties of Kingspan Kooltherm K7 Pitched Roof Board



NSAI
Agrément

CERTIFICATE NO. 09/0329
DETAIL SHEET 3

Kingspan Kooltherm K8 Cavity Board



PRODUCT DESCRIPTION:

This Detail Sheet relates to Kingspan Kooltherm K8 Cavity Board, as defined in IAB Certificate 09/0329.

USE:

The product is used for the thermal insulation of new cavity masonry walls of dwellings or buildings of similar occupancy type and conditions. It also facilitates the control of surface condensation in walls.

MANUFACTURE AND MARKETING:

The product is manufactured and marketed by:

Kingspan Insulation Ltd.,
Castleblayney,
County Monaghan,
Ireland.
Tel: +353 42 9795000
Fax: +353 42 9754299
Email: info@insulation.kingspan.com
Website: www.kingspaninsulation.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Kingspan Kooltherm K8 Cavity Board, when used in conjunction with this Detail Sheet and NSAI Agrément Certificate 09/0329, meets the requirements of the Building Regulations 1997 - 2017 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

This matter is dealt with in NSAI Agrément Certificate 09/0329.

2.1 PRODUCT DESCRIPTION

This Detail Sheet relates to the Kingspan Kooltherm K8 Cavity Board, comprising rigid phenolic insulation board manufactured in accordance with I.S. EN 13166:2012+A2:2016. Kingspan Kooltherm K8 Cavity Board is faced on both sides with a low emissivity composite foil autohesively bonded to the insulation core during manufacture. This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K8 Cavity Boards are CFC and HCFC free and therefore have zero ozone depletion potential (zero ODP).

Table 1 shows the Kingspan Kooltherm K8 Cavity Board product range.

Length	1200mm
Width	450mm
Thickness	25 – 100mm*
* Other thicknesses are available	

Table 1: Product Range

2.2 MANUFACTURE

Kingspan Kooltherm K8 Cavity Board is manufactured from a formulation of chemicals, which are distributed onto low emissivity composite foil facers subsequently autohesively bonded to the insulation core during manufacture.

2.3 INSTALLATION

Kingspan Kooltherm K8 Cavity Board is normally held in position by the wall ties used to tie the two skins of masonry together, using retaining clips.

Walls are constructed in the conventional manner but with the first run of wall ties at least one course below the DPC and at approximately 600mm horizontal centres. A section of inner or outer leaf of the wall is built up to the course below the next run of the wall ties which are situated at a spacing of 450mm vertically and not exceeding 750mm horizontally.

The Kingspan Kooltherm K8 Cavity Board is then placed in position behind the retaining clips on the wall ties, additional wall ties and clips are used to retain the top of the board. Additional ties may also be required at corners, junctions and cut board ends. Each board should be secured at a minimum of three points. The boards should form a reasonable butt jointed row. The other leaf is then built up to the level of the top of the boards and construction proceeds.

Table 2 shows typical wall tie spacing.

Cavity Width	Horizontal Spacing mm	Vertical Spacing mm	No. of Wall Ties per m²
76 – 110	750	450	3.0
111 - 150	450	450	4.9

Table 2: Maximum Spacing of Wall Ties

The first row of boards commencing below DPC level also provides some edge insulation to the floor slab. Successive sections of wall incorporating wall ties and clips are constructed and Kingspan Kooltherm K8 Cavity Board is installed as work proceeds up to the required height. After raising each section of inner leaf, before installation, excess mortar should be removed and mortar droppings cleaned from exposed edges of the installed slabs. Use of a cavity batten or cavity board is recommended to protect board edges and maintain a clear cavity. Penetration of damp across the cavity will be prevented with good practice.

3. GENERAL

Kingspan Kooltherm K8 Cavity Board when installed in accordance with this Detail Sheet is effective in reducing the 'U' value (thermal transmittance) of new external masonry cavity walls, using clay or calcium silicate bricks, concrete blocks, or natural and reconstituted stone blocks. It is essential that such walls are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.

Buildings subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with IS EN 1996-1-1:2005+A1:2012, IS EN 1996-1-2:2005 COR:2010 *Eurocode 6 – Design of masonry structures – Part 1-2: General rules – Structural fire design (including Irish National Annex)*, IS EN 1996-2:2006 COR:2009 *Eurocode 6 – Design of masonry structures – Part 2: Design considerations, selection of materials and execution of masonry (including Irish National Annex)* and IS EN 1996-3:2006 COR:2009 *Eurocode 6 – Design of masonry structures – Part 3: Simplified calculation methods for unreinforced masonry structures (including Irish National Annex)*. The relevant recommendations these standards should be followed where the wall incorporates stone or cast stone.

The use of a cavity board or cavity during construction is recommended to prevent accumulation of mortar droppings on the top edge of the Kingspan Kooltherm K8 Cavity Board and to prevent bridging of cavity by mortar droppings.

It is recommended that installation be carried out to the highest level on each wall. Where appropriate the top edge of the insulation should be protected by a cavity tray. On site trimming of boards may be necessary to achieve this.

Where a nominal residual cavity width of 40mm is maintained, Kingspan Kooltherm K8 Cavity Board is suitable for use in any exposure conditions, in buildings up to 12m in height. For buildings over 12m and up to 25m in height the exposure factor must not exceed 122, calculated in accordance BS 5618:1985 *Code of practice for thermal insulation of cavity walls (with masonry or concrete inner and outer leaves)*, and using the Irish Map of Driving Rain Index.

It is important to ensure during installation that:

- a) Wall ties and fixings are installed correctly and are thoroughly clean
- b) Excess mortar is cleaned from the inside face of the leading leaf and any debris is removed from the cavity.
- c) Mortar droppings are cleaned from the exposed edges of installed slabs.

Data obtained by NSAI Agrément confirms that a masonry wall incorporating Kingspan Kooltherm K8 Cavity Board and built to the requirements of IS 325-1:1996 will not transmit water to the inner leaf.

Data obtained by NSAI Agrément also demonstrates that Kingspan Kooltherm K8 Cavity Board does not absorb water by capillary action. When the product is used in situations where it bridges the DPC in walls, dampness from the ground will not pass through, provided the cavity is taken down to at least 150mm below the level of the lowest DPC.

A minimum residual cavity width of 40mm should be maintained where possible. Where, for structural reasons, the cavity width is reduced by the intrusion of ring beams or other structural elements, the manufacturer's advice on fixing and weather-proofing should be sought. Raked or recessed mortar joints are not suitable in high exposure areas and must be avoided.

4.1 BEHAVIOUR IN FIRE

Kingspan Kooltherm K8 Cavity Board may be used in buildings of any purpose group in a wall in which the cavity intercommunicates with another such cavity, and may be unlimited in extent in respect of the provision of barriers provided the walls comply with B3 of the TGD to Part B of the Building Regulations 1997 to 2017 (Cavity walls excluded from provisions for cavity barriers) as follows:

- a) The wall consists of two leaves, each being not less than 75mm thick and constructed of non-combustible materials;
- b) The cavity does not exceed 110mm in width and is closed by a cavity barrier at the top of the wall and at the top of any opening through any leaf of the wall, and
- c) There is no combustible material exposed or situated within the cavity other than:
 - timber lintels, window or door frames or the end faces of joists
 - pipes, ducts or cables
 - closers, flashings, DPCs or wall ties
 - thermal insulating material
 - meter boxes which require an opening in the outer leaf of not greater than 800 x 500mm and do not penetrate the inner leaf except through a sleeve of not more than 80 x 80mm which is fire stopped where it passes through the inner leaf.

Kingspan Kooltherm K8 Cavity Board is classified as NPD to EN 13501-1. The boards are combustible and must be protected from naked flames and other ignition sources during and after installation.

Toxicity – Negligible when used in a cavity wall situation.

Kingspan Kooltherm K8 Cavity Board is manufactured without the use of CFC's or HCFC's and there is no release of such gas on burning.

4.1.1 J3 – Protection of Building

Combustible wall insulation material shall generally be separated by solid non combustible material not less than 200mm thick, from any heating appliance or from any flue pipe or opening to a heating appliance. Particular details are given in Section 2, and in Diagrams 2 - 8 of the TGD Part J Building Regulations 1997 to 2017. It should also be separated by 40mm from the external surface of a masonry chimney. For chimneys covered IS EN 1859:2009+A1:2013 *Chimneys – Metal chimneys – Test methods*, separation between this product and the external surface of the chimney shall be determined in accordance with TGD to Part J of the Building Regulations 1997 to 2017.

4.2 WATER PENETRATION

Capillary Action – The closed cell structure does not allow water uptake by capillary action.

Kingspan Kooltherm K8 Cavity Board, when used in accordance with this Detail Sheet, presents no significant risk of water penetration.

4.3 WATER VAPOUR PENETRATION AND CONDENSATION RISK

Kingspan Kooltherm K8 Cavity Board has a water vapour resistance greater than 100MNs/g when tested in accordance with BS 4370-2:1993 *Methods of test for rigid cellular materials – Methods 7 to 9*. It has significant resistance to the passage of water vapour when used in conventional masonry cavity wall construction. This obviates the risk of surface condensation and presents no significant risk of damage from interstitial condensation. Correct use of the heating and ventilation system is important. When insulating buildings, the recommendations of BS 5250:2011+A1:2016 *Code of practice for control of condensation in buildings* should be followed to minimise the risk of condensation within the building elements and structures.

4.4 THERMAL INSULATION

The aged thermal conductivity ' $\lambda_{90/90}$ ' value of Kingspan Kooltherm K8 Cavity Board, when measured in accordance with IS EN 12667:2001 is 0.022W/mK for thickness of 15-24mm, 0.021W/mK for 25-44mm, and 0.020W/mK for thickness of 45mm or greater. The required maximum U-values for cavity walls can be obtained with Kingspan Kooltherm K8 Cavity Board constructions as indicated in Table 3. For the purpose of these calculations, all examples are based on 100mm inner leaf, 100mm cavity and 100mm external leaf of brick or rendered blockwork.

The DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* should also be referred to.

Uncontrolled leakage of air through the fabric of a building and/or cracks in and around door and window frames, sills, jambs etc, air movement due to thermal effects or due to wind pressure can occur. Details of how to avoid infiltration of cold air are given in TGD to Part L of the Building Regulations 1997 to 2017.

Lintel and sill designs similar to those shown in TGD to Part L of the Building Regulations 1997 to 2017 will be satisfactory to limit thermal bridging.

The foil facing on Kingspan Kooltherm K8 Cavity Boards is a low emissivity aluminium foil which has been tested by the National Physics Laboratory to achieve an aged aggregate emissivity value (including printing) of 0.06. This value can then be used in the calculation in Appendix B2 of IS EN ISO 6946:1997 *Building components and building elements – Thermal resistance and thermal transmittance – Calculation method* to derive an increased thermal resistance of 0.644m²K/W for the residual airspace immediately adjacent to the foil facing.

The high thermal resistance of Kingspan Kooltherm K8 Cavity Board ensures that cold bridging and extra heat loss around the edges of openings can be avoided. Lintel jamb and cill designs similar to those shown in Diagram 3 of TGD to Part L of the Building Regulations 1997 to 2017 will be satisfactory to limit thermal bridging.

4.5 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with the ETCI publication ET 207 *Guide to the National Rules for Electrical Installations as Applicable to Domestic Installations*. It is recommended that cables should not be buried in the insulation and carried in a conduit. In relation to recessed spotlights and other luminaires, ET 207 requires they be not less than the minimum distances from combustible materials as specified in clause 559.3.2 of the TCI National rules of the Electro Technical Council of Ireland (ET 101).

4.6 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING

- Density
- Water vapour resistance
- Water uptake
- Dimensional accuracy
- Compressive and cross breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

4.7 OTHER INVESTIGATIONS

- Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Kooltherm K8 Cavity Board does not contain CFC or HCFC gas.
- The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.
- A condensation risk analysis was performed.

Property	Declared Value
Reaction to Fire*	NPD
Thermal Conductivity*	15-44mm: 0.021W/mK 45-120mm: 0.020 W/mK 121-159mm: 0.021 W/mK
Compressive Strength*	CS(Y)100
Tensile Strength*	TR60

Table 4: Physical Properties of Kingspan Kooltherm K8 Cavity Board

Brick/Dense Concrete Block	
Insulant Thickness (mm)	U-value (W/m ² K)
30	0.40
35	0.37
40	0.34
45	0.30
50	0.28
55	0.26
60	0.25
65	0.23
Brick/Med Density Concrete Block	
Insulant Thickness (mm)	U-value (W/m ² K)
25	0.42
30	0.38
35	0.35
40	0.33
45	0.29
50	0.27
55	0.25
60	0.24
65	0.23
Brick/Lightweight Insulating Block Accounting for Mortar Joints	
Insulant Thickness (mm)	U-value (W/m ² K)
20	0.40
25	0.36
30	0.33
35	0.31
40	0.29
45	0.26
50	0.25
55	0.23
Brick/Aerated Concrete Aircrete Block Accounting for Mortar Joints	
Insulant Thickness (mm)	U-value (W/m ² K)
17	0.39
20	0.37
25	0.34
30	0.32
35	0.30
40	0.28
45	0.25
50	0.24
Rendered Dense Concrete Block/Dense Concrete Block	
Insulant Thickness (mm)	U-value (W/m ² K)
30	0.40
35	0.37
40	0.34
45	0.30
50	0.28
55	0.26
60	0.25
65	0.23
Rendered Dense Concrete Block/ Med Density Concrete Block	
Insulant Thickness (mm)	U-value (W/m ² K)
25	0.42
30	0.38
35	0.35
40	0.33
45	0.29
50	0.27
55	0.25
60	0.24

Table 3: Wall Construction Typical U-values (Partial Fill)

Kingspan Kooltherm K12 Framing Board

PRODUCT DESCRIPTION:

This Detail Sheet relates to Kingspan Kooltherm K12 Framing Board, as defined in IAB Certificate 09/0329.

USE:

The product is used for the thermal insulation of timber framed or steel framed walls by inserting between the studs, or it may be used as an insulation sheathing. It also facilitates the control of surface condensation in walls.

MANUFACTURE AND MARKETING:

The product is manufactured and marketed by:

Kingspan Insulation Ltd.,
Castleblayney,
County Monaghan,
Ireland.
Tel: +353 42 9795000
Fax: +353 42 9754299
Email: info@insulation.kingspan.com
Website: www.kingspaninsulation.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Kingspan Kooltherm K12 Framing Board, when used in conjunction with this Detail Sheet and NSAI Agrément Certificate 09/0329, meets the requirements of the Building Regulations 1997 - 2017 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

This matter is dealt with in NSAI Agrément Certificate 09/0329.

2.1 PRODUCT DESCRIPTION

This Detail Sheet relates to the Kingspan Kooltherm K12 Framing Board, comprising rigid phenolic insulation board manufactured in accordance with I.S. EN 13166:2012+A2:2016. Kingspan Kooltherm K12 Framing Board is faced on both sides with a low emissivity composite foil autohesively bonded to the insulation core during manufacture. This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K12 Framing Boards are CFC and HCFC free and therefore have zero ozone depletion potential (zero ODP).

Table 1 shows the Kingspan Kooltherm K12 Framing Board product range.

Length	2400mm
Width	1200mm
Thickness	Various thicknesses available

Table 1: Product Range

2.2 MANUFACTURE

Kingspan Kooltherm K12 Framing Board is manufactured from a formulation of chemicals, which are distributed onto low emissivity composite foil facers subsequently autohesively bonded to the insulation core during manufacture.

2.3 INSTALLATION

2.3.1 Insulating Sheathing Steel Frame Wall

Similarly fix as for timber frame (see 1.3.1). Kingspan Kooltherm K12 Framing Board should be restrained to the outside of the steel frame construction ensuring vertical board joints coincide with a vertical member. Fixings should be in accordance with the steel frame manufacturers recommendations. Contact the Certificate holder for further information.

2.3.2 Between Timber Studs Timber Frame Wall or Dwarf Wall

To restrain insulation boards from moving within the timber stud cavity, side nail battens to the stud to provide a stop. This should coincide with board thickness, allowing the Kingspan Kooltherm K12 Framing Board to finish flush with the outside surface of the timbers.

Insulation boards that have been individually cut to fit the stud spacing may be temporarily held to the battens with large headed clout nails. An additional restraint to the boards will be provided by a plasterboard lining fixed to the inside face of the timbers. When utilising Kingspan Kooltherm K12 Framing Board between studwork, the plasterboard lining should be of the vapour check type or a separate polythene vapour control layer used.

Ensure there is a tight fit between Kingspan Kooltherm K12 Framing Board and the adjoining structure. Fill all gaps with expanding urethane sealant.

2.3.3 Use of Wall Ties for Timber Frame Wall

The outer leaf of brickwork/blockwork may be constructed in the conventional manner using appropriate wall ties to restrain the two wall skins together. The ties should be inserted whilst constructing the outer leaf ensuring a slight offset is achieved, sloping the tie downwards towards the outer leaf.

2.3.4 Use of Wall Ties for Steel Frame Wall

Advice should be sought from the appropriate steel frame manufacturer for recommendations of a suitable wall tie specification.

3. GENERAL

Kingspan Kooltherm K12 Framing Board, when installed in accordance with this Detail Sheet, is effective in reducing the 'U' value (thermal transmittance) of new or existing walls and ceilings.

Timber frame buildings subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with IS EN 1995-1-1:2004+A2:2014 *Eurocode 5 – Design of timber structures – General – Common rules and rules for buildings*.

Supplementary rules for cold-formed members and sheeting, and other relevant codes as appropriate.

As with all types of wall insulation, the construction detailing should comply with good practice.

Kingspan Kooltherm K12 Framing Board is manufactured without the use of CFC's or HCFC's and there is no release of such gas on burning.

4.1 BEHAVIOUR IN FIRE

The plasterboard used to cover the insulation is deemed to be Class O in accordance with the Building Regulations 1997 to 2017 and so the insulated board qualifies as the highest product performance classification as defined in TGD B Paragraph A10 of Annex A. The insulation component of the board should be isolated from possible sources of combustion.

Kingspan Kooltherm K12 Framing Board should be separated by a minimum distance of 150mm from an oil, solid fuel or gas heating appliance as indicated in Diagram 8 of TGD J of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K12 Framing Board when installed with a residual cavity between the board and the wall, will require the provision of cavity barriers and may be used in buildings of any purpose group provided:

- a) Cavity barriers in walls are provided at maximum distances apart of 10m unless a Class 1 material is exposed to the cavity when a spacing of 20m may be adopted.
- b) Every such cavity shall be closed by a cavity barrier around the whole perimeter of the wall or ceiling element and around the perimeter of any opening through such elements.
- c) Cavity barriers in spaces between a floor and ceiling are provided at maximum distances of 20m for any class of surface exposed to the cavity.
- d) Where any wall or ceiling containing a cavity meets another such element, the cavities shall be closed so that they do not communicate with one another.
- e) Direction on the provision and spacing of cavity barriers is given in Tables 3.2 and 3.3 of TGD B of the Building Regulations 1997 to 2017.

For steel frame buildings, the frame should be in accordance with IS EN 1993-1-3:2006 *Eurocode 3 – Design of steel structures – General rules* –

4.1.1 J3 – Protection of Building

Combustible wall insulation material shall generally be separated by solid non-combustible material not less than 200 mm thick, from any heating appliance or from any flue pipe or opening to a heating appliance. Particular details are given in Section 2, and in Diagrams 2 - 8 of the TGD Part J Building Regulations 1997 to 2017. It should also be separated by 40 mm from the external surface of a masonry chimney. For chimneys covered by IS EN 1859:2009+A1:2013 *Chimneys – Metal chimneys – Test methods*, separation between this product and the external surface of the chimney shall be determined in accordance with clause 2.17, Part J Building Regulations 1997 to 2017.

4.2 WATER PENETRATION

Kingspan Kooltherm K12 Framing Board incorporates a closed cell structure that does not allow water uptake by capillary action.

Kingspan Kooltherm K12 Framing Board when used in accordance with this Detail Sheet presents no significant risk of water penetration.

4.3 WATER VAPOUR PENETRATION AND CONDENSATION RISK

Kingspan Kooltherm K12 Framing Board has a water vapour resistance greater than 100MNs/g when tested in accordance with BS 4370-2:1993 *Methods of test for rigid cellular materials – Methods 7 to 9*. It has significant resistance to the passage of water vapour when used in timber frame and steel frame construction. This obviates the risk of surface condensation and presents no significant risk of damage from interstitial condensation. However, as in normal practice the insulation should not be regarded as a vapour barrier and a full vapour barrier and vapour permeable membrane are required.

When insulating buildings, the recommendations of BS 5250:2011+A1:2016 should be followed to minimise the risk of condensation within the building elements and structures.

4.4 THERMAL INSULATION

The aged thermal conductivity ' $\lambda_{90/90}$ ' value of Kingspan Kooltherm K12 Framing Board, when measured in accordance with IS EN 12667:2001 is 0.022W/mK for thickness of 15-24mm, 0.021W/mK for 25-44mm, and 0.020W/mK for thickness of 45mm or greater. The required maximum U-values for timber frame and steel frame walls can be obtained with Kingspan Kooltherm K12 Framing Board constructions as indicated in Table 2.

The foil facing on Kingspan Kooltherm K12 Framing Boards is a low emissivity aluminium foil which has been tested by the National Physics Laboratory to achieve an aged aggregate emissivity value (including printing) of 0.06. This value can then be used in the calculation in Appendix B2 or B3 as appropriate of IS EN ISO 6946:1997 *Building components and building elements – Thermal resistance and thermal transmittance – Calculation method* to derive an increased thermal resistance of 0.644m²K/W for the residual airspace immediately adjacent to the foil facing.

Lintel jamb and sill designs similar to those shown in TGD to Part L of the Building Regulations 1997 to 2017 will be satisfactory to limit thermal bridging.

The DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* should also be referred to.

U-Value W/m ² K	Brick Faced Timber Frame Wall	Brick Faced Steel Frame Wall
0.27	50mm	55mm

Table 2: Wall Constructions – Typical U Values

4.5 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive and cross-breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

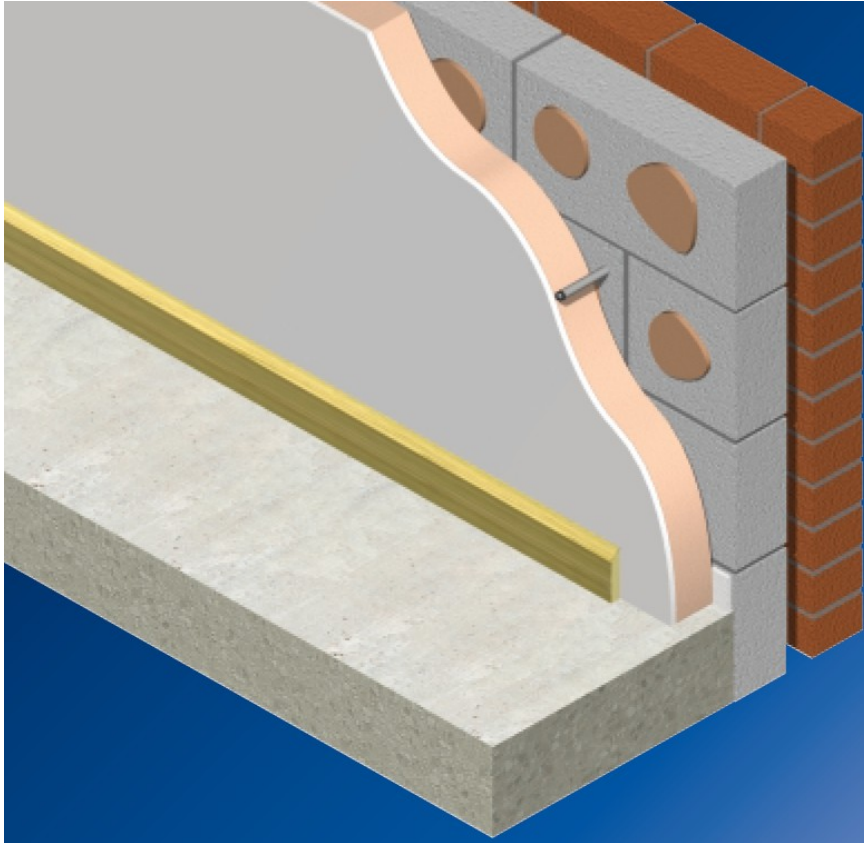
4.6 OTHER INVESTIGATIONS

- Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Kooltherm K12 Framing Board does not contain CFC or HCFC gas.
- The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.
- A condensation risk analysis was performed.

Property	Declared Value
Reaction to Fire*	NPD
Thermal Conductivity*	15-44mm: 0.021W/mK 45-120mm: 0.020 W/mK 121-159mm: 0.021 W/mK
Compressive Strength*	CS(Y)100

Table 3: Physical Properties of Kingspan Kooltherm K12 Framing Board

Kingspan Kooltherm K17 Insulated Drylining Board



PRODUCT DESCRIPTION:

This Detail Sheet relates to Kingspan Kooltherm K17 Insulated Drylining Board, as defined in IAB Certificate 09/0329.

USE:

The product is used for the thermal insulation of solid or cavity masonry walls using plaster-dab/adhesive bonding. It may also be used to line ceilings. It also facilitates the control of surface condensation in walls and ceilings.

MANUFACTURE AND MARKETING:

The product is manufactured and marketed by:

Kingspan Insulation Ltd.,
Castleblayney,
County Monaghan,
Ireland.

Tel: +353 42 9795000

Fax: +353 42 9754299

Email: info@insulation.kingspan.com

Website: www.kingspaninsulation.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Kingspan Kooltherm K17 Insulated Drylining Board, when used in conjunction with this Detail Sheet and NSAI Agrément Certificate 09/0329, meets the requirements of the Building Regulations 1997 - 2017 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

This matter is dealt with in NSAI Agrément Certificate 09/0329.

2.1 PRODUCT DESCRIPTION

This Detail Sheet relates to the Kingspan Kooltherm K17 Insulated Drylining Board, comprising rigid phenolic insulation board manufactured in accordance with I.S. EN 13166:2012+A2:2016, bonded to tapered edge plasterboard for internal applications. Kingspan Kooltherm K17 Insulated Drylining Board is faced on one side with a low emissivity composite foil and the reverse side with a tissue based facing autohesively bonded to the insulation core during manufacture. The plasterboard is 12.5mm thick manufactured to IS EN 520:2005+A1:2009 *Gypsum plasterboards – Definitions, requirements and test methods*, and accepts dry-jointing materials, plaster skim or direct decoration. This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K17 Insulated Drylining Boards are CFC and HCFC free and therefore have zero ozone depletion potential (zero ODP).

Table 1 shows the Kingspan Kooltherm K17 Insulated Drylining Board product range.

Length	2400mm
Width	1200mm
Insulation Thickness	Various thicknesses available
Plasterboard Thickness	12.5mm

Table 1: Product Range

2.2 MANUFACTURE

Kingspan Kooltherm K17 Insulated Drylining Board is manufactured from a formulation of chemicals, which are distributed onto low emissivity composite foil facers subsequently autohesively bonded to the insulation core during manufacture. The plasterboard is secondary bonded and provides a durable surface to accept traditional finishing techniques.

2.3 INSTALLATION

2.3.1 General

Installation should be in accordance with good drylining practice and the manufacturer's instructions. All installations require careful planning and setting out.

The ceiling lining should be in position before wall lining commences.

Wall mounted fittings such as electrical sockets should be fitted so as to take into account the additional wall thickness. Heavy surface mounted fittings will require provision for the fixing load to be applied direct to the supporting wall and not to the Kingspan Kooltherm K17 Insulated Drylining Board in isolation. On existing constructions all surfaces should be clean and free of loose or flaking materials. Wallpaper should be stripped and surface and surface mounted fittings removed.

Before fixing the product, sufficient time must be allowed to disperse the solvents contained in wood preservatives and damp proofing treatments where applied. Ensure continuity of insulation between first floor joists on all external walls.

2.3.2 Thermal Bridging

In order to avoid the effects of cold bridging, window and door reveals should also be insulated. The margins of window and door reveals should therefore be sufficient to accommodate the thickness of the Kingspan Kooltherm K17 Insulated Drylining Board being employed. The possibility of a cold bridge occurring via the window boards should also be considered and provision made to insulate this area.

2.3.3 Window – Door Reveals and Soffits

Narrow widths of board should be cut and rebated to allow a plasterboard/plasterboard joint at the angle. Fixing should employ the same method as is used for the plain wall areas. Care should be taken to ensure that the cavity in cavity wall constructions is not bridged by the board or fixing medium so that it allows water to pass to the inner leaf. Where adhesives are employed, soffit boards and boards at window heads should be temporarily supported.

2.3.4 Plaster Dab Bonding

This method is for applications to brick, block or concrete masonry cavity walls. The method usually involves setting out a continuous fillet of gypsum adhesive around perimeter wall and ceiling junctions, and around any openings in order to provide a seal. Vertical dabs of the gypsum adhesive are progressively applied to the background together with a continuous fillet at skirting and ceiling level. The number, size and layout of the dabs will depend on the chosen gypsum adhesive manufacturer's recommendations. Boards are then located against the adhesive dabs and tapped back to align with predetermined guidelines on the floor and ceiling. Metal plugs are recommended to complement the plaster dab bond, these are normally applied at a rate of 3 no. per board, after the plaster dabs have set – two fixings positioned at the top of each board and one in the board centre.

2.3.5 Adhesive Bonding

This method is for application to sound, plane concrete or plastered wall surfaces on cavity walls. Bostik 1440 adhesive is applied to the wall surface in strips to a predetermined pattern that coincides with the edges of the board, a further strip is applied horizontally at the mid point of the board. Strips of Bostik 1440 pads are then applied to the wet adhesive which is allowed to become tacky which takes about half an hour. The protective paper is then removed from the foam strips, and a coating of adhesive is applied to the corresponding position on the Kingspan Kooltherm K17 Insulated Drylining Board. After a suitable delay to allow the adhesive to become tacky, the board should be accurately offered up to the wall and pressed firmly back

onto the pads. Metal plugs are recommended at a rate of 3 no. per board after adhesive has set – two fixings positioned at the top of each board and one in the board centre.

2.3.6 Metal Frame System

Kingspan Kooltherm K17 Insulated Drylining Board can be fixed by the use of proprietary metal framing systems to brick, block or concrete walls. The metal frame should be fixed to the masonry or concrete wall in accordance with the manufacturer's instructions to provide a true and level base of the board. The frame should be set vertically at a maximum of 600mm centres to coincide with board joints and mid point of board. Short lengths of metal framing should be fixed horizontally between the vertical pieces at skirting level, at the midpoint of the board and just below the ceiling or soffit level. Provision for horizontal services can be made by the use of two pieces of metal framing set no more than 300mm apart. Kingspan Kooltherm K17 Insulated Drylining Board should be screw fixed to each metal framing section with self-drilling and tapping, countersunk, surface coated (to avoid corrosion, screws placed at 150mm centres. Screws should not be sited less than 10mm from the edges of the board. The screws should be driven straight until the heads are slightly below the paper surface of the plasterboard facing taking care not to overdrive the screws.

2.3.7 Fixing to Timber Frame/Battens

This method may be used on timber frame constructions or on any dry masonry walls that will support and retain the battens and associated fixings. Kingspan Kooltherm K17 Insulated Drylining Board should be fixed to timber framing/battens set at maximum 600mm centres and positioned horizontally at floor and ceiling level. The timbers should run vertically and be wide enough to offer a minimum 20mm support to all four edges of the board. Galvanised clout nails, long enough to allow a minimum 25mm penetration of the timber, should be placed at 150mm centres and not less than 10mm from the edges of the board. They should be driven straight with the heads embedded just below the surface of the board. Care should be taken not to overdrive nails. Timbers should be treated where appropriate.

2.3.8 Mechanical Fixing

This method is for application to fair finished brick, block and concrete cavity walls where Kingspan Kooltherm K17 Insulated Drylining Board is to be finished with gypsum plaster. The wall should be sound, dry and level (surface irregularities may impede the fixing of the board). The board should be fully restrained using mechanical fixings. The number and type of such fixings should be in accordance with the fixing supplier's recommendations, and should be evenly distributed over the whole area of the board, fixings should not overlap board edges.

2.3.9 Ceiling Linings (Horizontal and Sloping)

Kingspan Kooltherm K17 Insulated Drylining Board may be used to line ceilings. Installation is similar to standard plasterboard. Boards must always be placed with the long edge running across the joists, rafters or battens and all edges must be supported. Timbers must offer a minimum 20mm support to all four edges of the board. This will necessitate the use of noggins placed between the joists to coincide with the long edges of the board. Large headed galvanised clout or sheradised nails should be used to fix the board. These must be long enough to allow a minimum 25mm penetration of the supporting timber, and be placed not less than 10mm from the edges of the board and be spaced at 150mm intervals along all supporting timbers.

2.3.10 Finishing

Tapered edged boards are jointed and finished in accordance with standard dry lining procedure offering a surface suitable for paper hanging and paint finishes. A plaster skim finish can also be applied to the boards. The finishing should be carried out in accordance with the specified manufacturers instructions, particularly in relation to the need to allow thorough drying of the plaster prior to decoration.

3. GENERAL

Kingspan Kooltherm K17 Insulated Drylining Board when installed in accordance with this Detail Sheet, is effective in reducing the 'U' value (thermal transmittance) of new or existing walls and ceilings.

Kingspan Kooltherm K17 Insulated Drylining Board may be used to insulate clay or calcium silicate bricks, concrete blocks, or natural and reconstituted stone blocks. It is essential that such walls are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.

Buildings subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with IS EN 1996-1-1:2005+A1:2012, IS EN 1996-1-2:2005 COR:2010 *Eurocode 6 – Design of masonry structures – Part 1-2: General rules – Structural fire design (including Irish National Annex)*, IS EN 1996-2:2006 COR:2009 *Eurocode 6 – Design of masonry structures – Part 2: Design considerations, selection of materials and execution of masonry (including Irish National Annex)* and IS EN 1996-3:2006 COR:2009 *Eurocode 6 – Design of masonry structures – Part 3: Simplified calculation methods for unreinforced masonry structures (including Irish National Annex)*. The relevant recommendations these standards should be followed where the wall incorporates stone or cast stone.

With dry lining installations forming a void of 20mm or more, services can be incorporated behind the dry lining, making the chasing of the wall unnecessary. When using adhesive systems, or where the services have a greater depth than the void, the wall should be chased rather than the insulation.

All mould or fungal growth should be treated prior to the application of the product.

When bonding is by adhesives, it is essential that a satisfactory bond is achieved between the walling material and the adhesives. Backgrounds of high suction will behave differently to those of low suction. The Certificate holder's advice should be sought in case of difficulty.

4.1 BEHAVIOUR IN FIRE

The plasterboard used in Kingspan Kooltherm K17 Insulated Drylining Board is deemed to be Class O in accordance with the Building Regulations 1997 to 2017 and so the insulated board qualifies as the highest product performance classification as defined in TGD to Part B of the Building Regulations 1997 to 2017. The insulation component of the board should be isolated from possible sources of combustion.

Combustible material shall be separated by solid non-combustible material not less than 200mm thick from a flue pipe to an oil, solid fuel or gas heating appliance as indicated in Section 2 of TGD to Part J of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K17 Insulated Drylining Board should be separated by a minimum distance of 150mm from an oil, solid fuel or gas heating appliance as indicated in Diagram 8 of TGD to Part J of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K17 Insulated Drylining Board when installed with a residual cavity between the board and the wall, will require the provision of cavity barriers and may be used in buildings of any purpose group provided:

- a) Cavity barriers in walls are provided at maximum distances apart of 10m unless a Class 1 material is exposed to the cavity when a spacing of 20m may be adopted.
- b) Every such cavity shall be closed by a cavity barrier around the whole perimeter of the wall or ceiling element and around the perimeter of any opening through such elements.
- c) Cavity barriers in spaces between a floor and ceiling are provided at maximum distances of 20m for any class of surface exposed to the cavity.
- d) Where any wall or ceiling containing a cavity meets another such element, the cavities shall be closed so that they do not communicate with one another.

- e) Direction on the provision and spacing of cavity barriers is given in TGD to Part B of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K17 Insulated Drylining Board is manufactured without the use of CFC's or HCFC's and there is no release of such gas on burning.

4.2 WATER PENETRATION

Kingspan Kooltherm K17 Insulated Drylining Board incorporates a closed cell structure that does not allow water uptake by capillary action.

Kingspan Kooltherm K17 Insulated Drylining Board when used in accordance with this Detail Sheet presents no significant risk of water penetration.

4.3 WATER VAPOUR PENETRATION

Kingspan Kooltherm K17 Insulated Drylining Board has a water vapour resistance greater than 100MNs/g when tested in accordance with BS 4370-2:1993 *Methods of test for rigid cellular materials – Methods 7 to 9*. Where additional vapour control is required an appropriate surface treatment should be applied over the completed insulated wall area.

4.4 THERMAL INSULATION

The aged thermal conductivity ' $\lambda_{90/90}$ ' value of Kingspan Kooltherm K17 Insulated Drylining Board, when measured in accordance with IS EN 12667:2001 is 0.022W/mK for thickness of 15-24mm, 0.021W/mK for 25-44mm, and 0.020W/mK for thickness of 45mm or greater. The aged thermal conductivity ' λ ' value of the plasterboard component is 0.19W/mK. The required maximum U-values for external walls can be obtained with Kingspan Kooltherm K17 Insulated Drylining Board constructions as indicated in Table 2.

Render/Block/Block	
Product Thickness* (mm)	U-value (W/m ² K)
72.5	0.28
77.5	0.26
82.5	0.24
Brick/Block	
Product Thickness* (mm)	U-value (W/m ² K)
72.5	0.28
77.5	0.26
82.5	0.24
* Product thickness is the thickness of the insulation plus the gypsum plasterboard	

Table 2: Wall Construction Typical U-values (Dry Lining) – Compliance with Building Regulations

Lintel jamb and sill designs similar to those shown in TGD to Part L of the Building Regulations 1997 to 2017 will be satisfactory to limit thermal bridging.

The DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* should also be referred to.

4.5 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with the ETCI publication ET 207 *Guide to the National Rules for Electrical Installations as Applicable to Domestic Installations*. It is recommended that cables should not be buried in the insulation and carried in a conduit. In relation to recessed spotlights and other luminaires, ET 207 requires they be not less than the minimum distances from combustible materials as specified in clause 559.3.2 of the TCI National rules of the Electro Technical Council of Ireland (ET 101).

4.6 CONDENSATION RISK

Kingspan Kooltherm K17 Insulated Drylining Board has a high vapour resistance and is therefore unlikely to be affected by surface or interstitial condensation, provided the correct thickness of Kingspan Kooltherm K17 Insulated Drylining Board is chosen and all joints between boards are filled and taped in accordance with Standard Dry Lining practice. Correct use of the heating and ventilation system is important. Interstitial condensation analysis for average winter environmental conditions for cavity wall constructions indicate no condensation risk. When insulating buildings the recommendations of BS 5250:2011+A1:2016 *Code of practice for control of condensation in buildings*, should be followed to minimise the risk of condensation within the building elements and structures. No separate vapour control layer is required, however areas of high moisture content (wet rooms) should have moisture resistant plasterboard in accordance with the Building Regulations 1997 to 2017.

4.7 WALL MOUNTED FITTINGS

The recommendations of the manufacturer should be followed. Any object fixed to the wall, other than lightweight items, e.g. framed pictures, should be fixed through the lining board into the wall behind, using proprietary fixings.

4.8 LIMITATIONS

Kingspan Kooltherm K17 Insulated Drylining Board has a gypsum plasterboard face, and should therefore not be used to isolate dampness nor be used in continuously damp or humid conditions.

4.9 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive and cross-breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

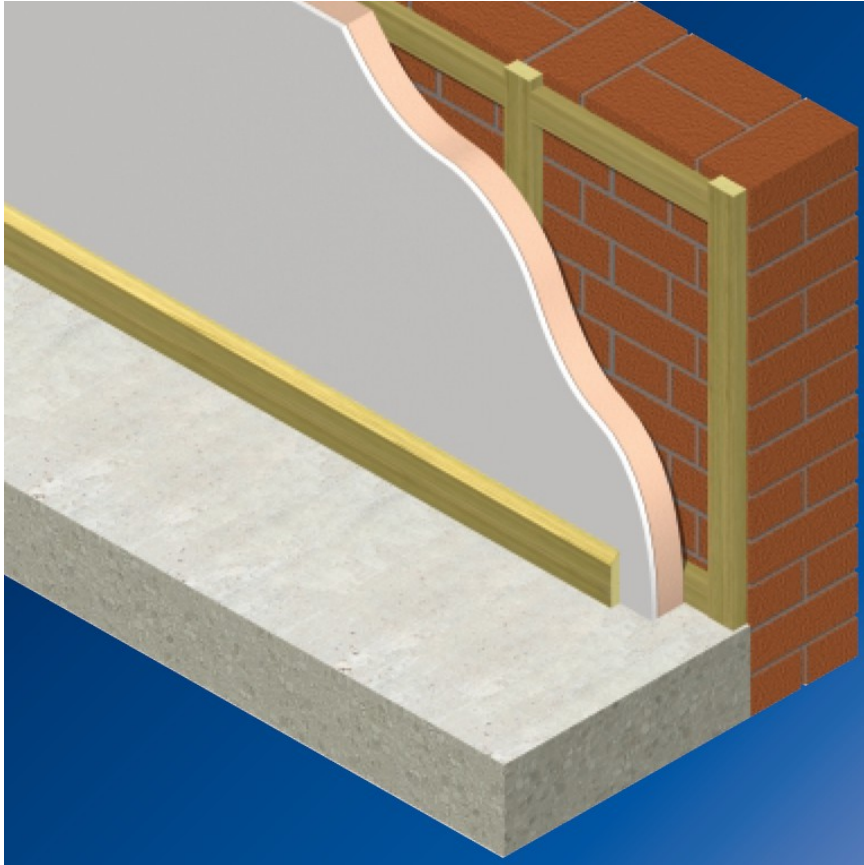
4.10 OTHER INVESTIGATIONS

- (i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Kooltherm K17 Insulated Drylining Board does not contain CFC or HCFC gas.
- (ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- (iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.
- (iv) A condensation risk analysis was performed.

Property	Declared Value
Reaction to Fire*	NPD
Thermal Conductivity*	15-44mm: 0.021W/mK 45-120mm: 0.020 W/mK 121-159mm: 0.021 W/mK
Compressive Strength*	CS(Y)100
Tensile Strength*	TR60

Table 3: Physical Properties of Kingspan Kooltherm K17 Insulated Drylining Board

Kingspan Kooltherm K18 Insulated Drylining Board



PRODUCT DESCRIPTION:

This Detail Sheet relates to Kingspan Kooltherm K18 Insulated Drylining Board, as defined in IAB Certificate 09/0329.

USE:

The product is used for the thermal insulation of solid or cavity masonry walls using mechanical fasteners. It may also be used to line ceilings. It also facilitates the control of surface condensation in walls and ceilings.

MANUFACTURE AND MARKETING:

The product is manufactured and marketed by:

Kingspan Insulation Ltd.,
Castleblayney,
County Monaghan,
Ireland.

Tel: +353 42 9795000

Fax: +353 42 9754299

Email: info@insulation.kingspan.com

Website: www.kingspaninsulation.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Kingspan Kooltherm K18 Insulated Drylining Board, when used in conjunction with this Detail Sheet and NSAI Agrément Certificate 09/0329, meets the requirements of the Building Regulations 1997 - 2017 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

This matter is dealt with in NSAI Agrément Certificate 09/0329.

2.1 PRODUCT DESCRIPTION

This Detail Sheet relates to the Kingspan Kooltherm K18 Insulated Drylining Board, comprising rigid phenolic insulation board manufactured in accordance with I.S. EN 13166:2012+A2:2016, bonded to tapered edge plasterboard for internal applications. Kingspan Kooltherm K18 Insulated Drylining Board is faced on both sides with a low emissivity composite foil autohesively bonded to the insulation core during manufacture. The plasterboard is 12.5mm thick manufactured to plasterboard is 12.5mm thick manufactured to IS EN 520:2005+A1:2009 *Gypsum plasterboards – Definitions, requirements and test methods*, and accepts dry-jointing materials, plaster skim or direct decoration. This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K18 Insulated Drylining Boards are CFC and HCFC free and therefore have zero ozone depletion potential (zero ODP).

Table 1 shows the Kingspan Kooltherm K18 Insulated Drylining Board product range.

Length	2400mm
Width	1200mm
Insulation Thickness	Various thicknesses available
Plasterboard Thickness	12.5mm

Table 1: Product Range

2.2 MANUFACTURE

Kingspan Kooltherm K18 Insulated Drylining Board is manufactured from a formulation of chemicals, which are distributed onto low emissivity composite foil facers subsequently autohesively bonded to the insulation core during manufacture. The plasterboard is secondary bonded and provides a durable surface to accept traditional finishing techniques.

2.3 INSTALLATION

2.3.1 General

Installation should be in accordance with good drylining practice and the manufacturer's instructions. All installations require careful planning and setting out.

The ceiling lining should be in position before wall lining commences.

Wall mounted fittings such as electrical sockets should be fitted so as to take into account the additional wall thickness. Heavy surface mounted fittings will require provision for the fixing load to be applied direct to the supporting wall and not to the Kingspan Kooltherm K18 Insulated Drylining Board in isolation. On existing constructions all surfaces should be clean and free of loose or flaking materials. Wallpaper should be stripped and surface and surface mounted fittings removed.

Before fixing the product, sufficient time must be allowed to disperse the solvents contained in wood preservatives and damp proofing treatments where applied. Ensure continuity of insulation between first floor joists on all external walls.

2.3.2 Thermal Bridging

In order to avoid the effects of cold bridging, window and door reveals should also be insulated. The margins of window and door reveals should therefore be sufficient to accommodate the thickness of the Kingspan Kooltherm K18 Insulated Drylining Board being employed. The possibility of a cold bridge occurring via the window boards should also be considered and provision made to insulate this area.

2.3.3 Window – Door Reveals and Soffits

Narrow widths of board should be cut and rebated to allow a plasterboard/plasterboard joint at the angle. Fixing should employ the same method as is used for the plain wall areas. Care should be taken to ensure that the cavity in cavity wall constructions is not bridged by the board or fixing medium so that it allows water to pass to the inner leaf. Where adhesives are employed, soffit boards and boards at window heads should be temporarily supported.

2.3.4 Metal Furring System

Kingspan Kooltherm K18 Insulated Drylining Board can be fixed by the use of proprietary metal furring systems to brick, block or concrete walls. The metal furrings should be fixed to the masonry or concrete wall in accordance with the manufacturer's instructions to provide a true and level base for the board.

The furrings should be set vertically at a maximum of 600mm centres to coincide with board joints and mid point of board. Short lengths of metal furring should be fixed horizontally between the vertical pieces at skirting level, at the midpoint of the board and just below the ceiling or soffit level. Provision for horizontal services behind the board can be made by the use of two pieces of metal furring set no more than 300mm apart. Kingspan Kooltherm K18 Insulated Drylining Board should be screw fixed to each metal furring section with self drilling and tapping, countersunk, surface coated (to avoid corrosion) screws placed at 150mm centres. Screws should not be sited less than 10mm from the edges of the board. The screws should be driven straight until the heads are slightly below the paper surface of the plasterboard facing taking care not to overdrive the screws.

2.3.5 Fixing to Timber Frame/Battens

This method may be used on timber frame constructions or on any dry masonry walls that will support and retain the battens and associated fixings. Kingspan Kooltherm K18 Insulated Drylining Board should be fixed to timber framing/battens set at maximum 600mm centres. The timbers should run vertically and be wide enough to offer a minimum 20mm support to all four edges of the board.

Galvanised clout nails, long enough to allow a minimum 25mm penetration of the timber, should be placed at 150mm centres and not less than 10mm from the edges of the board. They should be driven straight with the heads embedded just below the surface of the board. Care should be taken not to overdrive the nails. Timbers should be treated where appropriate.

2.3.6 Mechanical Fixing

This method is for application to fair finished brick, block and concrete cavity walls where Kingspan K18 Insulated Drylining Board is to be finished with gypsum plaster. The wall should be sound, dry and level (surface irregularities may impede the fixing of the board). The board should be fully restrained using mechanical fixings. The number and type of such fixings should be in accordance with the fixing supplier's recommendations, and should be evenly distributed over the whole area of the board, fixings should not overlap board edges.

2.3.7 Ceiling Linings (Horizontal and Sloping)

Kingspan Kooltherm K18 Insulated Drylining Board may be used to line ceilings. Installation is similar to standard plasterboard. Boards must always be placed with the long edge running across the joists, rafters or battens and all edges must be supported. Timbers must offer a minimum 20mm support to all four edges of the board. This will necessitate the use of noggins placed between the joists to coincide with the long edges of the board. Large headed galvanised clout or sheradised nails should be used to fix the board. These must be long enough to allow a minimum 25mm penetration of the supporting timber, and be placed not less than 10mm from the edges of the board and be spaced at 150mm intervals along all supporting timbers.

2.3.8 Fixing to Structural Insulated Panels e.g. Kingspan TEK Building System

Kingspan Kooltherm K18 Insulated Drylining Board can be fixed direct to Structural Insulated Panels (SIPs) using gyproc drywall screws of suitable length to allow screw penetration through the internal facing. The screws should be evenly placed over the whole area of the Kingspan Kooltherm K18 Insulated Drylining Board at 300mm centres. Screws should be no less than 50mm from the corners, and no less than 20mm from the edges. Fixing items to the finished wall will necessitate integral timber noggins.

2.3.9 Finishing

Tapered edged boards are jointed and finished in accordance with standard dry lining procedure offering a surface suitable for paper hanging and paint finishes. A plaster skim finish can also be applied to the boards. The finishing should be carried out in accordance with the specified manufacturers instructions, particularly in relation to the need to allow thorough drying of the plaster prior to decoration.

3. GENERAL

Kingspan Kooltherm K18 Insulated Drylining Board when installed in accordance with this Detail Sheet, is effective in reducing the 'U' value (thermal transmittance) of new or existing walls and ceilings.

Kingspan Kooltherm K18 Insulated Drylining Board may be used to insulate clay or calcium silicate bricks, concrete blocks, or natural and reconstituted stone blocks. It is essential that such walls are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.

Buildings subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with IS EN 1996-1-1:2005+A1:2012, IS EN 1996-1-2:2005 COR:2010 *Eurocode 6 – Design of masonry structures – Part 1-2: General rules – Structural fire design (including Irish National Annex)*, IS EN 1996-2:2006 COR:2009 *Eurocode 6 – Design of masonry structures – Part 2: Design considerations, selection of materials and execution of masonry (including Irish National Annex)* and IS EN 1996-3:2006 COR:2009 *Eurocode 6 – Design of masonry structures – Part 3: Simplified calculation methods for unreinforced masonry structures (including Irish National Annex)*. The relevant recommendations these standards should be followed where the wall incorporates stone or cast stone.

With dry lining installations forming a void of 20mm or more, services can be incorporated behind the dry lining, making the chasing of the wall unnecessary. When using adhesive systems, or where the services have a greater depth than the void, the wall should be chased rather than the insulation.

All mould or fungal growth should be treated prior to the application of the product.

4.1 BEHAVIOUR IN FIRE

The plasterboard used in Kingspan Kooltherm K18 Insulated Drylining Board is deemed to be Class O in accordance with the Building Regulations 1997 to 2017 and so the insulated board qualifies as the highest product performance classification as defined in TGD B Paragraph A10 of Annex A. The insulation component of the board should be isolated from possible sources of combustion.

Combustible material shall be separated by solid non-combustible material not less than 200mm thick from a flue pipe to an oil, solid fuel or gas heating appliance as indicated in Section 2 of TGD J of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K18 Insulated Drylining Board should be separated by a minimum distance of 150mm from an oil, solid fuel or gas heating appliance as indicated in Diagram 8 of TGD J of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K18 Insulated Drylining Board when installed with a residual cavity between the board and the wall, will require the provision of cavity barriers and may be used in buildings of any purpose group provided:

- a) Cavity barriers in walls are provided at maximum distances apart of 10m unless a Class 1 material is exposed to the cavity when a spacing of 20m may be adopted.
- b) Every such cavity shall be closed by a cavity barrier around the whole perimeter of the wall or ceiling element and around the perimeter of any opening through such elements.
- c) Cavity barriers in spaces between a floor and ceiling are provided at maximum distances of 20m for any class of surface exposed to the cavity.
- d) Where any wall or ceiling containing a cavity meets another such element, the cavities shall be closed so that they do not communicate with one another.
- e) Direction on the provision and spacing of cavity barriers is given in TGD to Part B of the Building Regulations 1997 to 2017.

Kingspan Kooltherm K18 Insulated Drylining Board is manufactured without the use of CFC's or HCFC's and there is no release of such gas on burning.

4.2 WATER PENETRATION

Kingspan Kooltherm K18 Insulated Drylining Board incorporates a closed cell structure that does not allow water uptake by capillary action.

Kingspan Kooltherm K18 Insulated Drylining Board when used in accordance with this Detail Sheet presents no significant risk of water penetration.

4.3 WATER VAPOUR PENETRATION

Kingspan Kooltherm K18 Insulated Drylining Board has a water vapour resistance greater than 100MNs/g when tested in accordance with BS 4370-2:1993 *Methods of test for rigid cellular materials – Methods 7 to 9*. Where additional vapour control is required an appropriate surface treatment should be applied over the completed insulated wall area.

4.4 THERMAL INSULATION

The aged thermal conductivity ' $\lambda_{90/90}$ ' value of Kingspan Kooltherm K18 Insulated Drylining Board, when measured in accordance with IS EN 12667:2001 is 0.022W/mK for thickness of 15-24mm, 0.021W/mK for 25-44mm, and 0.020W/mK for thickness of 45mm or greater. The aged thermal conductivity ' λ ' value of the plasterboard component is 0.19W/mK. The required maximum U-values for external walls can be obtained with Kingspan Kooltherm K18 Insulated Drylining Board constructions as indicated in Table 2.

The foil facing on Kingspan Kooltherm K18 Insulated Drylining Boards is a low emissivity aluminium foil which has been tested by the National Physics Laboratory to achieve an aged aggregate emissivity value (including printing) of 0.06. This value can then be used in the calculation in Appendix B2 or B3 as appropriate of IS EN ISO 6946:1997 *Building components and building elements – Thermal resistance and thermal transmittance – Calculation method* to derive an increased thermal resistance of 0.644m²K/W for the residual airspace immediately adjacent to the foil facing.

Render/Block/Block	
Product Thickness* (mm)	U-value (W/m ² K)
72.5	0.27
77.5	0.25
82.5	0.24
Brick/Block	
Product Thickness* (mm)	U-value (W/m ² K)
72.5	0.27
77.5	0.25
82.5	0.24
* Product thickness is the thickness of the insulation plus the gypsum plasterboard	

Table 2: Wall Construction Typical U-values (Dry Lining) – Compliance with Building Regulations

Lintel jamb and cill designs similar to those shown in Diagram 3 of the TGD to Part L of the Building Regulations 1997 to 2018 will be satisfactory to limit thermal bridging. The DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* should also be referred to.

4.5 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with the ETCI publication ET 207 *Guide to the National Rules for Electrical Installations as Applicable to Domestic Installations*. It is recommended that cables should not be buried in the insulation and carried in a conduit. In relation to recessed spotlights and other luminaries, ET 207 requires they be not less than the minimum distances from combustible materials as specified in clause 559.3.2 of the TCI National rules of the Electro Technical Council of Ireland (ET 101).

4.6 CONDENSATION RISK

Kingspan Kooltherm K18 Insulated Drylining Board has a high vapour resistance and is therefore unlikely to be affected by surface or interstitial condensation, provided the correct thickness of Kingspan Kooltherm K18 Insulated Drylining Board is chosen and all joints between boards are filled and taped in accordance with Standard Dry Lining practice. Correct use of the heating and ventilation system is important. Interstitial condensation analysis for average winter environmental conditions for cavity wall constructions indicate no condensation risk. When insulating buildings the recommendations of BS 5250:2011+A1:2016, should be followed to minimise the risk of condensation within the building elements and structures. No separate vapour control layer is required, however areas of high moisture content (wet rooms) should have moisture resistant plasterboard in accordance with the Building Regulations 1997 to 2017.

4.7 WALL MOUNTED FITTINGS

The recommendations of the manufacturer should be followed. Any object fixed to the wall, other than lightweight items, e.g. framed pictures, should be fixed through the lining board into the wall behind, using proprietary fixings.

4.8 LIMITATIONS

Kingspan Kooltherm K18 Insulated Drylining Board has a gypsum plasterboard face, and should therefore not be used to isolate dampness nor be used in continuously damp or humid conditions.

4.9 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive and cross-breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

4.10 OTHER INVESTIGATIONS

- (i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Kingspan Kooltherm K18 Insulated Drylining Board does not contain CFC or HCFC gas.
- (ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- (iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.
- (iv) A condensation risk analysis was performed.

Property	Declared Value
Reaction to Fire*	NPD
Thermal Conductivity*	15-44mm: 0.021W/mK 45-120mm: 0.020 W/mK 121-159mm: 0.021 W/mK
Compressive Strength*	CS(Y)100
Tensile Strength*	TR60

Table 3: Physical Properties of Kingspan Kooltherm K18 Insulated Drylining Board