CI/SfB (45) Rn7 M2
Third Issue September 2019

Kooltherm® K110 PLUS Soffit Board

INSULATION FOR STRUCTURAL CEILINGS (SOFFITS)

- Premium performance rigid thermoset phenolic insulation – thermal conductivity of 0.018 W/m·K
- Impact resistant building board
- Unaffected by air infiltration
- Resistant to the passage of water vapour
- Easy to handle
- Quick to install
- Ideal for new build and refurbishment
- Non–deleterious material
- Manufactured with a blowing agent that has zero ODP and low GWP

Fibre-free Core

EVEN THINNER LOWER λ EVEN BETTER

Kingspan®

Low Energy – Low Carbon Buildings

Typical Constructions & U-values

Assumptions

The U–values in Table 1 have been calculated, under a management system certified to the BBA Scheme for Assessing the Competency of Persons to Undertake U–value and Condensation Risk Calculations, using the method detailed in BS EN ISO 6946: 2017 / I.S. EN ISO 6946: 2007 (Building components & building elements. Thermal resistance & thermal transmittance. Calculation methods), and using the conventions set out in BR 443 (Conventions for U–value calculations). They are valid for the construction shown in Figure 1.

BBA CERTIFICATE CS/1004-4
U Value Competency Scheme

These examples are based on the use of *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board mechanically fixed directly to the soffit of a 200 mm concrete deck using thermally broken fasteners with a thermal conductivity of 1.00 W/m·K or less, the effect of which is insignificant.

NB When calculating U–values to BS EN ISO 6946: 2017 / I.S. EN ISO 6946: 2007, the type of fixing used may change the thickness of insulation required. If metal fixings are to be used, contact the Kingspan Insulation Technical Service Department for a comprehensive U-value calculation, which will take account of the correction factor specific to the fixing.

NB For the purposes of these calculations the standard of workmanship has been assumed good, and therefore the correction factor for air gaps has been ignored.

NB The figures quoted are for guidance only. A detailed U–value calculation and a condensation risk analysis should be completed for each project.

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

U-value Table Key

Where an ✗ is shown, the U–value is higher than the worst of the maximum new build area weighted average U–values allowed by the:

- 2013 editions of Approved Documents L to the Building Regulations for England;
- 2014 editions of Approved Documents L to the Building Regulations for Wales;
- 2015 editions of Technical Handbooks Section 6 to the Building Standards for Scotland;
- 2012 editions of Technical Booklets F1 & F2 to the Building Regulations for Northern Ireland; and
- 2011 edition of Technical Guidance Document L (Dwellings) and 2008 edition of Technical Guidance Document L (Buildings other than Dwellings) to the Building Regulations for the Republic of Ireland.

Fixed Directly to Concrete Soffit

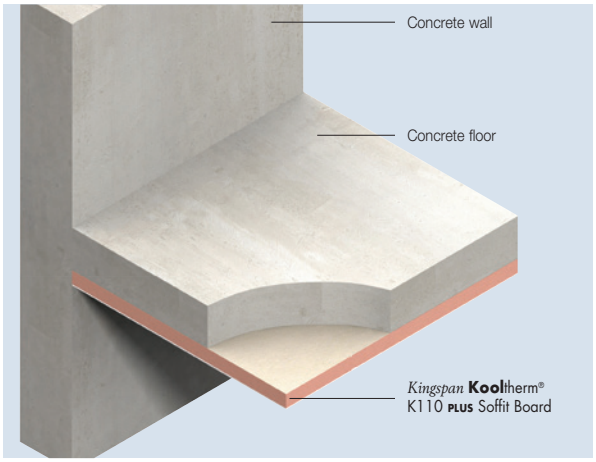


Figure 1

Product Thickness* (mm)	U–values (W/m²·K)
66	✗
71	0.25
76	0.23
81	0.22
86	0.21
91	0.20
96	0.19
106	0.17
116	0.15
126	0.14

**Product thickness = insulation thickness + 6 mm building board.*

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

Design Considerations

Responsible Sourcing

Kingspan **Kool**therm® K110 **PLUS** Soffit Board produced at Kingspan Insulation's Pembridge manufacturing facility is certified to BES 6001 (Framework Standard for the Responsible Sourcing of Construction Products) 'Excellent'.

NB The above information is correct at the time of writing. Please confirm at the point of need by contacting Kingspan Insulation's Technical Service Department (see rear cover), from which a copy of Kingspan Insulation's BES 6001 certificate can be obtained.

BES 6001
Responsible Sourcing
www.greenbooklive.com

Sustainability & Responsibility

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

A report covering the sustainability and responsibility of Kingspan Insulation Ltd's British operations at its Pembridge, Herefordshire and Selby, North Yorkshire manufacturing facilities is available at www.kingspaninsulation.co.uk/sustainabilityandresponsibility.

Specification Clause

Kingspan **Kool**therm® K110 **PLUS** Soffit Board should be described in specifications as:–

The soffit insulation shall be *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board ____ mm thick: comprising a premium performance rigid thermoset fibre–free phenolic insulation core with a glass tissue based facing on its inner face and a building board on its outer face. The product shall have a thermal conductivity of 0.018 W/m·K. The product shall be manufactured: with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP); under a management system certified to ISO 9001: 2015, ISO 14001: 2015, BS OHSAS 18001: 2007 and ISO 50001: 2011 by Kingspan Insulation Limited; and installed in accordance with the instructions issued by them.

NBS Specifications

Details also available in NBS Plus.
NBS users should refer to clause(s): E60–110, 130 and 140 (Standard)

NBSPlus

Wind Loading

Where the insulation boards may be subject to external wind pressure, wind loadings should be assessed in accordance with BS / I.S. EN 1991–1–4: 2005 + A1: 2010 (National Annex to Eurocode 1 Actions on Structures. General Actions. Wind Actions) taking into account:

- length / width / height of the building;
- orientation of the building;
- wind speed;
- aspect (i.e. on a hill side); and
- topographical value of the surrounding area.

Lightning Protection

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

Sitework

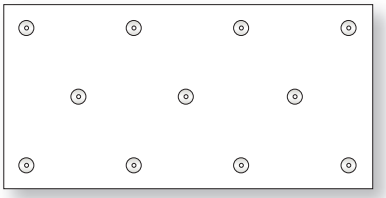
Fixing Directly to Concrete Soffits

- Insulation boards should be installed break–bonded, with joints lightly butted.
- The number of mechanical fixings required to fix *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board will vary with the geographical location of the building, the local topography, the height and width of the soffit concerned, and the soffit construction.
- A minimum of 11 mechanical fixings, with a minimum head diameter of 25 mm, are required to secure the insulation board to the soffit.
- Where the insulation boards may be subject to external wind pressure, the requirement for additional fixings should be assessed in accordance with BS / I.S. EN 1991–1–4: 2005 + A1: 2010 (National Annex to Eurocode 1 Actions on Structures. General Actions. Wind Actions).
- The fixings should be evenly distributed over the whole area of the board, and must offer a minimum 40 mm penetration into a solid substrate.
- Please refer to the column opposite for recommended fixing patterns.
- Fixings at board edges must be located > 50 mm and < 150 mm from edges and corners of the board and not overlap board joints.
- For details on fixings refer to:

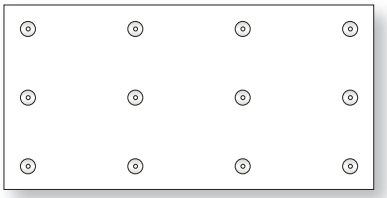
Ejot UK Limited www.ejot.co.uk	+44 (0) 1977 687 040
Fixfast www.fixfast.com	+44 (0) 1732 882 387
ITW Spit www.itwcp.co.uk/Spit/	+44 (0) 800 731 4924
SFS Intec www.sfsintec.biz/uk	+44 (0) 113 2085 500

Recommended Fixing Patterns

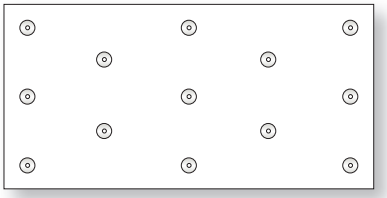
- The images below show recommended fixing patterns, the number of fixings used and the resultant fixing density (number of fixings per m^2).
- The fixing patterns shown are suitable for continuous flat (even) decks only. For non–continuous decks please contact the Kingspan Insulation Technical Service Department (see rear cover) for further guidance.



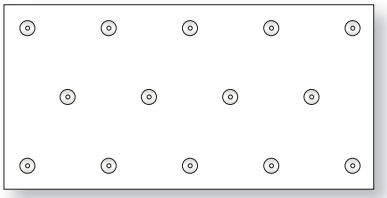
11 No. per board
(2.4 x 1.2 m board – 3.81 fixings / m^2)



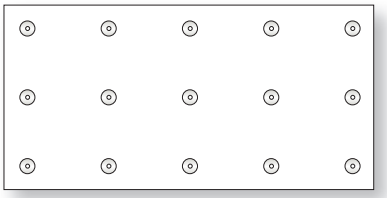
12 No. per board
(2.4 x 1.2 m board – 4.16 fixings / m^2)



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



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



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

Proprietary Grid Systems

- *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board can also be fixed to a proprietary grid system comprising metal furring bars or timber battens.
- For further information regarding proprietary grid system specifications, please contact the Kingspan Insulation Technical Service Department (see rear cover) for further information.

Taping

- In the absence of other protection, exposed insulation edges of *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board should be protected by a suitable self–adhesive aluminium foil tape, with a 50 mm min. wide overlap onto the insulation board face (Figure 2).
- For advice on the specification of self–adhesive aluminium foil tape and application guidelines, please refer to:

  Bostik Limited +44 (0) 1785 272 727
  www.bostik.co.uk

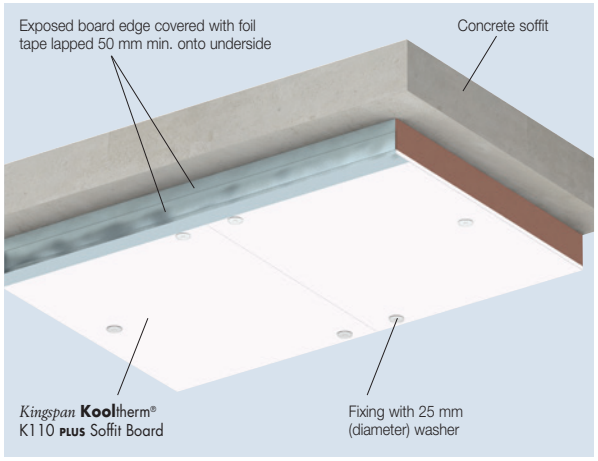


Figure 2 – Protection of Exposed Insulation Edges of *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board.

General

Cutting

- The cutting of boards should be carried out by using a fine toothed saw. The snapping of boards is not recommended.
- Ensure accurate trimming to achieve close–butting joints and continuity of insulation.

Availability

- *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board is available through specialist insulation distributors and selected builders' merchants throughout the UK and Ireland.

Packaging & Storage

- The polyethylene packaging of Kingspan Insulation products, which is recyclable, should not be considered adequate for outdoor protection.
- Ideally, boards should be stored inside a building. If, however, outside storage cannot be avoided, then the boards should be stacked clear of the ground and covered with an opaque polythene sheet or weatherproof tarpaulin. Boards that have been allowed to get wet should not be used.

Health & Safety

- Kingspan Insulation products are chemically inert and safe to use.
- A Safety Information Data Sheet for this product is available from the Kingspan Insulation website www.kingspaninsulation.co.uk/safety or www.kingspaninsulation.ie/safety.

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

Product Details

The Inner Facing

The inner (concealed) facing of *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board is a glass tissue based facing, autohesively bonded to the insulation core during manufacture.

The Core

The core of the insulation board component *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board is a premium performance rigid thermoset fibre–free phenolic insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

The Outer Facing

The outer (exposed) facing of *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board is a 6 mm A1 Euroclass building board.

Standards & Approvals

Kingspan **Kool**therm® K110 **PLUS** Soffit Board is manufactured to the highest standards under a management system certified to ISO 9001: 2015 (Quality Management Systems. Requirements), ISO 14001: 2015 (Environmental Management Systems. Requirements), BS / I.S. OHSAS 18001: 2007 (Occupational Health & Safety Management Systems. Requirements) and ISO 50001: 2011 (Energy Management Systems. Requirements with guidance for use).

Standard Dimensions

Kingspan **Kool**therm® K110 **PLUS** Soffit Board is available in the following standard size:

Nominal Dimension		Availability
Length	(m)	2.4
Width	(m)	1.2
Building Board Thickness	(mm)	6
Insulant Thickness	(mm)	Refer to local distributor or Kingspan Insulation price list for current stock and non–stock sizes.

Compressive Strength

The compressive strength of *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board typically exceeds 100 kPa at 10% compression, when tested to BS / I.S. EN 826: 2013 (Thermal insulating products for building applications. Determination of compression behaviour).

Water Vapour Resistance

Adjusted for the effect of board joints, the insulation component of the product typically achieves a resistance far greater than 41.6 MN·s/g, when tested in accordance with BS / I.S. EN 12086: 2013 (Thermal insulating products for building applications. Determination of water vapour transmission properties).

NB the resistivity of the building board component of the product should be taken as 112 MN·s/g·m.

Durability

If correctly installed, *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board can have an indefinite life. Its durability depends on the supporting structure and the conditions of its use.

NB If the building is considered to be in an exposed location advice should be sought from the Kingspan Insulation Technical Service Department (see rear cover) to determine the product's suitability.

Resistance to Solvents, Fungi & Rodents

The insulation core is resistant to short–term contact with petrol and with most dilute acids, alkalis and mineral oils. However, it is recommended that any spills be cleaned off fully before the boards are installed. Ensure that safe methods of cleaning are used, as recommended by suppliers of the spilt liquid. The insulation core is not resistant to some solvent–based adhesive systems, particularly those containing methyl ethyl ketone. Adhesives containing such solvents should not be used in association with this product. Damaged boards or boards that have been in contact with harsh solvents or acids should not be used.

The insulation core and facings used in the manufacture of *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board resist attack by mould and microbial growth, and do not provide any food value to vermin.

Fire Performance

Kingspan **Kool**therm® K110 **PLUS** Soffit Board achieves European Classification (Euroclass) B-s1,d0 when classified to EN 13501-1: 2018 (Fire classification of construction products and building elements. Classification using data from reaction to fire tests).

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

Thermal Properties

The λ–values and R–values detailed below are quoted in accordance with BS / I.S. EN 13166: 2012 + A2: 2016 (Thermal insulation products for buildings. Factory made phenolic foam (PF) products. Specification.)

Thermal Conductivity

The thermal conductivity (λ–value) of the building board component of *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board is 0.27 W/m·K.

The thermal conductivity of the insulation board component of *Kingspan* **Kool**therm® K110 **PLUS** Soffit Board is 0.018 W/m·K.

Thermal Resistance

Thermal resistance (R–value) varies with the thickness of each component and is calculated by dividing the thickness of the board (expressed in metres) by its thermal conductivity, followed by adding the resulting figures together. The sum is rounded down to the nearest 0.05 (m^2·K/W).

Product Thickness* (mm)	Thermal Resistance (m^2·K/W)
66	3.35
71	3.60
76	3.90
81	4.15
86	4.45
91	4.70
96	5.00
106	5.55
116	6.10
126	6.65

**Product thickness = insulation thickness + 6 mm building board.*

NB Kingspan Insulation's maximum available single insulation thickness is subject to alteration without notice. Please contact the Kingspan Insulation Technical Service Department for current stock and non-stock sizes (see rear cover for details).

Insulation Product Benefits

Kingspan OPTIM-R® Vacuum Insulation Panel (VIP) **Products**

- With a declared aged thermal conductivity of 0.007 W/m·K, these products provide an insulating performance that is up to five times better than commonly used insulation materials.
- Provides high levels of thermal efficiency with minimal thickness.
- Over 90% (by weight) recyclable.

Kingspan **Kool**therm® Range **Products**

- With a thermal conductivity of 0.018–0.023 W/m·K these are the most thermally efficient insulation products commonly used.
- The thinnest commonly used insulation products for any specific U–value.
- Manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

Kingspan **Therma**™ Range **Products**

- With a thermal conductivity of 0.022–0.028 W/m·K these are amongst the more thermally efficient insulation products commonly used.
- Manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

Kingspan **GreenGuard**® Range **Products**

- Rigid extruded polystyrene insulation (XPS) has the necessary compressive strength to make it the product of choice for specialist applications such as heavy duty flooring, car park decks and inverted roofing.
- Manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP).

All Products

- Unaffected by air infiltration – a problem that can be experienced with mineral fibre and which can reduce thermal performance.
- Safe and easy to install.
- If installed correctly, can provide reliable long term thermal performance over the lifetime of the building.
- Each product achieves the required fire performance for its intended application.

Contact Details

Customer Service

For quotations, order placement and details of despatches please contact the Kingspan Insulation Customer Service Department on the numbers below:

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

Ireland – Tel: +353 (0) 42 979 5000
– email: info@kingspaninsulation.ie

Literature & Samples

Kingspan Insulation produces a comprehensive range of technical literature for specifiers, contractors, stockists and end users. The literature contains clear user friendly advice on typical design; design considerations; thermal properties; sitework and product data.

For copies please contact the Kingspan Insulation Marketing Department, or visit the Kingspan Insulation website, using the details below:

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

Ireland – Tel: +353 (0) 42 979 5000
– email: info@kingspaninsulation.ie
– www.kingspaninsulation.ie/literature

Tapered Roofing

For technical guidance, quotations, order placement and details of despatches please contact the Kingspan Insulation Tapered Roofing Department on the numbers below:

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

Ireland – Tel: +353 (0) 42 975 4297
– email: tapered@kingspaninsulation.ie

Technical Advice / Design

Kingspan Insulation supports all of its products with a comprehensive Technical Advisory Service. Calculations can be carried out to provide U–values, condensation / dew point risk, required insulation thicknesses etc…

U–value calculations can also be carried out on the Kingspan Insulation U–value Calculator, available for free online at www.uvalue-calculator.co.uk or downloaded as an App.

The Kingspan Insulation Technical Service Department can also give general application advice and advice on design detailing and fixing etc... Site surveys are also undertaken as appropriate.

The Kingspan Insulation British Technical Service Department operates under a management system certified to the BBA Scheme for Assessing the Competency of Persons to Undertake U–value and Condensation Risk Calculations.

BBA CERTIFICATE CS/1004-4 U Value Competency Scheme

Please contact the Kingspan Insulation Technical Service Department on the numbers below:

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

Ireland – Tel: +353 (0) 42 975 4297
– email: technical@kingspaninsulation.ie

General Enquiries

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

UK – Tel: +44 (0) 1544 388 601
– email: info@kingspaninsulation.co.uk

Ireland – Tel: +353 (0) 42 979 5000
– email: info@kingspaninsulation.ie

Kingspan Insulation Ltd reserves the right to amend product specifications without prior notice. Product thicknesses shown in this document should not be taken as being available ex–stock and reference should be made to the current Kingspan Insulation price–list or advice sought from Kingspan Insulation's Customer Service Department (see above left). The information, technical details and fixing instructions etc. included in this literature are given in good faith and apply to uses described. Recommendations for use should be verified for suitability and compliance with actual requirements, specifications and any applicable laws and regulations. For other applications or conditions of use, Kingspan Insulation offers a Technical Advisory Service (see above), the advice of which should be sought for uses of Kingspan Insulation products that are not specifically described herein. Please check that your copy of this literature is current by contacting the Kingspan Insulation Marketing Department (see left).

Kingspan®

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