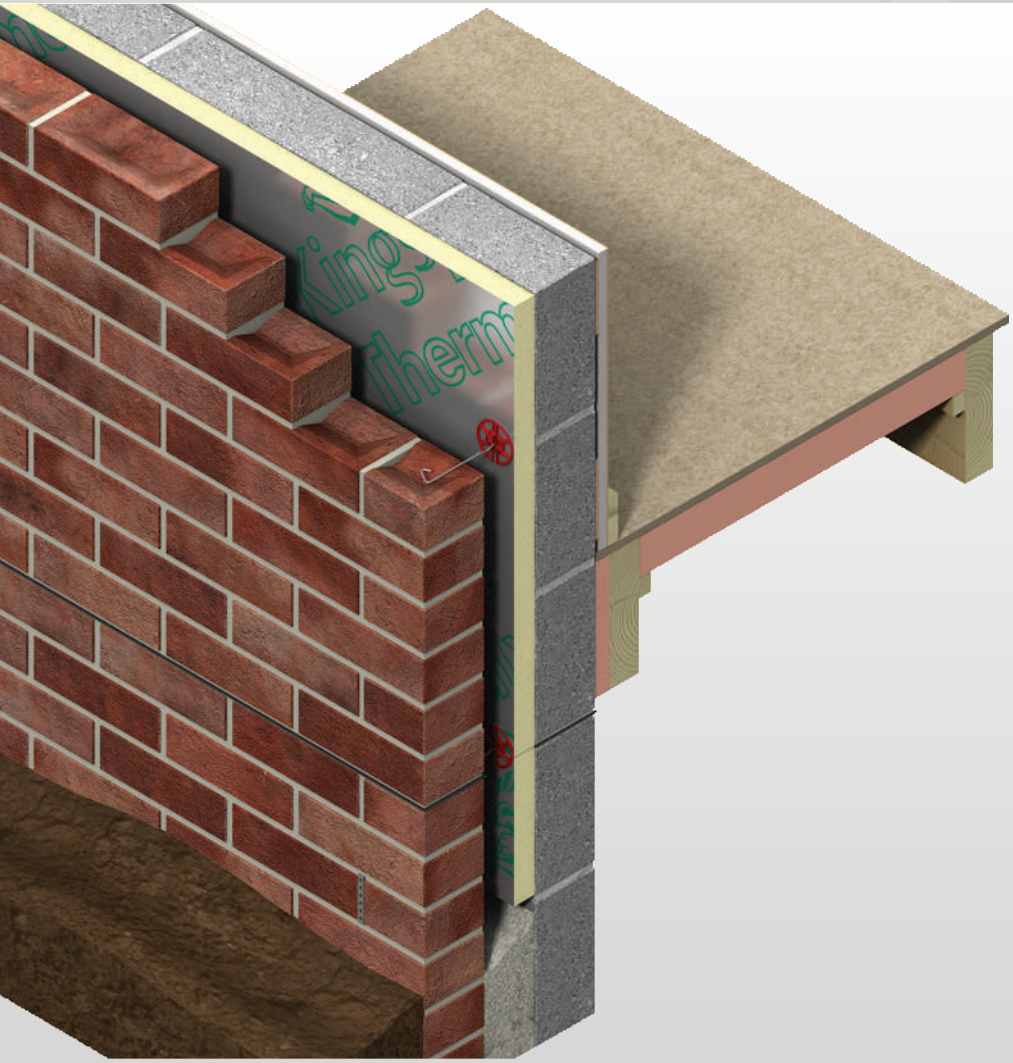
CI/SfB (21.9) Rn7 M2
Ninth Issue June 2019

Thermawall® TW50

PARTIAL FILL CAVITY WALL INSULATION



- High performance rigid thermoset insulation – thermal conductivity 0.022 W/m·K
- Clear cavity is maintained – resists moisture penetration
- Low emissivity foil facings significantly increase the thermal resistance of the cavity
- Meets NHBC technical requirements when used with a 50 mm residual cavity
- Unaffected by air infiltration
- Easy to handle and install
- Non–deleterious material
- Manufactured with a blowing agent that has zero ODP and low GWP

Fibre-free Core

Kingspan®

Low Energy – Low Carbon Buildings

Typical Constructions and U-values

Assumptions

The U–values in the tables that follow 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 and building elements. Thermal resistance and thermal transmittance. Calculation methods), and using the conventions set out in BR 443 (Conventions for U–value calculations). They are valid for the constructions shown in the details immediately each table.

BBA CERTIFICATE CS/1004-4
U Value Competency Scheme

Unless stated otherwise the internal wall finish is taken to be a 3 mm skim coated 12.5 mm plasterboard on dabs.

These U–values are valid for constructions with both a 40 mm and 50 mm clear residual cavity between the outer surface of the insulation and the inner face of the outer masonry leaf.

NB When calculating U–values to BS EN ISO 6946: 2017 / I.S. EN ISO 6946: 2007, the type of wall tie used may change the thickness of insulation required. For cavity widths ≤ 125 mm, calculations assume a stainless steel flexible tie with 2.5 ties per m² and a cross–sectional area of 12.50 mm². For cavity widths > 125 mm, calculations assume a stainless steel flexible tie with 2.5 ties per m² and a cross–sectional area of 23.40 mm². For cavity widths > 175 mm, calculations assume a stainless steel flexible tie with 2.5 ties per m² and a cross–sectional area of 80.00 mm².

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

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

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

U-value Table Key

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

- 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.

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

10 mm Polymer Rendered 100 mm Dense Block Outer Leaf* / 100 mm Block Inner Leaf

Internal Finish – Fair Faced Blockwork

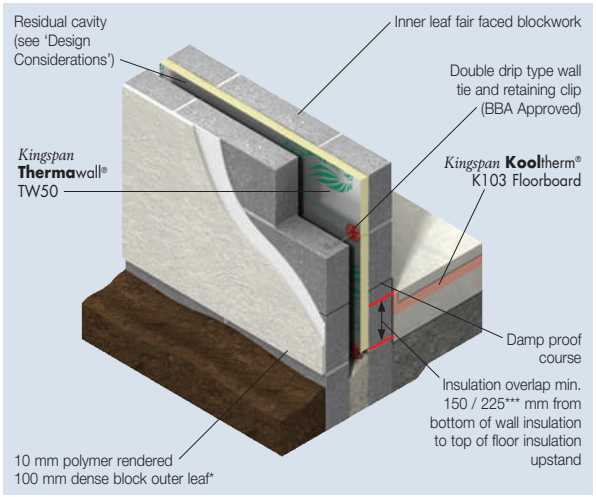


Figure 1

U–values (W/m²·K) for Various Thicknesses of *Kingspan* **Therma**wall® TW50			
Insulant Thickness (mm)	Inner Leaf Fair Faced Blockwork Density and λ–value (W/m·K)		
	Dense (1.13)	Medium (0.51)	Lightweight (0.15)**
25	✗	✗	✗
30	✗	✗	0.34
35	✗	✗	0.32
40	0.34	0.33	0.29
45	0.32	0.31	0.28
50	0.30	0.29	0.26
55	0.28	0.27	0.25
60	0.26	0.25	0.23
65	0.25	0.24	0.22
70	0.23	0.23	0.21
75	0.22	0.22	0.20
80	0.21	0.21	0.19
85	0.20	0.20	0.18
90	0.19	0.19	0.18
95	0.18	0.18	0.17
100	0.18	0.17	0.16
110	0.16	0.16	0.15
120	0.16	0.15	0.14
125	0.15	0.15	0.14
130	0.16	0.15	0.15
140	0.15	0.15	0.14

* *Calculations assume dense block outer leaf of λ–value (1.13 W/m·K).*

** *A 6.6% thermal bridging factor has been assumed for the effect of mortar joints.*

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

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

Please seek guidance for all buildings with cavity build -ups above 18 m. Refer to the latest information on regulatory guidance from the Ministry of Housing, Communities & Local Government at https://www.gov.uk/guidance/building-safety-programme.

Internal Finish – 3 mm Skim Coated 12.5 mm Plasterboard

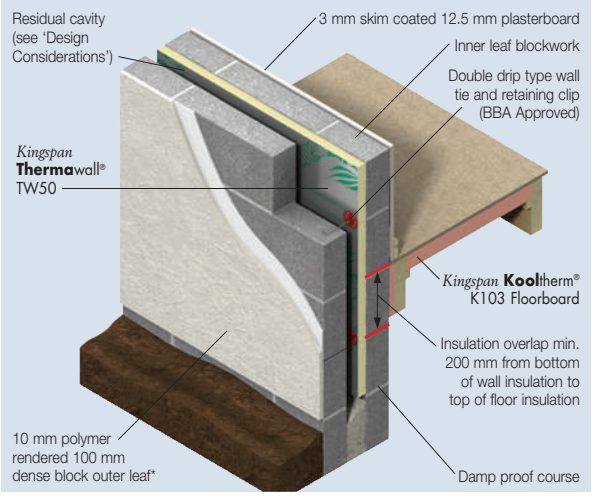


Figure 2

Internal Finish – *Kingspan* **Kool**therm® K118 Insulated Plasterboard

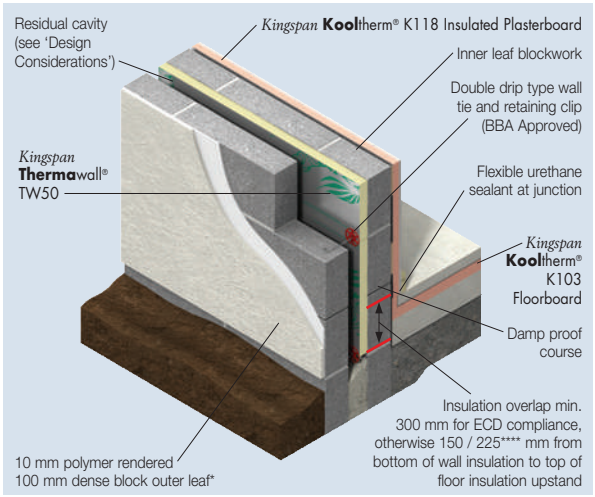


Figure 3

U–values (W/m²·K) for Various Thicknesses of *Kingspan* **Therma**wall® TW50

Insulant Thickness (mm)	Inner Leaf Blockwork Density and λ–value (W/m·K)			
	Dense (1.13)	Medium (0.51)	Lightweight (0.15)**	Aerated (0.11)**
20	✗	✗	✗	0.35
25	✗	✗	0.34	0.32
30	✗	✗	0.32	0.30
35	0.35	0.33	0.30	0.28
40	0.32	0.31	0.28	0.27
45	0.30	0.29	0.26	0.25
50	0.28	0.27	0.25	0.24
55	0.26	0.26	0.23	0.22
60	0.25	0.24	0.22	0.21
65	0.23	0.23	0.21	0.20
70	0.22	0.22	0.20	0.19
75	0.21	0.21	0.19	0.19
80	0.20	0.20	0.18	0.18
85	0.19	0.19	0.18	0.17
90	0.19	0.18	0.17	0.17
95	0.18	0.17	0.16	0.16
100	0.17	0.17	0.16	0.15
110	0.16	0.16	0.15	0.14
120	0.15	0.15	0.14	0.13
125	0.14	0.14	0.13	0.13
130	0.15	0.15	0.14	0.14

* *Calculations assume dense block outer leaf of λ–value (1.13 W/m·K).*

** *A 6.6% thermal bridging factor has been assumed for the effect of mortar joints.*

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

Please seek guidance for all buildings with cavity build -ups above 18 m. Refer to the latest information on regulatory guidance from the Ministry of Housing, Communities & Local Government at https://www.gov.uk/guidance/building-safety-programme.

U–values (W/m²·K) for Various Product Thicknesses of *Kingspan* **Kool**therm® K118 Insulated Plasterboard** and Thicknesses of *Kingspan* **Therma**wall® TW50

Thickness of *Kingspan* **Therma**wall® TW50 (mm)	Inner Leaf Blockwork Density and λ–value (W/m·K)			
	Dense (1.13)	Medium (0.51)	Lightweight (0.15)***	Aerated (0.11)***
32.5 mm *Kingspan* Kooltherm® K118 Insulated Plasterboard**				
35	💧	💧	💧	💧
40	0.23	0.22	0.21	0.20
45	0.22	0.21	0.20	0.19
50	0.21	0.20	0.19	0.18
55	0.20	0.19	0.18	0.18
60	0.19	0.19	0.17	0.17
65	0.18	0.18	0.17	0.16
70	0.17	0.17	0.16	0.16
75	0.17	0.16	0.16	0.15
80	0.16	0.16	0.15	0.15
85	0.16	0.15	0.15	0.14
90	0.15	0.15	0.14	0.14
57.5 mm *Kingspan* Kooltherm® K118 Insulated Plasterboard**				
50	💧	💧	💧	💧
55	0.16	0.15	0.14	0.14
60	0.15	0.15	0.14	0.14

* *Calculations assume dense block outer leaf of λ–value (1.13 W/m·K).*

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

*** *A 6.6% thermal bridging factor has been assumed for the effect of mortar joints.*

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

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

Please seek guidance for all buildings with cavity build -ups above 18 m. Refer to the latest information on regulatory guidance from the Ministry of Housing, Communities & Local Government at https://www.gov.uk/guidance/building-safety-programme.

Typical Constructions and U-values

102.5 mm Brick Outer Leaf / 100 mm Block Inner Leaf

Internal Finish – Fair Faced Blockwork

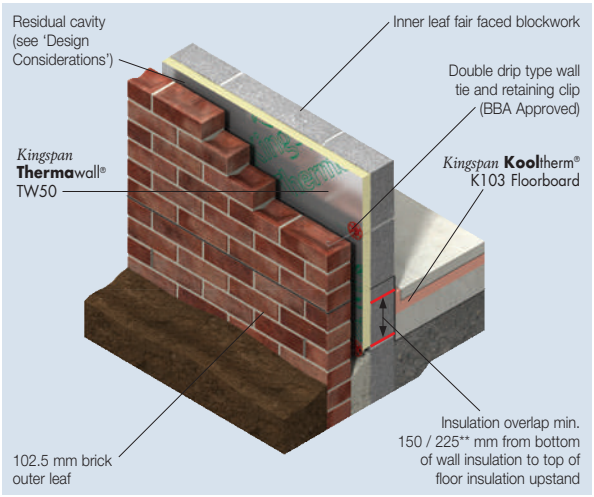


Figure 4

Internal Finish – 3 mm Skim Coated 12.5 mm Plasterboard

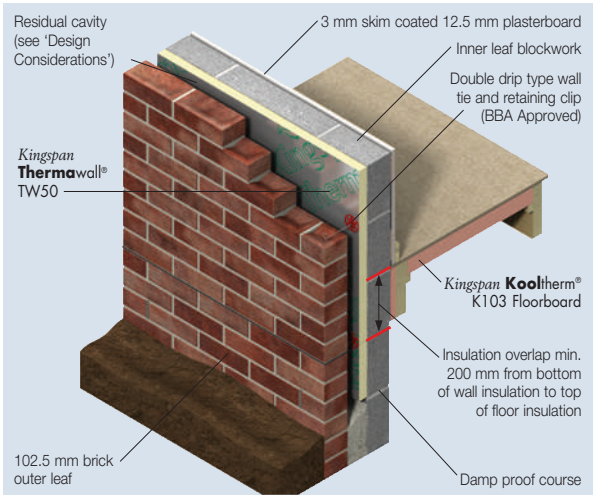


Figure 5

U–values (W/m²·K) for Various Thicknesses of *Kingspan* **Therma**wall® TW50			
Insulant Thickness (mm)	Inner Leaf Fair Faced Blockwork Density and λ–value (W/m·K)		
	Dense (1.13)	Medium (0.51)	Lightweight (0.15)*
25	✗	✗	✗
30	✗	✗	0.35
35	✗	✗	0.32
40	0.35	0.34	0.30
45	0.32	0.31	0.28
50	0.30	0.29	0.26
55	0.28	0.27	0.25
60	0.26	0.26	0.23
65	0.25	0.24	0.22
70	0.24	0.23	0.21
75	0.22	0.22	0.20
80	0.21	0.21	0.19
85	0.20	0.20	0.19
90	0.19	0.19	0.18
95	0.19	0.18	0.17
100	0.18	0.18	0.16
110	0.17	0.16	0.15
120	0.16	0.15	0.14
125	0.15	0.15	0.14
130	0.16	0.16	0.15
140	0.15	0.15	0.14

* *A 6.6% thermal bridging factor has assumed for the effect of mortar joints.*

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

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

Please seek guidance for all buildings with cavity build -ups above 18 m. Refer to the latest information on regulatory guidance from the Ministry of Housing, Communities & Local Government at https://www.gov.uk/guidance/building-safety-programme.

U–values (W/m²·K) for Various Thicknesses of *Kingspan* **Therma**wall® TW50				
Insulant Thickness (mm)	Inner Leaf Blockwork Density and λ–value (W/m·K)			
	Dense (1.13)	Medium (0.51)	Lightweight (0.15)*	Aerated (0.11)*
20	✗	✗	✗	✗
25	✗	✗	0.35	0.33
30	✗	✗	0.32	0.31
35	0.35	0.34	0.30	0.29
40	0.32	0.31	0.28	0.27
45	0.30	0.29	0.26	0.25
50	0.28	0.27	0.25	0.24
55	0.27	0.26	0.24	0.23
60	0.25	0.24	0.22	0.22
65	0.24	0.23	0.21	0.21
70	0.22	0.22	0.20	0.20
75	0.21	0.21	0.19	0.19
80	0.20	0.20	0.19	0.18
85	0.20	0.19	0.18	0.17
90	0.19	0.18	0.17	0.17
95	0.18	0.18	0.17	0.16
100	0.17	0.17	0.16	0.15
110	0.16	0.16	0.15	0.14
120	0.15	0.15	0.14	0.14
125	0.14	0.14	0.13	0.13
130	0.15	0.15	0.14	0.14

* *A 6.6% thermal bridging factor has been assumed for the effect of mortar joints.*

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

Please seek guidance for all buildings with cavity build -ups above 18 m. Refer to the latest information on regulatory guidance from the Ministry of Housing, Communities & Local Government at https://www.gov.uk/guidance/building-safety-programme.

Internal Finish – *Kingspan* **Kool**therm® K118 Insulated Plasterboard

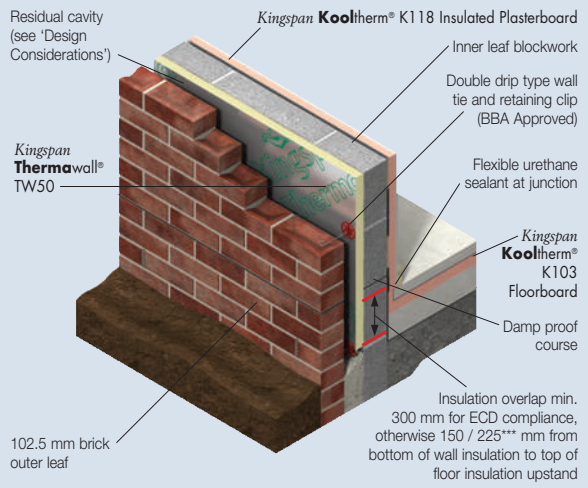


Figure 6

U–values (W/m²·K) for Various Product Thicknesses of *Kingspan* **Kool**therm® K118 Insulated Plasterboard* and Thicknesses of *Kingspan* **Therma**wall® TW50

Thickness of *Kingspan* **Therma**wall® TW50 (mm)	Inner Leaf Blockwork Density and λ–value (W/m·K)			
	Dense (1.13)	Medium (0.51)	Lightweight (0.15)**	Aerated (0.11)**
32.5 mm *Kingspan* **Kool**therm® K118 Insulated Plasterboard*				
35	💧	💧	💧	💧
40	0.23	0.23	0.21	0.20
50	0.21	0.20	0.19	0.18
55	0.20	0.20	0.18	0.18
60	0.19	0.19	0.18	0.17
65	0.18	0.18	0.17	0.16
70	0.18	0.17	0.16	0.16
75	0.17	0.17	0.15	0.15
80	0.16	0.16	0.15	0.15
85	0.16	0.15	0.15	0.14
90	0.15	0.15	0.14	0.14
57.5 mm *Kingspan* **Kool**therm® K118 Insulated Plasterboard**				
50	💧	💧	💧	💧
55	0.16	0.15	0.15	0.14
60	0.15	0.15	0.14	0.14

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

** *A 6.6% thermal bridging factor has assumed for the effect of mortar joints.*

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

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

Please seek guidance for all buildings with cavity build -ups above 18 m. Refer to the latest information on regulatory guidance from the Ministry of Housing, Communities & Local Government at https://www.gov.uk/guidance/building-safety-programme.

Heat Loss and Linear Thermal Bridging

Basic Principles

Linear thermal bridging describes the additional heat losses or gains that occur at junctions between elements e.g. where a cavity wall meets the ground or intermediate floor, or at junctions around openings in the building fabric where the thermal insulation layer is discontinuous e.g. sills, jambs and lintels.

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

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

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

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

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

Reducing Linear Thermal Bridging

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

- Care is required to ensure continuation of insulation wherever possible for best thermal performance. Where this is not possible, insulation layers should be overlapped and ideally, insulation material introduced between. In a standard cavity wall–to–ground floor junction the main linear thermal bridge is the inner leaf of masonry. This linear thermal bridge can be reduced by increasing the distance that the heat has to travel through the inner leaf of masonry. This can be achieved by means of overlapping the partial fill cavity wall insulation and the floor insulation.
- The key factor is the distance between the bottom of the cavity wall insulation and the top of the floor insulation (including any perimeter insulation upstand). In order to minimise cold bridging at the edge of ground floors, the distance between the top surface of the floor insulation or perimeter insulation upstand, and the bottom of the wall insulation must be a minimum of 150 / 225* mm for a concrete floor (see Figures 1 & 4) and 200 mm for a suspended timber floor (see Figures 2 & 5). The further appropriate wall insulation extends past the floor insulation, the better the thermal performance of the junction between the wall and the floor.

  ** 150 mm applies to the UK and 225 mm to the Republic of Ireland.*
- Perimeter upstand insulation is extremely important for minimising heat losses from the junction with external walls. This helps to increase the path of heat flow and therefore helps reduce losses through the junction. Omitting this, or using a poorer performance insulation for this purpose, can increase these losses.
- Using better thermal performance 'lightweight' aggregate blockwork on the inner leaf in adjacency to the junction with the floor can also assist with assuring lower heat losses from the junction.
- An internal lining of insulation on the warm side of the construction such as *Kingspan* **Kool**therm® K118 Insulated Plasterboard, can also help to reduce heat losses.
- Prevention of thermal bridging should be considered when designing sills, jambs and lintels. An insulated cavity closer e.g. *Kingspan* **Kool**therm® Cavity Closer or **Kool**therm® Cavity Closer **PLUS** is available from Kingspan Insulation. Please refer to the literature for these products for further information. This literature is available from the Kingspan Insulation Marketing Department or via the Kingspan Insulation website (see rear cover for details).
- Heat–loss from junctions around window or door openings can be further reduced by insulating the reveal. The key factor is the thermal resistance (R–value) of the insulation layer. Reveals should be designed to accommodate 32.5 mm (min.) of *Kingspan* **Kool**therm® K118 Insulated Plasterboard.
- For junctions between the external walls and roof constructions, continuity and overlap of insulation layers is the key to minimising heat losses from the junctions. Refer to *Kingspan* **Therma**roof® TP10 Pitched Roof Board literature for further design considerations.

To aid in limiting thermal bridging and uncontrolled air–leakage via junctions in cavity wall constructions, Kingspan Insulation has had a number of the junctions incorporating *Kingspan* **Therma**wall® TW50 Cavity Board modelled and ψ–values calculated for them – many of which are significantly better than the approved ψ–values given in column 1 of Table K1 of SAP for the ACDs that comprise partial fill cavity wall constructions.

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

Design Considerations

Environmental Impact & Responsible Sourcing

Green Guide Rating

An Ecoprofile, certified by BRE Certification to the 2008 BRE Environmental Profiles Methodology, has been created for *Kingspan* **Therma**wall® TW50 produced at Kingspan Insulation's British and Irish manufacturing facilities. The BRE has assigned the product a 2008 Green Guide Summary Rating of A+.

Environmental Profiles Scheme
Certificate Number ENP 500

Responsible Sourcing

Kingspan **Therma**wall® TW50 produced at Kingspan Insulation's Pembridge and Selby manufacturing facilities is certified to BES 6001 (Framework Standard for the Responsible Sourcing of Construction Products) 'Excellent'.

Kingspan **Therma**wall® TW50 produced at Kingspan Insulation's Castleblayney manufacturing facilities is manufactured under a management system certified to ISO 14001: 2015.

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

Sustainability & Responsibility

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

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

Specification Clause

Kingspan **Therma**wall® TW50 should be described in specifications as:–

The cavity wall insulation shall be *Kingspan* **Therma**wall® TW50 ____ mm thick: comprising a high performance rigid thermoset insulation core faced on both sides with a low emissivity composite foil facing. The product shall be manufactured: with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP); in accordance with the requirements of BS 4841–1; under a management system certified to ISO 9001: 2015, ISO 14001: 2015, BS / I.S. 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):
F30 155 (Standard and Intermediate)
F30 12 (Minor works).

Building Information Modelling (BIM)

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

Design Standards

BS EN 845-1: 2013 + A1: 2016 (Specification for ancillary components of masonry. Wall ties, tension straps, hangers and brackets), BS EN 1996-1-1: 2005 + A1: 2012 (Eurocode 6. Design of masonry structures. General rules for reinforced and unreinforced masonry structures), BS EN 1996-2: 2006 (Eurocode 6. Design of masonry structures. Design considerations, selection of materials and execution of masonry), BS EN 1996-3: 2006 (Eurocode 6. Design of masonry structures. Simplified calculation methods for unreinforced masonry structures) and PD 6697: 2010 (Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2) should be consulted regarding the construction of insulated cavity walls.

Sitework

Residual Cavity Width

UK

A minimum 25 mm residual cavity width is recommended between the insulation and the outer leaf for wall heights up to 12 metres. A minimum 50 mm residual cavity width is recommended for wall heights greater than 12 metres and up to and including 25 metres. For further details please refer to current BBA Certificate 14/5133.

The NHBC and / or Zurich Building Insurance Technical Standards normally require a minimum 50 mm residual cavity width in areas of severe exposure to wind driven rain (exposure zone 3) and a minimum 75 mm residual cavity width in areas of very severe exposure to wind driven rain (exposure zone 4), where nominal standards of tolerance and workmanship are accepted. The NHBC and/or Zurich Building Insurance Technical Standards are able to accept a 50 mm residual cavity width for *Kingspan* **Therma**wall® TW50 in all exposure zones including areas of very severe exposure to wind driven rain (exposure zone 4) where the outer leaf is fair faced masonry with tool flush joints.

Ireland

A minimum 40 mm residual cavity width is recommended for all wall heights. For further details please refer to current NSAI Agrément Certificate 03/0196.

Wall Ties

Wall ties should have a retaining clip for securing the insulant to the masonry plane and be of a double drip type. Ideally they should be BBA / NSAI approved and conform to BS EN 845-1: 2013 + A1: 2016 (Specification for ancillary components of masonry. Wall ties, tension straps, hangers and brackets), BS EN 1996-1-1: 2005 + A1: 2012 (Eurocode 6. Design of masonry structures. General rules for reinforced and unreinforced masonry structures), BS EN 1996-2: 2006 (Eurocode 6. Design of masonry structures. Design considerations, selection of materials and execution of masonry), BS EN 1996-3: 2006 (Eurocode 6. Design of masonry structures. Simplified calculation methods for unreinforced masonry structures) and PD 6697: 2010 (Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2).

Lightning Protection

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

Fixing Details

- *Kingspan* **Therma**wall® TW50 is normally held in position by the wall ties used to tie the two skins of masonry together.
- Wall ties should include a retaining disc / clip and be of the double drip type, installed drip downward.
- For a solid concrete ground floor the first row of wall ties are installed in the inner leaf at 600 mm horizontal centres a minimum of one course of blockwork below the damp proof course or 150 mm below the top surface of the ground floor perimeter insulation upstand (see ‘Heat Loss and Linear Thermal Bridging’ above), whichever is the lower.
- For a suspended timber floor the first row of wall ties are installed in the inner leaf at 600 mm horizontal centres a minimum of 200 mm below the top surface of the ground floor perimeter insulation upstand (see ‘Heat Loss and Linear Thermal Bridging’ above).
- Continue constructing the inner leaf up to the next wall tie course (450 mm above the first – usually 2 block courses).
- The next course of wall ties is positioned at the usual 900 mm horizontal centres in the UK and 750 mm horizontal centres in Ireland.
- The next course of blockwork is installed to secure the ties.
- The first row of insulation boards should now be installed between the two rows of wall ties, ensuring each insulation board is retained tight against the inner leaf and joints are lightly butted.
- Each board should be secured at a minimum of three points. Additional ties may also be required to satisfy the structural requirements of BS EN 845-1: 2013 + A1: 2016, BS EN 1996-1-1: 2005 + A1: 2012, BS EN 1996-2: 2006, BS EN 1996-3: 2006, PD 6697: 2010 and / or to ensure adequate retention of boards or cut pieces.
- The outer leaf is then built up to the level of the top of the boards and the process is repeated.
- When insulating a gable, insulation boards should be continued 250 mm beyond the height of the top storey ceiling and a cavity tray installed above the insulation.

Excess Mortar

- After raising each section of inner leaf, before installation of the insulation board, excess mortar should be removed and mortar droppings cleaned from exposed edges of the installed insulation boards.
- Use of a cavity batten or cavity board is recommended to protect board edges and maintain a clear cavity (see Figures 7 & 8 or refer to BBA Certificate 14/5133 or NSAI Agrément Certificate 03/0196).

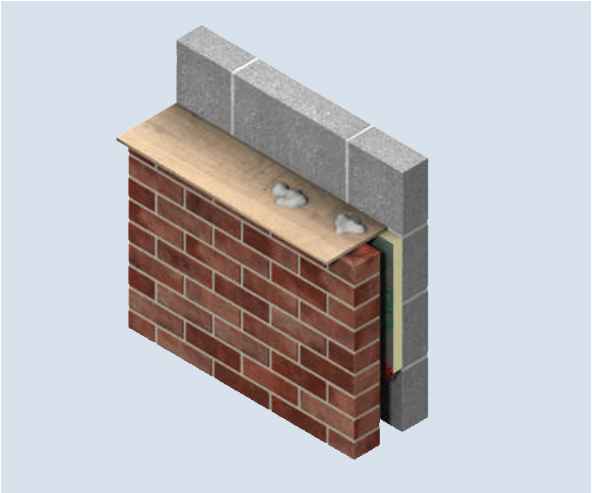


Figure 7 – Use of a Cavity Board to Protect the Cavity and Insulation Board Top Edge

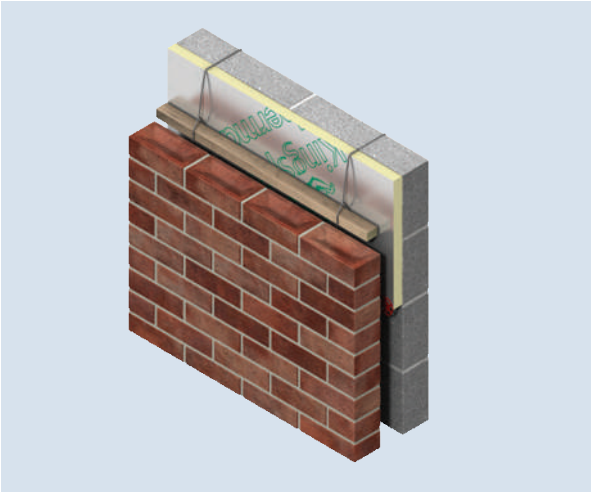


Figure 8 – Use of a Cavity Batten to Protect the Cavity

General

Cutting

- Cutting should be carried out either by using a fine toothed saw, or by scoring with a sharp knife, snapping the board over a straight edge and then cutting the facing on the other side.
- Ensure accurate trimming to achieve close butting joints and continuity of insulation.

Daily Working Practice

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

Availability

- *Kingspan* **Therma**wall® TW50 is available through specialist insulation distributors and selected builders' merchants throughout the UK and Ireland.

Packaging and Storage

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

Health and Safety

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

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

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

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

Product Details

The Facings

Kingspan **Therma**wall® TW50 is faced on both sides with a low emissivity composite foil, autohesively bonded to the insulation core during manufacture. This reflective, low emissivity surface improves the thermal resistance of any unventilated cavity adjacent to the board.

The Core

The core of *Kingspan* **Therma**wall® TW50 is a high performance fibre–free rigid thermoset polyisocyanurate (PIR) insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

Standards and Approvals

Kingspan **Therma**wall® TW50 is manufactured to the highest standards in accordance with the requirements of BS 4841–1: 2006 (Rigid polyisocyanurate (PIR) and polyurethane (PUR) products for building end–use applications. Specification for laminated insulation boards with auto-adhesively or separately bonded facings).

Kingspan **Therma**wall® TW50 is also manufactured 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 and Safety Management Systems. Requirements) and ISO 50001: 2011 (Energy Management Systems. Requirements with guidance for use).

The use of *Kingspan* **Therma**wall® TW50 produced at Kingspan Insulation's Pembridge and Selby manufacturing facilities is covered by BBA Certificate 14/5133 and that produced at Kingspan Insulation's Castleblayney manufacturing facility by NSAI Agrément Certificate 03/0196.

Standard Dimensions

Kingspan **Therma**wall® TW50 is available in the following standard size(s):

Nominal Dimension		Availability
Length	(m)	1.2
Width	(m)	0.45
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* **Therma**wall® TW50 typically exceeds 125 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 product typically achieves a resistance far greater than 100 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).

Durability

If correctly installed, *Kingspan* **Therma**wall® TW50 can have an indefinite life. Its durability depends on the supporting structure and the conditions of its use.

Resistance to Solvents, Fungi & Rodents

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

The insulation core and facings used in the manufacture of *Kingspan* **Therma**wall® TW50 resist attack by mould and microbial growth and do not provide any food value to vermin.

Fire Performance

Kingspan **Therma**wall® TW50, is Class 1, as defined by BS 476–7: 1997 (Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products).

Kingspan **Therma**wall® TW50 will not prejudice the fire resistance properties of a wall in which it is installed. It is unlikely to become ignited within the cavity. If fire does penetrate into an unventilated cavity, the amount of air present will be insufficient to support combustion, and flame spread will be minimal.

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 13165: 2012 + A1: 2015 (Thermal insulation products for buildings. Factory made rigid polyurethane foam (PU) products. Specification).

Thermal Conductivity

The boards achieve a thermal conductivity (λ–value) of 0.022 W/m·K.

Thermal Resistance

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

Insulant Thickness (mm)	Thermal Resistance (m^2·K/W)
25	1.10
30	1.35
35	1.55
40	1.80
45	2.00
50	2.25
55	2.50
60	2.70
65	2.95
70	3.15
75	3.40
80	3.60
85	3.85
90	4.05
95	4.30
100	4.50
110	5.00
120	5.45
125	5.65
130	5.90
140	6.35

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

Insulation Product Benefits

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

- With a declared value 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®

Kingspan Insulation Ltd
Pembridge, Leominster, Herefordshire HR6 9LA, UK
Castleblayney, County Monaghan, Ireland
www.kingspaninsulation.co.uk **www.kingspaninsulation.ie**

® Kingspan, Kingspan GreenGuard, Kooltherm, Nilflam, OPTIM-R, Thermawall and the Lion Device are Registered Trademarks of the Kingspan Group plc in the UK, Ireland and other countries. All rights reserved.
™ Therma is a Trademark of the Kingspan Group plc.
Registered in England & Wales, No. 01882722. Registered Office: Pembridge, Leominster, Herefordshire HR6 9LA UK. VAT GB428602456.
Registered in Ireland, No. 54621. Registered Office: Bree Industrial Estate, Castleblayney, Co. Monaghan, Ireland. VAT IE4575069I.