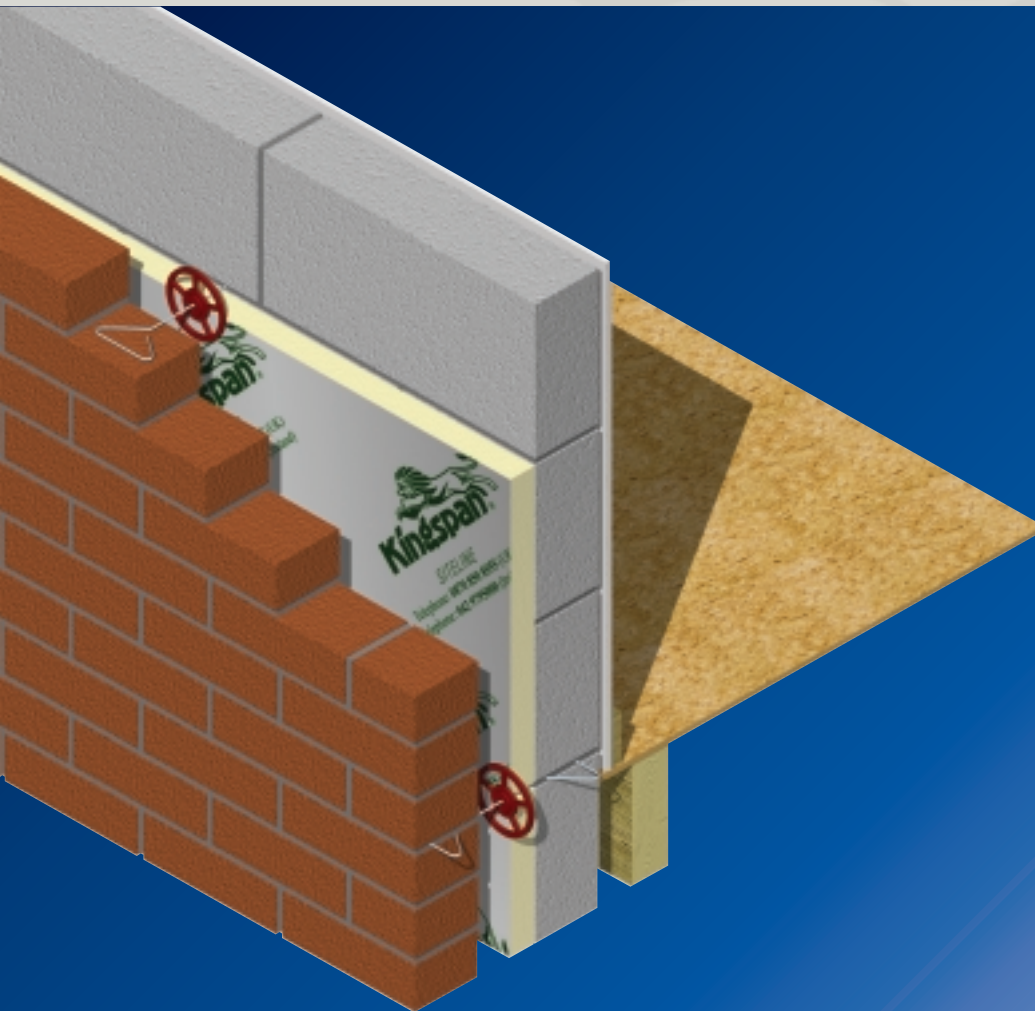


Thermawall® TW50

PARTIAL FILL CAVITY WALL INSULATION



- High performance rigid urethane insulation – thermal conductivity 0.023 W/m-K
- Utilises traditional cavity wall construction methods
- Clear cavity is maintained – resists moisture penetration
- Low emissivity foil facings are resistant to the passage of water vapour and double the thermal resistance of the cavity
- Unaffected by air movement
- Easy to handle and install
- Non-deleterious material
- CFC/HCFC-free with zero Ozone Depletion Potential (ODP)



Typical Design Detail

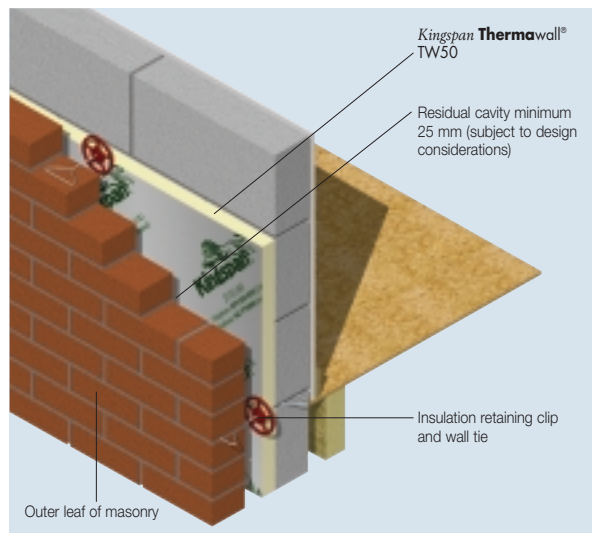


Figure 1

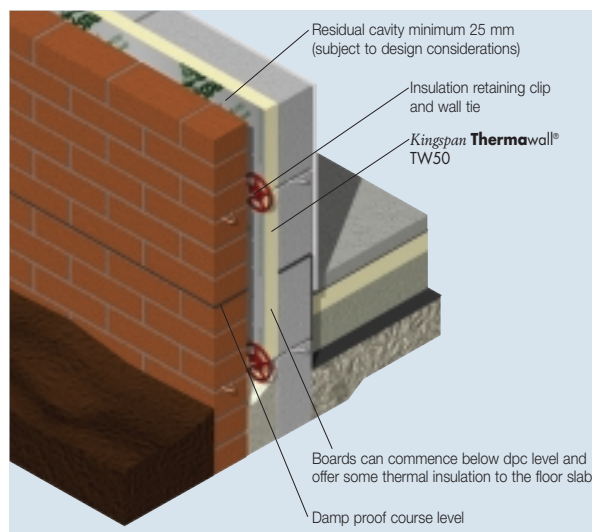


Figure 2

Specification Clause

Kingspan Thermawall® TW50 should be described in specifications as:-

The wall insulation shall be **Kingspan Thermawall® TW50** ____mm thick comprising a CFC/HCFC-free rigid urethane insulation core with low emissivity composite foil facings on both sides manufactured to the highest standards in accordance with both the requirements of draft BS 4841-1 and quality control systems approved to BS EN ISO 9001: 2000 / I.S. EN ISO 9001: 2000 by Kingspan Insulation Limited and shall be applied in accordance with the instructions issued by them.

Details also available in NBS Plus.
NBS users should refer to clause(s):
F30 155 (Standard and Intermediate)
F30 12 (Minor works)



Design Considerations

Sustainability

In the past, erroneously, the relative environmental sustainability of insulation materials has been compared on the basis of embodied energy and ozone depletion potential. It is now recognised that a much wider basket of embodied environmental impacts (including those caused by their embodied energy), rather than embodied energy alone, is the only credible tool of comparison. Time has also annulled ozone depletion potential as an issue as all insulation materials are now banned from using CFC and HCFC blowing agents by law.

For buildings designed to today's Building Regulations energy use standards it is now also known that the embodied environmental impacts of all of the materials and labour used to create a building are insignificant in comparison with the lifetime operational environmental impacts of that building, and so are of very limited importance. Since it is operational energy use that creates the vast majority of operational environmental impact, saving energy by specifying the lowest U-values possible is the most environmentally sustainable action to take.

However, one of the most neglected facts about environmentally sustainable buildings is that the longevity of their standards of operational energy use, and therefore the longevity of their operational environmental impacts, is critical. The performance of some insulants, such as mineral fibre, can deteriorate rapidly if exposed to water penetration, air movement or compression. This may increase operational energy use and hence compromise the environmental sustainability of the finished building to an alarming degree. Other insulation materials, such as rigid phenolic or rigid urethane, are not vulnerable to any of these problems.

In summary, designers should:

- specify the lowest possible U-value regardless of insulation type;
- design out the risk of their chosen insulant not performing as specified; and
- if the latter is not possible, choose an insulant that is at low risk of failure e.g. a cellular plastic insulation material.

However, manufacturers should not rest on their laurels; it is a matter of social responsibility to be open and honest about the environmental impact of the manufacture of a product, and a full Life Cycle Analysis (LCA) based on a much wider basket of environmental impacts, rather than embodied energy alone, is recognised as the preferred tool to achieve this. Kingspan Insulation was the first insulation manufacturer to openly complete and publish independently certified Ecoprofiles (a type of LCA) on its product ranges. The Ecoprofile for the **Kingspan Thermo™** range of rigid urethane insulation products was performed by Building Research Establishment (BRE). The product range comfortably achieves a BRE Green Guide A rating.



But there is far more to sustainability than whether or not a product, process or company affects the environment in a positive or a negative way. A company can, and should, demonstrate its financial viability and social responsibility, as well as ensure that its materials and methods do not add unduly to the burden placed on the planet.

Kingspan Insulation has now put the manufacture of its products at its Pembroke facility in Herefordshire through a rigorous independent appraisal of its economic, social, environmental and natural resource impacts using Arup's SPeAR® tool.

The results show a well balanced performance in terms of sustainability, and that Kingspan Insulation is already meeting legislation or best practice in most areas, even moving beyond best practice in some. Kingspan Insulation is the first and only construction material manufacturer to have taken this bold move and openly publish the results.

Residual Cavity Width

For wall heights up to 12 m a minimum 25 mm cavity is recommended, and a minimum 50 mm cavity for wall height greater than 12 m, and up to and including 25 m after the installation of **Kingspan Thermawall® TW50** irrespective of the thickness specified. By maintaining a clear cavity, problems associated with fully filled cavities can be avoided. For further details please refer to current BBA Certificate No. 94/2992.

NB A residual cavity width of 50 mm nominal will be required by the NHBC where nominal standards of tolerance and workmanship are accepted. In Ireland a residual cavity not less than 40 mm should be maintained in accordance with Technical Guidance document C.

Design Standards

BS 5628-1: 1992 (Code of practice for use of masonry. Structural use of unreinforced masonry) and BS 5628-2: 2000 (Code of practice for use of masonry. Structural use of reinforced and prestressed masonry) should be consulted regarding the construction of insulated cavity walls.

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 approved and conform to BS EN 845-1: 2003 (Specification for ancillary components for masonry. Ties, tension straps, hangers and brackets).

Severe Exposure Zones

In severe exposure zones only stainless steel or copper alloy wall ties should be used. BS 5628-3: 2001 (Code of practice for use of masonry. Materials and components, design and workmanship) refers to this.

Typical U-values

The following examples have been calculated using the Combined Method for compliance with Building Regulations / Standards revised after 2002. These examples are based on the use of **Kingspan Thermawall® TW50** fixed to the outer face of the inner leaf of a masonry cavity wall with a minimum 25 mm clear residual cavity between the outer face of the **Kingspan Thermawall® TW50** and the inner face of the outer masonry leaf. The internal wall finish has been assumed to be 3 mm skim coated 12.5 mm plasterboard installed on dabs. If your construction is any different, please contact the Kingspan Insulation Technical Service Department (see rear cover).

Combined Method – U-values were calculated using the method which has been adopted to bring National standards in line with the European Standard calculation method, BS / I.S. EN ISO 6946: 1997 (Building components and building elements. Thermal resistance and thermal transmittance. Calculation method).

NB When calculating U-values to BS EN ISO 6946: 1997, the type of wall tie used may change the thickness of insulation required. These calculations assume a stainless steel flexible tie with 2.5 ties per m² and a cross-sectional area of 12.50 mm². Please contact the Kingspan Insulation Technical Service Department (see rear cover) for project calculations.

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

NB The figures quoted are for guidance only. A detailed U-value calculation together with condensation risk analysis should be completed for each individual project. Please contact the Kingspan Insulation Technical Service Department (see rear cover) for assistance.

Brick Outer Leaf / Cavity / Dense Block Inner Leaf

Insulant Thickness (mm)	U-value (W/m²·K)
17	0.51
20	0.48
25	0.43
30	0.39
35	0.36
40	0.34
45	0.31
50	0.29
55	0.28
60	0.26
65	0.25
70	0.23

NB Calculations assume the use of 102.5 mm external brickwork and 100 mm dense internal blockwork of λ-value 1.13 W/m·K.

Brick Outer Leaf / Cavity / Medium Dense Block Inner Leaf

Insulant Thickness (mm)	U-value (W/m²·K)
17	0.48
20	0.45
25	0.41
30	0.38
35	0.35
40	0.33
45	0.30
50	0.28
55	0.27
60	0.25
65	0.24

NB Calculations assume the use of 102.5 mm external brickwork and 100 mm medium dense internal blockwork of λ-value 0.51 W/m·K.

Brick Outer Leaf / Cavity / Lightweight Block Inner Leaf

Insulant Thickness (mm)	U-value (W/m ² ·K)
17	0.43
20	0.41
25	0.37
30	0.34
35	0.32
40	0.30
45	0.28
50	0.26
55	0.25
60	0.24

NB Calculations assume the use of 102.5 mm external brickwork and 100 mm lightweight internal blockwork of λ -value 0.19 W/m·K.

Brick Outer Leaf / Cavity / Aerated Block Inner Leaf

Insulant Thickness (mm)	U-value (W/m ² ·K)
17	0.38
20	0.36
25	0.34
30	0.31
35	0.29
40	0.28
45	0.26
50	0.25
55	0.23

NB Calculations assume the use of 102.5 mm external brickwork and 100 mm internal aerated blockwork of λ -value 0.11 W/m·K.

Dense Block Outer Leaf / Cavity / Dense Block Inner Leaf

Insulant Thickness (mm)	U-value (W/m ² ·K)
17	0.51
20	0.48
25	0.43
30	0.40
35	0.36
40	0.34
45	0.31
50	0.29
55	0.28
60	0.26
65	0.25
70	0.23

NB Calculations assume the use of 100 mm dense block inner and outer leaves of λ -value 1.13 W/m·K.

NB Calculations assume a 20 mm external coat of sand / cement render.

Dense Block Outer Leaf / Cavity / Medium Dense Block Inner Leaf

Insulant Thickness (mm)	U-value (W/m ² ·K)
17	0.48
20	0.45
25	0.41
30	0.38
35	0.35
40	0.33
45	0.30
50	0.29
55	0.27
60	0.25
65	0.24

NB Calculations assume the use of 100 mm external dense blockwork of λ -value 1.13 W/m·K and 100 mm internal medium dense blockwork of λ -value 0.51 W/m·K.

NB Calculations assume a 20 mm external coat of sand / cement render.

Prevention of Thermal Bridging

In an effort to prevent a cold bridge detail at window cill and jamb details the designer may wish to adopt the following details. The insulation is simply cut and returned to suit.

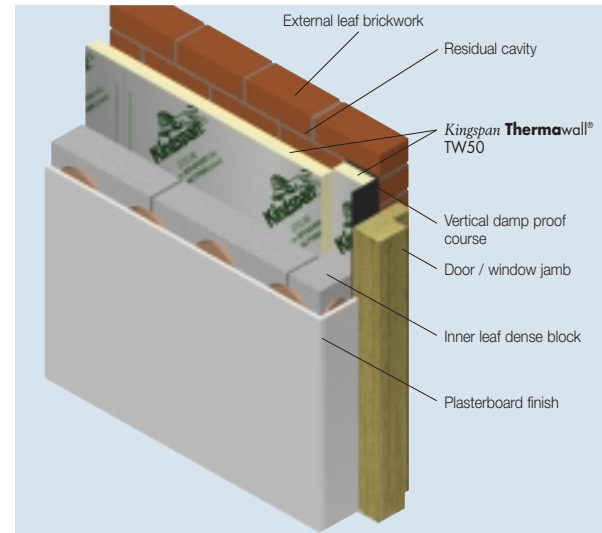


Figure 3 Robust Jamb Detail – UK

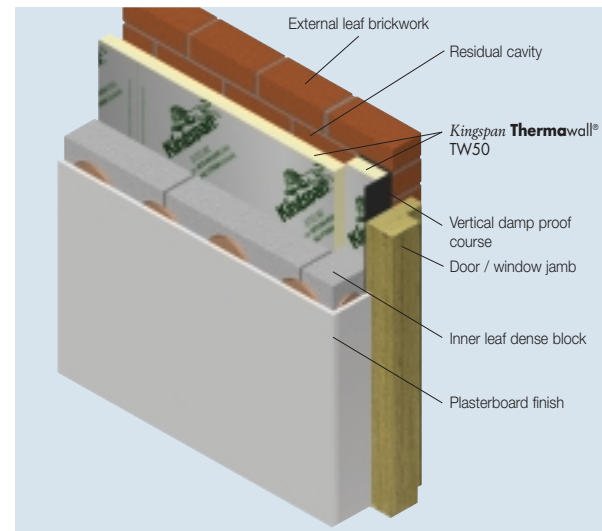


Figure 4 Robust Jamb Detail – Ireland

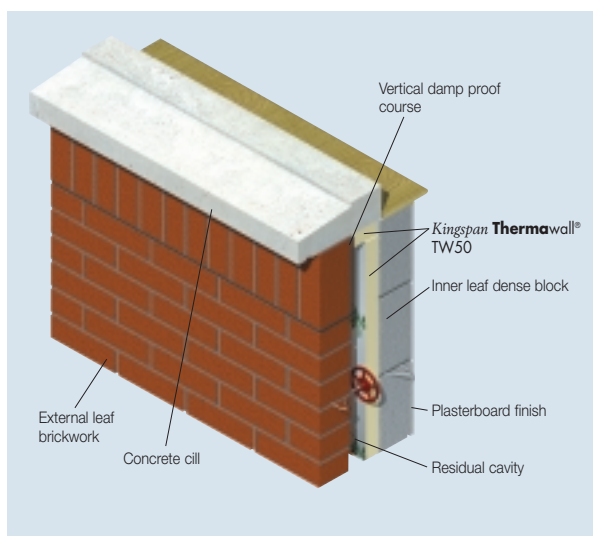


Figure 5 Robust Cill Detail – UK

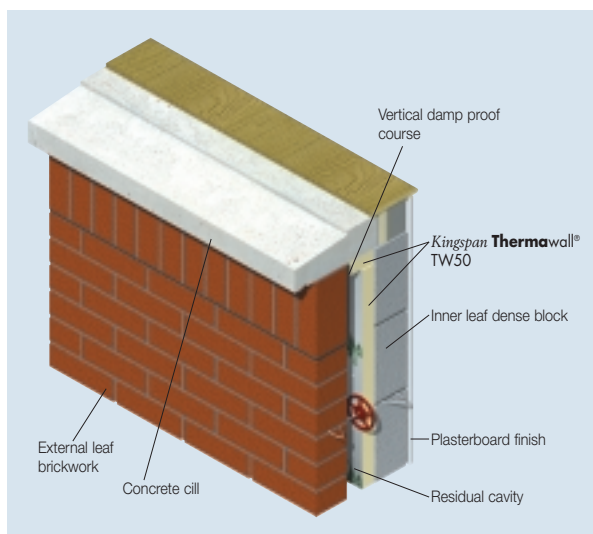


Figure 6 Robust Cill Detail – Ireland

Sitework

Wall Ties & Retaining Clips

Kingspan Thermawall® TW50 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 damp-proof course and at approximately 600 mm horizontal centres. A section of the 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 450 mm vertically and not exceeding 900 mm (750 mm in Ireland).

The *Kingspan Thermawall®* TW50 boards are then placed in position behind the retaining clips on the wall ties, and 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.

The first row of boards commencing below damp-proof course level also provides some edge insulation to the floor slab (see Figure 2). Successive sections of wall incorporating wall ties and clips are constructed and *Kingspan Thermawall®* TW50 boards 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 (see Figures 7 & 8 or refer to BBA Certificate 94/2992 or IAB Certificate 03/0196).

Daily Working Practice

Installed *Kingspan Thermawall®* TW50 boards should be protected against inclement weather.

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.

Availability

Kingspan Thermawall® TW50 is available through specialist insulation distributors and selected builders' merchants throughout the UK, Ireland and Europe.

Packaging

The boards are supplied in labelled packs, shrinkwrapped in polythene.

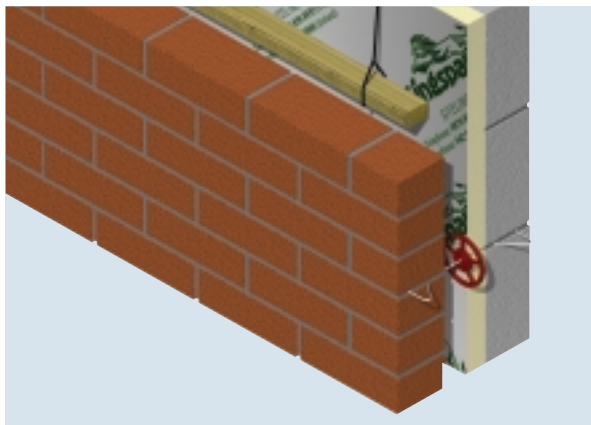


Figure 7 Use of a Cavity Batten to protect the Cavity

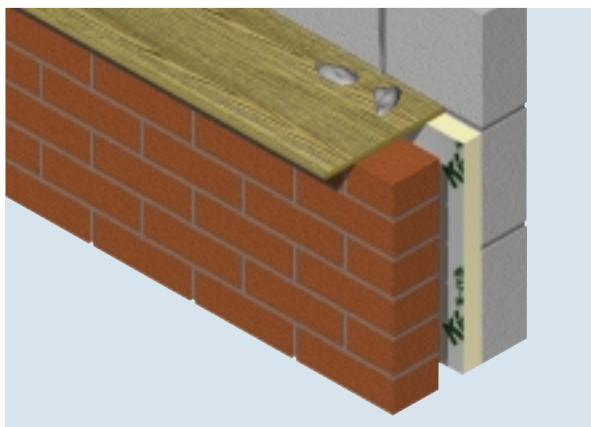


Figure 8 Use of a Cavity Board to protect the Cavity

Storage

The packaging of **Kingspan Thermawall® TW50** should not be considered adequate for long term outside 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 a 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 leaflet on this topic which satisfies the requirements set out in the Control of Substances Hazardous to Health Regulations 1988 (COSHH) is available from the Kingspan Insulation Marketing Department (see rear cover).

Please note that the reflective surface on this product is designed to enhance its thermal performance. As such, it will reflect light as well as heat, including ultraviolet light. Therefore, if this board 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 facing used on this product can be slippery underfoot when wet. Therefore, it is recommended that any excess material should be contained to avoid a slip hazard.

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

Product Description

The Facings

Kingspan Thermawall® TW50 is faced on both sides with a low emissivity composite foil which is highly resistant to the transmission of water vapour. This reflective, low emissivity surface effectively doubles the thermal resistance of the cavity in which the board is placed.

The Core

The core of **Kingspan Thermawall® TW50** is manufactured from trademarked



Nilflam® technology (a high performance CFC/HCFC-free polyisocyanurate (PIR) based formulation). **Kingspan Thermawall® TW50** has a typical density of 32 kg/m³.

CFC/HCFC-free

Kingspan Thermawall® TW50 is manufactured without the use of CFCs/HCFCs and has zero Ozone Depletion Potential (ODP).



Product Data

Standards and Approvals

Kingspan Thermawall® TW50 is manufactured to the highest standards in accordance with the requirements of draft BS 4841-1 (Rigid Polyurethane (PUR) and Polyisocyanurate (PIR) products for building end-use applications. Specification for laminated insulation boards for wall cavities).

Kingspan Thermawall® TW50 is manufactured to the highest standards under quality control systems approved to BS EN ISO 9001: 2000 / I.S. EN ISO 9001: 2000 (Quality management systems. Requirements). Its use is covered by BBA Certificate 94/2992 and IAB Certificate 03/0196.



Manufactured to BS EN ISO 9001: 2000
Certificate No. 388



I.S. EN ISO 9001: 2000
Registration No. 19.0633



IAB No. 03/0196

Standard Dimensions

Kingspan Thermawall® TW50 is available in the following standard size:

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

Typically exceeds 140 kPa at 10% compression when tested to BS EN 826: 1996 (Thermal insulating products for building applications. Determination of compression behaviour).

Water Vapour Resistance

Modified to include board facings, the boards achieve a resistance far greater than 100 MN·s/g when tested in accordance with BS 4370-2: 1993 (Methods of test for rigid cellular materials. Methods 7 to 9).

Durability

If correctly applied, *Kingspan Thermawall*® TW50 has an indefinite life. Its durability depends on the supporting structure and the conditions of its use.

Resistance to Solvents, Fungi & Rodents

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

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

Fire Performance

Kingspan Thermawall® TW50, when subjected to British Standard fire tests, achieves the results given below.

Test	Result
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)	Class 1 rating

The use of the product in the context of BBA Certificate 94/2992 does not prejudice the fire resistance properties of the wall. 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.

Walls containing the product do not need cavity barriers in buildings of any purpose group provided they are constructed in accordance with the provisions of BBA Certificate 94/2992.

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 quoted are in accordance with the Harmonised European Standard BS EN 13165: 2001 (Thermal insulation products for buildings – Factory made rigid polyurethane foam (PUR) products – Specification) using so called 90 / 90 principles. Comparison with alternative products may not be appropriate unless the same procedures have been followed.

Thermal Conductivity

The boards achieve a thermal conductivity (λ -value) of 0.023 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.

Insulant Thickness (mm)	Thermal Resistance (m ² ·K/W)
17	0.75
20	0.90
25	1.10
30	1.35
35	1.50
40	1.70
45	1.95
50	2.15
55	2.35
60	2.60
65	2.80
70	3.00

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

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) 870 850 8555
	– Fax:	+44 (0) 870 850 8666
	– email:	commercial.uk@insulation.kingspan.com
Ireland	– Tel:	+353 (0) 42 97 54200
	– Fax:	+353 (0) 42 97 54299
	– email:	commercial.ie@insulation.kingspan.com

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.

Available as a complete Design Manual or as individual product brochures, Kingspan Insulation technical literature is an essential specification tool. For copies please contact the Kingspan Insulation Marketing Department on the numbers below:

UK	– Tel:	+44 (0) 870 733 8333
	– Fax:	+44 (0) 1544 387 299
	– email:	literature.uk@insulation.kingspan.com
Ireland	– Tel:	+353 (0) 42 97 54298
	– Fax:	+353 (0) 42 97 54299
	– email:	literature.ie@insulation.kingspan.com

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) 870 761 7770
	– Fax:	+44 (0) 1544 387 289
	– email:	tapered.uk@insulation.kingspan.com
Ireland	– Tel:	+353 (0) 42 97 54297
	– Fax:	+353 (0) 42 97 54296
	– email:	tapered.ie@insulation.kingspan.com

Technical Advice / Design

Kingspan Insulation supports all of its products with a comprehensive Technical Advisory Service for specifiers, stockists and contractors.

This includes a computer-aided service designed to give fast, accurate technical advice. Simply phone the Kingspan Insulation Technical Service Department with your project specification. Calculations can be carried out to provide U-values, condensation / dew point risk, required insulation thicknesses etc... Thereafter any number of permutations can be provided to help you achieve your desired targets.

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.

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

UK	– Tel:	+44 (0) 870 850 8333
	– Fax:	+44 (0) 1544 387 278
	– email:	techline.uk@insulation.kingspan.com
Ireland	– Tel:	+353 (0) 42 97 54297
	– Fax:	+353 (0) 42 97 54296
	– email:	techline.ie@insulation.kingspan.com

General Enquiries

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

UK	– Tel:	+44 (0) 870 850 8555
	– Fax:	+44 (0) 870 850 8666
	– email:	info.uk@insulation.kingspan.com
Ireland	– Tel:	+353 (0) 42 97 54200
	– Fax:	+353 (0) 42 97 54299
	– email:	info.ie@insulation.kingspan.com

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 as to the 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 the literature is current by contacting the Kingspan Insulation Marketing Department (see left).



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