

Ballytherm 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 Ballytherm insulation products:

- BTCW – Ballytherm Rebated Cavity Wall Insulation (Detail Sheet 1)
- BTF – Ballytherm Floor Insulation (Detail Sheet 2)
- BTR – Ballytherm Pitch Roof Insulation (Detail Sheet 3)
- BTDL – Ballytherm Dry Lining Board Insulation (Detail Sheet 4)

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2017.

USE:

This is covered in each individual Detail Sheet.

MANUFACTURE AND MARKETING:

Ballytherm Trading Ltd.,
Annagh Industrial Park,
Ballyconnell,
Co. Cavan,
Ireland.
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F: +353 (0)49 9527002
E: info@ballytherm.ie
W: www.ballytherm.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Ballytherm Insulation Products if used in accordance with this Certificate and in conjunction with the relevant Detail Sheet, can meet the requirements of the Building Regulations 1997 to 2017, as indicated in Section 1.2 of this Irish Agrément Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

REQUIREMENTS:

Part D – Materials and Workmanship

D3 – Ballytherm Insulation Products, as certified in this Certificate, are comprised of 'proper materials' fit for their intended use (see Part 4 of this Certificate).

D1 – Ballytherm Insulation Products, as certified in this Certificate, meet the requirements of the building regulations for workmanship.

Part B – Fire Safety

B2 – Internal Fire Spread (Linings)

Part B Vol 2 – Fire Safety

B7 – Internal Fire Spread (Linings)

Ballytherm Insulation Products faced with plasterboard are considered to be Class 0. They may therefore be used on the internal surfaces of buildings of every purpose group.

B3 – Internal Fire Spread (Structure)

B8 – Internal Fire Spread (Structure)

The reaction to fire classifications for Ballytherm Insulation Products are listed in their Detail Sheets.

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture

Ballytherm Insulation 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 or interstitial condensation.

Part F – Ventilation

F1 – Means of Ventilation

Ballytherm Insulation Products can be incorporated into structures that meet the requirements of this Regulation.

Part J – Heat Producing Appliances

J3 – Protection of Building

In the opinion of NSAI Agrément, the Ballytherm Insulation Products, if used in accordance with this Certificate and the relevant Detail Sheet, can meet the requirements of Part J 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 Ballytherm Insulation Products, the products can contribute to complying with the requirements of this Regulation.

2.1 PRODUCT DESCRIPTION

Each of the Ballytherm Insulation Products is given a detailed description in the relevant Detail Sheet.

2.2 DELIVERY, STORAGE AND MARKING

Ballytherm Insulation Products are supplied palletised in labelled packs and shrink wrapped in polyethylene. Each pack carries a label bearing the CE Marking together with the product description, product characteristics (λ and R values), size, thickness, batch number and date of manufacture, the 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.

Boards should be protected in transit and in storage from damage caused by ropes and tie straps.

The boards must not be exposed to a naked flame or other ignition sources.

On-site cutting of boards where it is 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. Cutting BTDL panels is also easy to execute by using a trimming knife to cut through the insulation and paper backing of the 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 Ballytherm Insulation 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 ' $\lambda_{90/90}$ ' value' of the Ballytherm Insulation Products have been 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* (see each individual Detail Sheet). The high thermal resistance of the Ballytherm 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 2017, Section 1.6 page 14.

The required maximum U-values for external walls, floors 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. Window and door reveal design used with Ballytherm Insulation 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 QL Dry Lining with Plasterboard Laminate.

4.6 CONDENSATION RISK

The Ballytherm Insulation 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 Ballytherm Insulation 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 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. The insulation core is however resistant to dilute acids, alkalis, mineral oil and petrol.

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 Ballytherm Insulation Products referred to in this Certificate are rot-proof and durable. As insulation for cavity walls, floors and roofs and as dry lining, such products are judged to be stable and will remain effective as an insulation system for the life of the building, so long as it is installed in accordance with this Certificate. Ballytherm BTDL Dry Lining Board should not be used to isolate dampness nor be used in continuously damp or humid conditions.

4.11 CE MARKING

The manufacturer has taken responsibility of CE marking the Ballytherm Insulation Products in accordance with harmonised European Standard IS EN 13165:2012+A2:2016 *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PU) products - Specification*. An asterisk (*) appearing in this Certificate indicates that data shown is an essential characteristic of the product and declared in the manufacturer's 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 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.

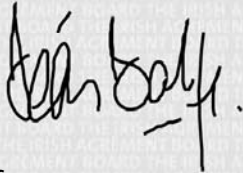
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is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

NSAI Agrément

This Certificate No. **05/0220** is accordingly granted by the NSAI to **Ballytherm Trading Ltd** on behalf of NSAI Agrément.

Date of Issue: **May 2005**

Signed



Seán Balfé
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.n sai.ie

Revisions

12th January 2018: References to Building Regulations and standards updated, product specifications updated to reflect manufacturer's DoP.

17th December 2020: General revision.

25 March 2021: Change of name to Ballytherm Trading Ltd.



NSAI

Agrément

CERTIFICATE NO. 05/0220
DETAIL SHEET 1

Ballytherm BTCW Rebated Cavity Wall Insulation



PRODUCT DESCRIPTION:

This Detail Sheet relates to Ballytherm BTCW Rebated Cavity Wall Insulation, as defined in NSAI Agrément Certificate 05/0220.

USE:

Ballytherm BTCW Rebated Cavity Wall Insulation 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 and interstitial condensation in walls.

MANUFACTURE AND MARKETING:

The product is manufactured and marketed by:

Ballytherm Trading Ltd.,
Annagh Industrial Park,
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Co. Cavan,
Ireland.

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1.1 ASSESSMENT

In the opinion of NSAI Agrément, the Ballytherm BTCW Rebated Cavity Wall Insulation product, if used in accordance with this Detail Sheet, meets the requirements of the Building Regulations 1997 to 2017 as indicated in Section 1.2 of Certificate 05/0220.

1.2 BUILDING REGULATIONS 1997 to 2017

This matter is dealt with in NSAI Agrément Certificate 05/0220.

2.1 PRODUCT DESCRIPTION

This Detail Sheet relates to Ballytherm BTCW Rebated Cavity Wall Insulation, a partial fill cavity wall board with a rebated edge, using Polyisocyanurate (PIR) closed cell rigid insulation manufactured in accordance with IS EN 13165:2012+A2:2016. During the manufacturing process, liquid raw materials expanded by blowing agents are applied between low emissivity composite foil facings. Ballytherm BTCW Rebated Cavity Wall Insulation is CFC and HCFC free and therefore has zero ozone depletion potential (zero ODP).

This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Length	2400mm
Width	450mm (plus 10mm rebate)
Thickness	25 to 150mm
Nominal density	30-40kg/m ³
Edge profiles	<ul style="list-style-type: none"> • Tongue and groove • Rebated • Plain edge (butt jointed)
Thermal conductivity*	0.022W/mK
Water vapour permeability*	60-100hm ² Pa/mg
Compressive strength*	CS(10\Y)100
Reaction to fire*	Euroclass F
Dimensional stability*	DS(23,90)2 @ 23°C 90% RH DS(-20,-)2 @ -20°C

Table 1: Product Range & Physical Properties

2.2 MANUFACTURE

Ballytherm BTCW is manufactured from a formulation of chemicals, which is sprayed onto low emissivity composite foil facings subsequently autohesively bonded to the insulation core during manufacture. The reflective low emissivity surface can increase the thermal resistance of the residual cavity airspace in which the board is placed.

2.3 DELIVERY, STORAGE AND MARKING

This matter is dealt with in Section 2.2 of NSAI Agrément Certificate 05/0220.

2.4 INSTALLATION

2.4.1 General

Walls are constructed in the conventional manner with the first row of ties one course below damp proof course (DPC) level at not greater than 600mm horizontal centres. It is recommended that the wall ties are not placed directly on the DPC. The first row of insulation boards should be supported by the ties providing edge insulation for the floor, as required by TGD to Part L of the Building Regulations 1997 to 2017.

The mortar fill below DPC level must be considered and it is also necessary to ensure that any installed radon membrane is not damaged. The walls are constructed by raising each section of the inner or outer leaf up to the level of the next run of wall ties, which are situated at a spacing shown in Table 2. Ballytherm BTCW boards are then placed in position behind the retaining clips of the wall ties tight against the cavity face of the inner leaf. The joints should be as neat as possible. This ensures maximum thermal performance. It is recommended that

drainage holes be provided in the perpend block joints below DPC level at approximately 1m centres. Refer to IS EN 1996-1-1:2005+A1:2012 *Eurocode 6 – Design of masonry structures – Part 1-1: General rules for reinforced and unreinforced masonry structures (including Irish National Annex)*. Reference should also be made to TGD to Part A and TGD to Part L of the Building Regulations 1997 to 2017.

Each board should be secured by a minimum of 3 retaining clips. Additional wall ties at unbonded openings, junctions and cut ends should be located at maximum 225mm vertical centres and within 150mm of any opening.

All wall ties should be installed correctly, clear of all mortar, sloped downwards towards the outer leaf and conform to structural design requirements. In severe exposure zones, Ballytherm BTCW should be installed in walls whilst maintaining a 40mm cavity width. Only certified wall ties specified by Ballytherm Trading Ltd should be used in conjunction with this system. Included in each pack of ties is a small saw to cut the rebate of the board for positioning of the tie at the required spacing. The spacing of wall ties should be in accordance with IS EN 1996-1-1:2005+A1:2012.

Successive sections of wall fixed by certified stainless steel wall ties are constructed and Ballytherm BTCW boards are installed as work proceeds up to the required height. Excess mortar should be removed and mortar droppings cleaned from the exposed edges of the installed boards. Use of cavity battens or cavity boards or similar means is recommended to protect installed boards and keep the cavity mortar free. Penetration of damp across the cavity will be prevented with good practice.

Where the use of wall ties is inappropriate, e.g. under window sills, proprietary clips may be used to hold the cavity boards tightly in place. Jamb details must incorporate a vertical DPC, positioned between the Ballytherm BTCW board and the external leaf, returning a minimum of 150mm.

Cavity Width (mm)	Horizontal Spacing (mm)	Vertical Spacing (mm)	No of Wall Ties per m ²
76-110	750	450	3.0
111-150	450	450	4.9

Table 2: Maximum Wall Tie Spacing

To prevent damp penetrating across the cavity it is important to ensure the following:

- Mortar filling of cavity at wall base is not too high.

- Keep wall ties clean free from mortar droppings. This is achieved with the use of cavity board and daily cleaning of wall ties.
- The DPC should not project into cavity at ground floor level as it can lead to catching mortar droppings, resulting in bridging the cavity.
- Avoid the build up of mortar on trays/lintels and over window and door heads.
- Ensure the correct fitting of ties. Avoid wall ties sloping to the inside, which could be caused by the difference in level between the outer and inner leaf of the cavity wall.
- Ensure the Ballytherm BTCW board is placed against the inner leaf properly, i.e. as specified in this Detail Sheet and the manufacturer’s instructions. This is critical in order to minimise the potential for thermal looping.
- Once the Ballytherm BTCW board is installed in the cavity wall, ensure that there are no gaps in the insulation and the joints are tight fitting, as this will reduce the risk of bold bridging.

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

2.4.2 Cutting

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 with a sharp trimming knife.

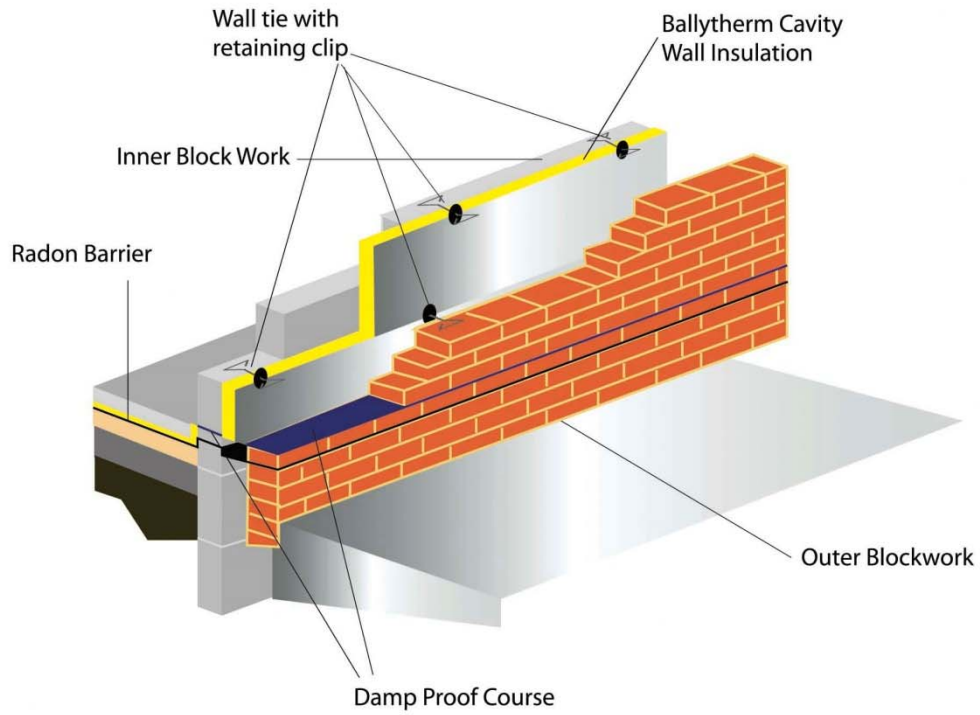


Figure 1: Ballytherm Cavity Wall Insulation

3. GENERAL

3.1 Ballytherm BTCW Rebated Cavity Wall Insulation, 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.

3.2 External walls of 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 of these standards should be followed where the wall incorporates stone or cast stone.

3.3 The use of a cavity board or cavity batten during construction is recommended to prevent accumulation of mortar droppings on the top edge of the Ballytherm BTCW board and to prevent bridging of cavity by mortar droppings.

3.4 As with all cavity wall insulation, the construction detailing should comply with good practice (see also Section 2.4).

3.5 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.

3.6 Where a nominal residual cavity width of at least 40mm is maintained, Ballytherm BTCW is suitable for use in any exposure conditions, in buildings up to 12m in height. For buildings greater than 12m in height and up to 25m in height, the exposure factor must not exceed 122, calculated in accordance with 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.

3.7 Data obtained by NSAI Agrément confirms that a masonry wall incorporating Ballytherm BTCW and built to the requirements of IS EN 1996-1-1:2005+A1:2012 will not transmit water to the inner leaf.

3.8 Data obtained by NSAI Agrément also demonstrates that Ballytherm BTCW boards do 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.

3.9 A minimum residual cavity width of at least 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

Ballytherm BTCW Rebated Cavity Wall Insulation 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 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; or
 - Meter boxes which require an opening in the outer leaf of not greater than 800mm x 500mm and do not penetrate the inner leaf except through a sleeve of not more than 80mm x 80mm which is fire stopped where it passes through the inner leaf.

Spread of flame within the cavity – Ballytherm BTCW is achieves Class F in accordance with IS EN 13501-1. Ballytherm BTCW is 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.

Ballytherm BTCW is manufactured without the use of CFCs or HCFCs, 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 TGD to Part J of the Building Regulations 1997 to 2017. It should also be separated by 40mm 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 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.

Ballytherm BTCW, when used in accordance with this Certificate, presents no significant risk of water penetration.

4.3 WATER VAPOUR PENETRATION & CONDENSATION RISK

Ballytherm BTCW board has an integral vapour check and has a 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/design thermal conductivity ' $\lambda_{90/90}$ ' value of Ballytherm BTCW when measured in accordance with IS EN 12667:2001 is 0.022W/mK. The high thermal resistance of Ballytherm BTCW ensures that cold bridging and extra heat loss around the edges of openings can be avoided.

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 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 required maximum U-values for external walls can be obtained with Ballytherm BTCW constructions as indicated in Table 3.

4.5 DURABILITY

Ballytherm BTCW is judged to be stable and will remain effective as an insulation system for the

life of the building, so long as it is installed in accordance with this Detail Sheet. Its durability depends upon the supporting structure and the conditions of use.

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 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with the ETCI publication ET 207. It is recommended that cables should not be buried in the insulation and instead be 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 ETCI National Rules of the Electro Technical Council of Ireland (ET 101).

4.8 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS

Ballytherm BTCW boards 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 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.

4.9 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. Ballytherm BTCW does not contain CFC or HCFC gas and has zero ODP.
- (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.

U-value (W/m ² K)	BTCW Insulation Thickness (mm)	
	13mm dense plaster, 100mm dense block	Plasterboard on dabs, 100mm AAC block
0.18	-	90
0.19	100	80
0.25	70	50
0.26	65	50
0.27	65	50

These U-value calculations are based on the following:

- Standard product thicknesses
- Assumption that the unprinted foil-face of the insulation boards faces the 50mm cavity and the printed foil-face faces the inner leaf
- Wall ties – mild steel, 2.5/m², 12.5mm² cross-section
- 102mm brick with conductivity 0.77W/mK
- 50mm low e cavity
- 100mm dense block with conductivity 1.13W/mK, or
- 100mm AAC block with conductivity 0.12W/mK bridged by mortar (6.7%) with conductivity 0.88W/mK
- 13mm dense plaster with conductivity 0.57W/mK, or
- 12.5mm plasterboard with conductivity 0.21W/mK, on 15mm dabs (20%) with conductivity 0.43W/mK

Table 3: Wall Construction Typical U Values (Partial Fill)



NSAI

Agrément

CERTIFICATE NO. 05/0220
DETAIL SHEET 2

Ballytherm BTF Floor Insulation



PRODUCT DESCRIPTION:

This Detail Sheet relates to Ballytherm BTF Floor Insulation, as defined in NSAI Agrément Certificate 05/0220.

USE:

Ballytherm BTF Floor Insulation is used for the thermal insulation of ground supported and suspended floors and may be installed:

1. Below a concrete floor slab;
2. Below a cement based floor screed on a concrete slab with a hardcore base;
3. Above a suspended concrete floor (e.g. beam and block) with a cement based screed;
4. Between the joists of a suspended timber floor.

MANUFACTURE AND MARKETING:

The product is manufactured and marketed by:

Ballytherm Trading Ltd.,
Annagh Industrial Park,
Ballyconnell,
Co. Cavan,
Ireland.

T: +353 (0)49 9527000

F: +353 (0)49 9527002

E: info@ballytherm.ie

W: www.ballytherm.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, the Ballytherm BTF Floor Insulation product, if used in accordance with this Detail Sheet, meets the requirements of the Building Regulations 1997 to 2017 as indicated in Section 1.2 of Certificate 05/0220.

1.2 BUILDING REGULATIONS 1997 to 2017

This matter is dealt with in NSAI Agrément Certificate 05/0220.

2.1 PRODUCT DESCRIPTION

This Detail Sheet relates to Ballytherm BTF Floor Insulation using a Polyisocyanurate (PIR) closed cell rigid insulation manufactured in accordance with IS EN 13165:2012+A2:2016. During the manufacturing process, liquid raw materials expanded by blowing agents are applied between low emissivity composite foil facings. Ballytherm BTF is CFC and HCFC free and therefore has zero ozone depletion potential (zero ODP).

This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Length	2400mm
Width	1200mm
Thickness	20 to 200mm
Nominal density	30-40kg/m ³
Edge detail	Plain square edge
Thermal conductivity*	0.022W/mK
Water vapour permeability*	60-100hm ² Pa/mg
Compressive strength*	CS(10\Y)140
Reaction to fire*	Euroclass F
Dimensional stability*	DS(23,90)2 @ 23°C 90% RH DS(-20,-)2 @ -20°C

Table 1: Product Range & Physical Properties

2.2 MANUFACTURE

Ballytherm BTF floor insulations boards are manufactured from a formulation of chemicals, which is sprayed onto low emissivity composite foil facings subsequently autohesively bonded to the insulation core during manufacture.

2.3 DELIVERY, STORAGE AND MARKING

This matter is dealt with in Section 2.2 of NSAI Agrément Certificate 05/0220.

2.4 INSTALLATION

2.4.1 General

Ballytherm BTF boards are placed below the slab or between the slab and the screed. Boards can also be used to provide insulation to suspended timber floors. Vertical upstands of insulation (perimeter insulation strips) should be used to separate the screed/slab from the wall to reduce thermal bridging at the wall/floor junction.

2.4.2 Laying Below the Floor Screed

Where Ballytherm BTF boards are placed below the floor screed, it is simply laid loose over the concrete floor slab with the necessary water and vapour protection. Board joints should be lightly butted, staggered and laid to break-bonded pattern. The floor slab should be uniformly flat without steps or gaps to provide continuous bearing support to the Ballytherm BTF board. A strip of board 25mm thick should be used around the perimeter of the floor area being insulated. This should also 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 polythene sheet (not less than 500 gauge) or building paper to BS 1521:1972 *Specification for waterproof building papers*, Grade B1F, between the screed and the Ballytherm BTF board to prevent wet screed penetrating joints between the boards. The minimum thickness of sand and cement screed is 65mm for domestic construction and 75mm for most other buildings.

Floor loading on non-domestic applications should be verified by a Chartered Engineer.

The concrete floor over which the insulation is to be laid should be left as long as possible to maximise drying out in accordance with the relevant recommendations of BS 8203:2017 *Code of practice for installation of resilient floor coverings*.

2.4.3 Laying Below the Floor Slab

Where Ballytherm BTF is used below the floor slab, lay the hardcore in layers: min 150-225mm. Each layer should be well compacted, with the surface blinded with a thin layer of sand to provide a suitable surface for laying a damp proof membrane (DPM) or radon barrier.

A DPM, e.g. 1200 gauge polythene, or a radon barrier, subject to site conditions and statutory requirements, should be laid over the well compacted hardcore and blinding with joints taped and folded to prevent the passage of ground moisture. The DPM should be carried up the surrounding foundation walls until it meets and seals with the DPC.

Ballytherm BTF should be laid staggered to break-bonded pattern with closely butted joints, fitted tightly at the edges and around any service penetrations.

A strip of 25mm thick board should be used around the perimeter of the floor slab in order to prevent cold bridging of the slab. Boards are overlaid with a separating layer of polythene sheet (not less than 500 gauge) or building paper to BS 1521:1972, Grade B1F.

Care should be taken to avoid damage to the insulation or DPMs and radon barriers as the slab is being poured and operatives should make use of barrow runs and walkways whilst installation progresses.

A vapour barrier is to be provided over the insulation board to prevent condensation damage from cold bridging.

2.4.4 Laying on Precast Beam & Block Floor

All surfaces should be level to accept the Ballytherm BTF board. The floor surface should be smooth; uneven surfaces should be levelled prior to laying of the floor and flat irregularities should be removed by a levelling screed. Lay a DPM, ensure that it is correctly positioned and turned up to meet the seal with the DPC.

Ballytherm BTF should be laid with joints tightly butted. During construction the boards must be protected from damage by moisture sources, water spillage, plaster droppings etc. Use scaffold boards to prevent wheelbarrow and other traffic damage to the boards. Ballytherm BTF should be over laid with 500 gauge polythene sheet to prevent the wet screed from penetrating the joints between the insulation boards.

As in the case with solid ground floors, attention should be given to detailing to avoid thermal bridging.

2.4.5 Laying in Suspended Timber Floors

The application of Ballytherm BTF in suspended floor constructions should be carried out before commencement of floor boarding. Ballytherm BTF should be cut to fit snugly between the timber joists. It should be supported on softwood timber battens, proprietary galvanised steel saddle clips or galvanised nails partly driven into the side of the joists. Battens/nails should be placed at an appropriate height to suit the thickness of board being employed and nails should remain 40mm proud of the joist. The board should then be laid between the joists so that they are supported by the battens, clips or nails. Any narrow gaps between the joist and perimeter walls should be insulated by specially cut pieces of board. Ballytherm BTF is not suitable for laying over timber joists.

Where services need to be accommodated below the floor, an insulated duct can be created by lowering the Ballytherm BTF board.

Install flooring grade chipboard, ply or softwood timber flooring directly onto the joists fixing in the normal manner.

Ensure that the void below the insulated suspended floor is well ventilated and that the airflow is not restricted by sleeper walls.

2.4.6 Cutting

On-site trimming of Ballytherm BTF 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 with a sharp trimming knife, cutting and snapping the board face down over a straight edge and cutting the foil facing on the other side.

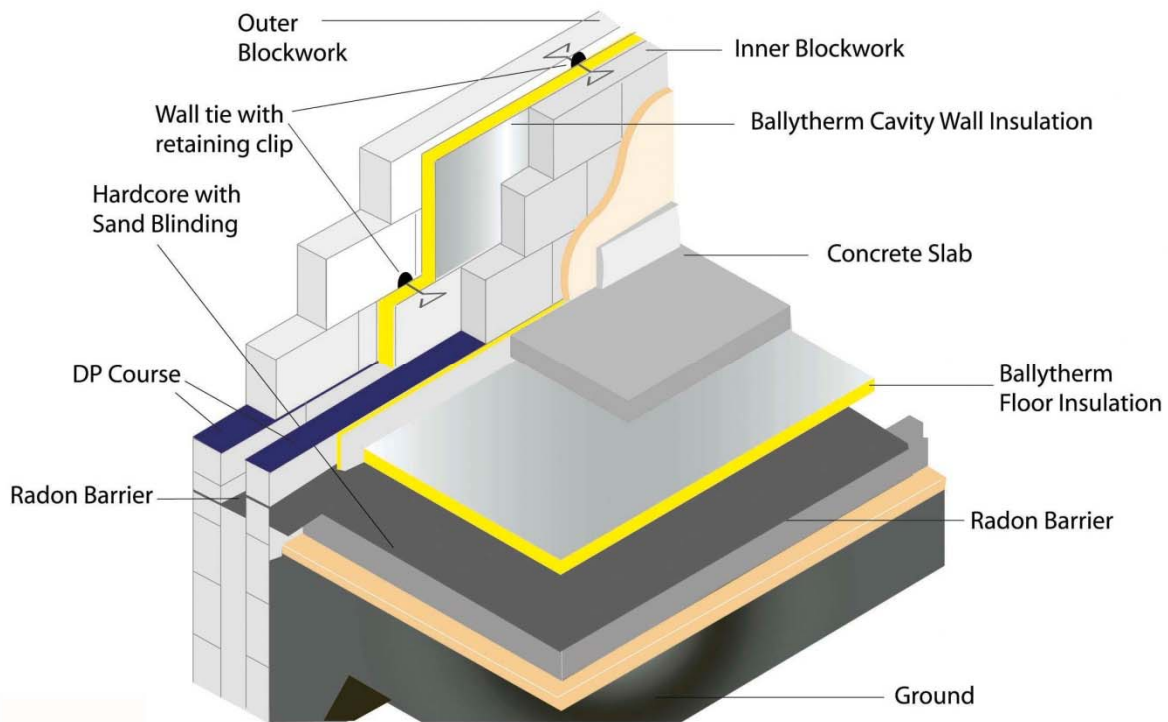


Figure 1: Ballytherm BTF Floor Insulation below floor slab

3.1 GENERAL

Ballytherm BTF Floor Insulation, 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 Ballytherm BTF must include a suitable DPM laid in accordance with BS CP 102:1973 *Code of practice for protection of buildings against water from the ground* (as read with AMD 1511, AMD 2196 and AMD 2470).

Suspended concrete ground floors incorporating Ballytherm BTF must include suitable ventilation.

Except in the case of use in a timber floor, the overlay to Ballytherm BTF should be a cement based floor or a concrete slab.

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).

Ballytherm BTF covered with chipboard, OSB or similar material (laid over joists) or a screed can support these design loadings without undue deflection.

Where Ballytherm BTF is used under a concrete slab, resistance to concentrated and distributed loads is a function of the slab specification.

3.3 UNDERLOOR SERVICES

The maximum continuous working temperature of PIR is 100°C. Where underfloor heating systems are to be used, installers should ensure that this temperature is not exceeded.

3.4 WATERPROOFING

If an overlay of chipboard, OSB or similar material is to be used in a bathroom or kitchen, a continuous waterproof finish (e.g. vinyl) must be provided to protect it.

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 TGD to Part J of the Building Regulations 1997 to 2017. Ballytherm BTF is 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.

Ballytherm BTF is manufactured without the use of CFCs or HCFCs, and there is no release of such gas on burning.

4.2 STRENGTH

Ballytherm BTF exceeds 140kPa at 10% yield and when installed in accordance with the manufacturer's instructions and this Detail sheet, will resist the loads likely to be met in service.

4.3 RESISTANCE TO MOISTURE

Ballytherm BTF will not allow moisture to cross the floor construction provided it is installed in accordance with this Detail Sheet.

4.4 CONDENSATION RISK

Ballytherm BTF has a vapour resistivity of greater than 250MNs/gm. It has significant resistance to the passage of water vapour when used in ground floor construction using a suitable DPM.

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

4.5 THERMAL INSULATION

The aged/design thermal conductivity ' $\lambda_{90/90}$ ' value of Ballytherm BTF when measured in accordance with IS EN 12667:2001 is 0.022W/mK.

The required maximum U-values for ground floors can be obtained with Ballytherm BTF as indicated in Table 2.

4.6 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS

Ballytherm BTF boards 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 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.

4.7 DURABILITY

Ballytherm BTF is rot proof and durable. As floor insulation, Ballytherm BTF is judged to be stable and will remain effective as an insulation system for the life of the building, so long as it is installed in accordance with this Detail Sheet.

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

- (i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. Ballytherm BTF does not contain CFC or HCFC gas and has zero ODP.
- (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.

Floor type	Target U-Value (W/m ² K)	Insulation thickness (mm)				
		P/A Ratio				
		0.2	0.4	0.6	0.8	1.0
Ground-supported concrete floor ¹	0.13	80	110	120	125	130
	0.15	60	90	100	110	110
	0.20	25	60	65	70	70
	0.22	20	50	60	60	60
Suspended concrete ground floor ²	0.13	120	130	140	140	150
	0.15	100	110	120	120	120
	0.20	60	75	80	90	90
	0.22	50	65	75	75	75
Suspended timber ground floor ³	0.13	180	-	-	-	-
	0.15	150	170	180	190	190
	0.20	90	120	125	130	140
	0.22	70	100	110	120	120

⁽¹⁾ Ground-supported concrete floor construction (BTF insulation on top of slab, under screed finish) – 65mm concrete screed ($\lambda = 1.15\text{W/mK}$), polyethylene separating layer, BTF insulation, DPM, 100mm concrete oversite, 150mm sand-blinded hardcore.

⁽²⁾ Suspended concrete ground floor construction (BTF insulation on top of beam-and-block, below screed finish) – 65mm concrete screed ($\lambda = 1.15\text{W/mK}$), polyethylene separating layer, BTF insulation, beam-and-block floor (12%) beam ($\lambda = 2.00\text{W/mK}$), dense block infill ($\lambda = 1.13\text{W/mK}$), ventilated void.

⁽³⁾ Suspended timber ground floor construction (BTF insulation between floor joists) – Floor deck thermal resistance $0.169\text{m}^2\text{K/W}$, (based on 22mm chipboard ($\lambda = 0.13\text{W/mK}$), BTF insulation (87%) between 47mm wide joists at 400mm centres. The depth of the joists = 100 to 200mm depending on the depth of insulation between floor joists (13%), based on BRE Report BR443:2006 (noggin every 3 metres at 38mm wide).

Table 2: Ground Floor Construction Typical U Values



NSAI

Agrément

CERTIFICATE NO. 05/0220
DETAIL SHEET 3

Ballytherm BTR Pitched Roof Insulation



PRODUCT DESCRIPTION:

This Detail Sheet relates to Ballytherm BTR Pitched Roof Insulation, as defined in NSAI Agrément Certificate 05/0220.

USE:

Ballytherm BTR Pitched Roof Insulation 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:

Ballytherm Trading Ltd.,
Annagh Industrial Park,
Ballyconnell,
Co. Cavan,
Ireland.

T: +353 (0)49 9527000

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E: info@ballytherm.ie

W: www.ballytherm.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, the Ballytherm BTR Pitched Roof Insulation product, if used in accordance with this Detail Sheet, meets the requirements of the Building Regulations 1997 to 2017 as indicated in Section 1.2 of Certificate 05/0220.

1.2 BUILDING REGULATIONS 1997 to 2017

This matter is dealt with in NSAI Agrément Certificate 05/0220.

2.1 PRODUCT DESCRIPTION

This Detail Sheet relates to Ballytherm BTR Pitched Roof Insulation using a Polyisocyanurate (PIR) closed cell rigid insulation with an intergral vapour barrier, manufactured in accordance with IS EN 13165:2012+A2:2016. During the manufacturing process, liquid raw materials expanded by blowing agents are applied between low emissivity composite foil facings. Ballytherm BTR is CFC and HCFC free and therefore has zero ozone depletion potential (zero ODP).

This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

Length	2400mm
Width	1200mm
Thickness	20 to 200mm
Nominal density	30-40kg/m ³
Edge detail	Plain square edge
Thermal conductivity*	0.022W/mK
Water vapour permeability*	60-100hm ² Pa/mg
Compressive strength*	CS(10\Y)140
Reaction to fire*	Euroclass F
Dimensional stability*	DS(23,90)2 @ 23°C 90% RH DS(-20,-)2 @ -20°C

Table 1: Product Range & Physical Properties

2.2 MANUFACTURE

Ballytherm BTR is manufactured from a formulation of chemicals, which is sprayed onto low emissivity composite foil facings subsequently autohesively bonded to the insulation core during manufacture.

2.3 DELIVERY, STORAGE AND MARKING

This matter is dealt with in Section 2.2 of NSAI Agrément Certificate 05/0220.

2.5 INSTALLATION

2.4.1 General

Installation must be in accordance with the relevant clauses of SR 82:2017 and the manufacturer's instructions, and can be carried out in all conditions normal for roof construction.

Ballytherm BTR 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 TGD to Part B of the Building Regulations 1997 to 2017.

2.4.2 Between Rafter Layer of Insulation

Ballytherm BTR may be used in pitched roof constructions where the insulation follows the slope of the roof. Battens fixed to the rafters may be used as a retaining stop. The required thickness of Ballytherm BTR is fixed between the rafters to achieve the relevant U-value. However, where the requirement is for very low U-values or to reduce the effects of thermal bridging, a second layer fixed to the underside of the rafters under the first layer may be appropriate. When the relevant space is to be used as a living area, Ballytherm BTR should be covered with 12.5mm plasterboard or use Ballytherm BTDL Dry Lining board, which eliminates the cold bridge effect of

the rafters. A vapour control layer should be installed between the plasterboard and Ballytherm BTR insulation or between the Ballytherm BTDL Dry Lining board and BTR 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, the insulation can be installed by the use of nailable sarking clips. These clips are driven into the upper surface of each rafter at 1m intervals up to the roof slope. The nailable sarking clips then support lengths of Ballytherm BTR suitably trimmed to size and placed between the rafters.

In cases where Ballytherm BTR between the rafters is to be flush with the bottom of the rafters but does not fill the 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.

In cases where Ballytherm BTR between rafters fully fills the rafter depth, simply install the correct thickness of insulation in such a manner that it is flush with the bottom of the rafters.

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 instruction and conditions of Certificate).

2.4.3 Cutting

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.

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.

2.4.4 Breather Membranes

Breather membranes for the purposes of this Detail Sheet should be approved for use with the system by Ballytherm Trading Ltd or may be any NSAI Agrément certified breather membrane.

2.4.5 Slating and Tiling

Slating and tiling is installed in accordance with SR 82:2017. When the relevant space is to be used as a living area, Ballytherm BTR should be covered with 12.5mm plasterboard or Ballytherm BTDL Dry Lining board. A vapour control layer should be fixed as described in Section 2.4.2 of this Detail Sheet.

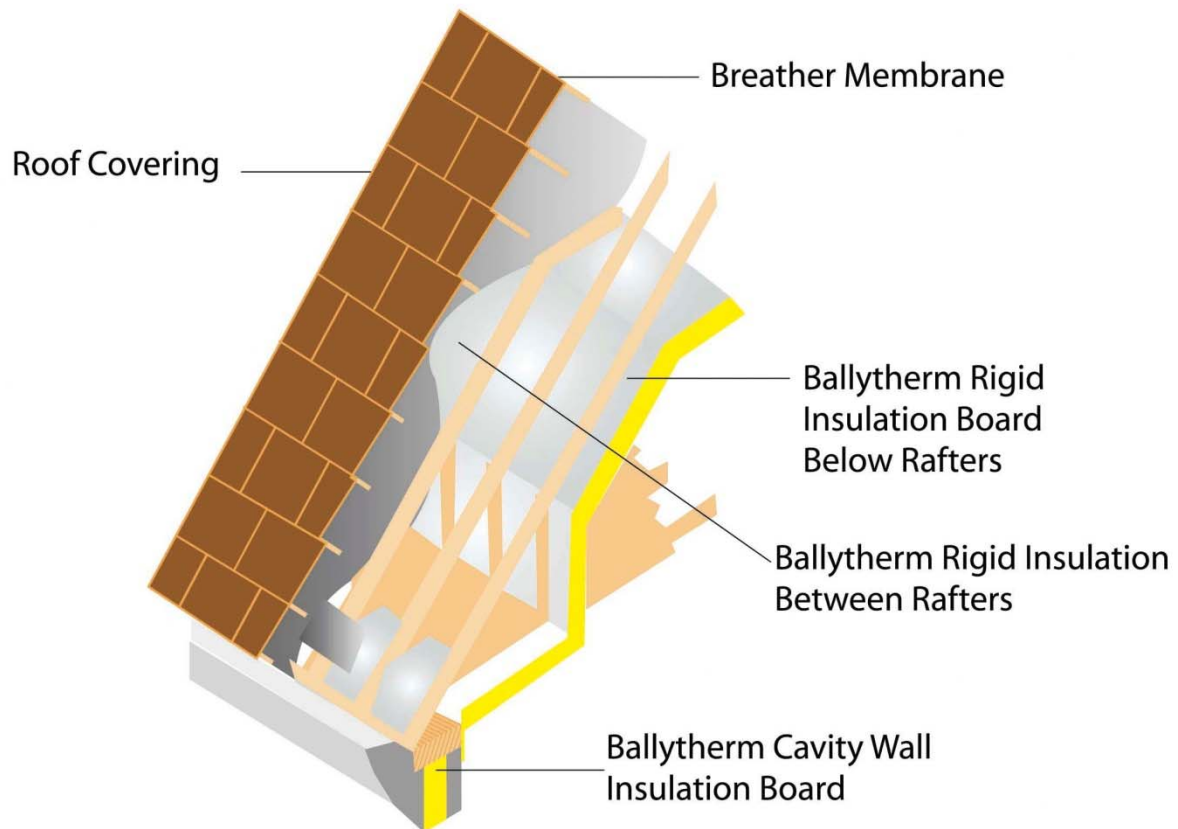


Figure 1: Ballytherm BTR Pitched Roof Insulation

3.1 GENERAL

Ballytherm BTR Pitched Roof Insulation, 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 SR 82:2017.

When installed in accordance with this Detail Sheet, Ballytherm BTR will contribute to the buckling and racking strength of the roof as described in SR 82:2017. However, it is not recommended that they be considered as an alternative to cross-bracing.

During installation, boards must not be walked on except 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 Ballytherm Trading Ltd or hold a current NSAI Agrément Certificate for such use. Underlays should be installed with, and within the limits of, that Certificate.

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

4.1 BEHAVIOUR IN FIRE

Ballytherm BTR is 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.

Ballytherm BTR is manufactured without the use of CFCs or HCFCs, and there is no release of such gas on burning.

4.2 STRENGTH

Ballytherm BTR, when installed in accordance with the manufacturer's instructions and this Detail Sheet, 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 with IS EN 1991-1-4:2005 AMD 1:2010 *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.*

When installed in accordance with this Detail Sheet, Ballytherm BTR will have sufficient resistance to wind uplift.

4.4 RESISTANCE TO MOISTURE

Ballytherm BTR 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

Ballytherm BTR has an integral vapour check and has a significant resistance to the passage of water vapour, when used in conventional roof 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 should be followed to minimise the risk of condensation within the building elements and structures.

The risk of condensation to the underside of the sarking will be minimal under normal conditions of use.

4.6 THERMAL INSULATION

The aged/design thermal conductivity ' $\lambda_{90/90}$ ' value of Ballytherm BTR when measured in accordance with IS EN 12667:2001 is 0.022W/mK.

The required maximum U-values for pitched roof constructions can be obtained with Ballytherm BTR as indicated in Table 2.

4.7 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS

Ballytherm BTR boards 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 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 of boards that have been damaged in any other way should not be used.

4.8 DURABILITY

Ballytherm BTR is rot proof and durable. As roof insulation, Ballytherm BTR is judged to be stable and will remain effective as an insulation system for the life of the building, so long as it is installed in accordance with this Detail Sheet.

4.9 MAINTENANCE AND REPAIR

Damaged boards can be easily replaced prior to the installation of plasterboard or Ballytherm BTDL Dry Lining board.

The product is light to handle and can be easily cut, but care must be taken to prevent damage. Since the board will not support the weight of operatives, appropriate care must be taken during slating/tiling.

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

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

4.11 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. Ballytherm BTR does not contain CFC or HCFC gas and has zero ODP.

- (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.

Target U-value (W/m ² K)	Insulation Thickness (mm)		
	Over Rafters	Between Rafters	Between and Under Rafters
0.13	150	-	100 + 90
0.15	120	-	100 + 65
0.16	120	-	100 + 50

Table23: Roof Construction Typical U Values



NSAI

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CERTIFICATE NO. 05/0220
DETAIL SHEET 4

Ballytherm BTDL Dry Lining Board Insulation



PRODUCT DESCRIPTION:

This Detail Sheet relates to Ballytherm BTDL Dry Lining Board, as defined in NSAI Agrément Certificate 05/0220.

USE:

Ballytherm BTDL Dry Lining Board is used for the thermal insulation of existing or new, solid or cavity masonry walls of dwellings or buildings of similar occupancy type and conditions. It may also be used to line ceilings. It also facilitates the control of surface and interstitial condensation in walls and ceilings.

MANUFACTURE AND MARKETING:

The product is manufactured and marketed by:

Ballytherm Trading Ltd.,
Annagh Industrial Park,
Ballyconnell,
Co. Cavan,
Ireland.

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F: +353 (0)49 9527002

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W: www.ballytherm.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, the Ballytherm BTDL Dry Lining Board, if used in accordance with this Detail Sheet, meets the requirements of the Building Regulations 1997 to 2017 as indicated in Section 1.2 of Certificate 05/0220.

1.2 BUILDING REGULATIONS 1997 to 2017

This matter is dealt with in NSAI Agrément Certificate 05/0220.

2.1 PRODUCT DESCRIPTION

This Detail Sheet relates to Ballytherm BTDL Dry Lining Board, a composite panel consisting of Polyisocyanurate (PIR) closed cell rigid insulation bonded to square or tapered edge plasterboard for internal applications. 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. Ballytherm BTDL has Kraft paper with a polythene membrane on both faces, which acts as an integral vapour check. The PIR foam core is a thermoset closed cell rigid foam insulation manufactured in accordance with IS EN 13165:2012+A2:2016.

Ballytherm BTDL is CFC and HCFC free and therefore has zero ozone depletion potential (zero ODP).

This Detail Sheet certifies compliance with the requirements of the Building Regulations 1997 to 2017.

2.2 MANUFACTURE

Ballytherm BTDL is manufactured from a formulation of chemicals, which is sprayed onto the Kraft paper and subsequently plasterboard is adhesive bonded to the insulation core during manufacture. The plasterboard face provides a durable surface to accept traditional finishing techniques.

2.3 DELIVERY, STORAGE AND MARKING

This matter is dealt with in Section 2.2 of NSAI Agrément Certificate 05/0220.

Length	2400mm
Width	1200mm
Thickness	25 to 80mm
Plasterboard thickness	9.5 and 12.5mm
Nominal density	30-40kg/m ³
Board facings	Bilaminate foil/Kraft paper-facing
Edge profiles	Plain square edge
Thermal conductivity*	Insulation: 0.022W/mK Plasterboard: 0.19W/mK
Water vapour resistance factor*	125mm plasterboard 10/4 Insulation (25-55) 60/60
Compressive strength*	CS(10\Y)100
Reaction to fire*	B-s1, d0

Table 1: Product Range & Physical Properties

2.4 INSTALLATION

2.4.1 General

Ballytherm BTDL is for installation on the internal surface of walls and ceilings of new or existing buildings. The fixing method depends on the substrate.

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

Before fixing the product, sufficient time must be allowed to disperse the solvents contained in wood preservatives and damp proofing treatments where applied.

Ceiling plaster slabs should be fixed in place before dry lining commences.

2.4.2 Thermal Bridging

Walls should be insulated to full height and returned at door/window reveals to prevent cold bridging. The margins of window and door reveals should be sufficient to accommodate the thickness of Ballytherm BTDL being employed. The possibility of a cold bridge occurring via the window boards should also be considered and provision made to insulate this area. Services should be fixed in place before drylining commences. The void between the wall and the thermal liner can accommodate certain services, however the PIR insulation should not be chased. The area around any services that penetrate the thermal liner must be sealed to prevent air leakage and thermal looping.

2.4.3 Thermal Looping/Fire Stops

Fire stops must be provided using proprietary methods horizontally at floor and ceiling level.

2.4.4 Adhesive Bonding

This method is for application to sound, plane concrete or plastered wall surfaces on cavity walls. Adhesive is applied to the wall surface in strips to a pre-determined pattern that coincides with the edges of the board; a further strip is applied horizontally at the mid-point of the board. Suitable approved mechanical fixings are recommended to complement the adhesive bond. These are normally applied at a rate of 3 no. per board, after the adhesive has set, two fixings positioned at the top of each board and one at the board centre. Allow for expansion at the top and bottom of the panel. The Certificate holder's advice should be sought in relation to the type of adhesive and the choice of fixings.

2.4.5 Mechanical Fixing

This method is for application to fair finished brick, block and concrete cavity walls where Ballytherm BTDL 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. There should be 18 no. fixings per 2400 x 1200 board, three of which should be type TID-M anchors. Other 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's edges and should penetrate at least 30mm into the masonry.

2.4.8 Linings (Horizontal and Sloping)

Ballytherm BTDL may be used to line ceilings. Insulation is fixed in a similar way 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.

2.4.9 Cutting

On-site cutting of boards where it is 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. Cutting BTDL panels is also easy to execute by using a trimming knife to cut through the insulation and paper backing of the plasterboard layer, then snapping the board down over a straight edge and cutting the paper facing of the plasterboard on the other side.

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

2.4.10 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 manufacturer's instructions, particularly in relation to the need to allow thorough drying of the plaster prior to decoration.

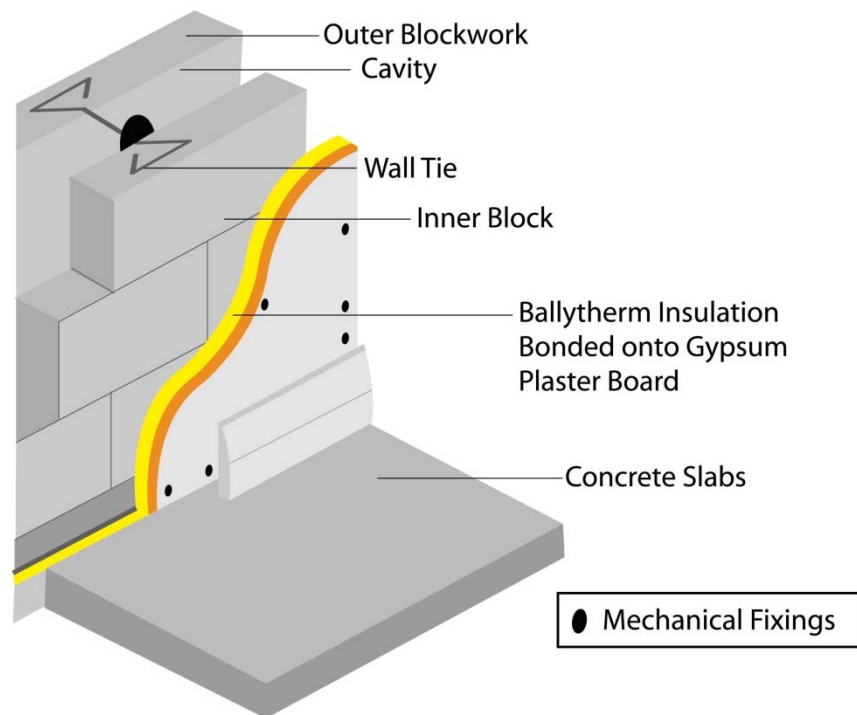


Figure 1: Internal insulation of masonry wall with plasterboard laminate

3. GENERAL

3.1 Ballytherm BTDL Dry Lining Board, when installed in accordance with this Detail Sheet, is effective in reducing the U-value (thermal transmittance) of new and existing walls and ceilings.

Ballytherm BTDL 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.

3.2 Buildings subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with should be constructed in accordance with IS EN 1996-1-1:2005+A1:2012, IS EN 1996-1-2:2005 COR:2010, IS EN 1996-2:2006 COR:2009 and IS EN 1996-3:2006 COR:2009. The relevant recommendations of these standards should be followed where the wall incorporates stone or cast stone. Particular attention should be paid to the exclusion of moisture in that the designer should select a construction appropriate to the local wind driven rain index, paying due regard to the design detailing, workmanship and materials to be used.

3.3 With dry lining installations forming a void of 20mm or more, services can be incorporated behind the dry lining, make 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.

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

3.5 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 Ballytherm BTDL Dry Lining Board achieves B-s1, d0 when tested in accordance with IS EN 13501-1. The insulation component of the board should be isolated from possible sources of combustion. To achieve this Ballytherm BTDL should be installed in accordance with the following:

- (i) 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 TGD to Part J of the Building Regulations 1997 to 2017.
- (ii) Ballytherm BTDL should be separated by a minimum distance of 150mm from an oil, solid fuel or gas heating appliance as indicated in TGD to Part J of the Building Regulations 1997 to 2017.
- (iii) Ballytherm BTDL 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.

4.2 WATER PENETRATION

Capillary action – The closed cell structure does not allow water uptake by capillary action. Ballytherm BTDL, when used in accordance with this Certificate, presents no significant risk of water penetration.

4.3 THERMAL INSULATION

The aged/design thermal conductivity ' $\lambda_{90/90}$ ' value of Ballytherm BTDL when measured in accordance with IS EN 12667:2001 is 0.022W/mK for the insulation board and 0.19W/mK for the plasterboard. The high thermal resistance of Ballytherm BTDL ensures that cold bridging and extra heat loss around the edges of openings can be avoided.

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 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 required maximum U-values for external walls can be obtained with Ballytherm BTDL constructions as indicated in Table 3.

4.4 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with the ETCI publication ET 207. It is recommended that cables should not be buried in the insulation and instead be 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 ETCI 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 Ballytherm BTDL.

4.5 CONDENSATION RISK

Ballytherm BTDL has a high vapour resistance and is therefore unlikely to be affected by surface or interstitial condensation, provided the correct thickness of Ballytherm BTDL 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.

4.6 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS

Ballytherm BTDL boards 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 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.

4.7 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 MAINTENANCE

Damaged boards can be easily replaced and no maintenance of the insulation will be required provided that the plasterboard layer remains intact.

4.9 DURABILITY

Ballytherm BTDL is judged to be stable and will remain effective as an insulation system for the life of the building, so long as it is installed in accordance with this Detail Sheet. Its durability depends upon the supporting structure and the conditions of use.

4.10 LIMITATIONS

Ballytherm BTDL has a gypsum plasterboard face, and should therefore not be used to isolate dampness or be used in continuously damp or humid conditions.

4.11 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. Ballytherm BTDL does not contain CFC or HCFC gas and has zero ODP.
- (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.

U-value (W/m ² K)	BTDL Insulation Thickness ⁽²⁾ (mm)	
	Direct bond (plaster dabs) ⁽³⁾	Mechanical fixing to timber battens ⁽⁴⁾
0.18	-	90
0.19	100	80
0.25	70	50
0.26	65	50

(1) 215mm thick existing solid brickwork wall (0.77W/mK thermal conductivity)
(2) Thickness of insulation specified excludes plasterboard thickness of 9.5mm .or 12.5mm.
(3) Direct bonding with 15mm plaster adhesive dabs (15mm air cavity). Boards adhesively fixed in addition to 0.69 fully penetrating steel fixings (50W/mK) per square metre with a cross-sectional area of 18.2mm² (minimum of two nailable fixings, at midpoint of the board, 25mm from board edge).
(4) Mechanical fixing to treated softwood timber battens, 22mm batten cavity. Boards mechanically fixed with 10.35 fully penetrating steel fixings (50W/mK) per square metre with a cross-sectional area of 18.2mm² (47mm wide timber battens at 600mm centres maximum).

Table 3: Solid Brickwork Wall⁽¹⁾ Typical U Values