



Bord Agrément na hÉireann
Irish Agrément Board

CERTIFICATE NO.05/0220

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Ballytherm BTF Floor Insulation Ballytherm BTCW Rebated Cavity Wall Insulation Ballytherm BTDL Dry Lining Board Insulation Ballytherm BTR Pitch Roof Insulation

Isolation de murs
Wärmedämmung

The Irish **Agrément Board** is designated by Government to issue European Technical Approvals.

Irish Agrément Board 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 2002**.

The Irish Agrément Board operates in association with
the **National Standards Authority of Ireland (NSAI)** as the National Member of UEAtc.



PRODUCT DESCRIPTION:

This Certificate relates to the following products:

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

MANUFACTURE AND MARKETING:

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Readers are advised to check that this Certificate has not been withdrawn or superseded by a later issue by contacting the Irish Agrément Board, NSAI, Glasnevin, Dublin 9 or online at www.irishagrementboard.com/certs.php?no=050220

1.1 ASSESSMENT

In the opinion of the Irish Agrément Board (IAB), Ballytherm Insulation panels described in this general Certificate when used in conjunction with the relevant Detail Sheet, and if used in accordance with this Certificate, meet the requirements of the Building Regulations 1997 - 2002 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2002

REQUIREMENT:

Part D – Materials and Workmanship

D3 – Ballytherm Insulation panels as certified in this Irish Agrément Certificate comprise proper materials fit for their intended use (See Part 4 of this Certificate).

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

Part B – Fire Safety

B2 – Internal Fire Spread (Linings)

Ballytherm Insulation panels faced with plasterboard are considered to be Class o. It may therefore be used on the internal surfaces of buildings of every purpose group.

Ballytherm insulation panels faced with low emissivity aluminium foil facings are declared to be Class 1 to BS 476 Part 7: 1987.

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture

Ballytherm Insulation panels referred to in this Certificate when installed in compliance with the conditions indicated in Part 2 of the relevant Detail Sheet will not promote the passage of moisture and will minimise the risk of surface of interstitial condensation.

Part J – Heat Producing Appliances

J3 – Protection of Building

In the opinion of the Irish Agrément Board (IAB) the Ballytherm Insulation panels, if used in accordance with this Certificate and the TGD Part J – Heat producing Appliances, meet the requirements of the Building Regulations 1997 to 2002.

Part L – Conservation of Fuel and Energy

L1 - Conservation of fuel and energy

Based on the measured thermal conductivity of the Ballytherm Insulation panels referred to in this certificate and detailed in the relevant “Detail Sheet”, the current ‘U Value’ requirements can be achieved.

2.1 PRODUCT DESCRIPTION

Each type of Ballytherm Insulation Panel is given a detailed description in the relevant “Data Sheet” related to its use.

2.2 DELIVERY, STORAGE AND MARKING

Ballytherm Insulation Panels are supplied palletised in labelled packs and shrink wrapped in polyethylene. Each pack carries a label with the product description, product characteristics (λ and R values), size, thickness, batch number and date of manufacture, the manufacturer’s name, IAB identification mark and IAB Certificate number for the system.

The product packaging must not be considered adequate for outside protection and boards should be stored undercover, upright in a clean dry flat area because paper facings may become loose if the boards are exposed to damp conditions for extended periods.

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

Installation instructions and details outlining the steps necessary to ensure proper installation are included in each pack

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

4.2.1 Ballytherm Insulation Panels referred to in this Certificate are of a closed cell structure, which do not allow water uptake by capillary action.

4.2.2 Ballytherm Insulation panels referred to in this Certificate, when used in accordance with this Certificate present no significant risk of water penetration.

4.3 THERMAL INSULATION

The aged/design thermal conductivity ‘ λ ’ value’ of Ballytherm Insulation panels, BTF floor Insulation, BTCW cavity wall insulation, and BTR pitch roof insulation is 0.022 W/mK. The aged/design thermal conductivity ‘ λ ’ value of Ballytherm BTDL dry lining board insulation is 0.026 W/mK when measured in accordance with I.S. EN 12667 :2000 ‘*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*’. The high thermal resistance of Ballytherm Insulation panels 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 – Conservation of Fuel and Energy (DWELLINGS), (Building Regulations 2002), 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. air movement due to thermal effects or due to wind pressure can occur. Details of how to avoid the infiltration of cold air are given in TGD – L (Dwellings), Section 1.6.

The required maximum U-values for external walls, floors and roofs can be obtained by reference to the relevant “Detail Sheets”.

4.4 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with the ETCI publication ET 207: 2003 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 Ballytherm BTDL Dry Lining Board insulation.

4.5 CONDENSATION RISK

Ballytherm Insulation Panels 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 taped and in the case of Ballytherm BTDL Dry Lining board 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: 2002 Code of practice for control of condensation in buildings should be followed to minimise the risk of condensation within the building elements and structures. While no vapour check would be necessary it would be prudent to use a separate vapour check in ceiling insulation in high humidity areas such as kitchens and bathrooms. The vapour check could be installed between the BTR insulation and the Ballytherm BTDL Dry Lining board.

4.6 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS

Ballytherm Insulation Panels 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.

4.7 WALL MOUNTED FITTINGS

This matter is dealt with in the “Detail Sheets”.

4.8 MAINTENANCE

This matter is dealt with in the “Detail Sheets”.

4.9 DURABILITY

Ballytherm Insulation Panels referred to in this certificate are rot-proof and durable. As insulation for cavity walls, roofs, floors and as a 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.

- 5.1** National Standards Authority of Ireland ("NSAI") following consultation with the Irish Agrément Board ("IAB") 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 so long as:
- (a) the specification of the product is unchanged.
 - (b) the Building Regulations 1997 to 2002 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 IAB are paid.
- 5.2** The IAB 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 IAB 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, 1989, 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.

The Irish Agrément Board

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

Date of Issue: **May 2005**

Signed



Chief Executive, NSAI

Readers may check that the status of this Certificate has not changed by contacting the Irish Agrément Board,
NSAI, Glasnevin, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. www.nsaie

Detail Sheet 1 / Ballytherm BTF Floor Insulation



PRODUCT DESCRIPTION:

This Certificate relates to Ballytherm BTF floor insulation, as defined in IAB Certificate No. 05/0220.

USE:

Ballytherm BTF floor insulation is used for the thermal insulation in ground supported and suspended floors and may be installed:

1. Below a concrete floor slab, or
2. Below a cement based floor screed on a concrete slab with a hardcore base.
3. Above a suspended concrete floor (e.g. block and beam) 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 Limited
Annagh Industrial Park, Ballyconnell
Co Cavan, Ireland

Tel: +353 (0) 49 9527000
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1.1 PRODUCT DESCRIPTION

This Certificate relates to the Ballytherm BTF floor insulation using Polyisocyanurate (PIR), closed cell rigid foam insulation manufactured in accordance with I.S. EN 13165: 2001 *Thermal insulation products for buildings – Factory made products of polyurethane foam (PUR) Specification*. During the manufacturing process, liquid raw materials expanded by blowing agents are applied between low emissivity tri-laminate foil facings. Ballytherm BTF floor insulation boards are CFC and HCFC free and therefore have zero ozone depletion potential.

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2002.

Table 1 shows the Ballytherm BTF floor insulation, product range.

Table 1: Product Range

The boards are available in the following sizes:

Length	2400m
Width	1200mm
Thickness	25, 30, 35, 40, 45, 50, 60, 70, and 75mm
Grade	PIR

1.2 MANUFACTURE

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

1.3 INSTALLATION

1.3.1 General

Ballytherm BTF floor insulation 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. Refer to clause 0.6 (General) and 1.5 (Thermal Bridging) of Technical Guidance Document L to Building Regulations 2002 – Conservation of Fuel and Energy

1.3.2 Procedure – Laying below the floor screed

Where Ballytherm BTF floor insulation board is used 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 floor insulation board. A strip of board 25 mm thick should be used around the perimeter of the floor area being insulated. This should be placed vertically against the abutting wall so that it connects with the insulation laid over the slab and protects the edge of the screed, so preventing cold bridging of the floor screed. Boards are overlaid with a separating layer of 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 floor insulation board to prevent the wet screed penetrating joints between the boards. The minimum thickness of sand and cement screed is 65 mm for domestic construction and 75 mm 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: 2001, *Code of practice for the installation of resilient floor coverings*.

1.3.3 Procedure –Laying below the floor slab

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

A damp proof membrane 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 damp proof course.

Ballytherm BTF floor insulation board 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 board 25 mm thick 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 – Specification for Waterproof Building Papers, Grade B1F.

Care should be taken to avoid damage to the insulation or damp proof membranes 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.

1.3.4 Procedure – Laying on precast block and beam floor

All surfaces should be level to accept the Ballytherm BTF floor insulation 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 Damp Proof Membrane, ensure that it is correctly positioned and turned up to meet the seal with the dpc.

Ballytherm BTF floor insulation board 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 floor insulation board should be overlaid 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.

1.3.5 Laying in suspended timber floors

The application of Ballytherm BTF floor insulation board in suspended floor constructions should be

carried out before commencement of floor boarding. Ballytherm BTF floor insulation board 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 40 mm 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 floor insulation board 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 floor insulation 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.

1.3.6 Cutting

On-site trimming of Ballytherm BTF floor insulation board where necessary to maintain continuity of insulation or to fit around openings is easily executed using a fine tooth saw or by scoring with a sharp knife and cutting snapping the board face down over a straight edge and cutting the foil facing on the other side.

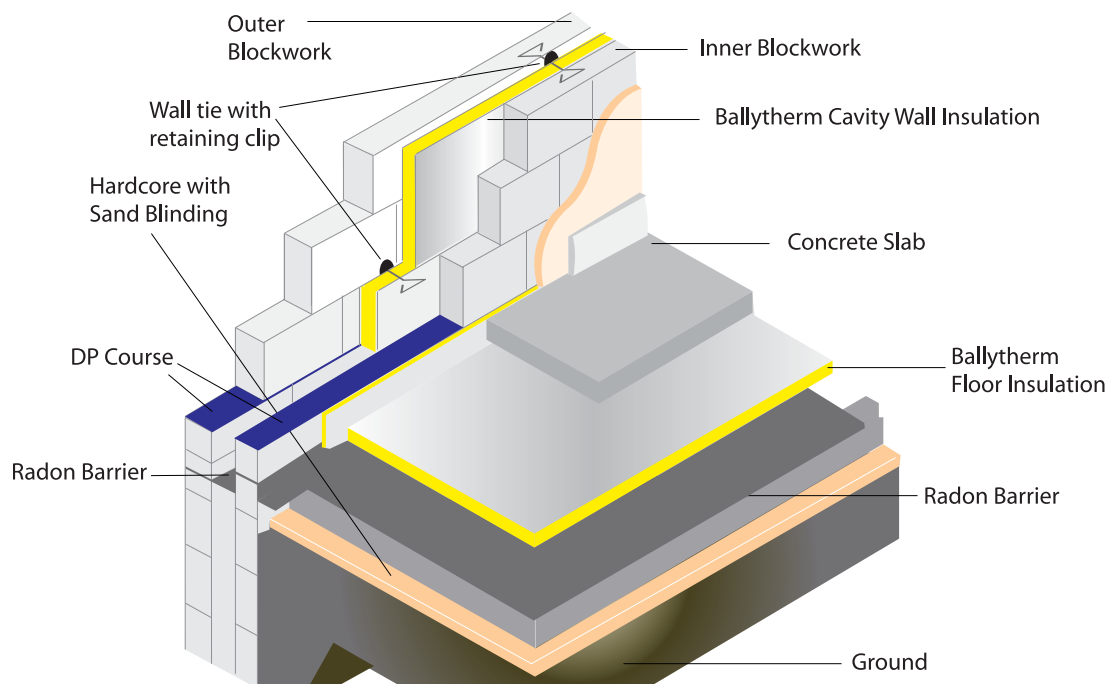


Figure 1: Ballytherm BTF Floor Insulation below floor slab.

2 GENERAL

2.1 Ballytherm BTF floor insulation board when installed in accordance with this Certificate, is effective in reducing the 'U' value (thermal transmittance) of new and existing floor constructions.

Ground supported floors incorporating Ballytherm BTF floor insulation board must include a suitable damp proof membrane laid in accordance with BS CP 102: 1973 Code of Practice for the 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 floor insulation board must include suitable ventilation.

Except in the case of use in a timber floor, the overlay to Ballytherm BTF floor insulation board should be: -

1. A cement based floor, or
2. A concrete slab.

2.2 Floor Loading

The design loadings for self contained single family dwelling units as defined in BS 6399: Part 1: 1996 Loading for buildings – code of practice for dead and imposed loads, are

- Uniformly distributed load – 1.5 kPa.
- Concentrated load 1.4 kPa.
- Ballytherm BTF floor insulation board covered with chipboard, OSB or similar material or a screed can support these design loadings without undue deflection.
- Where Ballytherm BTF floor insulation board is used under a concrete slab, resistance to concentrated and distributed loads is a function of the slab specification.

2.3 Underfloor services

The maximum continuous working temperature of PIR is 100°C. Where underfloor heating systems are to be used; the advice of the certificate holder should be sought.

2.4 Waterproofing

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

3.1 BEHAVIOUR IN FIRE

- (i) Combustibility - Although Ballytherm BTF floor insulation board is combustible, when used in the context of this Certificate the increase in fire load in the building consequent to its use, is negligible.

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

- (ii) Toxicity - Negligible when used in a ground floor construction.
- (iii) Ballytherm BTF floor insulation board is manufactured without the use of CFC's and HCFC's, there is no release of such gas on burning.

3.2 STRENGTH

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

3.3 RESISTANCE TO MOISTURE

Ballytherm BTF floor insulation board will not allow moisture to cross the floor construction provided it is installed in accordance with this Certificate. See section 1.3.

3.4 CONDENSATION RISK

- 3.4.1 Ballytherm BTF floor insulation board has a vapour resistivity exceeding $250 \text{ MNsg}^{-1}\text{m}^{-1}$. It has significant resistance to the passage of water vapour when used in ground floor construction using a suitable damp proof membrane.

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

3.5 THERMAL INSULATION

The aged/design thermal conductivity 'λ' value of Ballytherm BTF floor insulation board when measured in accordance with I.S. EN 12667: 2000 Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method – Products of high and medium thermal resistance, is 0.022 W/mK.

The maximum U-values for ground floors which can be obtained with Ballytherm BTF floor insulation board constructions should be determined in accordance with the procedures of Appendix A, Clauses A3.1- A3.3 of Technical Guidance Document L to Building Regulations 2002. See Table 2 for typical U-values (indicative values only).

3.6 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS

Ballytherm BTF floor insulation panels do not promote infestation, as there is no food value in the materials used. They also resist attack by mould and microbial growth. The insulation core is resistant to dilute acids, alkalis, mineral oil and petrol. It is not resistant to some solvent-based adhesive systems, particularly those containing methyl ethyl ketone. Adhesives containing such solvents should not be used in association with the boards. Boards which have been in contact with harsh solvents, petrol, mineral oil or acids or boards that have been damaged in any other way should not be used

3.7 DURABILITY

Ballytherm BTF floor insulation board are rot-proof and durable. As floor insulation, Ballytherm BTF floor insulation board 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 certificate.

3.8 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

3.9 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 floor insulation board does not contain CFC or HCFC gas.
- (ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- (iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.
- (iv) A condensation risk analysis was performed.

Table 2: Ground Floor Construction – Typical U-Values

Typical Thickness to achieve 0.25 W/m²K

P/A Ratio (Perimeter/area)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Thickness	40	50	60	65	65	70	70	75	75

* These values are indicative only. Each design should be dealt with on a case by case basis. Design should be carried out by a competent person, in accordance with the Building Regulations Technical Guidance Document Part L 2002

Table 3: Physical Properties of Ballytherm BTF Floor Insulation

Property	Declared Value	Test Method
Water Absorption	Foil 1.2%	EN 12087
Dimensional Stability	DS(TH) 6	EN 1604
Thermal conductivity 'λ' value	0.022 W/mK	I.S. EN 12667
Thermal Resistance		
25 mm	1.136 m ² K/W	
30 mm	1.364 m ² K/W	
35 mm	1.590 m ² K/W	
40 mm	1.818 m ² K/W	
45 mm	2.045 m ² K/W	
50 mm	2.273 m ² K/W	
60 mm	2.727 m ² K/W	
70 mm	3.182 m ² K/W	
75 mm	3.409 m ² K/W	
Compressive strength	>140 kPa	EN 826

Detail Sheet 2 / Ballytherm BTCW Rebated Cavity Wall Insulation



PRODUCT DESCRIPTION:

This Certificate relates to Ballytherm BTCW rebated cavity wall insulation, as defined in IAB Certificate No. 05/0220.

USE:

Ballytherm BTCW 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 Limited
Annagh Industrial Park, Ballyconnell
Co Cavan, Ireland

Tel: +353 (0) 49 9527000
Fax: +353 (0) 49 9527002
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Website: www.ballytherm.ie

Part One / Technical Specification and Control Data

1

1.1 PRODUCT DESCRIPTION

This Certificate relates to Ballytherm BTCW cavity wall insulation, a partial fill cavity wall board with a rebated edge, using Polyisocyanurate (PIR) closed cell rigid insulation manufactured in accordance with I.S. EN 13165: 2001 *Thermal insulation products for buildings – Factory made products of polyurethane foam (PUR) Specification*. During the manufacturing process, liquid raw materials expanded by blowing agents are applied between low emissivity composite foil facings. Ballytherm BTCW cavity wall insulation is CFC and HCFC free.

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2002. Table 1 shows the Ballytherm BTCW cavity wall insulation, product range.

Table 1: Product Range

The boards are available in the following sizes:

Length	2400m
Width	450mm (plus 10mm rebate)
Thickness	25, 30, 35, 40, 45, 50, 60, 70, and 75mm
Grade	PIR

1.2 MANUFACTURE

Ballytherm BTCW cavity wall insulation is manufactured from a formulation of chemicals, which is poured 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.

1.3 INSTALLATION

1.3.1 General

Walls are constructed in the conventional manner with the first row of ties one course below damp-proof course level at not greater than 600 mm horizontal centres. Walls should be constructed in accordance the relevant parts of I.S. 325- *Use of Masonry*. It is recommended that the wall ties are not placed directly on the damp-proof course. The first row of insulation boards should be supported by the ties providing edge insulation for the floor, as required by Technical Guidance Document L – Conservation of Fuel and Energy DWELLINGS (2002).

The mortar fill below d.p.c level must be considered and it is also necessary to ensure that any installed Radon Barrier 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 cavity wall insulation 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, assisted by the rebated edge. This ensures maximum thermal performance. It is recommended that drainage holes be provided in the perpend block joints below d.p.c level at approximately 1 m centres. Refer to I.S. 325: Part 1 - *Use of Masonry*. Reference should also be made to TGD- L (Dwellings), Clauses 0.6 and 1.5 and TGD- A to the Building Regulations 1997 – 2002.

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 a maximum 225 mm vertical centres and within 150 mm 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 cavity wall insulation board should be installed in walls whilst maintaining a 40 mm cavity width. Only certified wall ties specified by Ballytherm Limited 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 table 9a of I.S. 325: Part 2: 1995 *Use of Masonry – Masonry Construction*. Table 2 shows typical wall tie spacing.

Successive sections of wall fixed by certified stainless steel wall ties are constructed and Ballytherm BTCW cavity wall insulation 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 cills, 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 cavity wall insulation board and the external leaf, returning a minimum of 150 mm.

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 d.p.c. 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 cavity wall insulation board is placed against the inner leaf properly; i.e. as specified in this Agrément certificate and the manufacturer's instructions. This is critical in order to minimise the potential for Thermal Looping.
- Once the Ballytherm BTCW cavity wall insulation board is installed in the cavity wall ensure that there are no gaps in the insulation and joints are tight fitting, as this will reduce the risk of cold 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.

1.3.2 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.

Table 2: *MAXIMUM SPACING OF WALL TIES*

Cavity Width mm	Horizontal Spacing mm	Vertical Spacing (mm)	No of wall ties per square meter
76 - 110	750	450	3.0
111 - 150	450	450	4.9

* Cavity widths greater than 110mm should be designed by a Chartered Engineer.

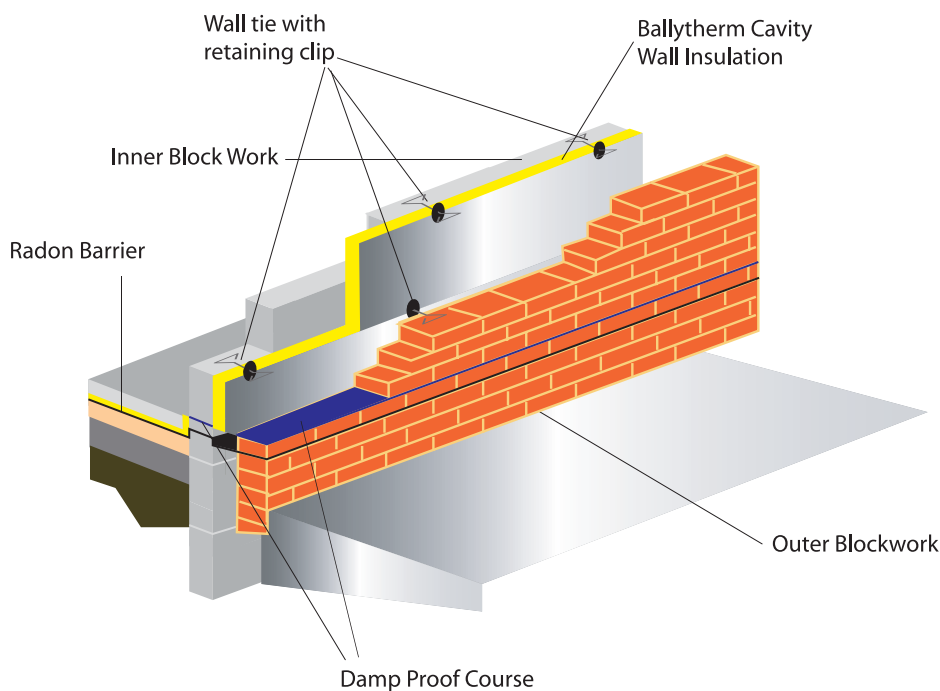


Figure 1: Ballytherm Cavity Wall Insulation

2 GENERAL

2.1 Ballytherm BTCW cavity wall insulation board when installed in accordance with this Certificate, 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.

2.2 External Walls of buildings subject to the relevant requirements of the Building Regulations 1997 - 2002 should be constructed in accordance with I.S. 325: Part 1: 1986 Use of Masonry, Structural Use of Unreinforced Masonry, and BS 5628: Part 3: 1995 Code of Practice for use of Masonry: Materials and Components, Design and Workmanship. Where reinforced masonry is involved, the design should be in accordance with BS 5628: Part 2: 1985, Code of Practice for use of Masonry, Structural Use of Reinforced and Prestressed Masonry. The relevant recommendations of Section 3 of BS 5390: 1976 (1984), Code of Practice for Stone Masonry, should be followed where the wall incorporates stone or cast stone.

2.3 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 cavity wall insulation board and to prevent bridging of cavity by mortar droppings.

2.4 As with all cavity wall insulation, the construction detailing should comply with good practice. (see also reference to installation in paragraph 1.3).

2.5 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.

2.6 Where a nominal residual cavity width of at least 40 mm is maintained, Ballytherm BTCW cavity wall insulation board is suitable for use in any exposure conditions, in buildings up to 12 meters in height. See I.S. 325 Part 2: 1995 *Masonry Construction*, for information on the Exclusion of Moisture (Driving Rain)

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.

2.7 Data obtained by the IAB confirms that a masonry wall incorporating the Ballytherm BTCW cavity wall insulation board and built to the requirements of I.S. 325: Part 1: 1986, Use of Masonry, Part 1: Structural Use of Unreinforced Masonry will not transmit water to the inner leaf.

2.8 Data obtained by the IAB also demonstrates that Ballytherm BTCW cavity wall insulation 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 150 mm below the level of the lowest dpc.

2.9 A minimum cavity width of at least 40 mm 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.

3.1 BEHAVIOUR IN FIRE

3.1.1 General

- (i) Ballytherm BTCW cavity wall insulation board may be used in buildings of any purpose group in a wall in which the cavity intercommunicates with another such cavity, and may be unlimited in extent in respect of the provision of barriers provided the walls comply with Part B3, Diagram 17 of TGD B to the Building Regulations 1997 - 2002, (Cavity walls excluded from provisions for cavity barriers) as follows: -
 - (ii) a) The wall consists of two leaves, each being not less than 75 mm thick and constructed of non-combustible materials;
 - b) The cavity does not exceed 110 mm 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:
 - (i) timber lintels, window or door frames or the end faces of joists.
 - (ii) pipes, ducts or cables.
 - (iii) closers, flashings, damp proof courses or wall ties.
 - (iv) thermal insulating material or
 - (v) meter boxes which require an opening in the outer leaf of not greater than 800 mm x 500 mm and do not penetrate the inner leaf except through a sleeve of not more than 80 mm by 80 mm which is fire stopped where it passes through the inner leaf.
 - (iii) Spread of flame within the cavity - Ballytherm BTCW cavity wall insulation board is designated Class 1 in accordance with BS 476: Part 7: 1997. In an unventilated cavity the amount of air will be insufficient to support combustion and flame spread is unlikely to occur.
 - (iv) Toxicity - Negligible when used in a cavity wall situation.
 - (v) Ballytherm BTCW cavity wall insulation board is manufactured without the use of CFC's or HCFC's, there is no release of such gas on burning.

3.1.2 J3 Protection of Building -

Combustible wall insulation material shall generally be separated by solid non-combustible material not less than 200 mm thick, from any heating appliance or from any flue pipe or opening to a heating appliance. Particular details are given in Section 2, and in Diagrams 2 - 8 of the TGD J to the Building Regulations 1997 - 2002. It should also be separated by 40 mm from the external surface of a masonry

chimney. For chimneys covered by BS 4543 Part 1: 1990 (1996) 'Factory made insulated chimneys' separation between this product and the external surface of the chimney shall be determined in accordance with clause 2.17, of TGD - J to the Building Regulations 1997 - 2002.

3.2 WATER PENETRATION

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

3.2.2 Ballytherm BTCW cavity wall insulation board, when used in accordance with this Certificate, presents no significant risk of water penetration.

3.3 WATER VAPOUR PENETRATION AND CONDENSATION RISK

Ballytherm BTCW cavity wall insulation 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: 2002 Code of practice for control of condensation in buildings, should be followed to minimise the risk of condensation within the building elements and structures.

3.4 THERMAL INSULATION

The aged/design thermal conductivity 'λ' value' of Ballytherm BTCW cavity wall insulation boards when measured in accordance with I.S. EN 12667: 2000 Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meters method - Products of high and medium thermal resistance, is 0.022 W/mK. The high thermal resistance of Ballytherm BTCW cavity wall insulation board 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 the infiltration of cold air are given in TGD - L (DWELLINGS), Section 1.6.

Lintel jamb and cill designs similar to those shown in Diagram 3 of the TGD to Part L (DWELLINGS), Building Regulations 1997 - 2002, will be satisfactory to limit thermal bridging.

The maximum U-values for external walls using Ballytherm BTCW cavity wall insulation board constructions can be determined by reference to Appendix A of TGD – *L Conservation of Fuel and Energy* to Building Regulations 2002. The aged/design thermal conductivity 'λ' value of Ballytherm BTCW cavity wall insulation board is 0.022 W/mK. See Table 3 for wall construction to achieve a U-value of 0.27W/m²K.

3.5 DURABILITY

Ballytherm BTCW cavity wall insulation board 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 certificate. Its durability depends upon the supporting structure and the conditions of use.

3.6 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

3.7 Electrical installations should be in accordance with the ETCI publication ET 207: 2003 *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).

3.8 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS

Ballytherm BTCW cavity wall insulation board 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.

3.9 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 cavity wall insulation board does not contain CFC or HCFC gas.
- (ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- (iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.
- (iv) A condensation risk analysis was performed.

Table 3: WALL CONSTRUCTION FOR U-VALUE OF 0.27 W/m²K (partial fill)

Construction	Thickness mm	Thermal Conductivity (W/mK)	Thermal Resistance (m ² K/W)
Outside surface resistance	-	-	0.040
Plaster, lightweight	19.0	0.570	0.033
Blockwork, dense	100.0	1.330	0.075
Cavity L Emissivity	-	-	0.350
BTCW Insulation	65.0	0.022	2.950
Blockwork, dense	100.0	1.330	0.075
Plaster lightweight	18.0	0.180	0.100
Inside surface resistance	-	-	0.130

* These values are indicative only. Each design should be dealt with on a case by case basis. Design should be carried out by a competent person, in accordance with the Building Regulations Technical Guidance Document Part L 2002

Table 4: PHYSICAL PROPERTIES of Ballytherm BTCW Cavity Wall Insulation

Property	Declared Value	Test Method
Water Absorption	Foil 1.2%	EN 12087
Dimensional Stability	DS(TH) 6	EN 1604
Thermal conductivity 'λ' value	0.022 W/mK	I.S. EN 12667
Thermal Resistance		
25 mm	1.136 m ² K/W	
30 mm	1.364 m ² K/W	
35 mm	1.590 m ² K/W	
40 mm	1.818 m ² K/W	
45 mm	2.045 m ² K/W	
50 mm	2.273 m ² K/W	
60 mm	2.272 m ² K/W	
70 mm	3.182 m ² K/W	
75 mm	3.409 m ² K/W	
Compressive strength	CS (10\Y) 50	EN 826

Detail Sheet 3 / Ballytherm BTDL Dry Lining Board Insulation



PRODUCT DESCRIPTION:

This Certificate relates to Ballytherm BTDL dry lining, as defined in IAB Certificate No 05/0220

USE:

Ballytherm BTDL dry lining 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 Limited
Annagh Industrial Park, Ballyconnell
Co Cavan, Ireland

Tel: +353 (0) 49 9527000
Fax: +353 (0) 49 9527002
e-mail: info@ballytherm.ie
Website: www.ballytherm.ie

1.1 PRODUCT DESCRIPTION

Ballytherm BTDL Dry Lining is a composite panel consisting of a closed cell rigid Polyisocyanurate (PIR) insulation bonded to tapered edge plasterboard for internal applications. The plasterboard is 12.5 mm thick manufactured to BS 1230 – Gypsum plasterboard, and accepts dry-jointing materials, plaster skim or direct decoration. Ballytherm BTDF Dry lining has Kraft paper with a polythene membrane on both faces, which acts as an integral vapour check. Polyisocyanurate (PIR) foam core is a thermoset closed cell rigid foam insulation manufactured in accordance with I.S. EN 13165: 2001 *Thermal insulation products for buildings – Factory made products of polyurethane foam (PUR) Specification*.

Ballytherm BTDL Dry Lining board does not contain either CFC or HCFC gases and has zero Ozone Depletion Potential (ODP).

Table 1 shows the Ballytherm BTDL Dry Lining, product range.

Table 1: *Product Range*

The boards are available in the following sizes:

Length	2400m
Width	1200mm
Thickness	20, 25, 30, 35, 40, 45, 50, 60, 70, and 80mm
Grade	PIR

1.2 MANUFACTURE

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

1.3 INSTALLATION PROCEDURE

1.3.1 Ballytherm BTDL Dry Lining board 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 drylining practice and the manufacturer's instructions. All installations require careful planning and setting out. Refer to clauses 0.6 and 1.5 of TGD Part-L to Building Regulations 2002.

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.

1.3.2 Systems and Fixings

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 Dry Lining board being employed. The possibility of a cold bridge occurring via the window boards should also be considered and provision made to insulate this area. 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.

Thermal Looping/Fire Stops

When required fire stops must be provided using proprietary methods or by applying a continuous 50 mm ribbon of dry wall adhesive to the top and bottom edge of each sheet. A treated timber batten will also suffice.

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.

Mechanical Fixing

This method is for application to fair finished brick, block and concrete cavity walls where Ballytherm BTDL Dry Lining board is to be finished with gypsum plaster. The wall should be sound, dry and level. (Surface irregularities may impede the fixing of the board).

The board should be fully restrained using mechanical fixings. 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.

Linings (Horizontal and sloping)

Ballytherm BTDL Dry Lining board 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 20 mm 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 25 mm penetration of the supporting timber, and be placed not less than 10 mm from the edges of the board and be spaced at 150 mm intervals along all supporting timbers.

1.3.3 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 face 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.

1.3.4 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.

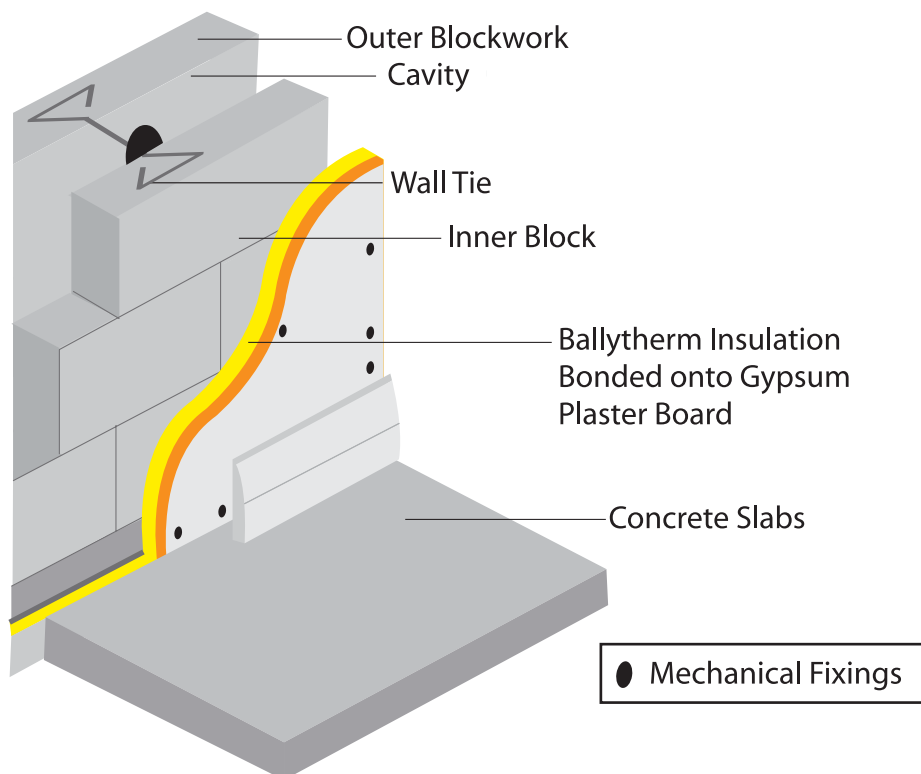


Figure 1: Ballytherm BTDL Dry Lining- Mechanically Fixed.

2 GENERAL

- 2.1** Ballytherm BTDL Dry Lining board when installed in accordance with this Certificate, is effective in reducing the 'U' value (thermal transmittance) of new or existing walls and ceilings.
- Ballytherm BTDL Dry Lining board may be used to insulate clay or calcium silicate bricks, concrete blocks, or natural and reconstituted stone blocks. It is essential that such walls are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.
- 2.2** Buildings subject to the relevant requirements of the Building Regulations 1997 to 2002 should be constructed in accordance with I.S. 325: Part 1: 1986 Use of Masonry, Part 1: Structural Use of Unreinforced Masonry, and BS 5628: Part 3: 1995 Code of Practice for use of Masonry: Materials and Components, Design and Workmanship. 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. Where reinforced masonry is involved, the design should be in accordance with BS 5628: Part 2: 1985, Code of Practice for use of Masonry, Structural Use of Reinforced and Prestressed Masonry. The relevant recommendations of Section 3 of BS 5390: 1976 (1984), Code of Practice for Stone Masonry, should be followed where the wall incorporates stone or cast stone.
- 2.3** With dry lining installations forming a void of 20 mm or more, services can be incorporated behind the dry lining, making the chasing of the wall unnecessary. When using adhesive systems, or where the services have a greater depth than the void, the wall should be chased rather than the insulation.
- 2.4** All mould or fungal growth should be treated prior to the application of the product.
- 2.5** 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.

3.1 BEHAVIOUR IN FIRE

The plasterboard used in the Ballytherm BTDL Dry Lining board is deemed to be Class 'O' in accordance with the Building Regulations, 1997 – 2002 and so the insulated board qualifies as the highest product performance classification as defined in Technical Guidance Document B - Fire Safety (paragraph A10 of Annex A). The insulation component of the board should be isolated from possible sources of combustion. To achieve this Ballytherm BTDL Dry Lining board should be installed in accordance with the following: -

- (i) Combustible material shall be separated by solid non-combustible material not less than 200 mm thick from a flue pipe to an oil, solid fuel or gas heating appliance as indicated in Section 2 of Technical Guidance Document J – Heat Producing Appliances.
- (ii) Ballytherm BTDL Dry Lining board should be separated by a minimum distance of 150 mm from an oil, solid fuel or gas heating appliance as indicated in Diagram 8 of Technical Guidance Document J - Heat Producing Appliances, of Building Regulations 1997.
- (iii) Ballytherm BTDL Dry Lining board when installed with a residual cavity between the board and the wall, will require the provision of cavity barriers and may be used in buildings of any purpose group provided: -
 - (a) direction on the provision and spacing of cavity barriers is given in Tables 3.2 and 3.3 of Technical Guidance Document B – Fire Safety to the Building Regulations.
 - (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; and
 - (c) cavity barriers in spaces between a floor and ceiling are provided at maximum distances of 20 m 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) cavity barriers in walls are provided at maximum distances apart of 10 m unless a Class 1 material is exposed to the cavity when a spacing of 20 m may be adopted.

3.2 WATER PENETRATION

- 3.2.1** Ballytherm BTDL Dry Lining board closed cell structure does not allow water uptake by capillary action.

- 3.2.2** Ballytherm BTDL Dry Lining board, when used in accordance with this Certificate, presents no significant risk of water penetration.

3.3 THERMAL INSULATION

The aged/design thermal conductivity 'λ' value of Ballytherm BTDL Dry Lining board when measured in accordance with I.S. EN 12667: 2000 Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method – Products of high and medium thermal resistance, is 0.026 W/mK. The high thermal resistance of Ballytherm BTDL Dry Lining board ensures that cold bridging and extra heat loss around the edges of openings can be avoided. Refer to Appendix A of Technical Guidance Document L to Building Regulations 2002.

Lintel jamb and cill designs similar to those shown in Diagram 3 of the TGD to Part L – Conservation of Fuel and Energy DWELLINGS, (Building Regulations 2002), 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 Section 1.6 of TGD Part L (DWELLINGS), to the Building Regulations 2002.

The maximum U-values which can be achieved with Ballytherm BTDL dry lining should be determined in accordance with the procedures of Appendix A, clauses A3.1- A3.3 of Technical Guidance Document L to Building Regulations 2002.

3.4 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with the ETCI publication ET 207: 2003 *Guide to the National Rules for Electrical Installations as Applicable to Domestic Installations*. It is recommended that cables should not be buried in the insulation and carried in a conduit. In relation to recessed spotlights and other luminaires, ET 207 requires they be not less than the minimum distances from combustible materials as specified in clause 559.3.2 of the TCI National rules of the Electro Technical Council of Ireland (ET 101).

For extra low voltage (ELV) it is recommended that only surface mounted ELV lighting be permitted in conjunction with Ballytherm BTDL Dry Lining Board.

3.5 CONDENSATION RISK

Ballytherm BTDF Dry lining has Kraft paper with a polythene membrane on both faces, which acts as an integral vapour check. It is therefore unlikely to be affected by surface or interstitial condensation, provided the correct thickness of Ballytherm BTDL Dry Lining board is chosen and all joints between boards are filled and taped in accordance with Standards 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: 2002 Code of practice for control of condensation in buildings, should be followed to minimise the risk of condensation within the building elements and structures.

3.6 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS

Ballytherm BTDL Dry Lining board panels do not promote infestation, as there is no food value in the materials used. They also resist attack by mould and microbial growth. The insulation core is resistant to dilute acids, alkalis, mineral oil and petrol. It is not resistant to some solvent-based adhesive systems, particularly those containing methyl ethyl ketone. Adhesives containing such solvents should not be used in association with the boards. Boards which have been in contact with harsh solvents, petrol, mineral oil or acids or boards that have been damaged in any other way should not be used.

3.7 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.

3.8 MAINTENANCE

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

3.9 DURABILITY

Ballytherm BTDL Dry Lining board 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 certificate. Its durability depends upon the supporting structure and the conditions of use.

3.10 LIMITATIONS

Ballytherm BTDL Dry Lining board has a gypsum plasterboard face, it should therefore not be used to isolate dampness nor be used in continuously damp or humid conditions.

3.11 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 Dry Lining board does not contain CFC or HCFC gas.
- (ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- (iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.
- (iv) A condensation risk analysis was performed.

Table 2: *PHYSICAL PROPERTIES of Ballytherm BTDL Dry Lining Board*

Property	Declared Value	Test Method
Water Absorption	Foil 1.2% Kraft Paper 2.1%	EN 12087
Dimensional Stability	DS(TH) 6	EN 1604
Thermal conductivity 'λ' value	0.026 W/mK	I.S. EN 12667
Thermal Resistance		
20 mm	0.769 m ² K/W	
25 mm	0.962 m ² K/W	
30 mm	1.154 m ² K/W	
35 mm	1.346 m ² K/W	
40 mm	1.538 m ² K/W	
45 mm	1.731 m ² K/W	
50 mm	1.923 m ² K/W	
60 mm	2.308 m ² K/W	
70 mm	2.692 m ² K/W	
75 mm	2.885 m ² K/W	
Compressive strength	Foil: CS (10\Y)50 Kraft Paper: CS (10Y)100	EN 826

Detail Sheet 4 / Ballytherm BTR Pitch Roof Insulation



PRODUCT DESCRIPTION:

This Certificate relates to Ballytherm BTR Pitch Roof Insulation, as defined in IAB Certificate No. 05/0220.

USE:

The product is used for the thermal insulation of pitched and tiled roofs constructed in accordance with I. S. ICP 2: 2002 - Code of Practice for Slating and Tiling, 2002. It can be used between, or between and under rafters. It also facilitates the control of surface and interstitial condensation in roofs.

MANUFACTURE AND MARKETING:

The product is manufactured and marketed by:

Ballytherm Limited
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1.1 PRODUCT DESCRIPTION

This Certificate relates to the Ballytherm BTR Pitch Roof Insulation using Polyisocyanurate (PIR), closed cell rigid foam insulation with an integral vapour barrier, manufactured in accordance with I.S. EN 13165: 2001 *Thermal insulation products for buildings – Factory made products of polyurethane foam (PUR) Specification*. During the manufacturing process, liquid raw materials expanded by blowing agents are applied between low emissivity composite foil facings. Ballytherm BTR Pitch Roof Insulation boards are CFC and HCFC free and therefore have zero ozone depletion potential (zero ODP).

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2002.

Table 1 shows the Ballytherm BTR Roof insulation, product range.

Table 1: *Product Range*

The boards are available in the following sizes:

Length	2400m
Width	1200mm
Thickness	25, 30, 35, 40, 45, 50, 55, 60, 65, 70, and 75mm
Grade	PIR

1.2 MANUFACTURE

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

1.3 INSTALLATION PROCEDURE

1.3.1 General

Installation must be in accordance with the relevant clauses of I. S. ICP 2: 2002 - Code of Practice for Slating and Tiling and the manufacturers instructions and can be carried out in all conditions normal for roof construction. Refer also to clause 0.6 (Technical Risks and Precautions - General) and Appendix A of Technical Guidance Document L to the Building Regulations 2002.

Ballytherm BTR Pitch Roof Insulation is light to handle and can be easily cut or shaped. The boards will not support the weight of operatives and care must be taken during tiling as indicated in the Company's Safety Notes.

Where the board is installed in Traditional and Timber Frame Construction cavity barriers at the junction of the external wall and roof space should be provided in accordance with the requirements of Part B of the Building Regulations 1997 - 2002.

1.3.2 Procedure – Between Rafter Layer of Insulation (Cold Roof)

Ballytherm BTR Pitch Roof Insulation 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 Pitch Roof Insulation 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 over the first layer may be appropriate. As in the solution for the Warm Roof when the relevant space is to be used as a living area, Ballytherm BTR Pitch Roof Insulation 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 BTR insulation or between the 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 proprietary nailable sarking clips. The nailable sarking clips are driven into the upper surface of each of rafter at one-metre intervals up the roof slope. The nailable sarking clips then support lengths of Ballytherm BTR Pitch Roof Insulation suitably trimmed to size and placed between the rafters.

In cases where the Ballytherm BTR Pitch Roof Insulation between the rafters is to be flush with the bottom of the rafters but does not fill the full rafter depth, install the insulation with the aid of battens nailed to the side of the rafters. The battens should be in the appropriate position to ensure the insulation flush with the bottom of the rafters.

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

In accordance with building regulations, a 50 mm ventilation space should be maintained between the sarking felt and the insulation in "Cold Roof" construction, unless a breather membrane is used allowing for a reduction in the recommended airspace. (Refer to manufacturers instruction and conditions of the certificate).

1.3.3 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 BTR 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.

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.

1.3.4 Breather membranes

Breather membrane for the purposes of this Agreement Certificate should be approved for use with the system by Ballytherm Limited or may be any other breather membrane with an Irish Agreement Certificate.

1.3.5 Slating and tiling

Slating and tiling is installed in accordance with I. S. ICP 2: 2002 - Code of Practice for Slating and Tiling. When the relevant space is to be used as a living area, Ballytherm BTR Pitch Roof Insulation should be covered with 12.5 mm plasterboard or Ballytherm BTDL Dry Lining board. A vapour control layer should be fixed as described in section 1.3.2 of this Detail Sheet.

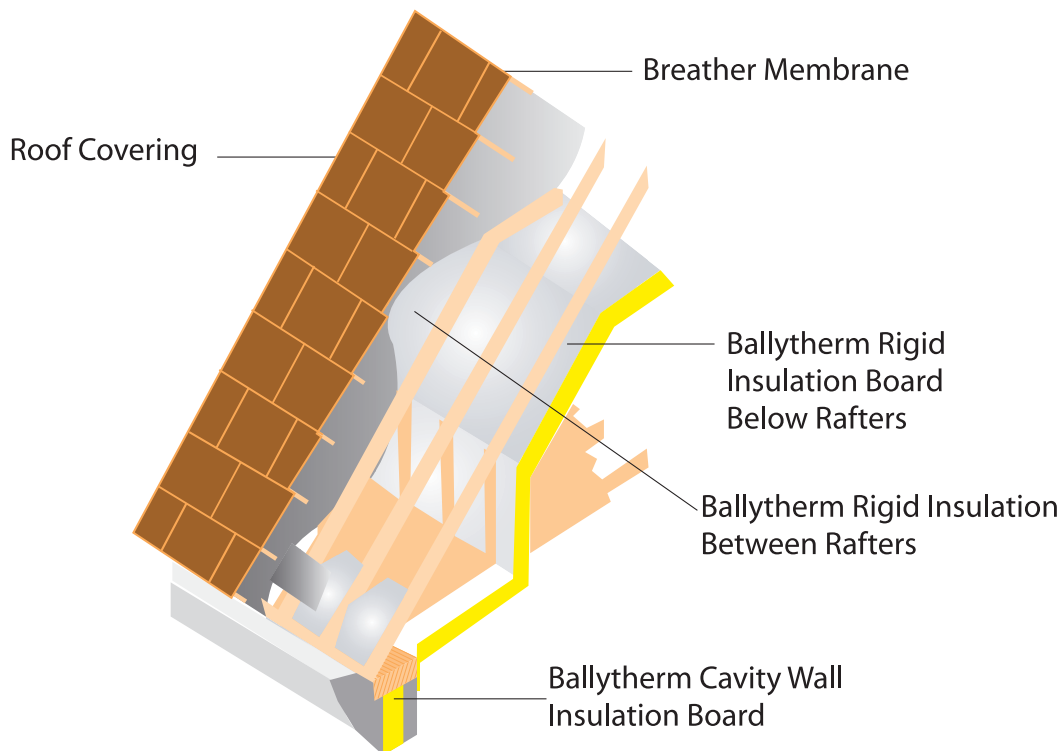


Figure 1: Ballytherm BTR Pitch Roof Insulation

2 GENERAL

- 2.1** Ballytherm BTR Pitch Roof Insulation when installed in accordance with this Certificate 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.
- 2.2** Roofs subject to the relevant requirements of the Building Regulations 1997 to 2002 should be constructed in accordance with I. S. ICP 2: 2002 – Code of Practice for Slating and Tiling
- 2.3** When installed in accordance with this Certificate, Ballytherm BTR Pitch Roof Insulation will contribute to the buckling and racking strength of the roof as described in I. S. ICP 2: 2002 – Code of Practice for Slating and Tiling. However, it is not recommended that they be considered as an alternative to cross bracing.
- 2.4** 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.
- 2.5** Roof tile underlays must be approved by Ballytherm Limited or be the subject of a current Irish Agrément Certification for such use. Underlays should be installed in accordance with, and within the limits of that Certificate.
- 2.6** Moisture entering the roof must be minimised using a minimum of 500 gauge polyethylene with sealed gaps, placed under the inclined ceiling. Gaps in the ceiling should be minimised and service openings should be sealed.

3.1 BEHAVIOUR IN FIRE

- (i) Combustibility - Although Ballytherm BTR Pitch Roof Insulation is combustible, when used in the context of this Certificate the increase in fire load in the building consequent to its use, is negligible.
- (ii) The use of Ballytherm BTR Pitch Roof Insulation will not affect the fire rating obtained by the tiled/slatted roof when assessed or tested to BS 476; Part 3: 1958 Fire tests on building materials and structures – External fire exposure roof test.
- (iii) Toxicity - Negligible when used in protected roof situation.
- (iv) As Ballytherm BTR Pitch Roof Insulation is manufactured without the use of CFC's or HCFC's, there is no release of such gas on burning.

3.2 STRENGTH

Ballytherm BTR Pitch Roof Insulation when installed in accordance with the manufacturer's instructions, and this certificate, will resist the loads likely to be met during installation and in service.

3.3 WATER VAPOUR PENETRATION AND CONDENSATION RISK

3.3.1. The resistance to wind uplift depends on many factors particular to each project. The effect of wind loading should be calculated in accordance with BS 6399: Part 2: 1997 Loading for buildings – Code of practice for wind loads, *including (AMD 13392) (AMD corrigendum 14009)*, using the appropriate basic wind speed shown on the map in Diagram 15 of TDG – A, Structure.

3.3.2 Ballytherm BTR Pitch Roof Insulation, when installed in accordance with section 1.3 of this Detail Sheet, will have sufficient resistance to wind uplift.

3.4 RESISTANCE TO MOISTURE

Ballytherm BTR Pitch Roof Insulation will not be adversely affected by rain during installation or by wind driven snow or rain penetrating the tiling in service. Water absorption is low and the influence on the 'λ' value is minimal.

3.5 CONDENSATION RISK

3.5.1 Ballytherm BTR Pitch Roof Insulation 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: 2002 Code of practice for control of condensation in buildings, should be followed to minimise the risk of condensation within the building elements and structures.

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

3.6 THERMAL INSULATION

The aged/design thermal conductivity 'λ' value of Ballytherm BTR Pitch Roof Insulation boards when measured in accordance with I.S. EN 12667: 2000 Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method – Products of high and medium thermal resistance, is 0.022 W/mK.

The maximum U-values for that can be obtained using BTR Pitch Roof insulation can be determined by reference to Appendix A of TGD –L (*Conservation of Fuel and Energy*) to Building Regulations 2002. The aged/design thermal conductivity 'λ' value of Ballytherm BTR Pitch Roof insulation is 0.022 W/mK.

3.7 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS

Ballytherm BTR Pitch Roof Insulation panels do not promote infestation, as there is no food value in the materials used. They also resist attack by mould and microbial growth. The insulation core is resistant to dilute acids, alkalis, mineral oil and petrol. It is not resistant to some solvent-based adhesive systems, particularly those containing methyl ethyl keytone. 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.

3.8 DURABILITY

Ballytherm BTR Pitch Roof Insulation is rot-proof and durable. As roof insulation, Ballytherm BTR Pitch Roof Insulation 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 certificate.

3.9 MAINTENANCE AND REPAIR

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

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 tiling/slating.

3.10 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

3.11 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 Pitch Roof Insulation board does not contain CFC or HCFC gas.
- (ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- (iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.
- (iv) A condensation risk analysis was performed.

Table 2: *PHYSICAL PROPERTIES of Ballytherm BTR Pitch Roof Insulation*

Property	Declared Value	Test Method
Water Absorption	Foil 1.2%	EN 12087
Dimensional Stability	DS(TH) 6	EN 1604
Thermal conductivity 'λ' value	0.022 W/mK	I.S. EN 12667
Thermal Resistance		
25 mm	1.136 m ² K/W	
30 mm	1.364 m ² K/W	
35 mm	1.590 m ² K/W	
40 mm	1.818 m ² K/W	
45 mm	2.045 m ² K/W	
50 mm	2.273 m ² K/W	
55 mm	2.500 m ² K/W	
60 mm	2.272 m ² K/W	
65 mm	2.955 m ² K/W	
70 mm	3.182 m ² K/W	
75 mm	3.409 m ² K/W	
Compressive strength	CS (10\Y) 50	EN 826