NSAI Agrément

IRISH AGRÉMENT BOARD CERTIFICATE NO. 08/0302
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Envirobead Cavity Wall Insulation System

Isolent de murs à double parol

Kerndämmung

NSAI Agrément (Irish Agrément Board) is designated by Government to carry out European Technical Assessments.

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 2019**.

PRODUCT DESCRIPTION:
This Certificate relates to the Envirobead Cavity Wall Insulation System.

Envirobead Cavity Wall Insulation is an expanded polystyrene material which is injected in bead form with a binding agent into masonry cavity walls.

In the opinion of NSAI, the Envirobead Cavity Wall Insulation System, as described in this Certificate, complies with the requirements of the Building Regulations 1997 to 2019.

USE:
The product is used for the thermal insulation of new or existing cavity walls up to 12 meters in height, where both leaves are constructed of either masonry or concrete or a combination thereof, subject to the conditions contained in Part 3 of this Certificate. It also facilitates the control of surface and interstitial condensation in walls

The product is approved for installing in masonry cavity walls for both full fill or partial fill situations when a residual cavity width of 40mm or greater exists subject to the conditions identified in Cl. 2.4.4 of this certificate.

MANUFACTURE AND MARKETING:
The product is manufactured on behalf of and marketed by:

Envirobead Insulation Ltd.
The IDA Business& Technology Park,
Quarterstown,
Mallow, Co. Cork.

Tel: +353 22 22102
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Readers are advised to check that this Certificate has not been withdrawn or superseded by a later issue by contacting NSAI Agrément, NSAI, Santry, Dublin 9 or online at www.nsai.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Envirobead Cavity Wall Insulation if used in accordance with this certificate, can meet or contribute to meeting the requirements of Part L of the Irish Building Regulations 1997 to 2019 as indicated in Section 1.2 of this Agrément Certificate.

1.2 BUILDING REGULATIONS 1997 to 2019

REQUIREMENT:

Part B – Fire Safety

B3 & B8 – Internal fire spread (Structure)
When used in accordance with this certificate the Envirobead cavity wall insulation system will meet the relevant requirements of TGD Part B3 & B8.

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture
Envirobead Cavity Wall Insulation will meet the relevant requirements of TGD Part C4, when installed in accordance with this Certificate.

Part D - Materials and Workmanship

D1 Envirobead Cavity Wall Insulation used in accordance with this NSAI Agrément Certificate will meet the requirements of TGD Part D1.

D3 – Envirobead Cavity Wall Insulation, as certified in this NSAI/Agrément Certificate, is manufactured from materials which are 'proper materials' fit for their intended use (see Part 4 of this Certificate).

Part F – Ventilation

F1 – Means of ventilation
The systems as certified can be incorporated into structures that will meet the requirements of this Regulation. (see Cl. 2.4.2 of this Certificate).

Part J – Heat Producing Appliances

J3 – Protection of Building
In the opinion of NSAI Agrément, Envirobead Cavity Wall Insulation if used in accordance with this Certificate can meet the requirements of Part J of the Building Regulations 1997 to 2019.

Part L – Conservation of Fuel and Energy

L1 – Conservation of Fuel and Energy
U value calculations may be based on a declared thermal conductivity ($\lambda_{90/90}$) of 0.035 W/(mK) for the Envirobead product and on a declared thermal conductivity ($\lambda_{90/90}$) of 0.033 W/(mK) for the Envirobead Plus product.

These values are based on bead densities of 12 kg/m^3. Users should be aware when calculating U Values, that the density of the bead together with the density of the installed product can vary and allowance should be made for these variations when calculating U Values. Installers should provide records of bead density used together with volume of bead used in each installation in order to more accurately determine actual U Values.

Walls using Envirobead Cavity Wall Insulation can meet the current U-value requirements in Full Fill Cavity Wall Insulation applications depending on the cavity width (see Table 1 and Cl. 4.4 of this Certificate)

2.1 PRODUCT DESCRIPTION

Envirobead Cavity Wall Insulation consists of an expanded polystyrene material injected in bead form with a bonding agent. The bonding agent is used to provide long-term stability to the insulant.

The Envirobead Cavity Wall Insulation System can be installed using a compressed air delivery system.

The polystyrene bead is delivered in a container and injected into the cavity with the bonding agent. The target mean density for this product installed with the bonding agent is not less than 12 kg/m^3.

2.2 MANUFACTURE

Envirobead is manufactured from BASF N2300 bead with a manufactured minimum dry bead density of 11.5 kg/m^3 (colour = silver/grey).

Envirobead Plus is expanded from BASF P5200 bead with a manufactured minimum dry bead density of 11.5 kg/m^3 (colour = dark grey).

Two bonding agents are approved by this Certificate: Evode BM 1999, manufactured by Evode Ltd. and EMUPOL 6650-34 which is manufactured and distributed by Dunwood Polymers. The delivery container is labelled with the makers name and the product code together with the name – Envirobead.

2.3 DELIVERY, STORAGE AND MARKING

The Envirobead Cavity Wall Insulation System is delivered to site in a bulk container. The relevant delivery paperwork is marked with the NSAI Agrément identification mark incorporating the number of this Certificate and a unique batch number. The material, which has an indefinite storage life, should be kept dry.

The bonding agent is also supplied to site in containers marked with the NSAI Agrément identification mark and identified by the manufacturers Type and Batch code and incorporating the number of this Certificate.

The bonding agent is used undiluted in accordance with instructions provided. It must not be allowed to freeze and should be handled in accordance with the data sheet as outlined in the Envirobead Installation Manual.

2.4 INSTALLATION PROCEDURE

2.4.1 Site Survey

A survey, as defined in Appendix A of the NSAI Agrément Assessment & Surveillance Scheme for Cavity Wall Insulation (CWI), is carried out prior to installation by a trained Envirobead Cavity Wall Insulation surveyor, acting on behalf of the Manufacturer/ Approved Installer who will ascertain the suitability of the property or properties for the Envirobead Cavity Wall Insulation System.

A complete survey report (including a borescope survey) is prepared before installation and held at the Approved Installer's offices. Particular problems are specifically identified and any reasons for rejection of the work are noted.

Quotations, tenders and invoices shall bear the NSAI Agrément identification mark incorporating the number of this Certificate and the installer's registration number.

2.4.2 Site Preparation

Before commencing work the installing operative ensures that the property has been correctly surveyed and is suitable for insulation with the Envirobead Cavity Wall Insulation System. Any problems encountered during drilling which prevent compliance with this Certificate are referred to the Certificate Holder before proceeding.

2.4.2.1 Ventilation

Essential ventilation openings such as that providing combustion air or under floor ventilation and all flues in the cavity wall are checked. If adequate sleeving or other cavity closures are not present, installation must not proceed until these openings have been sleeved or otherwise modified to prevent blockage by the insulant.

When installing the Cavity Wall Insulation System, the works to be undertaken must not compromise the existing ventilation provisions in the home.

When these existing ventilation provisions do not meet the requirements of Part F of the Building Regulations, the homeowner should be informed and remedial action should be taken before the cavity wall insulation system is installed.

2.4.2.2 The tops of cavity walls must be closed. Cavity filling should not be carried out unless electrical cables are placed in conduits or suitably isolated from the insulation material by cavity brushes or similar method approved by the Certificate Holder.

2.4.3 Approved Installers

Installation of the Envirobead Cavity Wall Insulation System shall be carried out by Envirobead Insulation Ltd. or by their Approved Installers who:

1) Are registered with the NSAI Agrément CWI scheme.
2) Are approved by Envirobead Insulation Ltd. and NSAI Agrément to install the product.
3) Have undertaken to comply with the Envirobead Insulation Ltd. Installation Procedure.
4) All technicians and surveyors have been trained and issued with appropriate identity cards by Envirobead Insulation Ltd. All members of each installation team must carry a card verifying this training and registration.
5) Are subject to supervision by Envirobead Insulation Ltd, including unannounced site inspections, in accordance with the NSAI Agrément Assessment/Surveillance Scheme.

2.4.4 Procedure

The Envirobead Cavity Wall Insulation System is installed using a compressed air system approved by Envirobead Insulation Ltd. and notified to NSAI Agrément.

The installer provides all necessary hoses, drilling tools equipment and materials for making good the walls after the installation of the Envirobead Cavity Wall Insulation System.

Prior to the commencement of the filling operation it is essential that the flow rates of the blown bead and adhesive are checked. This is carried out by filling a hessian bag with dry bead for 60 seconds, the bead is weighed and weight recorded. Using the bead/flow chart supplied by Envirobead , the correct amount of adhesive is applied to the bead to ensure adequate bonding of the product in accordance with the Envirobead Cavity Wall Insulation Systems Manuals.

Where a semi-detached or terraced property is to be insulated, the insulation is contained by inserting a cavity barrier at the line dividing the properties. This consists of an appropriate sized nylon brush. After filling, the cavity barrier is retained in the cavity and the drill holes filled. The nylon brush can also be used to prevent the blocking of under floor vents with the blown bead where these have not been previously sleeved.

2.4.4.1 New and existing buildings without existing partial fill in cavity.

All defects, such as missing ventilation sleeves or debris in the cavity, must be rectified prior to the installation of the bead. Holes of 22 mm – 26 mm diameter are drilled in the outer or inner leaf normally spaced approximately 600 – 650 mm horizontally apart and 200 mm above the highest ceiling level. A further series of holes 2.0 m apart is drilled at the middle height of a two storey building to ensure complete fill of the cavity space. Care should be taken to ensure that these holes do not coincide with the intermediate suspended timber floor.

A similar series of holes is drilled below windows and obstructions. A typical drilling pattern is shown in Figure 1.

2.4.4.2 New and existing buildings with existing partial fill in cavity.

Where partial fill insulation exists in the property/wall to be filled, additional factors must be examined to determine its suitability.

Each property is subject to two borescope inspections surveys, one performed by the Site Surveyor (on a minimum of two test holes per elevation) and a further more detailed survey (on **all** drill holes - See Figure 2) by the installer during the installation phase. The findings of these surveys will determine the suitability of the property to be filled. A clear minimum remaining cavity width of 40mm must exist if the wall is to be considered suitable for filling.

Note: The use of Envirobead Cavity Wall Insulation in cavities where partial filled mineral (glass/rock) wool boards exist, has not been approved per this Certificate. See also Cl. 3.8 of this Certificate.

Anomalies may include loose, missing or incorrect positioning (not tight to the inner leaf) of the partial fill insulation. If anomalies found cannot be rectified, filling of the cavity shall not proceed. Reference shall be made to the Certificate Holders Installation Procedures manual for full details all pre-inspection, rectification and filling requirements of residual fill applications. Details of the borescope inspection surveys shall be recorded on the Site Survey Record Sheet.

In addition, individual U-value calculations are required in residual fill applications with details of calculations (including existing insulation type and thickness) to be recorded on the Site Survey Record Sheet.

Note: The Envirobead Plus bead has not be assessed or approved for use in residual fill applications when the remaining cavity width to be filled is less than 50mm.

Holes of 22 mm – 26mm diameter are drilled in the outer or inner leaf (using a suitable drill equipped with a depth stop, to avoid damaging the existing partial fill insulation) normally spaced approximately 600 mm horizontally apart and 200 mm above the highest ceiling level.

A further series of holes 1.2 m apart is drilled at levels one third and two thirds the height of a two storey building to ensure complete fill of the cavity space. Care should be taken to ensure that these holes do not coincide with the intermediate suspended timber floor.

A similar series of holes is drilled below windows and obstructions. A typical drilling pattern is shown in Figure 2. Care should be taken when drilling near to the services supply box, distribution points, wall mounted lights etc. to prevent damage to hidden services runs within the property.

2.4.4.3 Installation should be carried out in accordance with requirements of the Certificate holders installation instructions and the NSAI Agrément Surveillance Scheme document.

During installation the following simple checks can be made, as an aid to determining that the installation conforms to the certified method:

1) Check that the pattern of holes complies with the description given in Section 2.4 and Figure 1 or 2 of this Certificate for the type of installation undertaken.

2) Check that the injection of the material takes place at each hole, to complete the filling of the cavity space.

In the case of work undertaken on an empty cavity or for residual fill applications, additional requirements relating to the survey of the wall to be filled are set out in the Envirobead Insulation Ltd. Survey and Installation manual.

Where the apex of the gable end wall is to be insulated a series of holes is drilled along the line of the eaves approximately 600 – 650 mm apart and 200mm below the soffit line and also below any window in the gable similar to that described for other windows.

In some circumstances, access for drilling injection holes and filling with insulation may be limited by features and obstructions such as garages, carports, cladding or conservatories. Refer to the Certificate Holder for advice.

After completion of the cavity assessment and drilling plan for the building, preparation for injection into the cavity is as follows:

The product is injected into the cavity (having determined the correct bead/bonding agent ratio by test) through a flexible pipe fitted with a non-directional nozzle. The material packs to a uniform density in the cavity. Holes beneath ground-floor windows are injected first and filling then continues upwards until a complete fill has been achieved.

After injection, the wall is made good to match the existing finish as closely as possible using mortar or similar waterproofing mix. All trunked air vents are checked, e.g. those providing underfloor ventilation and combustion air for heating appliances.

In certain cases, holes of 18 mm diameter may be acceptable, subject to the approval of the Certificate holder, where narrow mortar joints prevent the use of the larger diameter drill bits. An additional flow test shall be performed in such instances.

In all cases flues are carefully checked before and after the installation by means of an appropriate test (e.g. a smoke test) to ensure they are not obstructed by the insulant and the result recorded on the Technicians safety check sheet which is then filed with the job records.

Any insulant that has been blown through the top of the cavity into the loft space is removed and any points of leakage sealed.

3.0 GENERAL

3.1 The Envirobead Cavity Wall Insulation System, when installed in accordance with this Certificate, is effective in reducing the U-value (thermal transmittance) of external masonry cavity walls, using clay or calcium silicate bricks, concrete blocks, natural stone or reconstituted stone masonry units. It is essential that such walls are designed and constructed to prevent moisture penetration in accordance with the Building Regulations.

The Envirobead Cavity Wall Insulation System is certified for use to fill the cavity in a wall consisting of two leaves of masonry construction (as detailed in the certificate) only. It has not been approved for use on masonry cavity block (hollow block), timber or steel frame construction.

The KOREFILL Cavity Wall Insulation System can also be used to add additional insulation to prevent thermal looping and thermal bypass of masonry cavity wall constructions that are to have NSAI approved ETICS (External Thermal Insulation Composite Systems)/External Wall Insulation Systems (EWI) applied. Refer to the individual NSAI ETICS certificates for details.

Where required, the installer shall confirm the suitability of the masonry construction with the masonry manufacturer.

3.2 Envirobead Cavity Wall Insulation is capable of meeting or contributing to the 'U' value requirements of TGD Part L to Building Regulations 1997 to 2019, (See Table 1).

3.3 The construction details of the building where the insulation is to be installed should comply with all relevant standards (See Cl. 3.7 of this Certificate) and good building practice.

This certificate only relates to buildings which conform to the design conditions set out here, where the Certificate Holder or Registered Installer has carried out a complete assessment of the wall including a borescope survey, as set out in the Envirobead Insulation Ltd. Installation Manual and has deemed the walls suitable for filling by signing the survey sheet.

3.4 Cavity walls with the outer leaf constructed using unrendered (fair-faced) block work are not suitable for full-fill cavity wall insulation. They are therefore not approved by this Certificate.

3.5 Assessment Criteria

There are separate procedures for assessing suitability of existing and new buildings for Envirobead Cavity Wall Insulation. For the purposes of this Agrément Certificate," existing buildings" are defined as buildings in excess of three years old. New buildings are defined as buildings up to 3 years old.

3.5.1 Assessment of Existing Buildings:-

Existing buildings should be assessed in accordance with BS 8208[3]. In addition the requirements of Envirobead Insulation Ltd. Installation Manual must be referenced during this assessment process.

This includes the mandatory use of a borescope at a number of locations on each wall to be filled, to assess the condition of the inner faces of the masonry and to ensure a clear void exists. The findings of this survey shall be recorded on the assessment survey sheet. Additional borescope inspection are required for residual fill applications (walls with existing partial fill boards). See Cl. 2.4.4.2 of this Certificate for details.

In the case of fair faced brickwork recessed mortar joints are not suitable for filling. Only tool flush joint brickwork is acceptable, subject to the following conditions:

- The minimum cavity width for existing buildings is 40 mm.
- There are no signs of dampness on the inner face of the cavity.
- Mortar joints must be in good condition and free from defects which may allow water ingress.

Consideration must also be given to the exposure of the building, but particular reference to the Assessment of exposure zones defined in Section 3.5.2.1 of this Certificate is not required.

3.5.2 Assessment of New Buildings

For new buildings (which may not exhibit visible evidence of exposure damage) an assessment of the Exposure Zones where the property is located, including topography factors must be performed. All restrictions identified in this section of the certificate must be applied. A Borescope inspection shall be performed as identified in Cl. 3.5.1 of this certificate. The findings of this survey shall be recorded on the assessment survey sheet. Additional borescope inspections are required for residual fill applications (walls with existing partial fill boards). See Cl. 2.4.4.2 of this Certificate for details.

3.5.2.1 Assessment of Exposure Zones

During the assessment phase of new buildings for cavity wall insulation the topography factor of the site must be taken into account in all exposure zones. The topography factor takes account of local features such as hills, cliffs, escarpments or ridges where dwellings are located, which can significantly affect the wind speed in their vicinity. It should be derived for each wind direction considered. Reference should be made *to* BS 8104[4] for guidance in this regard. Appendix C of that code makes reference to the topography factor which details the method of calculation of the wind driven rain index for exposed sites in all zones.

It is only after all relevant factors are considered and calculations carried out that a true assessment of the work content for a particular building be determined. Figure 3 identifies the two exposure zones for wind driven rain appropriate to this certificate as follows:

3.5.2.1.1 Normal Exposure

Normal exposure to wind-driven rain applies in districts where the driving rain index is less than 5m²/sec/year however; some areas may require modification to calculations in order to cater for particular individual sites where the topography of a site warrants it (see Figure 3). Appendix C of BS 8104 together with information provided by the Irish meteorological office should be consulted.

In **normal exposure** areas the types of outer leaf masonry finishes where the Envirobead Cavity Wall Insulation System is suitable are as follows:

- Impervious cladding and rendered walls with a minimum cavity width of 40 mm and up to 12m in height, and
- Fair faced unrendered brickwork with tooled flush joints up to two storeys in height with a minimum cavity width of 40 mm.
- Walls must be in a good state of repair with no evidence of frost damage. Mortar joints must not show evidence of damage which would cause water ingress.

3.5.2.1.2 Severe Exposure

Severe exposure to wind-driven rain applies in districts where the driving rain index is 5m²/sec/year or greater (see Figure 3).

In **severe exposure** areas the type of outer leaf masonry finish where the Envirobead Cavity Wall Insulation System is suitable is:

- Impervious cladding and rendered walls with a minimum cavity width of 40 mm and up to 12m in height.
- Walls must be in a good state of repair with no evidence of frost damage and no evidence of damage which would cause water ingress.

Unrendered brickwork is not suitable for full-fill cavity wall insulation in the severe exposure zones

3.5.3 Assessment of all buildings

For both Existing and New Buildings, competent installation is critical. A complete survey of both the internal and external areas of the building (including a borescope survey) must be performed by a trained Envirobead Cavity Wall surveyor and a report prepared and held at the Approved Installers office. Factors to consider include:

- Form of construction and site conditions
- Age of building
- Structural condition
- Size of cavity
- Exposure to wind and driven rain

Installers should be trained to recognise where high exposure and less-than-ideal construction features may cause problems.

For example, it would be inappropriate to insulate a property where poor maintenance has created areas of damp within the dwelling, before the defects have been remedied.

3.6 Filling cavities in sections of the building

In both new and existing buildings, all of the cavity space from ground level to roof or gable copings must be filled. Filling a section of the cavity is only allowed in the following situations:

1) When separately insulating semi-detached or terraced properties. Use of the type of cavity barrier defined in Section 2.4.4 of this Certificate must be employed.

2) Up to the underside of a horizontal boundary, other than the roof, where that boundary is protected by a cavity tray or similar waterproof barrier which must not be distorted or damaged by the installation process.

3) Where filling is carried out above a horizontal boundary where that boundary is protected by a cavity tray or similar waterproof barrier which must not be distorted or damaged by the installation process

4) Where the wall to be insulated is below a waterproof cladding (e.g. tile hung) and this cladding either extends up to the roof or is protected at the top by other means (e.g. window sills with adequate waterproof barrier system).

5) Where it is established that the roof void will not be an occupied space, and where the attic insulation is provided at ceiling level, filling of that section of the cavity of the gable apex (i.e. limiting the fill to at least 200mm above ceiling level insulation) may be omitted provided the top of the gable apex is adequately protected by the roof and its overhang and where the attic space is adequately ventilated.

3.7 Structures

A visual inspection of the wall shall be performed to identify any obvious defects. These defects and their root cause shall be rectified before filling with bead is performed. The advice of a building professional may be required in such instances.

The construction of walls with cavities in excess of 110 mm requires adjustments to lintels, wall ties, cavity barriers etc. It is therefore necessary that cavity walls are adequately designed in respect of structural stability; fire safety and thermal bridging in accordance with Parts A, B and L of the Building Regulations.

In new build situations where extra wall ties may have been used, the density of wall ties shall be considered when calculating the U-value of the wall.

3.8 General Design Considerations

Any defects recorded which may affect the performance of the installed insulation system must be rectified to the satisfaction of the Approved Installer before work commences.

In cavities where electric cables can come into contact with expanded polystyrene, all PVC sheathed electric cables shall be run through ducting or be sleeved in accordance with I.S 10101[5].

Where a flue pipe from a heating system passes horizontally through a wall which is to be insulated with Envirobead Cavity Wall Insulation, the flue pipe shall be separated from the cavity insulation by non-combustible material in accordance with TGD Part J to the Irish Building Regulations. See Cl. 4.1.4 of this certificate for precautions to be taken where chimneys exist in the walls to be filled. See Cl. 4.1.4 of this certificate for precautions to be taken where chimneys exist in the walls to be filled.

Envirobead Cavity Wall Insulation may be used to fill the residual cavity where the wall was previously partially filled with rigid expanded polystyrene (EPS), foil faced Polyisocyanurate (PIR) or Phenolic board, as long as the above conditions for new and existing buildings are adhered to. The use of Envirobead Cavity Wall Insulation in cavities where partial filled mineral (glass/rock) wool boards exist, has not been assessed by this certificate. For the standard Envirobead bead product, a minimum cavity width of 40 mm is necessary to ensure good flow of the bead once the adhesive is applied.

Note: The Envirobead Plus bead has not been assessed or approved for use in residual fill applications when the remaining cavity width to be filled is less than 50mm.

Ensure the existing board is not damaged by restricting the depth of the drill bit so that it penetrates only the outer leaf of the cavity wall.

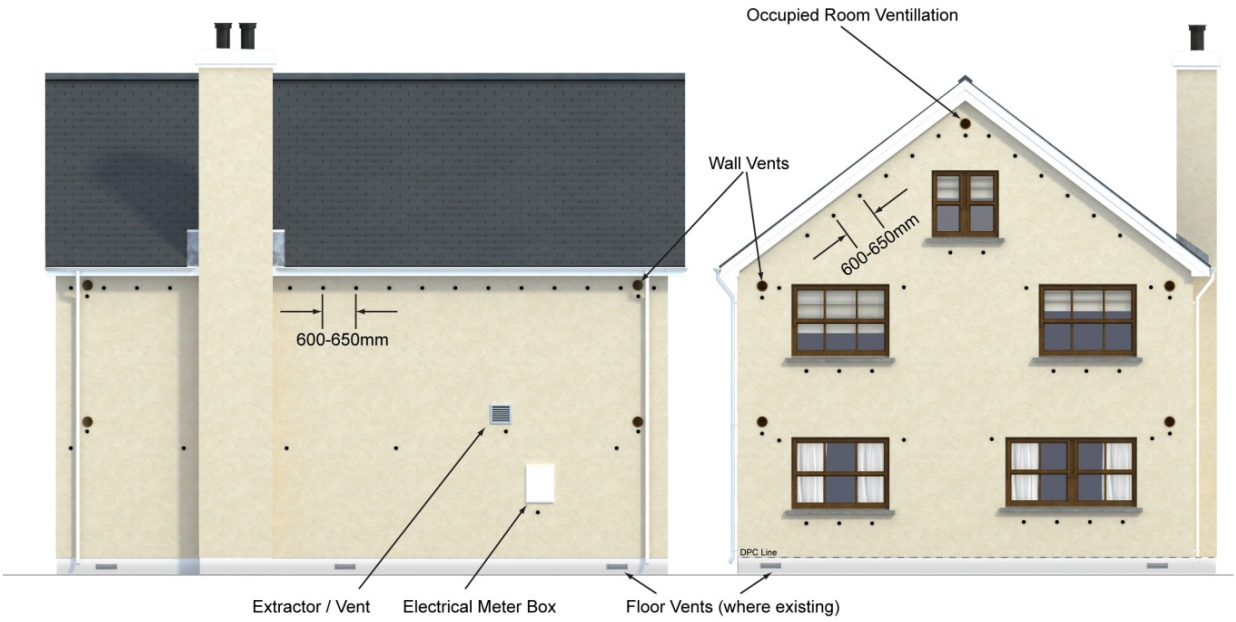

Figure 1: Typical Envirobead Hole Drilling Pattern in a Detached Dwelling.
New and existing buildings <u>without</u> existing partial fill insulation in cavity.

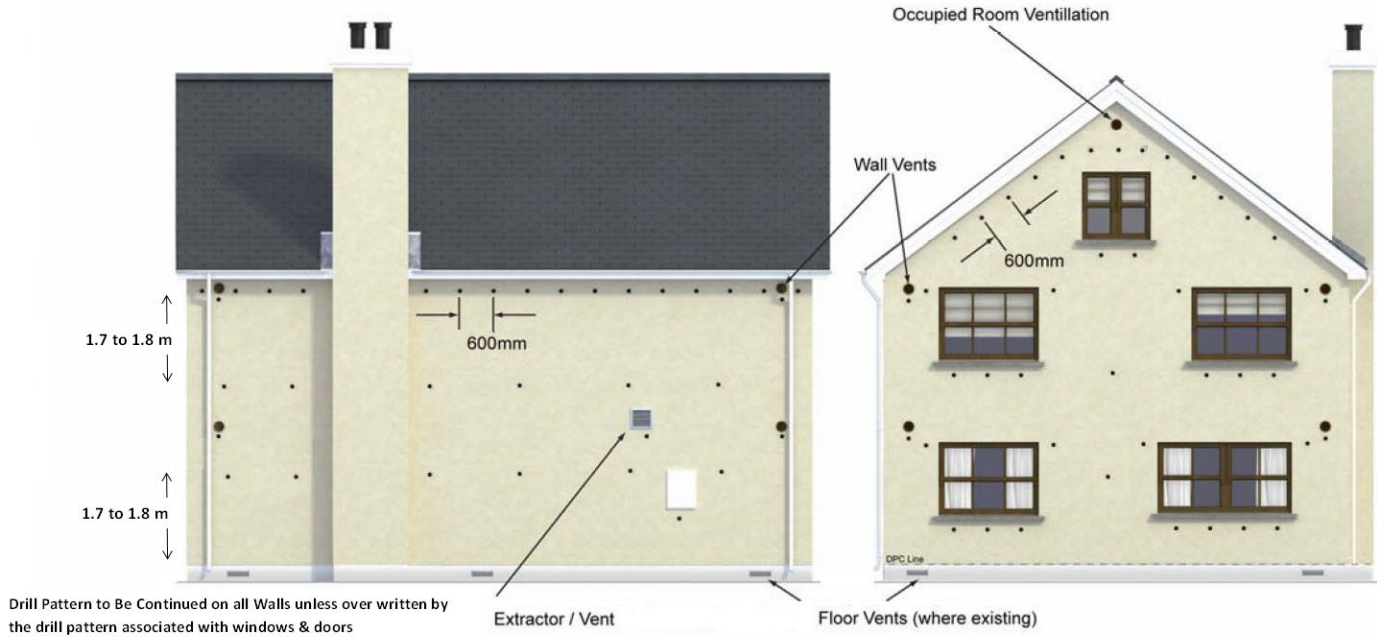

Figure 2: Typical Envirobead Hole Drilling Pattern in a Detached Dwelling for Residual Fill Application - New and existing buildings <u>with</u> existing partial fill insulation in cavity.

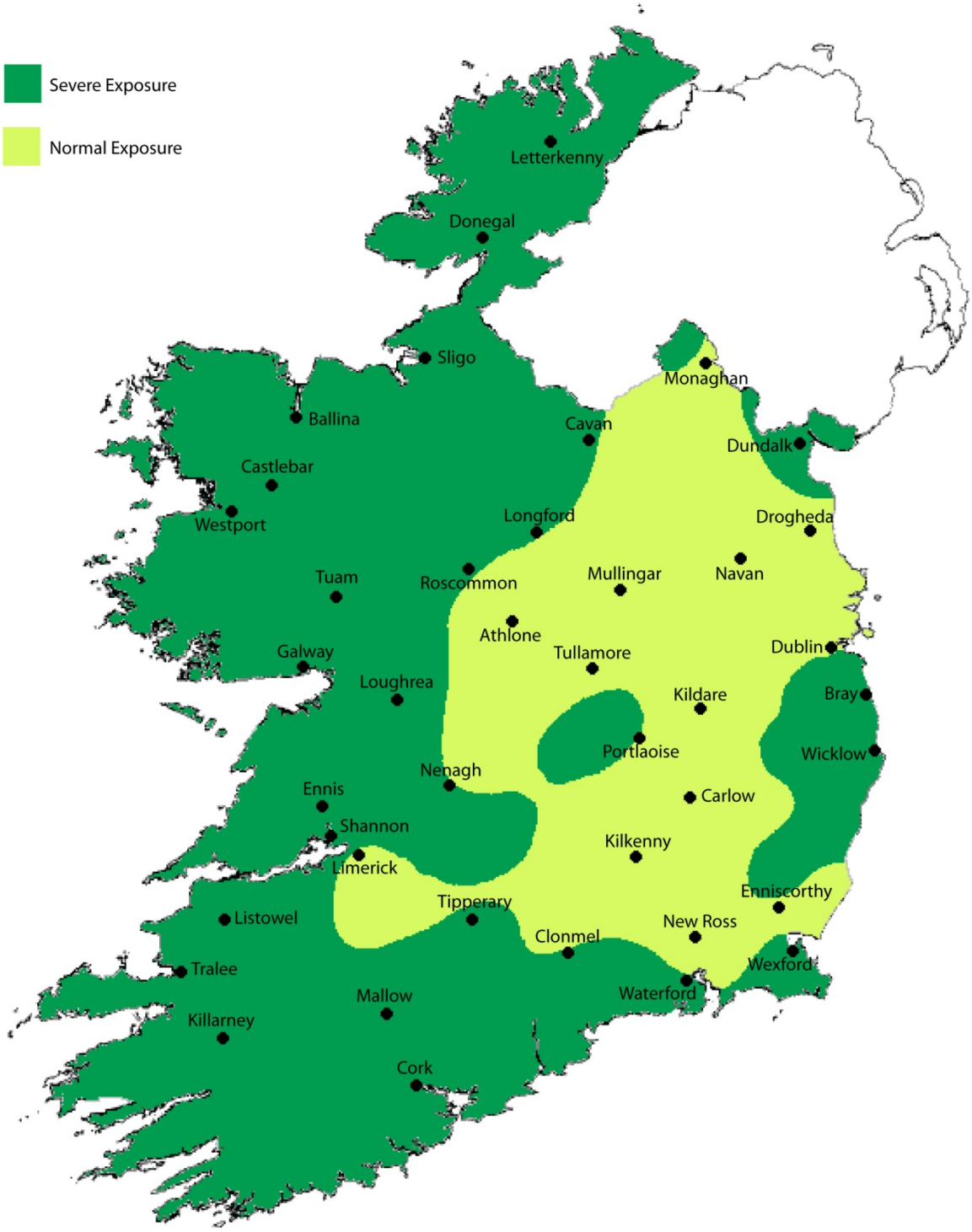

Figure 3: Driving Rain Map (Indicative only – Not to scale)

4.1 BEHAVIOUR IN FIRE

4.1.1 Although the Envirobead Cavity Wall Insulation products are considered combustible, the system will meet the relevant requirements of TGD Part B3 & B8 when used in accordance with this certificate. The directions contained in this Certificate relating to the sealing of an uncapped cavity and removing insulant present in the loft space after installation must be carefully followed

All beads approved in this certificate contain a uniformly distributed polymeric flame retardant. The adhesives used a part of the system as describe in this certificate are water based and are not combustible.

When using this product, the requirements of the Building Regulations 1997 to 2019 relating to fire spread in cavity walls can be met in most purpose groups without the need for cavity barriers provided the walls are constructed in accordance with the following provisions of the TGD to Part B, including Diagram 17:

1. The wall must consist of masonry or concrete inner and outer leaves, each at least 75 mm thick.

2. The cavity must be closed at the top of walls and any other opening.

3. In addition to the product, only the following combustible materials shall be placed in, or exposed to, the cavity:
   a) timber lintel, window or door frame, or end of timber joist
   b) pipe, conduit
   c) dpc flashing closer or wall tie
   d) domestic meter cupboard, provided that:
   - there are not more than two cupboards to a dwelling.
   - the opening in the outer leaf is not more than 800 mm by 500 mm for each cupboard, and
   - the inner leaf is not penetrated except by a fire-stopped sleeve not more than 80 mm by 80 mm.
   e) thermal insulating material
   f) in respect of purpose groups 3 – 8 the cavities are sub-divided so that the distance between cavity barriers does not exceed the dimensions given in sub-section 3.3 of the TGD to Part B.

4.1.2 For buildings constructed of masonry or concrete cavity walls (as detailed in this certificate), in accordance with the Building Regulations 1997 to 2019 the product may be used in buildings of every purpose group.

4.1.3 Protection of Buildings

Combustible cavity wall insulation material should be separated from the flue in a brick or blockwork chimney and from any heating appliance by solid non-combustible material not less than 200mm thick.

Alternatively, combustible material should be separated by 40mm from the outer surface of a masonry chimney.

Where a flue pipe from a heating system passes horizontally through a wall which is to be insulated with Envirobead Cavity Wall Insulation products, the flue pipe shall be separated from the cavity insulation by non-combustible material in accordance with the TGD to Part J to the Irish Building Regulations.

Particular details are given in Diagrams 2 – 8 of the TGD to Part J of the Building Regulations 1997 to 2019 regarding separation from any flue pipe or opening to a heating appliance.

For 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 Part J of the Building Regulations 1997 to 2019.

4.2 LIQUID WATER PENETRATION

Test data obtained by NSAI Agrément confirms that the masonry cavity wall built to determine the effects of water resistance incorporating the Envirobead Cavity Wall Insulation System did not transmit water to the inner leaf.

The Envirobead Cavity Wall Insulation System, when used in accordance with this Certificate, presents no significant risk of water penetration.

4.2 CONDENSATION RISK

The Envirobead Cavity Wall Insulation System is not a water vapour barrier and offers no resistance to vapourised moisture.

4.3.1 Internal Surface Condensation

When improving the thermal performance of the external envelope of a building through the use of Cavity Wall Insulation, designers need to consider the impact of these improvements on other untouched elements of the building. As referenced in Cl. 4.5 of this Certificate, thermally bridged sections of the envelope such as window jambs, sills, heads, internal wall and floor junctions and eaves will experience a lower level of increased thermal performance.

The ability to improve these junctions can be limited due to physical restrictions on site. As a result, best practice should be adopted in order to limit the risk of internal surface condensation which can result in dampness and mould growth. Reference should be made to SR 54[2] as required.

When site limiting factors give rise to substandard levels of insulation at bridged junctions, guidance should be sought from the Certificate holder as to acceptable minimum requirements.

4.3.2 Interstitial Condensation

When a potential interstitial condensation risk is identified at design stage, a condensation risk analysis must be carried out.

A transient hygrothermal (condensation) risk analysis in accordance with I.S. EN 15026[7] can be used to predict one dimensional transient heat and moisture transfer in multi-layer building envelope components subjected to non steady climate conditions on either side. When a problem is identified, the design shall be modified as appropriate to reduce the risk of interstitial condensation to acceptable levels.

Alternatively, a steady state condensation risk analysis to I.S EN 13788[6] must be performed at a minimum.

Further guidance may be obtained from BS5250[1].

4.4 THERMAL INSULATION

U-value calculations may be based on a declared thermal conductivity ($\lambda_{90/90}$) of 0.035 W/(mK) for the Envirobead product and on a declared thermal conductivity ($\lambda_{90/90}$) of 0.033 W/(mK) for the Envirobead Plus product.

The required maximum U-values for external walls can be obtained in typical cavity wall constructions as indicated in Table 1.

The U value of a completed wall will depend on the selected insulation thickness, the insulating value of the substrate masonry and its internal finish. Calculations of thermal transmittance (U value), including corrections for wall ties if required, should be carried out in accordance with I.S. EN ISO 6946[9] and BRE report (BR 443)[10] Conventions for U-value calculations using a thermal conductivity of 50 W/m.K for mild steel wall ties wall ties and 17W/m.k for Stainless steel wall ties.

Where the calculated wall U value does not meet the relevant requirement of the Building Regulations, additional energy improvement measures will be required to meet the backstop elemental U-values outlined in TGD Part L to the Irish Building Regulations.

4.5 LIMITING THERMAL BRIDGING

The linear thermal transmittance "Ψ" (Psi) describes the additional heat loss associated with junctions and around openings.

The requirements of TGD Part L, Appendix D applies to all thermal bridges. Further details on applicable junctions should be sought from an NSAI registered Thermal Modeller.

It is recommended that continuity of the blown bead insulation be maintained to limit the instances of thermal bridging, to maintain internal surface temperatures at sufficiently high levels in order to minimise the risk of surface condensation and mould growth. Reference should be made to SR54[2] in this regard. The site surveyor shall assess the construction and recommend additional measures if required.

4.6 DURABILITY

The Envirobead Cavity Wall Insulation System is rot-proof, water repellent and durable. When installed in accordance with this certificate it is sufficiently stable to prevent settlement and will remain effective as an insulant for the life of the building.

Should it ever become necessary for whatever reason, to remove the material from the cavity void, Envirobead Cavity Wall Insulation can be evacuated from the cavity void. The advice of the Certificate Holder should be sought in all such instances.

4.7 MAINTENANCE

As the product is confined within the wall cavity and has suitable durability (See Clause 4.6 of this certificate), maintenance is not required.

4.8 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING

- Efficiency of fill in clear and residual cavities using the specified equipment and drilling pattern.
- Density of factory manufacture bead.
- Water resistance of filled cavity.
- Thermal conductivity.

4.9 OTHER INVESTIGATIONS

- Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on structural stability and durability were assessed. The absence of chloro-fluorocarbon gases 'CFCs' was established by test.
- 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.
- Site visits were conducted to assess the practicability of installation.
- Driving rain resistance was assessed.
- A condensation risk analysis of the system was performed.
- Suitability for use of the product to fill residual cavities in partial fill installations. See certificate for details and restrictions.

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Table 1: External Masonry Walls – Estimated U Values W/(m^{2}K)[1]

Cavity fill	λ W/(m.K)	Rendered Cavity Wall - Type I											
		Unventilated Cavity (mm)											
		40	50	60	70	80	90	100	110	120[2]	130[2]	140[2]	150[2]
		U-value (W/m^{2}K)											
Envirobead	0.035	0.65	0.55	0.48	0.42	0.37	0.34	0.31	0.28	0.26	0.24	0.23	0.21
Envirobead Plus	0.033	0.62[3]	0.53	0.45	0.40	0.36	0.32	0.29	0.27	0.25	0.23	0.22	0.20
		Brick Cavity Wall - Type II											
Envirobead	0.035	0.64	0.54	0.47	0.41	0.37	0.33	0.30	0.28	0.26	0.24	0.23	0.21
Envirobead Plus	0.033	0.61[3]	0.51	0.45	0.39	0.35	0.32	0.29	0.27	0.25	0.23	0.21	0.20

Wall Type I - 19mm external render on 100/100/100 block cavity wall (100mm clear cavity) with 12.5mm internal plasterboard
Wall Type II - 102.5mm external brick, 100 clear cavity, 100 block inner leaf with 12.5mm internal plasterboard.
(Internal plasterboard – dabbed or mechanically fixed without air gap or insulation).

U-value calculations for **residual filling of *partial fill cavity walls*** are dependent on the thickness and type of existing insulation and the width of the residual cavity. Individual U-value calculations are required in all such instances with details of calculations (including existing insulation type and thickness) to be recorded on the Site Survey Record Sheet.

Specialist advice should be sought for cavity widths in excess of 150mm.

[1] The above values represent the most optimistic values achievable for the wall constructions shown filled with the Envirobead cavity wall insulation systems. The thermal conductivity and consequent U values quoted will be affected by adhesive use and the installed density of the product. Excessive use of adhesive and installed densities of less than12kg/m^3 are unlikely to meet the above quoted U values.

[2] The construction of walls with cavities in excess of 110mm wide requires adjustments to lintels, wall ties, cavity barriers, etc. It is therefore necessary that cavity walls are adequately designed in respect of structural stability and fire safety in accordance with Parts A and B of the Building Regulations. For Table 1 it is assumed that cavity walls containing full-fill bonded bead will be constructed in accordance with the requirements of the Building Regulations, 1997 to 2019.

[3]The Envirobead Plus bead has not be assessed or approved for use in residual fill applications when the remaining cavity width to be filled is less than 50mm.

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 latest date of revision so long as:

(a) the specification of the product is unchanged.

(b) the Building Regulations 1997 to 2019 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 Agrément 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. **08/0302** is accordingly granted by the NSAI to **Envirobead Insulation Ltd.** on behalf of NSAI Agrément.

Date of Issue: **February 2008**

Signed

Seán Balfe
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.nsai.ie

Revisions

February 2014: To add additional information and other general changes.
September 2015: To make general text changes.
22nd December 2020: General revisions.
03rd June 2021: General revisions

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Bibliography

[1] BS 5250:2011+A1:2016, *Code of practice for the control of condensation in buildings.*

[2] SR54: 2014 & A1:2019, *Code of Practice for the energy efficient retrofit of dwellings*.

[3] BS 8208: Part 1:1985, *Guide for the assessment of suitability of external cavity walls, for filling with thermal insulants – Existing traditional cavity construction*.

[4] BS 8104:1992, *Code of practice for assessing exposure of walls to wind driven rain*.

[5] I.S 10101: 2020+AC1:2020: *National Rules for Electrical Installations.*

[6] I.S EN ISO 13788:2012: *Hygrothermal performance of building components and building elements - Internal surface temperature to avoid critical surface humidity and interstitial condensation – Calculation Methods.*

[7] I.S. EN 15026: 2007, *Hygrothermal performance of building components and building elements - Assessment of moisture transfer by numerical simulation.*

[8] DoHPLG Acceptable Construction Details (ACD's): 2011.

[9] I.S. EN ISO 6946: 2017: *Building Components and Building Elements - Thermal Resistance and Thermal Transmittance - Calculation Method.*

[10] BRE report BR443 (2019): *Conventions for U-value Calculations.*

[11] I.S EN 13163: 2012: *Thermal insulation products for buildings - Factory made expanded polystyrene (EPS) products – Specification.*

[12] I.S EN 13501-1: 2018: *Fire classification of construction products and building elements- Part 1: Classification using data from reaction to fire tests.*

[13] I.S. EN 13172: 2012: *Thermal insulation products - Evaluation of conformity.*