

Ecoce! Insulation

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are 'proper materials' suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997 to 2017**.



PRODUCT DESCRIPTION:

This Certificate relates to Ecoce! Insulation, a cellulose fibre made from recycled paper products, treated with inorganic salts to provide protection against fire, for use as a thermal insulation material mechanically blown into lofts, timber frame walls and sloped ceilings. It is manufactured in accordance with the requirements of BS 5803-3:1985 *Thermal insulation for use in pitched roof spaces in dwellings - Specification for cellulose fibre thermal insulation for application by blowing* and IS EN 15101-1:2013 *Thermal insulation products for buildings - In-situ formed loose fill cellulose (LFCI) products - Part 1: Specification for the products before installation*.

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

USE:

The product is used for the thermal insulation of lofts, between the studding in the internal leaf of conventional timber frame external walls and sloped ceilings using a mechanical blowing system by approved installers, who are trained and monitored by Ecoce! Ltd. The product facilitates the control of surface and interstitial condensation in building elements into which they are installed.

MANUFACTURE & MARKETING:

The product is manufactured and marketed by:



Cellulose Insulation Ltd t/a Ecoce! Ltd.,
Unit K8 Marina Commercial Park,
Centre Park Road,
Cork.

T/F: +353 (0)21 4324567

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Ecocel Insulation if used in accordance with this Certificate can meet the requirements of the Building Regulations 1997 to 2017, as indicated in Section 1.2 of this Irish Agrément Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

REQUIREMENTS:

Part D – Materials and Workmanship

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

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

Part B – Fire Safety

Part B Vol 2 – Fire Safety

B2 & B7 – Internal Fire Spread (Linings)

Ecocel Insulation complies with the performance requirements of BS 5803-4:1985 *Thermal insulation for use in pitched roof spaces in dwellings – Methods for determining flammability and resistance to smouldering*.

B3 & B8 – Internal Fire Spread (Structure)

Lofts, timber frame walls and sloped ceilings filled with Ecocel Insulation can meet this requirement (see Section 4.1 of this Certificate).

Part C – Resistance to Weather and Ground Moisture

C4 – Resistance to Weather and Ground Moisture

Ecocel Insulation, when installed in accordance with this Certificate, can meet the relevant requirements of TGD Part C4 of the Irish Building Regulations.

Part F – Ventilation

F2 – Condensation in Roofs

Ecocel Insulation will not promote condensation and meets the requirements of this Regulation when designed and installed in accordance with Section 2.4 and Section 3 of this Certificate, and Appendix B of BS 5803-5:1985 *Thermal insulation for use in pitched roof spaces in dwellings – Specification for installation of man-made mineral fibre and cellulose fibre insulation*.

Part J – Heat Producing Appliances

J3 – Protection of Building

Ecocel Insulation should not be placed in contact with flues or metal chimneys, or in contact with heating pipes or fittings when the surface temperature is likely to exceed a continuous temperature of 80°C. Ecocel Insulation installations should be at least 200mm from the flue in a chimney or 40mm from the outer surface of the brick or blockwork chimney. Where a flue pipe is used, Ecocel Insulation should be separated from the flue pipe in accordance with the requirements of this Regulation.

Part L – Conservation of Fuel and Energy

L1 – Conservation of Fuel and Energy

U-value calculations may be based on a $\lambda_{90/90}$ value = 0.04W/mK for Ecocel Insulation for the loft insulation density and a $\lambda_{90/90}$ value = 0.039W/mK for timber frame wall and sloped ceiling insulation. Based on this value, the current 'U Value' requirements can be achieved (see Section 4.3 of this Certificate).

2.1 PRODUCT DESCRIPTION

Ecocel Insulation is a cellulose fibre material for use as a thermal insulation material mechanically blown into lofts, timber frame walls and sloped ceilings. The product is manufactured in accordance with BS 5803-3:1985 and IS EN 15101-1:2013, and is installed by trained and approved installers who are regulated by Ecocel Ltd. Ecocel Insulation is grey in colour and has an average installed density of 35kg/m³ for installation into lofts and 65kg/m³ for installation into timber frame walls and sloping ceilings.

2.2 MANUFACTURE

Ecocel Insulation is manufactured from recycled paper products which are shredded into small pieces. Controlled quantities of inorganic salts are added during the protection process. The product is then packed in 17kg polythene bags and stacked on pallets.

2.3 DELIVERY, STORAGE AND MARKING

Ecocel Insulation is delivered to site on pallets in sealed polythene bags each weighing approximately 17kg. Each pallet contains a label bearing the product name and date of manufacture. The NSAI Agrément logo and certificate number are printed on individual bags.

Bags must be stored off the ground, under cover, protected from heat and ignition sources and unopened until ready for use.

2.4 INSTALLATION

2.4.1 General

Ecocel Insulation must be installed in accordance with the relevant recommendations of BS 5803-5:1985, IS EN 15101-2:2013 *Thermal insulation products for buildings – In-situ formed loose fill cellulose (LFCI) products – Part 2: Specification for the installed products* and the Ecocel Installation Manual. Installation must only be performed by approved installers, trained and regulated by Ecocel Ltd.

2.4.2 Approved Installers

Installation of Ecocel Insulation is carried out by the approved installers of Ecocel Ltd, who:

- 1) Are required to meet the requirements of an initial site installation check by NSAI Agrément prior to approval and are subject to the NSAI Agrément Surveillance Scheme.
- 2) Are trained and approved by Ecocel Ltd and approved by NSAI Agrément to install the product.
- 3) Have undertaken to comply with the Ecocel Installation Manual.

- 4) Are employing technicians who have been issued with appropriate identity cards by Ecocel Ltd. At least one member of each installation team must carry a card verifying this.
- 5) Are subject to supervision by Ecocel Ltd.

2.4.3 Supervision

Installation should be carried out in accordance with this Certificate, the Ecocel Installation Manual and the NSAI Agrément Surveillance Scheme.

Upon completion of the installation of Ecocel Insulation, the installer shall provide the client with a signed and stamped certificate containing details of the installation to meet the requirements of BS 5803-5:1985 Paragraph 10.

2.4.4 Procedure – Lofts

Ecocel Insulation should not be used where ambient temperatures are consistently above 65°C. It is essential that the roof space is ventilated to meet the requirements of BS 5803-5:1985 Appendix B.

Ecocel Insulation is compatible with other insulation types and can therefore be used in top-up situations. In case of doubt, the certificate holder's advice must be sought.

Prior to installation of Ecocel Insulation, the installer should check the following:

- There should be no evidence of condensation or mustiness in the loft.
- Where a sarking felt is fitted beneath the roof tiles, there should be no evidence of significant daylight penetration on each of the two opposing sides of the roof.
- Ensure that any existing insulation material is not blocking the eaves.
- Check soffits externally – gaps on one or either side of the soffit will indicate access to the roof space for ventilating air flow.
- There should be no obvious rainwater penetration or evidence of same, no evidence of wet or dry rot in the roof space.
- The ceiling should be capable of supporting the weight of the insulation and loads imposed during installation.
- There should be no obvious defects in the electrical wiring.
- There should be no obvious corrosion to the structural metal connections in the roof members.

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 eaves ventilation has been maintained.
- 2) Check that all electrical cables of high amperage uses are raised clear of the insulation, and that all other electrical cables should be laid above the insulation once installation is complete.
- 3) Check that recessed lights are isolated from the insulation.
- 4) Check that exposed pipework above the insulation has been insulated to minimise the risk of freezing.
- 5) Check that all water tanks have been completely enclosed and insulated.
- 6) Check that the access hatch has been permanently and independently insulated.
- 7) Check that the insulation is not placed in contact with heating pipes or fittings above 80°C.
- 8) Check that all perforations through the plasterboard have been sealed with mastic sealant.
- 9) Ensure a hatch guard has been installed.

The loft to be insulated should first be cleared of stored items and the water tank and ventilation openings covered to prevent the ingress of fibre. After the installation of the insulation is completed a permanent guard must be fitted to all vents to prevent blockage by the fibre.

All perforations through the plasterboard ceiling at pipe drops etc must be sealed with mastic sealant to prevent the ingress of moist air and to prevent the loss of insulation material through the perforations (see Figure 1).



Figure 1: Sealing of Perforations Through Plasterboard Ceiling

All electrical cables of high amperage uses (cooker and shower cables) should be raised and clipped to a conventional rafter or tie above the level of Ecocel Insulation to meet the requirements of ETCI publication EF 207 *Guide to the National rules for electrical installation as applicable to domestic installations*. All other

electrical cables should be laid above the insulation once installation is complete.

All pipework on the cold side of the insulation should be well insulated to minimise the risk of freezing. Cold water tanks shall be completely enclosed and insulated to meet the requirements of BS 5803-5:1985.

Ecocel Insulation should not be placed in contact with flues or metal chimneys or in contact with heating pipes or fittings where the surface temperature is likely to exceed a continuous temperature of 80°C. Ecocel Insulation must be at least 200mm from the flue in a chimney or 40mm from the outer surface of the brick or blockwork chimney. Where a flue pipe is used, Ecocel Insulation should be separated from the flue pipe in accordance with the requirements of TGD to Part J of the Building Regulations 1997 to 2017.

Due to the fire risk due to high temperatures that can be caused by high current values produced by extra-low voltage lighting, it is recommended that only surface mounted extra-low voltage lighting be used. However where recessed lights exist, or are to be used, particularly recessed down-lighters, guards should be fitted to keep the Ecocel Insulation at least 75mm from the heat source and should be made of rigid boards or light gauge non-magnetic material. Where used with down-lighters and recessed light fittings, the guard should be open-topped, or ventilated by drilling holes in the top of the guard (see Figure 2).

Ecocel Insulation is installed by approved installers using the Krendle 205 or similar blowing machines. The certificate holder should be contacted if further information on these machines is required.

Where eaves ventilation exists, ventilation into the attic must be maintained when installing Ecocel Insulation to meet the ventilation requirements of BS 5803-5:1985 (see Figure 3).

A proprietary polyethylene or timber hatch surround is fixed to the hatch frame and holds the insulation in place around the hatch perimeter. In addition, timber boards can be installed over the insulation immediately around the hatch to facilitate access to the loft space.

The hatch door itself can be insulated by using a proprietary polyethylene bag filled with Ecocel Insulation and stapled to the back of the hatch door or by fastening a portion of rigid NSAI Agrément approved insulation material to the hatch door. The perimeter of the hatch should be sealed with a draught excluder to minimise water vapour ingress.

An extra 10% thickness above the desired final thickness should be installed before levelling of the surface to ensure a minimum depth requirement is achieved after settlement.

An EcoceI Information Label is installed inside the loft, close to the hatch opening, giving details of the EcoceI Insulation used.

After installation, the floor area of the loft should not be used for storage. If storage is required in the loft, raised shelving should be used.

EcoceI Insulation is hygroscopic, i.e. can take in and release water vapour. The insulation absorbs moisture and therefore must be replaced with new dry material if it becomes wet.

2.4.5 Assessment of Roof Space After Completion

After EcoceI Insulation has been installed in the roof space, it shall be established that the following conditions are fulfilled:

- The roof space is adequately ventilated.
- All water tanks have been completely enclosed, including lids, and insulated unless they are located on the joists.
- Exposed pipe work above the insulation has been insulated in accordance with BS 5422:2009 *Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range -40°C to 700°C*, to minimise the risk of freezing.
- The access hatch has been permanently and independently insulated.
- The insulation has not been installed directly over recessed lights. Combustible material is not in contact with flues or metal chimneys.
- All loose electrical wires have been lifted and re-laid over the insulation where practicable.
- The installer has removed the debris, packages etc from the site.
- The stamped certificate has been issued to the client.

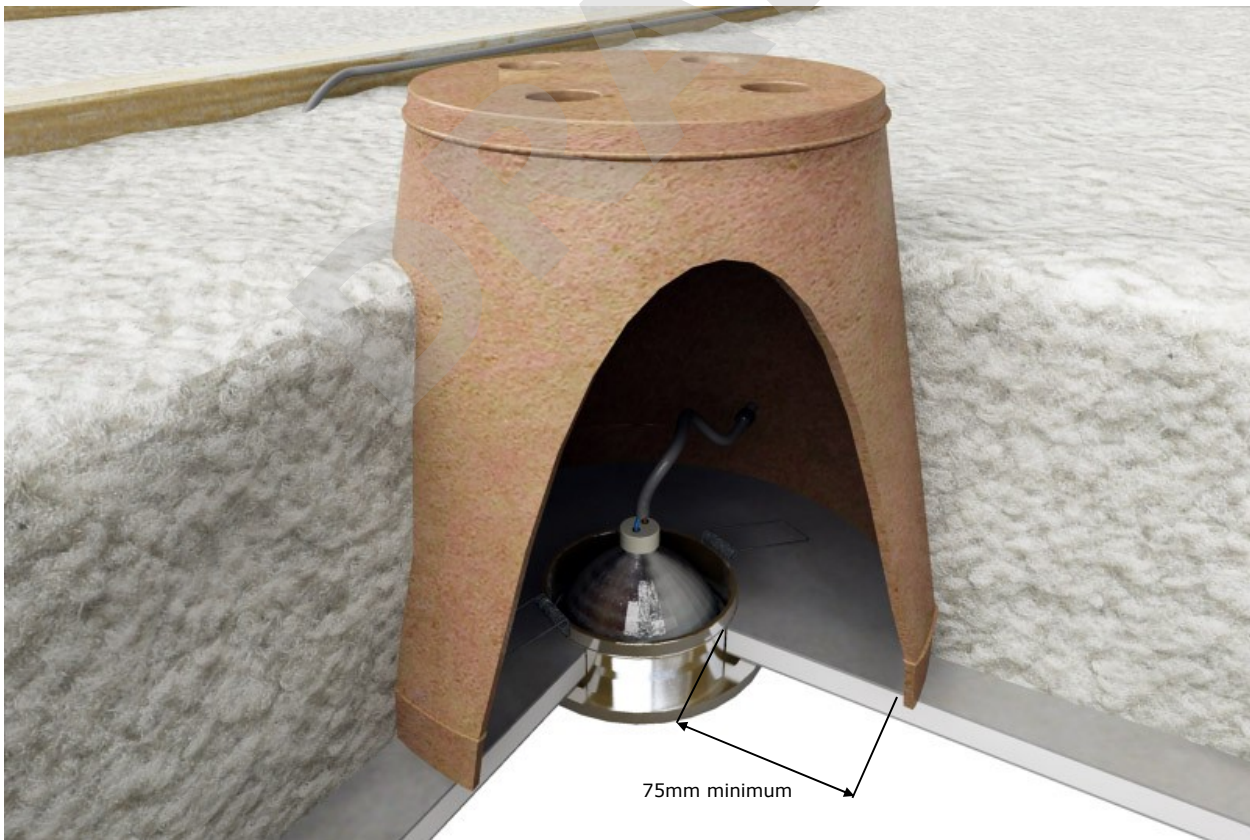


Figure 2: Light Guard Detail

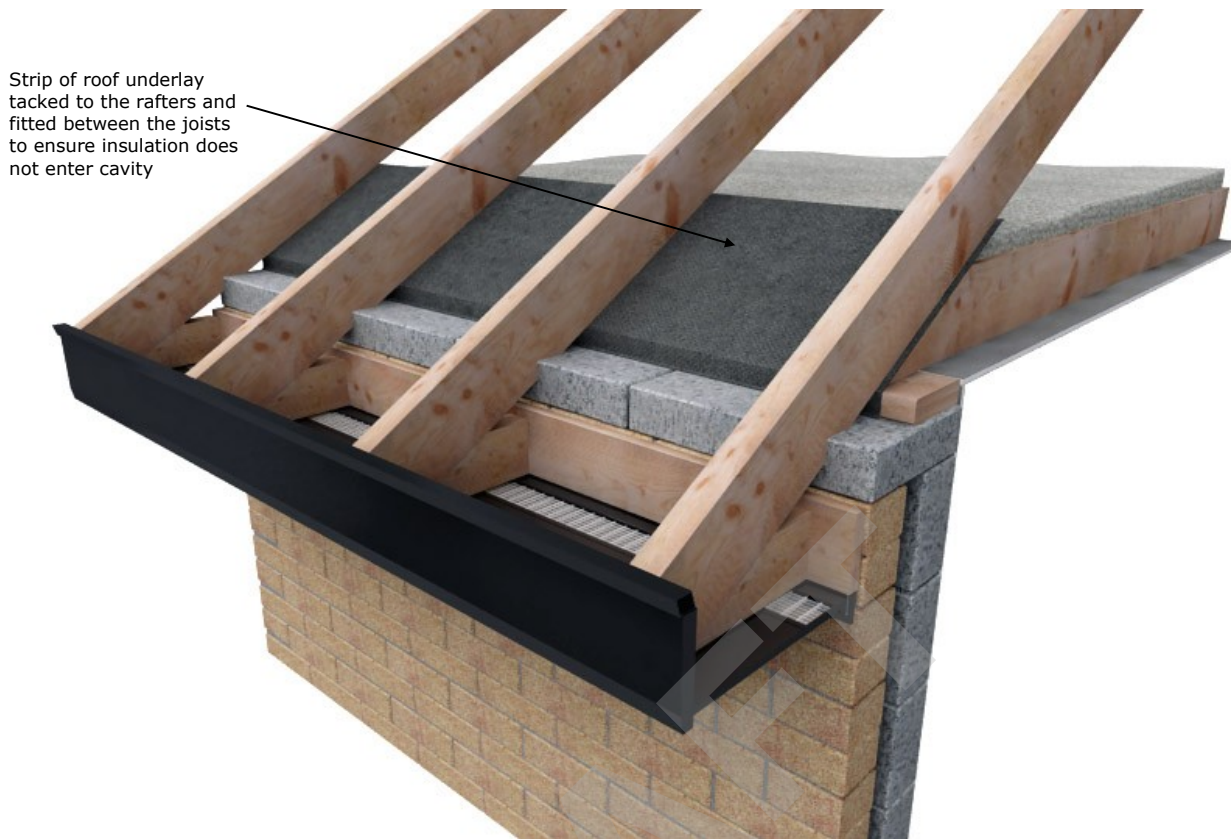


Figure 3: Eaves Detail

2.4.6 Procedure – Timber Frame Walls and Sloping Ceilings

Site Survey

For onsite application, a survey is carried out prior to installation to ascertain the suitability of the property for the EcoCel Insulation. The report of this survey is held by the approved installer. Particular problems are specifically identified and any reasons for rejection of the work are noted.

EcoCel Insulation may also be used in a factory environment to insulate timber frame panels prior to them being assembled on site. This environment also requires installation by trained and approved installers per Cl. 2.4.2 of this Certificate.

Site Preparation

The approved installer ensures that the property has been correctly surveyed and is suitable for installation of EcoCel Insulation. Any problems encountered during drilling which prevent compliance with this Certificate are referred to the Certificate holder before proceeding.

Where vapour control layers are used, it is essential that continuity of the layers be maintained at laps and joints at wall/ceiling and wall/floor level. It can be shown from calculations

that it is feasible to design constructions that rely on the relative vapour resistance of the materials on either side of the insulation to prevent harmful levels of condensation within the structure. Calculations for each individual design are necessary in the case of breathable wall constructions. It is essential that due provision is made for drainage of the cavity, for ventilation at high and low levels and over openings.

All ventilation openings and all flues in the 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. Perforations, such as service outlets etc, should be kept to a minimum and be well sealed and taped.

The recommendations of BS 5250:2011 + A1:2016 *Code of practice for control of condensation in buildings* should be followed to minimise the risk of condensation within the structure.

Installation must not be carried out until the moisture content of the timber frame is less than 20%.

Electrical installations should be in accordance with the ETCI publication ET 207 *Guide to the National Rules for Electrical Installations as Applicable to Domestic Installations*.

Installation Procedure

The Ecocel Insulation is installed between the studding of timber frame walls using approved blowing equipment. Note: The ventilated cavity must always be maintained. Depending on the depth of wall and position of the machine (regarding length of hose), the air blower and material feed need to be calibrated. This applies to all injection applications unless repeating a process already calibrated.

All studs and noggins are identified by drawings or stud locators, and holes marked out either on the sheeting board or plasterboard lining to ensure all voids are filled.

Holes are drilled into the sheeting board or plasterboard with a hole-saw, or airtightness membrane is slit with a sharp knife. The core is retained for making the hole good using sealant or adhesive as appropriate.

The hose is prepared with tape to smooth out corrugations for entry into the wall, so as not to tear the airtightness membrane as hose is fed into the cavity and withdrawn when cavity is full. It is also useful to have markings on the hose with different colour tape so the operator knows how much of the hose is in the cavity at any given time, which is especially important in the last 200mm of the hose.

The hose is then fed down to the bottom of the cavity and the machine is activated by the operator using remote control. The operator then listens to material passing through the hose, waiting for sounds of it about to block. Just as it is about to block, the operator withdraws the hose slightly so he can hear material moving again – this process is repeated until the hose is fully withdrawn. Note: It is important to have the site as quiet as possible during installation as sound feedback to the operator is crucial.

When the cavity is deemed full, the operator turns off the machine with the remote control just as the pipe exits the hole.



Figure 4: Operative pumping insulation into timber framed wall

3.1 Buildings subject to the relevant requirements of the Building Regulations 1997 to 2017 should be constructed in accordance with IS EN 1995-1-1:2004 AMD 2:2014 *Eurocode 5: Design of timber structures – Part 1-1: General – Common rules and rules for buildings*, IS EN 1996-1-1:2005 + A2:2012 *Eurocode 6 – Design of masonry structures – Part 1-1: General rules for reinforced and unreinforced masonry structures (including Irish National Annex)*.

3.2 Ecocel Insulation, when installed in accordance with this Certificate, is effective in reducing the U-value (thermal transmittance) of attic floor constructions, timber frame walls and sloped ceilings. It is essential that the building elements into which the product is installed are designed and constructed to incorporate precautions against moisture ingress. This includes the provision of a weather resistant cladding and a ventilated and drained cavity between the cladding and the timber frame.

Where the construction incorporates a masonry outer leaf of concrete block, brick, natural or reconstituted stone, a designated cavity 50mm in width should be provided between the timber frame sheathing and the outer leaf. In the case of an outer cladding of slates or tiles, timber or plastic weatherboarding, rendering or any other form of cladding, a 20mm designated cavity width should be maintained between the cladding and the timber frame sheathing.

3.3 Service openings should be sealed with a draught excluder. Any wet or damp Ecocel Insulation material must be replaced with new dry material.

3.4 As with all types of insulation, construction detailing should comply with good practice. Any defects should be corrected prior to the installation of Ecocel Insulation.

3.5 Special precautions are required when installing Ecocel Insulation in close proximity to electric cables of high amperage, extra-low voltage lighting, or items whose surface temperature is likely to exceed a continuous temperature of 80°C, as detailed in Section 2.4.3 of this Certificate.

3.6 Ecocel Insulation should not be used where ambient temperatures are likely to be consistently above 65°C.

3.7 Care must be taken to ensure continuity of fire resistance at junctions with fire resisting

elements, in accordance with the relevant provisions of TGD Part B of the Building Regulations 1997 to 2017.

3.8 Ecocel Insulation can be added to the void between studwork in a timber framed wall construction, when the complete wall system including inner and outer leaves has been shown by test or assessment by a suitably accredited body, to satisfy the test requirements and performance criteria of BS 476-21:1987 *Fire tests on building materials and structures – Part 21: Methods of determination of the fire resistance of loadbearing elements of construction* or IS EN 1365-1:2012 COR 2013 *Fire resistance tests for loadbearing elements – Part 1: Walls*, for the required fire resistance period. If it is proposed to change any component within the system, the effect, if any, on the overall fire performance of the wall must be assessed by a suitable independent body.

4.1 BEHAVIOUR IN FIRE

Ecocel Insulation contains inorganic fire retardants which inhibit flaming and smouldering combustion and complies with the performance requirements of BS 5803-4:1985. The product is however classified as a combustible material and must therefore not be used in close proximity to flues in accordance with the requirements of TGD to Part J of the Building Regulations 1997 to 2017.

In timber frame stud wall applications, the product will be contained within the cavity sheeting and internal lining board, and will therefore not contribute to the development stages of a fire or present a smoke or toxic hazard until these linings are compromised.

4.1.1 Protection of Buildings

Combustible wall insulation material should be separated by solid non-combustible material not less than 200mm thick, from any heating appliance or from any flue pipe or opening to a heating appliance. Alternatively it should be separated by 40mm from the outer surface of a masonry chimney. Particular details are given in Diagrams 2 to 8 of the TGD Part J of the Building Regulations 1997 to 2017. 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 TGD Part J of the Building Regulations 1997 to 2017.

4.2 RESISTANCE TO MOISTURE

Ecocel Insulation is hygroscopic, and absorbs moisture and must therefore be replaced with new dry material if it becomes wet. All perforations through the plasterboard must be sealed with mastic sealant to prevent moisture ingress.

A benefit of hygroscopic materials is that as moisture levels fluctuate, these materials will slowly take on or release moisture. Hydrophobic materials (i.e. materials that do not interact with moisture) on the other hand can allow diffusional and airborne moisture to accumulate on surrounding building materials which can result in damage.

4.3 THERMAL INSULATION

The declared thermal conductivity ($\lambda_{90/90}$ value) of Ecocel Insulation when measured in accordance with IS EN 12667:2001 *Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method –*

Products of high and medium thermal resistance is 0.040W/mK for the loft insulation and 0.039W/mK for the timber frame wall and sloped ceiling insulation. This value is based on a density of 35kg/m³ for lofts and 65kg/m³ for timber frame walls and sloped ceilings. See Tables 1 to 2 for declared U-values of Ecocel Insulation.

As the cellulose fibre insulation settles, it becomes more compact and can lead to an increase in density, which in turn may lead to an increased thermal resistance of the product. In-situ measurements to ISO 9869-1:2014 *Thermal insulation – Building elements – In-situ measurement of thermal resistance and thermal transmittance – Part 1: Heat flow meter method* have been carried out on loft spaces which had Ecocel Insulation installed 6-7 years prior to the test being carried out. A sample of these results is shown in Table 3. As timber frame walls are injected at higher density to open blown loft insulation, it is likely the improved thermal resistance of the product will be replicated in installations of that type – the Certificate holder should be contacted for further information and on-going testing.

4.4 TOXICITY

Ecocel Insulation does not carry a hazard classification. The product is a non-irritant with a pH of 6.5-7.5 and while no specific safety equipment is required, compliance with the Safety, Health and Welfare at Work (General Application) Regulations and Amendments regarding Personal Protective Clothing should be observed together with Ecocel Ltd safety protocols.

4.5 CONDENSATION RISK

When insulating buildings, the recommendations of BS 5250:2011 + A1:2016 should be followed to minimise the risk of condensation within the building elements and structure.

While an interstitial condensation analysis for a standard wall may indicate no condensation risk exists, calculations are necessary for each individual design in the case of a breathable wall construction.

In timber frame walls, a vapour barrier must be provided on the warm side of the insulation. It is essential that the continuity of vapour control layers be maintained at laps and joints at wall/ceiling and wall/floor level. Perforations such as service outlets etc should be kept to a minimum and be well sealed and taped.

Care should be taken to provide adequate ventilation, particularly in rooms expected to experience high humidity, and to ensure the integrity of vapour control layers and linings against vapour ingress.

4.6 LIMITING THERMAL BRIDGING

The linear thermal transmittance ' Ψ ' (Psi) describes the additional heat loss associated with junctions and around openings. The product can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between elements and openings.

The requirements of Appendix D of TGD Part L of the Building Regulations 1997 to 2017 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 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.

In addition, uncontrolled air leakage can occur 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 wind pressure can also occur. Details of how to avoid the infiltration of cold air are given in Section 1.6 of TGD Part L of the Building Regulations 1997 to 2017.

4.7 MATERIALS IN CONTACT WITH ELECTRICAL WIRING AND FITTINGS

The electrical installation shall be installed to comply with "National Rules for Electrical Installations (ET 101)" published by the Electro-Technical Council of Ireland.

The presence of insulation around electrical cables has the effect of reducing the current carrying capacity and in some cases this may require the cable to be increased in size to safely carry the load. Guidance on this issue should be sought from a qualified, RECI certified electrician.

4.8 CORROSIVITY

Ecocel Insulation meets the requirements for resistance to initiate corrosion when tested to BS 5803-3:1985 Appendix B.

4.9 DURABILITY

Ecocel Insulation contains additives to provide protection against insects, biological and fungal attack and to make them unattractive to vermin. The product will be virtually unaffected by the normal conditions found in a roof space and will have a life compatible with that of the building it is installed within so long as it is kept dry and is

installed in accordance with this Certificate. As stated in Section 4.2, Ecocel Insulation is hygroscopic, absorbs moisture and must therefore be replaced if it becomes wet.

4.10 REUSE AND RECYCLABILITY

Ecocel Insulation is made from recycled paper products.

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

- Product characteristics
- Thermal conductivity
- Corrosivity
- Flammability
- Smouldering resistance

4.12 OTHER INVESTIGATIONS

- (i) Existing data on product properties in relation to fire, toxicity, environmental impact and durability were assessed.
- (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) In-house testing including flammability, smoulder resistance, and retention of additives were also assessed.

**Table 1: Estimated U-Values for Ecocel Insulation ($\lambda_{90/90} = 0.040 \text{ W/mK}$)
Installation Into Lofts**

Installed Thickness (mm)	Settled Thickness (mm)	Settled Density (kg/m^3)	Declared Installed U-value After Settlement ($\text{W/m}^2\text{K}$)
110	100	35	0.40
163	150	35	0.26
218	200	35	0.20
245	225	35	0.17
272	250	35	0.16

Note: U-values above are based on a roof construction of 10mm tiles on battens, sarking felt, loft space with 100 x 38mm joists at 600mm centres with Ecocel Insulation between/over, and 10mm plasterboard.

**Table 2: Estimated U-Values for Ecocel Insulation ($\lambda_{90/90} = 0.039 \text{ W/mK}$)
Installation Into Timber Frame Walls¹**

Cavity width (mm)							
100	115	125	150	175	200	250	300
U-Value ($\text{W/m}^2\text{K}$)							
0.39	0.34	0.31	0.26	0.22	0.19	0.15	0.13

Timber frame construction details (outside to inside):

- 102.5mm outer brick leaf
- 50mm unventilated cavity
- 13mm OSB sheeting
- Timber framing (15%)/Insulation (85%)
- Vapour control layer
- 12.5mm plasterboard
- 3mm skim coat finish

¹ U-value calculations are dependent on the timber frame construction details. Individual U-value calculations are required in all instances with details of calculations (including details of timber frame construction, cavity width filled and insulation product used) to be recorded on the site survey sheet. In addition, the above values represent the most optimistic values achievable for the wall constructions shown filled with the Ecocel Insulation. The thermal conductivity and consequent U-values quoted will be affected by adhesive use and the installed density of the product.

Table 3: In-situ Measurements for Ecocel Insulation in Lofts

Property Type	Existing Insulation	Details of Ecocel Insulation Installed	U-value	Indicated λ value
Detached bungalow	20-100mm fibre insulation	300mm installed over existing fibre insulation in 2012	0.11W/m ² K	0.034W/mK
Detached farmhouse	None	350mm installed in 2014	0.09W/m ² K	0.033W/mK

5.1 National Standards Authority of Ireland ("NSAI") following consultation with NSAI Agrément has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:

- (a) the specification of the product is unchanged.
- (b) the Building Regulations 1997 to 2017 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.
- (c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.
- (d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.
- (e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.
- (f) the registration and/or surveillance fees due to IAB 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.

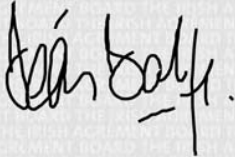
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is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

NSAI Agrément

This Certificate No. **07/0285** is accordingly granted by the NSAI to **Cellulose Insulation Ltd t/a Ecocel Ltd** on behalf of NSAI Agrément.

Date of Issue: **September 2007**

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.n sai.ie

Revisions: June 2018

- Change of manufacturer, extension of scope to cover timber frame walls and sloped ceilings, references to Building Regulations and standards updated.

DRAFT