Bord Agrément na hÉireann
Irish Agrément Board

CERTIFICATE No. 05/0235

Airpacks Ltd.,
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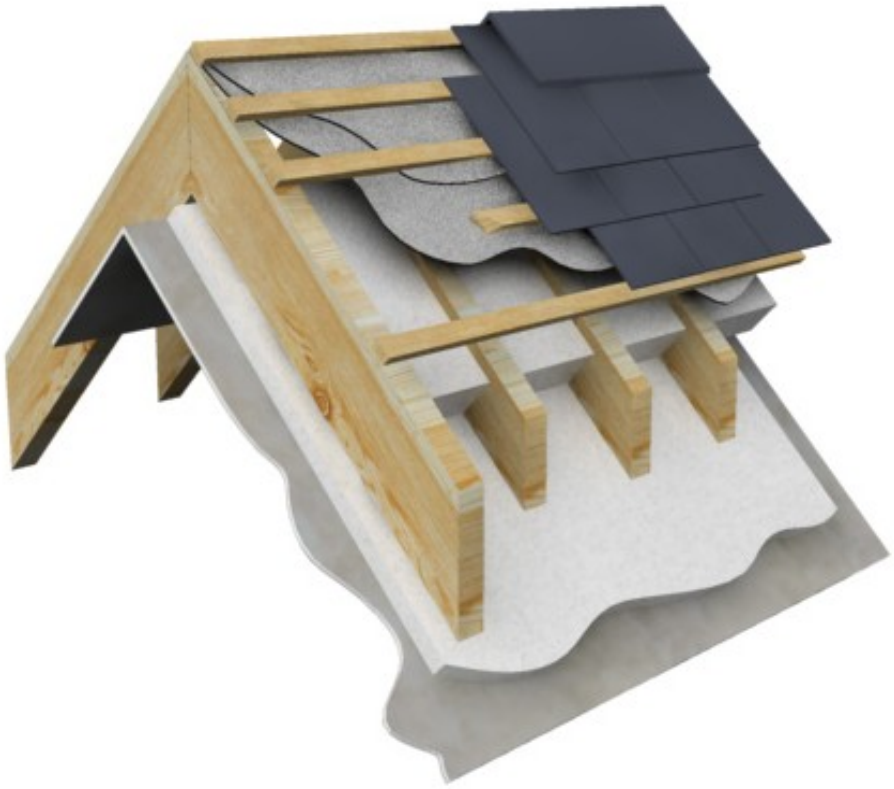
Airlockplus for Cold Roof and Timber Frame Wall Applications

Sous-toiture isolants
Dachlattung

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 Airlockplus expanded polystyrene insulation system, manufactured in accordance with IS EN 13163:2001 *Thermal insulation products for buildings – Factory made products of expanded polystyrene (EPS) – Specification*.

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

USE:
Cold Roof Application
The system consists of Airlock variable width panels, friction fitted between rafters, with Airlock liner panel below, to provide a tight fitting insulation envelope in cold roof applications. The system will accommodate most width variations in rafter spacing ensuring optimum performance and allowing a necessary clear airspace above the level of insulation. The product is used for the thermal insulation of pitched and tiled roofs constructed in accordance with IS ICP 2:2002 *Code of practice for slating and tiling*. It also facilitates the control of surface and interstitial condensation in roofs.

Timber Frame Wall Application
The Airlock variable width panels can be used for the thermal insulation of timber framed walls constructed in accordance with BS 5268-2:1991 *Structural use of timber - Code of practice for permissible stress design, materials and workmanship*, and BS 5268-6:1988 *Structural use of timber – Code of practice for timber frame walls, Section 6.1 Dwellings not exceeding three storeys,* as appropriate. It also facilitates the control of surface and interstitial condensation in walls.

MANUFACTURE AND MARKETING:
These products are manufactured and marketed by:

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Kilnaleck,
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Part One / Certification 1

1.1 ASSESSMENT
In the opinion of the Irish Agrément Board (IAB), Airlockplus if used in accordance with this Certificate can 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 – Airlockplus as certified in this Irish Agrément Certificate is comprised of proper materials fit for their intended use (See Part 4 of this Certificate).

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

Part B – Fire Safety
B2 – Internal Fire Spread (Linings)
As the Airlockplus system comprises an insulation panel finished with plasterboard liner, it will achieve a Class 0 performance classification. It may therefore be used on the internal surfaces of buildings of every purpose group.

Roofs using Airlockplus meet this requirement provided the completed roofs comply with the conditions described in Section 4.1 of this Certificate.

B3 – Internal Fire Spread (Structure)
Walls using Airlock variable width panels meet the requirement, provided the completed walls comply with the conditions described in Section 4.1 of this Certificate.

B4 – External Fire Spread
Airlockplus will not affect the external fire rating of roofs in which it is incorporated.

Part C – Site Preparation and Resistance to Moisture
C4 – Resistance to Weather and Ground Moisture
Airlockplus when installed in compliance with the conditions indicated in Part 2 of this Certificate will not promote the passage of moisture and will minimise the risk of surface of interstitial condensation.

Part F – Ventilation
F2 – Condensation in Roofs
Airlockplus meets the regulation requirements when designed and installed in accordance with Section 2.4 and Part 3 of this Certificate.

Part J – Heat Producing Appliances
J3 – Protection of Building
In the opinion of the Irish Agrément Board (IAB) Airlockplus, if used in accordance with this Certificate, meets 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 Airlockplus referred to in this Certificate, the current 'U Value' requirements can be achieved (see Section 4 of this Certificate).

2.1 PRODUCT DESCRIPTION

This Certificate relates to the Airlockplus insulation system for cold roof and timber frame wall applications. Airlock variable width panels are friction fitted between rafters ensuring the inner face of the panel is flush with the bottom of the rafters. Airlock liner panels are applied to the underside of the rafters with suitable fixings, ensuring all joints are tightly sealed. The panels are then faced with minimum 500 gauge polyethylene vapour barrier.

Airlock Variable Width Panels	
Length	1200mm x 377mm
Thickness	Up to 150mm
Width	To suit rafter design
Density	SD: 15 kg/m^3 HD: 20 kg/m^3 EHD: 25 kg/m^3 UHD: 30 kg/m^3 Grey SD: 15.9 kg/m^3 Grey HD: 20 kg/m^3
Airlock Liner Panels	
Length	2400mm x 1200mm
Thickness	In 5mm increments
Width	To suit rafter design
Density	SD: 15 kg/m^3 HD: 20 kg/m^3 EHD: 25 kg/m^3 UHD: 30 kg/m^3 Grey SD: 15.9 kg/m^3 Grey HD: 20 kg/m^3

Table 1: Product Range

2.2 MANUFACTURE

Airlockplus is manufactured from expanded polystyrene and has a flame retardant additive (FRA). Airlock insulation boards are manufactured using no HCFC or CFC gases and have zero Ozone Depletion Potential.

2.2.1 Quality Control

Quality control checks include board dimensions, density, dimensional stability, compressive strength and thermal conductivity.

2.3 DELIVERY, STORAGE AND MARKING

Every pack shows the manufacturer's name, IAB identification mark and IAB Certificate number.

Boards should be protected in transit and in storage from damage caused by ropes and tie straps. Boards should be protected from prolonged exposure to UV light and should be stored under cover or protected with polyethylene. Care must be taken to avoid contact with solvents and with materials containing volatile organic components such as coal tar, and timbers newly treated with creosote etc.

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

2.4 INSTALLATION

2.4.1 General

Installation must be in accordance with the relevant clauses of IS ICP 2:2002 (for installation in cold roof applications) and the manufacturer's instructions, and can be carried out in all conditions normal for roof and timber frame wall construction.

Airlock insulation boards are 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.

Where the system 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 to 2002.

2.4.2 Procedure – Cold Roof Application

1. Ensure that the cavity wall insulation has been continued to roof height to engage with the roof insulation. The insulation must be continuous to provide a complete envelope to reduce the risk of thermal bridging and condensation.

2. Commence by fitting Airlock variable width panels between each rafter, following completion of roof cladding, keeping panels flush with the underside face of the rafter and closely butted at ends. This will ensure the necessary clear air space between the insulation and the sarking felt.

3. Fix first row of Airlock panels to roof line at junction with vertical stud walls, beginning with first slot. Secure in position by nailing through batten and insulation into rafters. Repeat procedure until entire area is insulated.

4. Continue installation of Airlock panels to vertical studding and ceiling collars to completion.

5. Ensure a 50mm clear space is maintained above the insulation to provide the correct level of ventilation.

6. Apply Airlock liner panels to the underside of the rafters with suitable fixings, ensuring all joints are tightly sealed. Face with minimum 500 gauge polyethylene vapour barrier.

2.4.3 Procedure – Timber Frame Wall Application
Airlock variable width panels should be friction fitted between the timber studding and positioned against the inner face of sheathing board. The void created by space between the inner surface of the Airlock panels and the dry lining can be utilised as an insulated service duct.

Careful consideration must be given to the area of solid timber that may present a significant area of cold bridging if not insulated correctly. The area of solid timber in a construction could amount to more than 18% of the total wall area, which would dramatically affect the overall U-value of the structure. Lining the surface of the wall with a second layer of Airlock panels will effectively reduce the amount of thermal bridging and provide a robust construction.

Part Three / Design Data 3

3.1 Airlockplus insulation system, when installed in accordance with this Certificate, is effective in reducing the U-value (thermal transmittance) of new and existing pitched roof constructions and timber frame constructions. It is essential that such roofs are designed and constructed to prevent moisture penetration having regards to the Driving Rain Index.

3.2 Roofs subject to the relevant requirements of the Building Regulations 1997 to 2002 should be constructed in accordance with IS ICP 2:2002.

3.3 Buildings subject to the relevant requirements of the Building Regulations 1997 to 2002 should be constructed in accordance with BS 5268-2:1991 and BS 5268-9:1988 as appropriate.

3.4 When installed in accordance with this Certificate, Airlockplus will contribute to the buckling and racking strength of the roof as described in IS ICP 2:2002. However, it is not recommended that they be considered as an alternative to cross-bracing.

3.5 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.

3.6 Roof tile underlays must be approved by the manufacturer or hold a current Irish Agrément Certificate for such use. Underlays should be installed with, and within the limits of that Certificate.

3.7 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.

3.8 As with all types of wall insulation, the construction detailing should comply with good practice.

4.1 BEHAVIOUR IN FIRE

4.1.1 Cold Roof Application

Combustibility - Although Airlockplus is a product of limited combustibility, when used in the context of this Certificate the increase in fire load in the building consequent to its use, is negligible.

The use of Airlockplus will not affect the fire rating obtained by the tiled/slated roof when assessed or tested to BS 476:Part 3:2004 *Fire tests on building materials and structures – Classification and method of test for external fire exposure to roofs.*

Toxicity – Negligible when used in protected roof situation.

Airlockplus is manufactured without the use of CFC's and HCFC's, there is no release of such gas on burning.

4.1.2 Timber Frame Wall Application

Airlock variable width panels have a Class 1 Surface Spread of Flame rating in accordance with BS 476-7:1971. The liner panels used to cover the Airlock boards are deemed to be Class 'O' in accordance with the Building Regulations 1997 to 2002, and so the insulated board qualifies as the highest product performance classification as defined in Technical Guidance Document B (paragraph A10 of Annex A). The insulation component of the board should be isolated from possible sources of combustion. To achieve this, Airlock panels should be installed in accordance with the following:

(i) The Airlock panels should be separated by a minimum distance of 150mm from an oil, solid fuel or gas heating appliance as indicated in Diagram 8 of TGD J of the Building Regulations 1997 to 2002.

(ii) Airlock panels, when installed with a residual cavity between the board and the wall, will require the provision of cavity barriers and may be used in buildings of any purpose group provided:

(a) cavity barriers in walls are provided at a maximum distance apart of 10m unless a Class 1 material is exposed to the cavity when a spacing of 20m may be adopted;
(b) every such cavity shall be closed by a cavity barrier around the whole perimeter of the wall or ceiling element and around the perimeter of any opening through such elements;
(c) cavity barriers in spaces between a floor and ceiling are provided at maximum distances of 20m for any class of surface exposed to the cavity;
(d) where any wall or ceiling containing a cavity meets another such element, the cavities shall be closed so that they do not communicate with one another;
(e) direction on the provision and spacing of cavity barriers is given in Tables 3.2 and 3.3 of TGD B.

Combustible wall insulation material shall generally be separated by solid non-combustible material not less than 200mm thick, from any heating appliance or from any flue pipe or opening to a heating appliance. Particular details are given in Section 2, and in Diagrams 2 – 8 of TGD J. It should also be separated by 40mm from the external surface of a masonry chimney. For chimneys covered by BS 4543-1:1996 *Factory made insulated chimneys,* separation between this product and the external surface of the chimney shall be determined in accordance with Clause 2.17 Part J of the Building Regulations 1997 to 2002.

4.2 STRENGTH

Airlockplus, 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.

4.3 RESISTANCE TO WIND LOAD

The resistance to wind uplift depends on many factors peculiar to each project. The effect of wind loading should be calculated in accordance with BS 6399:Part 2:1997 *Loading for buildings – Code of practice for wind loadings (including AMD 13392, AMD corrigendum 14009)* using the appropriate basic wind speed shown on the map in Diagram 15 of TGD A of the Building Regulations 1997 to 2002.

When installed in accordance with Section 2.4 of this Certificate, Airlockplus will have sufficient resistance to wind uplift.

4.4 RESISTANCE TO MOISTURE

Airlockplus will not be adversely affected by rain during installation for a limited time scale or by wind driven snow or rain penetrating the tiling in service.

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

4.5 WATER VAPOUR PENETRATION AND CONDENSATION RISK

Airlockplus has a vapour resistance 145MNs/gm. The Certificate holder should be contacted for the purpose of calculating a project specific condensation risk analysis.

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

4.6 THERMAL INSULATION

The aged/design thermal conductivity 'λ' value of Airlockplus when measured in accordance with IS 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 0.037W/mK.

The required maximum U-values for external timber frame walls can be obtained with Airlock variable width panels.

Density of Insulation	Conductivity of Insulation	Thickness of Airlock variable width panels	Thickness of Airlock liner panels
SD	0.037 W/mK	125 mm	25 mm
HD	0.034 W/mK	110 mm	25 mm
EHD	0.033 W/mK	105 mm	25 mm
UHD	0.032 W/mK	100 mm	25 mm
Grey SD	0.030 W/mK	92 mm	25 mm
Grey HD	0.028 W/mK	85 mm	25 mm

Table 2: Insulation required to achieve a U-value of 0.25 W/m^{2}K

4.7 DURABILITY

Airlock boards are rot proof and durable. As roof insulation, Airlockplus 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.

4.8 MAINTENANCE AND REPAIR

Damaged boards can be easily replaced prior to the installation of counter battens.

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

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive and cross breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

4.10 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. Airlockplus 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.

Insulation between studs, 16.5mm SD Polystyrene, 12.5mm Plasterboard (Elemental Method)																	
mm	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150
U	0.35	0.34	0.33	0.32	0.31	0.30	0.29	0.28	0.28	0.27	0.26	0.26	0.25	0.25	0.24	0.24	0.23
Insulation between studs, 12.5mm Plasterboard (Elemental Method)																	
mm	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150
U	0.42	0.40	0.39	0.37	0.36	0.35	0.34	0.33	0.32	0.31	0.30	0.29	0.28	0.28	0.27	0.27	0.26

Table 3: Wall Constructions – Typical U-values (Timber Frame)

Property	Declared Value	Test Method
Long Term Water Absorption by Diffusion	WD(V) 10 (less than 10%)	EN 12088
Dimensional Stability	DS(N) 2	EN 1603
Thermal Conductivity 'λ' Value 15 – 20 kg/m^3 20 – 25 kg/m^3 Thermal Resistance 15 – 20 kg/m^3 40 mm 50 mm 60 mm 100 mm 20 – 25 kg/m^3 40 mm 50 mm 60 mm 100 mm	 0.037 W/mK 0.034 W/mK 1.081 m^{2}K/W 1.351 m^{2}K/W 1.622 m^{2}K/W 2.703 m^{2}K/W 1.176 m^{2}K/W 1.471 m^{2}K/W 1.765 m^{2}K/W 2.941 m^{2}K/W	EN 12667
Compressive Strength 20 – 25 kg/m^3 Bending Strength 20 – 25 kg/m^3	 > 211 kPa > 377.1 kPa	EN 526 EN 12089
Water Vapour Diffusion Resistance Factor μ	20 to 40 (EPS 80) 30 to 70 (EPS 150)	Tabulated Value
Water Vapour Permeability δ 15 – 20 kg/m^3 20 – 25 kg/m^3	 0.018 – 0.036 mg/(Pa.N.M) 0.010 – 0.024 mg/(Pa.N.M)	EN 826

Table 4: Physical Properties of Airlockplus Insulation

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 from date of issue 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.

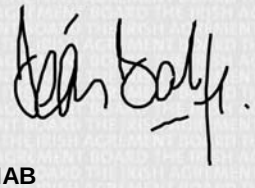
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards. Manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is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

The Irish Agrément Board

This Certificate No. **05/0235** is accordingly granted by the NSAI to **Airpacks Ltd.** on behalf of The Irish Agrément Board.

Date of Issue: **December 2005**

Signed



Manager, IAB

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.nsai.ie