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**Agrément
Certificate
No 05/4263**

Designated by Government
to issue
European Technical
Approvals

SUNDOLITT EPS FLOORING INSULATION

Isolation en polystyrène pour planchers en béton
Wärmedämmung aus Polystyrol für Betonfußboden

Product




• THIS CERTIFICATE RELATES TO SUNDOLITT EPS FLOORING INSULATION, AN EXPANDED POLYSTYRENE BOARD FOR INSULATING FLOORS.

- The product is for use on:
 - ground-supported or suspended concrete or timber ground floors
 - exposed or semi-exposed intermediate concrete or timber floors.
- The product is used to reduce the thermal transmittance of new or existing floors of dwellings or buildings of similar occupancy, type and condition.
- It is essential that the floors comply with the conditions set out in the Design Data and Installation parts of this Certificate.

Regulations

1 The Building Regulations 2000 (as amended) (England and Wales)

 The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of floor insulation with the Building Regulations. In the opinion of the BBA, Sundolitt EPS Flooring Insulation, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: A1	Loading
Comment:	Floors incorporating this product can meet this Requirement. See section 12.2 of this Certificate.
Requirement: C2(c)	Resistance to moisture
Comment:	Floors incorporating the product can meet this Requirement. See section 11.4 of this Certificate.
Requirement: L1(a)(i)	Dwellings
Comment:	The product can enable or contribute to enabling a floor to meet this Requirement. See sections 10.2 to 10.5 of this Certificate.
Requirement: Regulation 7	Materials and workmanship
Comment:	The product is an acceptable material. See section 13 of this Certificate.

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2 The Building (Scotland) Regulations 2004



In the opinion of the BBA, Sundolitt EPS Flooring Insulation, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Mandatory Standards as listed below.

Regulation:	8	Fitness and durability of materials and workmanship
Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The product can contribute to a construction satisfying this Regulation. See section 13 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	1.1(a)(b)	Structure
Comment:		Floors incorporating the product can satisfy this Standard with reference to clause 1.1.1 ⁽¹⁾ . See section 12.2 of this Certificate.
Standard:	3.15	Condensation
Comment:		Floors incorporating the product can satisfy this Standard with reference to clauses 3.15.1 ⁽¹⁾ , 3.15.3 ⁽¹⁾ and 3.15.4 ⁽¹⁾ . See section 11.5 of this Certificate.
Standard:	6.2	Building insulation envelope
Comment:		The product can enable a floor to satisfy this Standard with reference to clauses 6.2.1 ⁽¹⁾ (Table 1) to 6.2.4 ⁽¹⁾ . See sections 10.2 to 10.5 of this Certificate.
Regulation:	12	Building standards – conversions
Comment:		All comments given for this product under Regulation 9, also apply to this Regulation with reference to clause 0.12.1 ⁽¹⁾ and Schedule 6 ⁽¹⁾ .

(1) Technical Handbook (Domestic).

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Sundolitt EPS Flooring Insulation, if used in accordance with the provisions of this Certificate, will satisfy, or contribute to satisfying, the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is an acceptable material. See section 13 of this Certificate.
Regulation:	D1	Stability
Comment:		Floors incorporating this product can meet this Requirement. See section 12.2 of this Certificate.
Regulation:	F2	Building Fabric
Comment:		The product can satisfy or contribute to satisfying this Regulation. See sections 10.2 to 10.4 of this Certificate.

4 Construction (Design and Management) Regulations 1994 (as amended)

Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See section: 6 *Delivery and site handling* (6.4) and 14 *General (Installation)*.

Technical Specification

5 Description

5.1 Sundolitt EPS Flooring Insulation consists of rigid, expanded polystyrene boards, Class F grade,

manufactured without the use of HCFCs in accordance with BS EN 13163 : 2001, Section 4.2 and the relevant parts of Section 4.3.

5.2 The board is supplied with nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Characteristic (units)	EPS 70	EPS 100	EPS 150	EPS 200
Length ⁽¹⁾ (mm)	2400	2400	2400	2400
Width ⁽¹⁾ (mm)	1200	1200	1200	1200
Thickness ⁽¹⁾ (mm)	50, 75, 100	50, 75, 100	50, 75, 100	50, 75, 100
Minimum compressive strength at 10% compression (kNm ⁻²)	70	100	150	200
Density (kgm ⁻³)	15	18	23.5	27
Edge profile	square	square	square	square

(1) Other sizes supplied to order, with thickness to suit requirement.

6 Delivery and site handling

6.1 The boards are delivered to site in packs, wrapped in polythene. Each pack contains an instruction leaflet and a label bearing the manufacturer's trade name, product description, board dimensions, number of boards and the BBA identification mark incorporating the number of this Certificate.

6.2 The boards must be protected from prolonged exposure to sunlight and should be stored either under cover or protected with opaque polythene sheeting.

6.3 The boards must be stored fully supported and flat on a firm, level, dry base, protected from the weather and raised above damp surfaces.

6.4 Care must be taken to avoid contact with solvents and bitumen products. The boards must not be exposed to open flame or other ignition sources.

Design Data

7 General

7.1 Sundolitt EPS Flooring Insulation is effective in reducing the U value (thermal transmittance) of new or existing concrete or timber floors.

7.2 Site preparation should be in accordance with current national Building Regulations and Standards, in particular, with regard to harmful or dangerous substances and gases.

7.3 Ground-supported concrete floors incorporating the boards must include a suitable damp-proof membrane laid in accordance with the relevant clauses of CP 102 : 1973, Section 11 (see section 9 of this Certificate).

7.4 Suspended concrete or timber ground floors incorporating the boards must include suitable ventilation of the sub-floor void (see section 9).

7.5 The overlay to the boards should be:

- a cement-based floor screed (minimum 65 mm), laid in accordance with the relevant clauses of BS 8204-1 : 2003 and/or BS 8204-2 : 2003, or
- wood-based floor, eg tongue-and-groove plywood 16 mm thick (minimum) to BS EN 636 : 2003, flooring grade particle board (Types P4 to P7) to BS EN 312 : 2003 or oriented strand board of types OSB/2 to OSB/4 to BS EN 300 : 1997, 18 mm thick (minimum), installed in accordance with DD ENV 12872 : 2000, or
- a concrete slab.

8 Behaviour in relation to fire

8.1 The boards have a declared Class F to BS EN 13501-1 : 2002 but do not prejudice the fire resistance properties of the floor.

8.2 When properly installed the boards will not add significantly to any existing fire hazard. The insulation boards will be contained within the floor by the overlay until the overlay itself is destroyed and therefore will not contribute to the development stages of a fire or present a smoke or toxic hazard.

8.3 When the boards are to be used in exposed or semi-exposed intermediate timber floors such as rooms above a garage, the other floor materials and overall design must be selected to achieve the period of fire performance required.

9 Moisture penetration

9.1 The boards will resist water absorption.

9.2 For floors subject to national Building Regulations, construction should be detailed or designed in accordance with:

England and Wales

Approved Document C, Section 4

Scotland

Mandatory Standard 3.4, clauses 3.4.2⁽¹⁾ to 3.4.4⁽¹⁾ and 3.4.6⁽¹⁾

(1) Technical Handbook (Domestic).

Northern Ireland

Technical Booklet C, Section 1.

9.3 Guidance on limiting the risk of damage from other sources of dampness is given in section 11 of this Certificate; BS 5250 : 2002, Section 8.5, and BRE report (BR 262 : 2002) *Thermal insulation : avoiding risks*.

10 Thermal insulation

10.1 For the purpose of U value calculations to determine if the requirements of the Building (or other statutory) Regulations are met, the thermal conductivity ($\lambda_{90/90}$ value) of the boards as declared by the manufacturer (given in $\text{Wm}^{-1}\text{K}^{-1}$) may be taken as:

EPS 70	—	0.038
EPS 100	—	0.036
EPS 150	—	0.035
EPS 200	—	0.034



10.2 The requirement for limiting heat loss through the building fabric can be satisfied if the U values of the building elements, including thermal bridging, do not exceed the maximum values in the relevant Elemental Method given in the national Building Regulations:

England and Wales

Approved Documents L1 and L2, Table 1

Scotland

Mandatory Standard 6.2

Northern Ireland

Technical Booklet F, Tables 1.2 and 1.4.

10.3 Guidance is also given in these documents on selecting the thickness of insulation required to enable a floor to achieve the desired U value. Alternative approaches are also described in these documents which allow for some flexibility in design of U values for individual constructional elements.

10.4 The U values of floors may be calculated in accordance with CIBSE Guide A3 : 1999 *Thermal properties of building structures* or BS EN ISO 13370 : 1998 [see also BRE report (BR 262 : 2002) *Thermal insulation — avoiding risks*].



10.5 Care should be taken to ensure that the design allows for limiting excessive additional heat loss at junctions between floors and walls. Floors constructed according to the documents quoted in sections 11.4 and 11.5, as appropriate, will be acceptable.

11 Condensation

Interstitial condensation

11.1 Floors will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2002, Section 8.5 and Appendix D. The products have a water vapour resistivity between 100 and 500 $\text{MNs}(\text{gm})^{-1}$.

11.2 When the product is used above the damp-proof membrane on a ground-supported floor, or on a beam-and-block floor, a vapour control layer is installed on the warm side of the insulation to inhibit the risk of interstitial condensation on the upper slab surface.

11.3 For a timber suspended ground floor, it is not necessary to introduce a vapour control layer as long as adequate sub-floor cross ventilation is provided.

Surface condensation



11.4 Floors will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $0.7 \text{ Wm}^{-2}\text{K}^{-1}$ at any point, and the junctions with walls are designed in accordance with the relevant requirements of TSO publication *Limiting thermal bridging and air leakage: Robust construction details for dwellings and similar buildings*, TSO 2002 or BRE Information Paper IP 17/01 *Assessing the effects of thermal bridging at junctions and around openings*.



11.5 Floors will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $1.2 \text{ Wm}^{-2}\text{K}^{-1}$ at any point. Guidance may be obtained from Section 8 of BS 5250 : 2002 and BRE report (BR 262 : 2002) *Thermal insulation: avoiding risks*.

12 Floor loading

12.1 The design loadings for self-contained dwelling units, as defined in BS 6399-1 : 1996, are:

intensity of distributed load (kPa)	1.5
concentrated load (kN)	1.4



12.2 The insulation boards, covered with timber-based board or screed, can support these design loadings without undue deflection (see section 7.5).

12.3 A BRE survey of imposed floor loading in domestic buildings (see BRE current paper No 2/77 *Floor loadings in domestic buildings — the results of a survey*), indicates that loadings in flats are commonly in the region of 0.6 kPa and loadings of 1.5 kPa are normally associated with fixed items.

12.4 Where the boards are used under a concrete slab, resistance to concentrated and distributed loads is a function of the slab specification.

13 Durability



The boards are rot-proof, dimensionally stable and, when installed with the overlays specified in this Certificate, will remain effective as an insulating material for the life of the building in which they are incorporated.

Installation

14 General

14.1 Installation of Sundolitt EPS Flooring Insulation must be in accordance with the Certificate holder's installation instructions and the requirements of this Certificate.

14.2 Typical methods are shown in Figure 1. Reference should also be made to BRE report (BR 262 : 2002) *Thermal insulation — avoiding risks*.

14.3 All concrete floor surfaces should be smooth, level and flat to within 5 mm when measured with a 2-metre straight-edge. Irregularities greater than this must be

removed. Minor irregularities (up to 10 mm deep) may be levelled with mortar or thin screed.

14.4 In ground-supported concrete floors, the concrete floor slab over which the boards are laid should be left for as long as possible to maximise drying out and dissipation of constructional moisture, in accordance with BS 8203 : 2001, Section 3.1.2.

14.5 Where the boards are used over ground-supported concrete floor slabs a suitable damp-proof membrane in accordance with CP 102 : 1973, Section 11 and BS 8204-1 : 2003 or BS 8204-2 : 2003 should be laid to resist moisture from the ground. If a liquid-type damp-proof membrane is applied to the slabs, it should be of a type compatible with expanded polystyrene and be allowed to dry out fully before laying the boards.

14.6 Where the boards are used on hard core bases under ground-supported concrete slabs, the hard core must be compacted and blinded with a thin layer of sand before application of the boards.

14.7 The boards can be used on beam and block suspended concrete floors, that are the subject of a current Agrément Certificate and installed in accordance with, and within the limitations imposed by that Certificate, or those designed and installed to the precast concrete and general loading codes, that have been assessed as suitable.

14.8 Prior to installing the boards on exposed or semi-exposed intermediate timber floors, the floor should be inspected thoroughly for possible defects and its condition should meet the recommendations of BS 8201 : 1987, Section 6.

14.9 Where a screed or concrete slab is laid over the product, vertical upstands of insulation should be provided and be of sufficient depth to fully separate the screed or slab from the wall and provide a minimum thermal resistance of $0.75 \text{ m}^2\text{KW}^{-1}$. Alternatively, a suitable cavity or external wall insulation material can be extended below the damp-proof course and a minimum of 150 mm below the top of the floor insulation, to provide edge insulation to the floor. In this case, vertical upstands of insulation may not be necessary.

14.10 In suspended timber floors, the insulation boards are installed between the floor joists.

14.11 On exposed intermediate timber floors, the boards may be installed to the underside of the floor joists in a continuous fashion.

14.12 To limit the risk of damage from condensation and other sources of dampness, the boards and the overlay should only be laid after the construction is made substantially weathertight, eg after glazing. During construction the boards must also be protected from water spillage, plaster droppings and traffic.

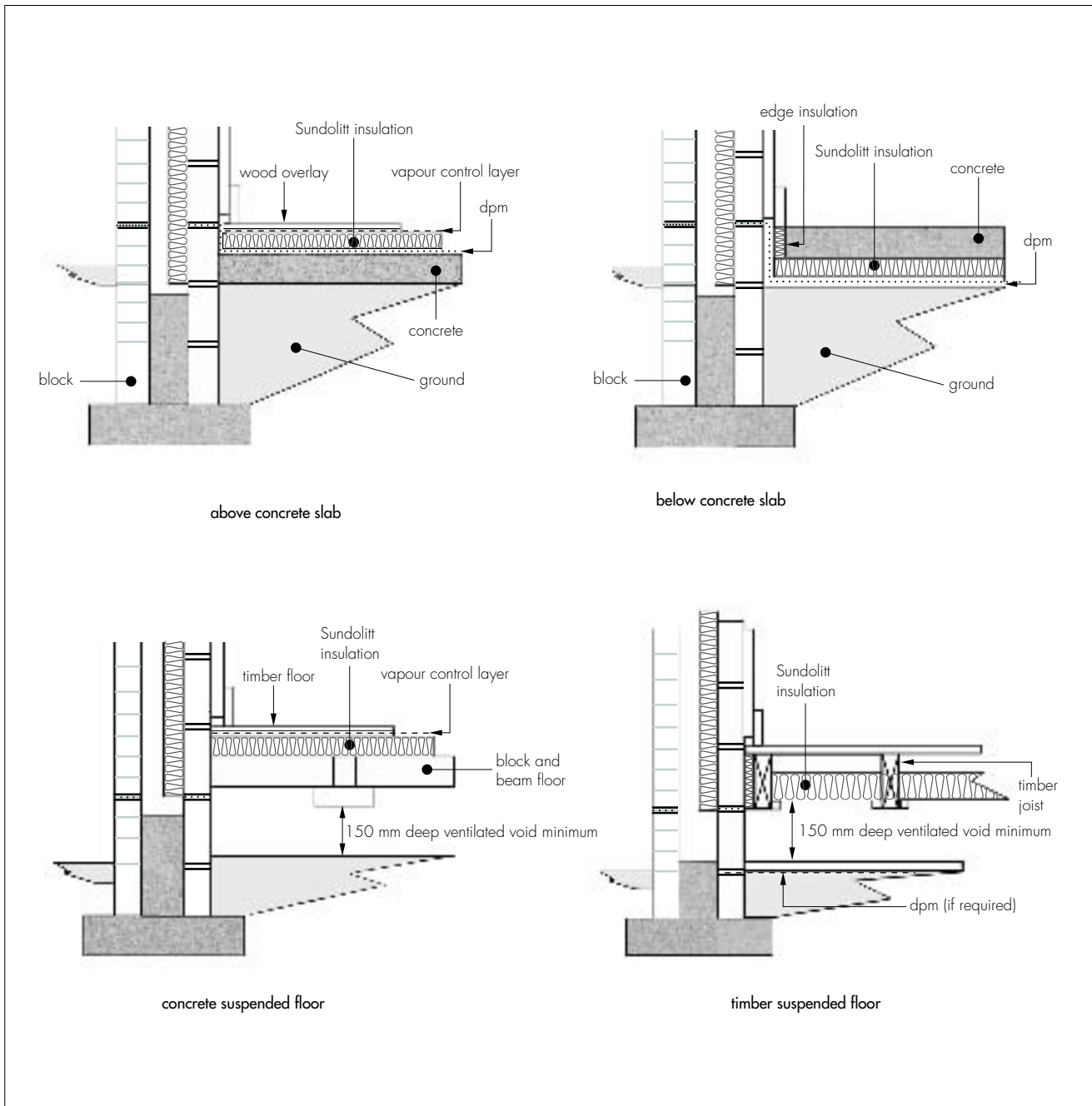
14.13 The boards can be cut using a sharp knife or fine-toothed saw to fit around service penetrations.

15 Procedure

15.1 The boards are cut to size, as necessary and laid with closely-butted, staggered cross-joints, ensuring that all spaces are completely filled.

15.2 The laying pattern should ensure that all cut edges are at the perimeter of the floor or some other feature, eg mat wells, thresholds or access ducts. Spreader boards should be used to protect the boards.

Figure 1 Typical installation details



Timber-based board overlays

15.3 Before laying the particle board or OSB overlays, pre-treated timber battens, in accordance with BS 1282 : 1999, are positioned at doorways, access panels and to support partitions.

15.4 A continuous vapour control layer with sealed joints of polythene sheet with a minimum thickness of 0.25 mm, is laid between the boards and the overlay board. The polythene sheet has 150 mm overlaps taped at the joints and is turned up 100 mm at the walls.

15.5 Tongue-and-groove 18 mm thick plywood, particle board (type P4 to P7), or OSB/2 to OSB/4 is laid with staggered cross-joints in accordance with DD ENV 12872 : 2000 .

15.6 An expansion gap between the overlay board and the perimeter walls or abutments should be provided at the rate of 2 mm per metre run or a minimum of 10 mm, whichever is the greater.

15.7 Where there are long, uninterrupted lengths of floor, eg corridors, proprietary expansion joints should be installed at intervals on the basis of a 2 mm gap per metre run of overlay board.

15.8 Before the overlay boards are interlocked, a waterproof PVA adhesive is applied to the joints.

15.9 Once the overlay board is laid, temporary wedges are inserted between the walls and the floor to maintain tight joints until the adhesive has set.

15.10 When the wedges are removed and before the skirting boards are fixed, suitable compressible filler, eg foamed polyethylene, should be fitted around the perimeter of the floor between the overlay board and the walls.

15.11 Where there is a likelihood of regular water spillage, eg in rooms such as kitchens, bathrooms, shower and utility rooms, additional overlay board protection should be considered, eg by a continuous

flexible vinyl sheet flooring, with welded joints and cove skirting.

Cement-based screed overlay

15.12 Perimeter edge pieces are cut and placed around the edges and all floor joints taped before a properly-compacted screed of a minimum 65 mm thickness is laid in domestic and 75 mm in other buildings. The relevant clauses of BS 8204-1 : 2003 or BS 8204-2 : 2003 should be followed and BRE's *Building Elements, Floors & Flooring*, Chapter 4.2, should be consulted.

Concrete slab overlay (ground-bearing only)

15.13 The boards are laid over the dpm and perimeter edge pieces are cut and placed around the edges and taped at joints. The concrete slab is laid to the required thickness in accordance with BS 8000-9 : 2003 and BS 8204-1 : 2003.

Timber floors

15.14 Saddle Clips are placed at intervals not exceeding one metre along the timber floor joists. Where the boards are to be installed only on one side of a joist, twin clips can be cut into single clips and nailed into place with galvanized nails.

15.15 Alternatively, the boards may be retained by pre-treated timber support beads or steel nails. Beads should be wide enough to retain the boards in place and secured with corrosion-protected nails at a depth that will accommodate the thickness of the insulation board and leave an air gap (minimum 25 mm) between the top of the insulation board and the underside of the flooring deck.

15.16 Boards are cut to fit tightly between joists and pushed down onto the spikes of the saddle clips, or onto the beads. Small gaps should be insulated with cut strips of insulation.

16 Incorporation of services

16.1 The boards must not be used in direct contact with electrical heating cables or hot water pipes.

16.2 The maximum continuous working temperature of the boards is 80°C. De-rating of electrical cables should be considered where the insulation restricts air cooling of cables.

16.3 Where possible, electrical conduits and water pipes or other services should be contained within ducts or channels within the concrete slab. Where this is not possible, the services may be accommodated within the insulation, provided they are securely fixed to the concrete slab. Electrical cables should be enclosed in a suitable conduit. With hot pipes the insulation must be cut back to maintain an air space.

16.4 Floorings incorporating gas pipes should be designed and installed in accordance with the requirements of the Gas Safety (Installation and Use) Regulations 1998.

16.5 Where water pipes are installed below the insulation they should be pre-lagged. Generally, insulation will be relatively thin so it would not be possible to install pipes within the insulation. Pipes installed above the insulation will not require lagging, although some provision needs to be made for expansion and contraction.

16.6 Where the boards are installed on a floor of a suspended beam and block design, all services must be installed so as not to impair the floor performance in accordance with the Agrément Certificate for that floor.

16.7 On overlay particle board floors, in situations where access to the services is desirable, a duct may be formed by mechanically fixing to the floor, timber bearers of the same thickness as the insulation to provide support for a particle board cover. The duct should be as narrow as possible and not exceed 400 mm in width or the maximum particle board spans given in DD ENV 12872 : 2000 without intermediate support. Services should be suitably fixed to the floor base and not to the insulation boards (see section 10.5 with regard to limiting heat loss).

16.8 On intermediate/exposed floors all the services should be incorporated beneath the existing floor and above the insulation if possible.

Technical Investigations

The following is a summary of the technical investigations carried out on Sundolitt EPS Flooring Insulation.

17 Investigations

17.1 An examination was made of test data to BS EN 13163 : 2001 relating to:

- dimensional tolerances
- squareness
- flatness
- density
- compressive strength at 10% compression
- long-term water absorption by immersion (total)
- thermal conductivity (λ value)
- dimensional stability under constant normal laboratory conditions

17.2 A theoretical risk analysis of the hygrothermal behaviour of various installations was carried out.

Additional Information

The Certificate holder has declared the designation codes (see Table 3) in accordance with Section 6 of BS EN 13163 : 2001.

Table 3 Certificate holder's declared designation codes/level or class — BS EN 13163 : 2001

Characteristic	Level/classes
Length	L1
Width	W1
Thickness	T1
Squareness	S1
Flatness	P1
Compressive stress (min) at 10% deformation ⁽¹⁾	CS(10)70, CS(10)100, CS(10)150, CS(10)200
Dimensional stability at 23°C/50% RH ⁽¹⁾	DS(N)5
Water absorption by immersion ⁽¹⁾ total (%)	WL(T)5

(1) For 50 mm thicknesses only.

Bibliography

BS 1282 : 1999 *Wood preservatives — Guidance on choice, use and application*

BS 5250 : 2002 *Code of practice for control of condensation in buildings*

BS 6399-1 : 1996 *Loading for buildings — Code of practice for dead and imposed loads*

BS 8000-9 : 2003 *Workmanship on building sites — Cementitious levelling screeds and wearing screeds — Code of practice*

BS 8201 : 1987 *Code of practice for flooring of timber, timber products and wood based panel products*

BS 8203 : 2001 *Code of practice for installation of resilient floor coverings*

BS 8204-1 : 2003 *Screeds, bases and in-situ floorings — Concrete bases and cement sand levelling screeds to receive floorings — Code of practice*

BS 8204-2 : 2003 *Screeds, bases and in-situ floorings — Concrete wearing surfaces — Code of practice*

BS EN 300 : 1997 *Oriented strand boards (OSB) — Definitions, classification and specifications*

BS EN 312 : 2003 *Particleboards — Specifications*

BS EN 636 : 2003 *Plywood — Specifications*

BS EN 13163 : 2001 *Thermal insulation products for buildings — Factory made products of expanded polystyrene (EPS) — Specification*

BS EN 13501-1 : 2002 *Fire classification of construction products and building elements. Classification using test data from reaction to fire tests*

BS EN ISO 13370 : 1998 *Thermal performance of buildings — Heat transfer via the ground — Calculation methods*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*

DD ENV 12872 : 2000 *Wood-based panels — Guidance on the use of load-bearing boards in floors, walls and roofs*

Conditions of Certification

18 Conditions

18.1 This Certificate:

- (a) relates only to the product that is named, described, installed, used and maintained as set out in this Certificate;
- (b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- (c) is valid only within the UK;
- (d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (e) is copyright of the BBA;
- (f) is subject to English law.

18.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

18.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabrication including all related and relevant processes thereof:

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;
- (b) continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine; and

(c) are reviewed by the BBA as and when it considers appropriate.

18.4 In granting this Certificate, the BBA is not responsible for:

- (a) the presence or absence of any patent, intellectual property or similar rights subsisting in the product or any other product;
- (b) the right of the Certificate holder to market, supply, install or maintain the product; and
- (c) the actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works.

18.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the installation and use of this product.



In the opinion of the British Board of Agrément, Sundolitt EPS Flooring Insulation is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 05/4263 is accordingly awarded to Sundolitt Ltd.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'G. A. Cooper'.

Date of issue: 20th December 2005

Chief Executive