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Agrément Certificate
No 08/4522

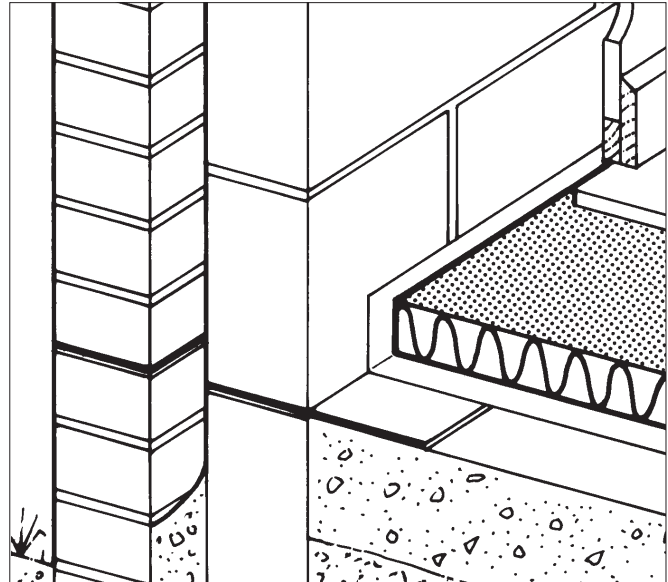
PRODUCT SHEET 1 — KINGSPAN KOOLTHERM K3 FLOORBOARD

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Kingspan Kooltherm K3 Floorboard, comprising rigid phenolic board for use on ground-supported or suspended concrete ground floors is also suitable for use between the joists of suspended timber ground floors.

AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Thermal performance — the product can contribute to enabling a building to achieve the requirement of national target carbon emission rates. The thermal conductivity ($\lambda_{90/90}$ value) of the product is declared by the Certificate holder (see section 4).

Condensation — the product can adequately limit the risk of surface condensation on floors (see section 5).

Behaviour in relation to fire — the product will be contained within the floor by the overlay until the overlay itself is destroyed (see section 6).

Floor loading — the product, covered with a screed overlay or concrete slab can support design loadings for self-contained dwelling units as defined in BS 6399-1 : 1996 without undue compression deflection (see section 7).

Durability — the product, when installed with the overlays specified, will remain effective as an insulating material for the life of the building in which it is incorporated (see section 9).

The BBA has awarded this Agrément Certificate for Kingspan Kooltherm K3 Floorboard to Kingspan Insulation Ltd as fit for its intended use provided it is installed, used and maintained as set out in this Agrément Certificate.

On behalf of the British Board of Agrément

Head of Approvals
— Physics

Chief Executive

Date of First issue: 10 March 2008

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, Kingspan Kooltherm K3 Floorboard, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



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

Requirement:	A1	Loading
Comment:		Floors incorporating the product can meet this Requirement. See section 7.2 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		Floors incorporating the product can meet this Requirement. See sections 5.1 and 5.3 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The product can contribute to a building to meet its Target Emission Rate. See sections 4.3 to 4.6 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is acceptable. See section 9 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

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 9 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 7.2 of this Certificate.
Standard:	3.15	Condensation
Comment:		Floors incorporating the product can satisfy this Standard, with reference to clauses 3.15.1 ⁽¹⁾ and 3.15.4 ⁽¹⁾ . See sections 5.1 and 5.4 of this Certificate.
Standard:	6.1(a)(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to satisfying clauses, or parts of, 6.1.2 ⁽¹⁾ , 6.1.3 ⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾ , 6.2.3 ⁽¹⁾ , 6.2.6 ⁽²⁾ , and 6.2.9 ⁽¹⁾⁽²⁾ to 6.2.12 ⁽¹⁾⁽²⁾ of these Standards. See sections 4.3 to 4.6 of this Certificate.
Regulation:	12	Building standards – conversions
Comment:		All comments given for the 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). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 9 of this Certificate.
Regulation:	C5	Condensation
Comment:		Floors incorporating the product can meet this Regulation. See section 5.1 of this Certificate.
Regulation:	D1	Stability
Comment:		Floors incorporating the product can meet this Regulation. See section 7.2 of this Certificate.
Regulation:	F2(a)(i)	Conservation measures
Regulation:	F3	Target carbon dioxide Emissions Rate
Comment:		The product can contribute to a building satisfying its Target Emission Rate. See sections 4.3 to 4.6 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: 1 *Description* (1.2).

Non-regulatory Information

NHBC Standards 2007

NHBC accepts the use of Kingspan Kooltherm K3 Floorboard, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 5.1, *Substructure and groundbearing floors*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, Kingspan Kooltherm K3 Floorboard, when installed and used in accordance with this Certificate, satisfies the requirements of the *Zurich Building Guarantee Technical Manual, Section 3 Substructure, Sub-section Floors*.

General

Kingspan Kooltherm K3 Floorboard is for use on ground-supported or suspended concrete ground floors, and is also suitable for use between the joists of a suspended timber ground floor.

Technical Specification

1 Description

1.1 Kingspan Kooltherm K3 Floorboard comprises a phenolic core, with coated glass-tissue facing on both faces. The nominal characteristics are:

length (mm)	2400
width (mm)	1200
thickness (mm)	45 to 120
edge profile	square
minimum compressive strength at 10% compression (kPa)	150
nominal density (kgm ⁻³)	35

1.2 The boards are manufactured in accordance with Section 4.2 and the relevant parts of Section 4.3 of BS EN 13165 : 2001.

2 Delivery and site handling

2.1 The boards are delivered to site in polyethylene shrink-wrapped packs incorporating a label with the manufacturer's trade name, product description and characteristics, and the BBA identification mark incorporating the number of this Certificate.

2.2 The boards must be protected from prolonged exposure to sunlight and should be stored either under cover or protected with opaque polyethylene. Where possible, packs should be stored inside. If stored outside, the boards should be raised above ground level, and not in contact with ground moisture.

2.3 The boards must not be exposed to open flame or other ignition sources.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Kingspan Kooltherm K3 Floorboard.

Design Considerations

3 Use

3.1 Kingspan Kooltherm K3 Floorboard is effective in reducing the U value (thermal transmittance) of new or existing ground floors.

3.2 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, BS 8102 : 1990 and/or BS 8215 : 1991 (see section 8 of this Certificate).

3.3 Suspended concrete or timber ground floors incorporating the boards must include a damp-proof membrane or suitable ventilation of the sub-floor as appropriate (see section 8 of this Certificate).

3.4 The overlay to the boards should be:

- a cement-based floor screed laid in accordance with the relevant clauses of BS 8204-1 : 2003 and/or BS 8204-2 : 2003, or
- a particle board Grade P5 or P7 to BS EN 312 : 2003 or
- a concrete slab.

4 Thermal performance

4.1 Calculations of the thermal transmittance (U value) of a floor should be carried out in accordance with BS EN ISO 6946 : 1997, BS EN ISO 13370 : 1998 and BRE report (BR 443 : 2006) *Conventions for U-value calculations* using the declared thermal conductivity ($\lambda_{90/90}$ value) of the insulation as shown in Table 1.

Table 1 Declared thermal conductivities

Thickness (mm)	Thermal conductivity $Wm^{-1}K^{-1}$
45–120	0.021
<45	0.023

4.2 The U value of a floor will depend on the thickness of the board, the perimeter/area ratio and the floor type. Examples of U values are given in Table 2. This table is for use as guidance only, a detailed calculation should be carried out for each proposed application.

Table 2 Floor U values⁽¹⁾ ($Wm^{-2}K^{-1}$)

Floor type	Perimeter/area ratio	Insulation thickness (mm)			
		25	50	75	100
Slab on ground supported	0.2	0.24	0.18	0.15	0.12
	0.4	0.35	0.24	0.18	0.15
	0.6	0.41	0.26	0.20	0.16
	0.8	0.45	0.28	0.21	0.17
	1.0	0.47	0.29	0.22	0.17
Suspended beam and block	0.2	0.25	0.19	0.15	0.13
	0.4	0.33	0.23	0.18	0.15
	0.6	0.37	0.25	0.19	0.16
	0.8	0.40	0.26	0.20	0.16
	1.0	0.42	0.27	0.20	0.16
Suspended timber	0.2	0.29	0.23	0.19	0.17
	0.4	0.39	0.29	0.23	0.20
	0.6	0.44	0.31	0.25	0.21
	0.8	0.48	0.33	0.26	0.22
	1.0	0.50	0.34	0.27	0.22

(1) Excluding edge insulation for the ground-supported floor system.



4.3 Subject to the selection of an appropriate construction, P/A ratio and insulation thickness, a floor construction can contribute to achieving the following design U values:

England and Wales and Northern Ireland

- 0.25 $Wm^{-2}K^{-1}$ required for 'notional' dwellings in SAP 2005
- 0.25 $Wm^{-2}K^{-1}$ limit average specified in Approved Documents L1A (Table 2), and Technical Booklet F1 (Table 2.2)
- 0.70 $Wm^{-2}K^{-1}$ limit for an individual element specified in Approved Documents L1A (Table 2), and Technical Booklets F1 (Table 2.2).

Scotland

- 0.20 $Wm^{-2}K^{-1}$ required for the 'simplified approach – solid fuel packages 3 and 6' 'notional' dwelling
- 0.22 $Wm^{-2}K^{-1}$ required for 'notional' dwellings in SAP 2005 (for Scotland) and the 'simplified approach – packages 1, 2, 4 and 5' in Mandatory Standard 6.1, clause 6.1.2⁽¹⁾⁽²⁾
- 0.25 $Wm^{-2}K^{-1}$ required for notional dwellings as described in Mandatory Standard 6.1, clause 6.1.6⁽¹⁾
- 0.22 $Wm^{-2}K^{-1}$ for extensions the value described by the Table to Mandatory Standard 6.2, clauses 6.2.9⁽¹⁾, 6.2.10⁽²⁾, 6.2.11⁽¹⁾ and 6.2.12⁽²⁾
- 0.70 $Wm^{-2}K^{-1}$ limit for an individual element specified in Mandatory Standard 6.2, clauses 6.2.1⁽¹⁾, 6.2.9⁽¹⁾ and 6.2.10⁽²⁾.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

4.4 Where a proposed floor U value is not greater than the relevant 'notional' value specified in section 4.3, additional energy saving measures will be required in the building envelope and/or services to achieve the required overall carbon dioxide emission rate reduction of about 20% in dwellings (18% to 25% in Scotland).

4.5 Compliance with the guidance referred to in section 4.6 will allow the use of the default psi values from Table 3 of BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings* and Table K1 of *The Government's Standard Assessment Procedure for Energy rating of Dwellings* (SAP 2005), in Target Emission Rate calculations to SAP 2005 or the simplified approach in Scotland.

4.6 The product can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between the external wall and other building elements. Guidance in this respect, and on limiting heat loss by air infiltration, can be found in:

England and Wales — *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings* TSO 2002.

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

5 Condensation

Interstitial condensation



5.1 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 product has a water vapour resistance exceeding 15 MNsg^{-1} .

5.2 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



5.3 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*, 2002 or BRE Information Paper IP 01/06.



5.4 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*.

6 Behaviour in relation to fire

6.1 The boards do not prejudice the fire resistance properties of the floor.

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

7 Floor loading

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

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



7.2 The boards, covered with timber-based board or screed overlays, can support these design loadings without undue compression deflection of the insulant.

7.3 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.

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

8 Moisture penetration

8.1 The boards must be used above the dpm and must not be used where they may come into contact with moisture from the ground.

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

England and Wales — Approved Document C, Section 4

Scotland — Mandatory Standard 3.4, clauses 3.4.2⁽¹⁾⁽²⁾ to 3.4.4⁽¹⁾⁽²⁾ and 3.4.6⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet C, Section 1.

9 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

10 General

10.1 Installation of Kingspan Kooltherm K3 Floorboard must be in accordance with the Certificate holder's installation instructions and the requirements of this Certificate.

10.2 Typical methods are shown in Figures 1 to 4. Reference should also be made to BRE report (BR 262 : 2002).

10.3 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.

10.4 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.

10.5 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 the boards and be allowed to dry out fully prior to installation of the boards.

Figure 1 Ground-supported concrete floor — screed overlay

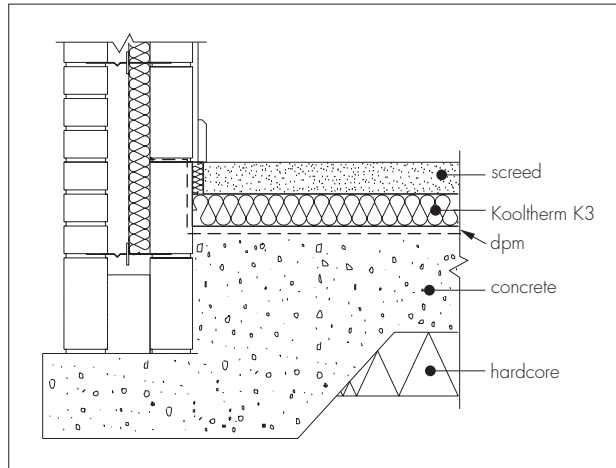


Figure 2 Suspended concrete floor — screed overlay

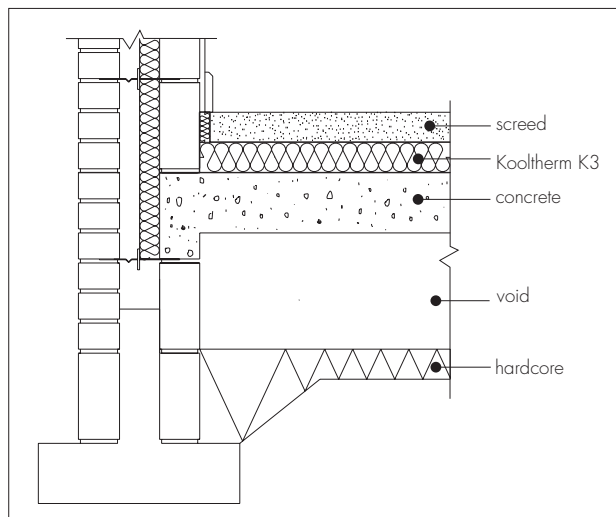


Figure 3 Concrete slab overlay

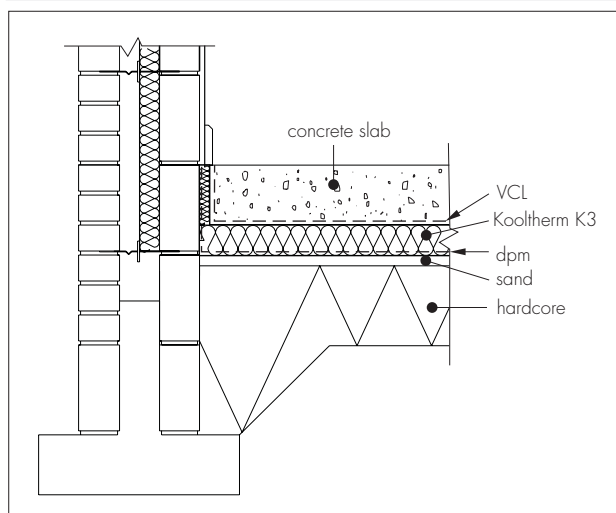
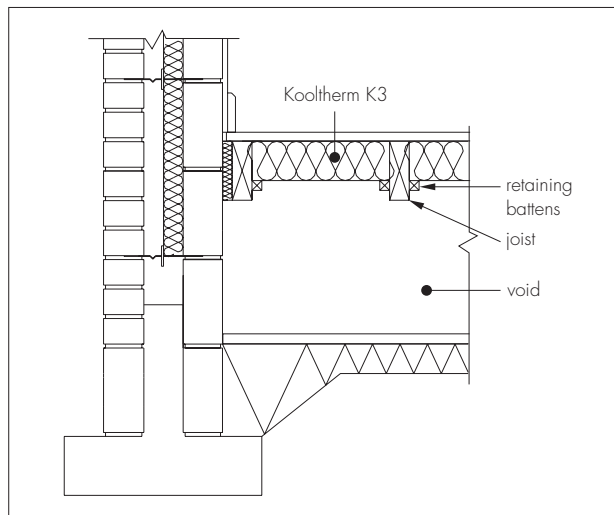


Figure 4 Suspended timber floors



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

10.7 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.

10.8 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 partial fill cavity wall insulation material can be extended below the damp-proof course level to provide edge insulation to the floor.

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

10.10 To limit the risk of damage from condensation and other sources of dampness, the boards and overlays 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.

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

11 Procedure

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

11.2 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.

Cement-based screed overlay

11.3 Perimeter edge pieces are cut and placed around the edges and all floor joints taped, or a polythene vapour control layer, minimum 0.125 mm thick, is laid over the boards with 150 mm laps. A properly-compacted screed of a minimum 65 mm thickness is laid in domestic and 75 mm in other buildings is then laid over. 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)

11.4 Perimeter edge pieces are cut and placed around the edges and taped at joints. A vapour control layer, minimum 0.125 mm thick, is laid over the boards with 150 mm laps. The concrete slab is laid to the required thickness in accordance with BS 8000-9 : 2003 and BS 8204-1 : 2003.

Suspended timber floors

11.5 Boards are cut to fit tightly between joists. Small gaps should be insulated with cut strips of insulation.

11.6 The boards may be retained by preservative-treated timber battens. These should be wide enough to retain the boards in place and secured with corrosion protected nails.

12 Incorporation of services

12.1 The maximum continuous working temperature of the boards is 100°C . De-rating of electrical cables should be considered where the insulation restricts air cooling of cables.

12.2 Where the boards are installed on a floor of a suspended beam and block design, all services must be installed in accordance with the Agrément Certificate for that floor and/or with the relevant current codes of practice.

12.3 Where possible, electrical conduits, gas 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.

12.4 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.

12.5 On board overlay 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 4.4 with regard to limiting heat loss).

Technical Investigations

13 Investigations

13.1 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.

13.2 An examination was made of test data relating to:

- dimensions
- thermal conductivity
- compressive strength
- load/deflection characteristics
- creep characteristics
- condensation analysis.

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 8102 : 1990 *Code of practice for protection of structures against water from the ground*
- 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 8215 : 1991 *Code of practice for design and installation of damp-proof courses in masonry construction*
- 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 13165: 2001 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PUR) products — Specification*
- BS EN ISO 6946 : 1997 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- 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*

14 Conditions

14.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

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

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

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

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

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

14.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does 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; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any 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 manufacture, supply, installation, use and maintenance of this product/system.

