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**Agrément
Certificate
No 89/2196**
Fourth issue*

Designated by Government
to issue
European Technical
Approvals

KAY-CEL, KAY-CEL PLUS AND KAY-CEL SUPER PLUS 030 FLOORING INSULATION FOR CONCRETE GROUND FLOORS

Isolation en polystyrène expansé pour planchers des rez-de-chaussées
Fußbodenwärmeeisolation

Product



• THIS CERTIFICATE REPLACES CERTIFICATE No 84/1293 AND RELATES TO KAY-CEL, KAY-CEL PLUS AND KAY-CEL SUPER PLUS 030 FLOORING INSULATION FOR CONCRETE GROUND FLOORS.

• The product is for use on ground-supported and suspended floors and may be installed on:
(1) a concrete floor with a cement-based screed overlay; or
(2) a concrete floor with wood-based overlay board; or
(3) hard core bases of ground floors with the concrete placed over.

• It is used to reduce the thermal transmittance of new or existing floors.

• 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, Kay-Cel, Kay-Cel Plus and Kay-Cel Super Plus 030 Flooring Insulation for Concrete Ground Floors, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: L1

Dwellings

Requirement: L2

Buildings other than dwellings

Comment:

The product can meet these Requirements. See sections 10.2, 10.3 and 10.5 of this Certificate.

Requirement: Regulation 7

Materials and workmanship

Comment:

The product is an acceptable material. See section 13 of this Certificate.

Electronic Copy

2 The Building Standards (Scotland) Regulations 1990 (as amended)



In the opinion of the BBA, Kay-Cel, Kay-Cel Plus and Kay-Cel Super Plus 030 Flooring Insulation for Concrete Ground Floors, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Technical Standards as listed below.

Regulation:	10	Fitness of materials and workmanship
Standard:	B2.1	Selection and use of materials, fittings, and components, and workmanship
Comment:		The product can contribute to a construction meeting this Standard. See the <i>Installation</i> part of this Certificate.
Standard:	B2.2	Selection and use of materials, fittings, and components, and workmanship
Comment:		The product is an acceptable material. See section 13 of this Certificate.
Regulation:	18	Condensation — Resistance to condensation
Standard:	G4.1	Condensation — Interstitial condensation
Standard:	G4.2	Surface condensation
Comment:		Floors incorporating the product can satisfy these Standards. See section 11 of this Certificate.
Regulation:	22	Conservation of fuel and power
Standard:	J3.1	Buildings in purpose group 1 — Building fabric
Standard:	J8.1	Buildings in purpose groups 2
Comment:		The product can satisfy these Standards. See sections 10.2, 10.3 and 10.5 of this Certificate.

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Kay-Cel, Kay-Cel Plus and Kay-Cel Super Plus 030 Flooring Insulation for Concrete Ground Floors, 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 acceptable. See section 13 of this Certificate.
Regulation:	C5	Condensation
Comment:		Floors incorporating the product can satisfy this Regulation. See section 10 of this Certificate.
Regulation:	F2	Building fabric
Comment:		The product can satisfy this Regulation. See sections 10.2, 10.3 and 10.5 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)* of this Certificate.

Technical Specification

5 Description

5.1 Kay-Cel, Kay-Cel Plus and Kay-Cel Super Plus O30 Flooring Insulation for Concrete Ground Floors are boards manufactured from expanded polystyrene beads.⁽¹⁾

(1) Kay-Cel Super Plus O30 is produced from grey polystyrene bead.

5.2 Boards are supplied with the characteristics of:

size (mm)	2400 x 1200, 1800 x 1200, 1200 x 1200
thickness ⁽²⁾ (mm)	20–150 (in 5 mm increments)

(2) Other thicknesses available to order.

6 Delivery and site handling

6.1 The boards are delivered to site wrapped in polythene. Each pack bears the manufacturer's trade name 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.

6.3 The boards must be stored flat, protected from high winds and raised above damp surfaces.

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

Design Data

7 General

7.1 Kay-Cel, Kay-Cel Plus and Kay-Cel Super Plus O30 Flooring Insulation for Concrete Ground Floors and is effective in reducing the U value (thermal transmittance) of new or existing floors incorporating either a cement-based screed or a wood-based overlay board.

7.2 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 9).

7.3 Suspended concrete ground floors incorporating the boards, must include suitable ventilation or a damp-proof membrane (see section 9).

7.4 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 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 (Type P5 or P7) to BS EN 312 : 2003 or oriented strand board of type OSB/3 or OSB/4 to BS EN 300 : 1997, 18 mm thick (minimum), installed in accordance with ENV 12872 : 2000, or
- a concrete slab.

8 Behaviour in relation to fire

8.1 The boards 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 polystyrene boards will be contained within the floor by the overlay until the overlay itself is destroyed. The boards therefore will not contribute to the development stages of a fire or present a smoke or toxic hazard. Electrical cables running within the boards should be separated from it by enclosing them within a suitable conduit, eg rigid PVC.

9 Moisture penetration

9.1 The boards are not a water vapour controlling layer; however, they will not allow moisture to cross the completed floor construction.

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

England and Wales

Approved Document C, Technical Solutions 3.4 to 3.8 or 3.13 to 3.14

Scotland

Technical Standards, Part G, Sections A, C or D of the *Provisions deemed to satisfy the standards*

Northern Ireland

Technical Booklet C, Section 1.

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 (λ value in $\text{Wm}^{-1}\text{K}^{-1}$) of the boards may be taken as:

Kay-Cel	0.038
Kay-Cel Plus	0.033
Kay-Cel Super Plus O30	0.030



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 Approach given in the national Building Regulations:

England and Wales

Approved Documents L1 and L2, Table 1

Scotland

The Technical Standards, J3.2 Table to J8.3 Table

Northern Ireland

Technical Booklet F, Table 1.2 or 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 to the elemental Method are also described which allow for some flexibility in design of U values for individual construction and elements.

10.4 U values for floors may be calculated in accordance with CIBSE Guide A3 : 1999, BS EN ISO 13370 : 1998 [see also 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 and risk of surface condensation at junctions between the floor and other building elements. Reference can be made to *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings* : 2002 or BR262 : 2002 *Thermal insulation : avoiding risks*.

11 Condensation



For floors subject to the national Building Regulations, construction should be in accordance with BS 5250 : 2002, clause 8.5, and with Annex D as appropriate.

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 boards covered with overlay board or screed, can support these design loadings without undue deflection.

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.

12.5 It is recommended that with heavy, vibrating items, such as washing machines, the overlay is supported on timber battens of the same thickness

as the insulation. Where the floor is required to resist impact sound transmission the battens should incorporate a resilient layer.

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 Typical methods of installation for Kay-Cel, Kay-Cel Plus and Kay-Cel Super Plus 030 Flooring Insulation for Concrete Ground Floors are shown in Figure 1 and must be in accordance with the Certificate holder's installation instructions.

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

14.3 The floor surface should be smooth and flat to within 5 mm when measured with a 3 m straight edge. Irregularities greater than this must be removed. Minor irregularities (up to 10 mm) may be levelled with mortar.

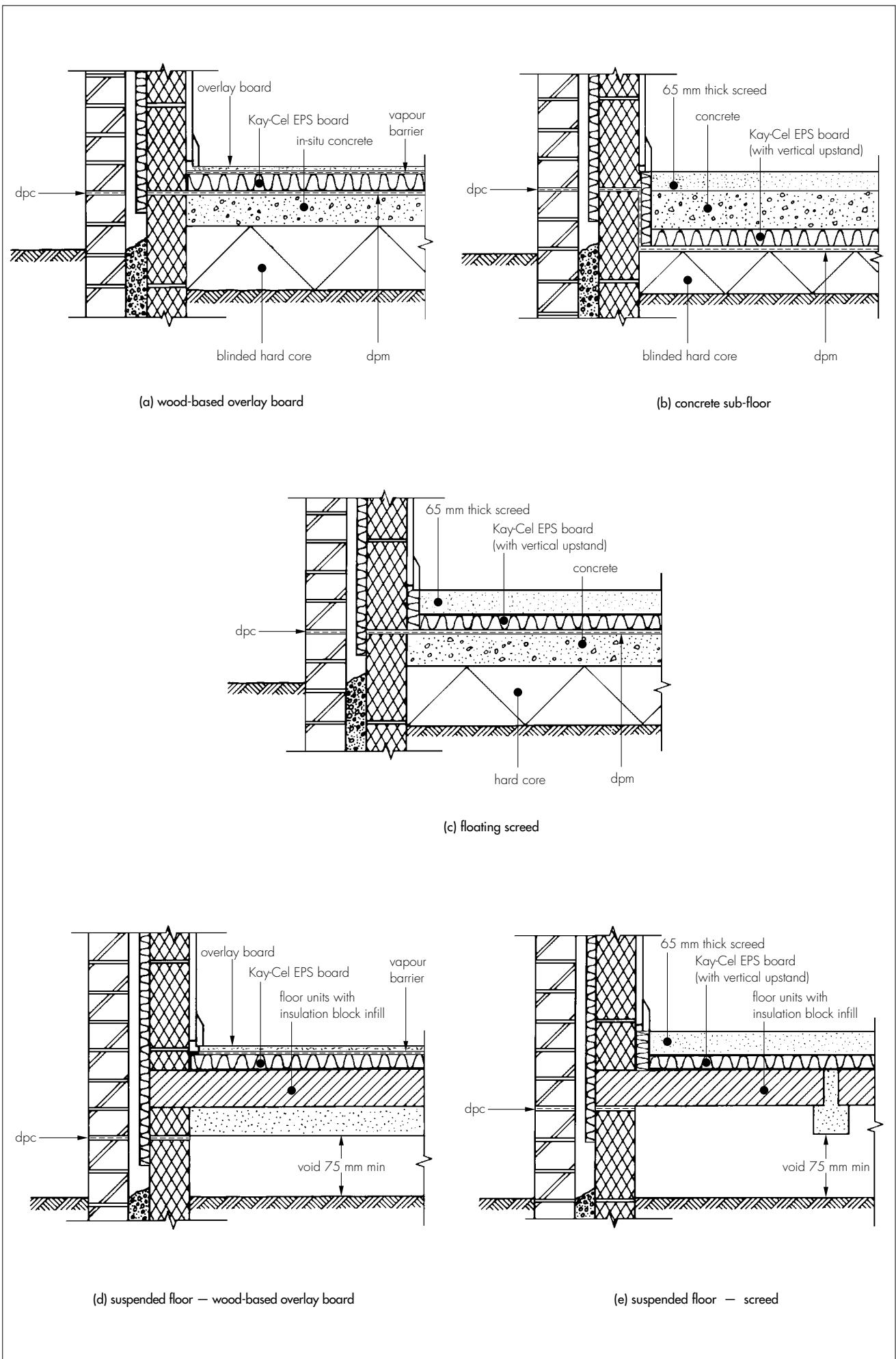
14.4 The boards can be used on beam and block suspended concrete floors that are subject of a current Agrément Certificate and installed in accordance with, and within the limitations imposed by, that Certificate.

14.5 Where the boards are used over ground-supported concrete floor slabs a suitable damp-proof membrane in accordance with BS 8102 : 1990 and CP 102 : 1973 should be incorporated 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 blinded before application of the boards.

14.7 Where a screed or concrete slab is laid over the product, vertical upstands of insulation should be provided and be of sufficient depth to separate fully the screed or slab from the wall and provide a minimal thermal resistance of $0.75 \text{ m}^2\text{KW}^{-1}$. A suitable cavity or external wall insulation material can be extended below the damp-proof course level to a minimum of 150 mm below the top of the floor insulation to provide additional edge insulation.

Figure 1 Typical installation details



14.8 During construction the boards and the overlays must be protected from damage, eg by moisture, water spillage, plaster droppings and traffic.

14.9 Before installation, the floor should be inspected thoroughly for possible defects and its condition should meet the recommendations of the relevant section in BS 8201 : 1987.

15 Procedure

15.1 The boards are cut to size, as necessary, and laid with closely butted, taped joints.

Cement-based screed overlay

15.2 Perimeter edge pieces are cut and placed around the edges. A properly compacted screed of at least 65 mm is laid. The relevant clauses of BS 8204-1 : 2003 should be followed and BRE Digest 224(1981) *Cellular Plastics for Buildings, Floors* and BRE Digest 104(1979) *Floor Screeds* should be consulted.

Wood-based board overlays

15.3 Before laying the boards, preservative-treated battens, in accordance with BS 1282 : 1999, are positioned at doorways and to support partitions (adequate time should be allowed for CCA-based preservatives to become fixed, and the solvents from solvent-based preservatives to evaporate).

15.4 Where boards are laid on a dpm, a continuous vapour control layer, consisting of 0.25 mm (1000 gauge) polyethylene sheet, is laid between the boards and the overlay board. The polyethylene sheet has 150 mm overlaps taped at the joints and is turned up 100 mm at the walls.

15.5 Tongue-and-groove plywood, particle board (type P5 or P7) or OSB/3 or OSB/4, is laid with staggered cross-joints in accordance with 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 board panels are interlocked, either a PVA or mastic 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 pieces of expanded polystyrene, should be fitted around the perimeter of the floor between the board and the walls.

15.11 Where there is a likelihood of regular water spillage (such as in kitchens, bathrooms, shower and utility rooms), additional board protection should be considered, eg by a continuous flexible vinyl sheet flooring with welded joints and cove skirting turned up at abutments.

Concrete slab overlay (ground bearing only)

15.12 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 : 1999 and BS 8204-1 : 2003.

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 Where possible, electrical conduits, gas and water pipes or other services should be contained in ducts or channels within the concrete slab of ground-supported floors. Where this is not possible, the services may be accommodated within the insulation, provided they are securely fixed to the concrete slab (see section 8.2). Electrical cables should be enclosed in a suitable conduit. With hot pipes, the insulation must be cut back to maintain an air space.

16.3 Where water pipes are installed, either within the slab or the insulation, they must be pre-lagged with close fitting pipe insulation, eg extruded polyethylene foam.

16.4 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 (where appropriate) for that floor.

16.5 On overlay 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 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).

16.6 For timber intermediate floors all the services should be incorporated beneath the existing floor.

Technical Investigations

The following is a summary of the technical investigations carried out on Kay-Cel, Kay-Cel Plus and Kay-Cel Super Plus 030 Flooring Insulation for Concrete Ground Floors.

17 Tests

Tests were carried out to determine:

- compressive strength at 10% compression
- density
- dimensions.

18 Investigations

18.1 A re-examination was made of the data and investigations on which the previous Certificate No 84/1293 was based. The conclusions drawn from the original data remain valid.

18.2 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. Regular factory inspections were carried out during the period of validity of the previous Certificate to ensure that the quality of the product was maintained.

18.3 An examination was made of data relating to Kay-Cel, Kay-Cel Plus and Kay-Cel Super Plus 030 Flooring Insulation for Concrete Ground Floors.

18.4 Data relating to the following properties were examined:

- thermal conductivity
- dimensional stability
- water vapour permeability.

Additional Information

The management systems of Kay Metzeler Limited have been assessed and registered as meeting the requirements of BS EN ISO 9002 : 1994 by the British Standards Institution Quality Assurance, Certificate No 10541.

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 : 1999 *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 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 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 ISO 9002 : 1994 *Quality systems — Model for quality assurance in production, installation and servicing*

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*

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

Conditions of Certification

19 Conditions

19.1 This Certificate:

- (a) relates only to the product that is 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.

19.2 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.

19.3 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.

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

- (a) the presence or absence of any patent 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 nature or standard of individual installations of the product or any maintenance thereto, including methods and workmanship.

19.5 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, Kay-Cel, Kay-Cel Plus and Kay-Cel Super Plus 030 Flooring Insulation for Concrete Ground Floors is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 89/2196 is accordingly awarded to Kay Metzeler Limited.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'P. Q. Newson'.

Date of Fourth issue: 6th May 2004

Chief Executive

**Original Certificate issued 21st March 1989. This amended version includes change of product name, reference to the revised national Building Regulations and Standards, addition of reference to CDM Regulations, and new Conditions of Certification.*