



## Excel Industries Ltd

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**Agrément  
Certificate  
No 94/3027**

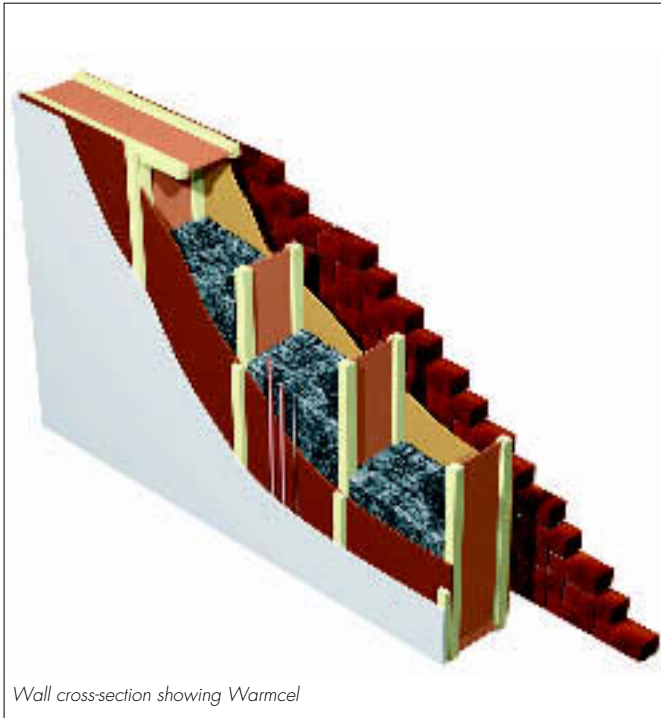
*Third issue\**

Designated by Government  
to issue  
European Technical  
Approvals

## WARMCEL 500

Isolation de murs  
Wärmedämmung

# Product



Wall cross-section showing Warmcel



Installation process


- THIS CERTIFICATE RELATES TO WARMCEL 500, A CELLULOSE FIBRE INSULATION BLOWN IN LOOSE FORM OR DAMP-SPRAYED.

- The product is installed between studding in walls of normal timber frame dwellings with a weather resistant cladding, and a ventilated and drained cavity between the cladding and the timber frame.

- It can be used in conventional constructions incorporating a vapour control layer or in 'breathing wall' constructions where layers either side of the insulation have appropriate relative vapour resistances.

## Regulations

### 1 The Building Regulations 1991 (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 timber frame wall insulation systems with the Building Regulations. In the opinion of the BBA, Warmcel 500, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: <b>B3(1)</b>	Internal fire spread (structure)
Comment:	Walls filled with the product can meet this Requirement. See section 8.5 of this Certificate.
Requirement: <b>L1</b>	Conservation of fuel and power
Comment:	Walls incorporating the product will satisfy the Elemental Approach for limiting heat loss. See sections 11.2 and 11.3 of this Certificate.
Requirement: <b>Regulation 7</b>	Materials and workmanship
Comment:	The product is acceptable. See sections 13.1 and 13.2 of this Certificate.

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



In the opinion of the BBA, Warmcel 500, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and Technical Standards as listed below.

Regulation:	10	Fitness of materials
Standard:	B2.1	Selection and use of materials and components
Comment:		The product is acceptable. See sections 13.1 and 13.2 of this Certificate.
Regulation:	12	Structural fire precautions
Standard:	D2.2	Fire resistance
Comment:		Walls filled with the product can meet this Standard. See section 8.5 of this Certificate.
Regulation:	18	Preparation of sites and resistance to moisture
Standard:	G4.1	Interstitial condensation
Standard:	G4.2	Surface condensation
Comment:		The product will not promote condensation. See sections 12.3 and 12.4 of this Certificate.
Regulation:	22	Conservation of fuel and power
Standard:	J2.1	Standards for buildings in purpose group 1.
Standard:	J2.2	Standards for buildings in purpose groups 2 to 7.
Comment:		Walls incorporating the product will satisfy the Elemental Approach for limiting heat loss. See sections 11.2 and 11.3 of this Certificate.

## 3 The Building Regulations (Northern Ireland) 1994 (as amended)



In the opinion of the BBA, Warmcel 500, 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 sections 13.1 and 13.2 of this Certificate.
Regulation:	C7	Condensation
Comment:		The product will not promote condensation. See sections 12.3 and 12.4 of this Certificate.
Regulation:	E6	Internal fire spread — Structure
Comment:		Walls filled with the product can meet this Regulation. See section 8.5 of this Certificate.
Regulation:	F2	Conservation of fuel and power
Comment:		Walls incorporating the product will satisfy the Elemental Approach for limiting heat loss. See sections 11.2 and 11.3 of this Certificate.

## 4 Construction (Design and Management) Regulations 1994

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.*

## Technical Specification

### 5 Description

5.1 Warmcel 500 cellulose fibre insulation is manufactured in accordance with BS 5803 : Part 3 : 1987(1994). It comprises recycled newsprint, gypsum, boric acid and other inorganic fire retardants. It has an installed density of between  $35 \text{ kgm}^{-3}$  and  $45 \text{ kgm}^{-3}$ .

5.2 The insulation is applied either by injection into the void after the internal lining has been applied or damp-spraying with a small amount of water before fixing the internal lining.

5.3 Lining boards specified for use with this system have not been assessed by the BBA and are not covered by this Certificate.

### 6 Delivery and site handling

6.1 The insulation is delivered to site in sealed plastic bags weighing approximately 12 kg. Each bag carries a label bearing the manufacturer's name, product name, type of material and the BBA identification mark incorporating the number of this Certificate.

6.2 Bags must be kept dry and unopened until ready for use.

### 7 General

7.1 When installed, Warmcel 500 is effective in reducing the U value (thermal transmittance) of external walls of timber frame dwellings. It is essential that such walls are designed and constructed to incorporate the normal precautions against moisture ingress.

7.2 New buildings subject to the national Building Regulations should be designed in accordance with the relevant recommendations of BS 5268 : Part 2 : 1991 and Part 6 : Section 6.1 : 1988.

7.3 Where applicable, construction should be in accordance with the relevant clauses of NHBC Standards, Chapter 6.2 and Zurich Building Guarantees Technical Standards, chapter 2.

7.4 Where the construction incorporates a masonry outer leaf (masonry includes clay and calcium silicate bricks, concrete blocks, natural and reconstituted stone blocks) which should be in accordance with BS 5628 : Part 3 : 1985 or BS 5390 : 1976(1984), the designed cavity width should be 50 mm and at no point should the cavity widths be less than 35 mm<sup>(1)</sup>.

(1) A residual cavity nominally 50 mm wide will be required by the NHBC where normal standards of tolerance and workmanship are adopted.

7.5 Where the construction has an outer cladding of rendering, slates or tiles, timber or plastic weatherboarding, or other form of cladding, a 19 mm minimum cavity width must be maintained between the cladding and the timber frame sheathing. A vapour control layer on the warm side of the insulation is likely to be required in this type of construction.

7.6 It is essential that proper care and attention is given to maintaining the integrity/continuity of vapour control layers (see section 1.2 of this Certificate).

7.7 Derating of any electrical cables in areas where the insulation restricts the flow of air should be considered.

### 8 Behaviour in relation to fire

8.1 The product contains inorganic fire retardants which inhibit flaming and smouldering combustion.

8.2 In the context of this Certificate the use of the product does not prejudice the fire resistance properties of the wall.

8.3 When properly installed, the insulation will be contained within the cavity sheathing and internal lining board until these layers are destroyed. Therefore the insulation will not contribute to the

development stages of a fire or present a smoke or toxic hazard.

8.4 Loadbearing timber stud partitions were tested for fire resistance in accordance with BS 476 : Part 21 : 1987 and achieved the ratings given in Table 1. The partitions comprised:

(a) 89 mm by 38 mm timber studs at 600 mm centres with noggings at a height of 2.4 m. The unexposed face was covered in 9.5 mm sheathing grade plywood. The core was filled with the insulation and covered with a 0.125 mm thick (500 gauge) polythene vapour control layer and 12.5 mm taper-edge plasterboard fixed over.

(b) Masonite studs 170 mm deep by 47 mm wide with 8 mm thick web of K40 Masonite. Each stud fixed at 600 mm centres between horizontally orientated Masonite studs at the head and an 8 mm thick K40 Masonite board at the bottom and additional horizontal Masonite stud as the sole plate. The exposed face was covered by two layers of 12.5 mm plasterboard. The core was filled with insulation and the unexposed face covered with 9.2 mm Panelvent.

Table 1 Fire resistance test results

Wall construction	Test panel dimensions (mm)	Loadbearing capacity (mins)	integrity (mins)	insulation (mins)
(a)	3000 x 3000 x 111	39*	39*	39*
(b)	2400 x 3000 x 205	71	71	71

\*Test terminated.



8.5 The constructions detailed in section 8.4 of this Certificate will meet the requirements for a minimum period of fire resistance of 30 minutes and 60 minutes respectively in accordance with:

#### England and Wales

Approved Document B, Table A2

#### Scotland

Technical Standard D2.2, Table 2

#### Northern Ireland

Technical Booklet E, Table 3.2.

### 9 Proximity of flues and appliances

When installing the product in close proximity to certain flue pipes and/or heat-producing appliances, the following provisions to the national Building Regulations are acceptable:

#### England and Wales

Approved Document J

#### Scotland

Technical Standards Part F *Provision deemed to satisfy the standards*

#### Northern Ireland

Technical Booklet L.

## 10 Liquid water penetration

10.1 Normal precautions should be taken during construction to ensure adequate resistance to moisture ingress. Walls built in accordance with this Certificate perform adequately in this respect.

10.2 The use of the product does not alter the normal requirements for a moisture resistant breather membrane in appropriate specifications and situations.

10.3 Ventilation and weep holes should be designed or protected to prevent the ingress of rain.

## 11 Thermal insulation

11.1 For the purpose of U value calculations to determine if the requirements of the Building (or other statutory) Regulations are met, the thermal conductivity ( $\lambda$  value) of the insulation may be taken as  $0.036 \text{ Wm}^{-1}\text{K}^{-1}$ .



11.2 The requirement for limiting heat loss through the building fabric can be satisfied if the effect of thermal bridges is taken into account and the U values of the building elements do not exceed the maximum values in the relevant Elemental Methods given in the national Building Regulations:

### England and Wales

Approved Document L

### Scotland

Technical Standards, Part J

### Northern Ireland

Technical Booklet F.

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

11.4 U values that may be achieved with typical timber frame construction comprising 102 mm brick outer leaf, 50 mm cavity (ventilated), and inner leafs as shown in Figures 2(b) and (c) are given in Table 2.

Table 2 Wall U values

Studding depth type (mm)	U value ( $\text{Wm}^{-2}\text{K}^{-1}$ )	
	proportional area method	combined method
150 Masonite stud	0.22	0.23
170 Masonite stud	0.19	0.20
89 solid timber	0.34	0.35
140 solid timber	0.24	0.25

11.5 The dynamic performance of a structure can be determined by the admittance procedure given in the CIBSE Guide A5 : 1986.

## 12 Condensation and hygrothermal characteristics

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

12.2 It is essential that the continuity of vapour control layers is maintained at laps and joints at wall/ceiling and wall/floor level. Perforations, eg service outlets, etc, should be kept to a minimum and be well sealed and taped. The recommendations of BS 5250 : 1989(1994) should be followed to minimise the risk of condensation within the structure.

### Standard timber panel



12.3 When incorporating a vapour control layer between the studding and the internal lining board, it can be shown from calculations that typical constructions will not suffer from harmful levels of condensation.

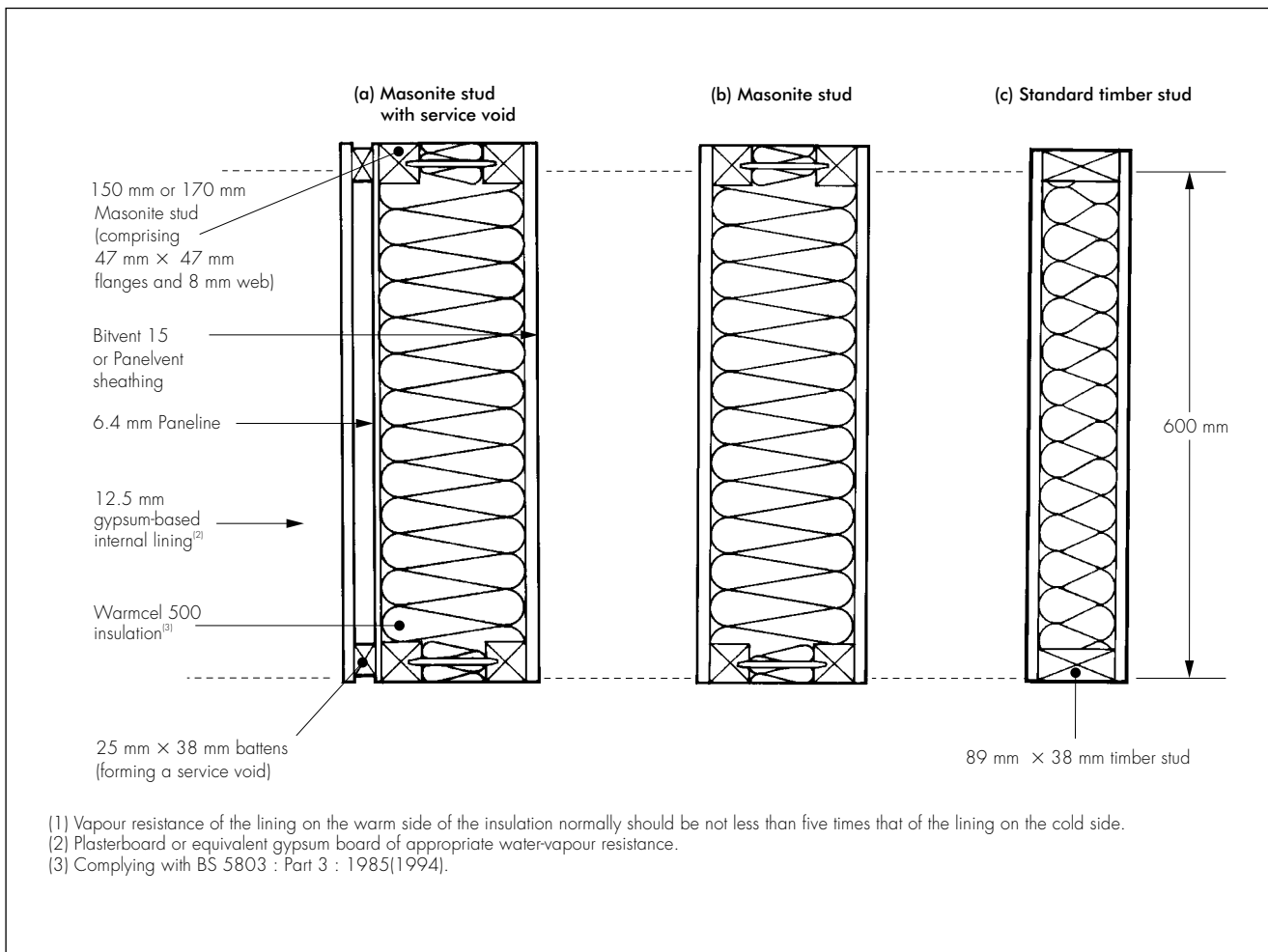
### Breathing wall construction

12.4 It can be shown from calculations that it is feasible to design constructions that rely on the relative vapour resistances of the materials on either side of the insulation to prevent harmful levels of condensation within the structure. It is essential, however, that due provision is made for drainage of the cavity, for ventilation at high and low levels, and over openings. Equivalent minimum open areas of one open perpend per 1.5 m run of wall are recommended.

12.5 An assessment of the risk of interstitial condensation within the structures shown in Figure 1 (including two coats of Drywall Sealer) has been carried out using the methods described in BS 5250 : 1989(1995). An assessment was made of moisture formed within the structures under adverse conditions of temperature and humidity. The data obtained indicate that the constructions will not be adversely affected. Other constructions should be analysed in accordance with BS 5250 : 1989(1995) to determine the risk of interstitial condensation and hence its suitability.

12.6 As with other types of insulation applied within timber frames, there may be a risk of cold bridging from the floors or ceilings. It has been demonstrated that the use of coving at the wall ceiling joint will significantly reduce this problem. Furthermore, provided the U value, calculated along the heat loss path of the abutment, is no greater than  $1.2 \text{ Wm}^{-2}\text{K}^{-1}$ , the effects of cold bridging should be avoided. With most normal designs of timber frame housing the U value at details is unlikely to exceed  $0.8 \text{ Wm}^{-2}\text{K}^{-1}$ .

Figure 1 Wall cross-section<sup>(1)</sup>



## 13 Durability



13.1 The product contains an inorganic biocide to protect it from attack by micro-organisms and, provided it does not become accidentally wetted, may be expected to remain effective as an insulant for a period of the order of 60 years.

13.2 Should any settlement occur after initial installation, it will be minimal and is not expected to significantly affect the thermal performance of the wall in which it is installed. When spray-applied no settlement is expected.

## Installation

### 14 General

14.1 Installation of Warmcel 500 is carried out only by trained operatives, registered and approved by Excel Industries Ltd and in accordance with the relevant requirements of the Warmcel Installation Manual *Timber Frame Walls and Sloping Ceilings*.

14.2 The spray or injection scrim technique is preferred as disturbances to linings are minimised.

For NHBC and Zurich Building Guarantees Technical Standards constructions, only techniques that do not damage the linings may be used.

### 15 Procedure

#### Spray

15.1 Stud faces are checked for projections and all surfaces to be protected are masked.

15.2 The pre-wetted Warmcel 500 is sprayed from a distance of about 1 m to 1.5 m starting from the bottom, working up and building up to thickness in layers.

15.3 When completed, a rotary stud scrubber is run over the wall to remove surplus material and leave a flush finish. Surplus material can be recycled.

15.4 The lining may be applied within 24 hours except in abnormal drying conditions.

#### Injection

15.5 All stud/nogging locations are identified by drawings or stud locators and holes marked out either in the sheathing board or plasterboard lining to ensure all cavities are filled.



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15.6 A 25 mm hole cutter is used and the core retained for making the hole good, using silicone sealant or gypsum-based adhesive as appropriate. For a normal 2.4 m high wall with studs at 0.6 m centres three holes are required at 0.2 m, 1.2 m and 2.2 m from the floor.

15.7 The upper holes are temporarily blocked to prevent fibre escape, the nozzle inserted into the lower hole and insulation blown until the machine stalls.

15.8 When accessing cavities lined with a gypsum fibreboard, a single triangular piece is cut near the top of the cavity large enough to accept the 50 mm hose and cut at 45 degrees with a jigsaw to facilitate its reinstatement with a suitable gypsum-based adhesive. The hose is inserted into the cavity to within 200 mm of the bottom and filling proceeds until the fibre flow rate slows. The hose is withdrawn about 200 mm until the flow rate slows again; the process continues until the cavity is full.

15.9 Any damage to a breather or control layer must be made good.

## Injection — scrim

15.10 Where the internal lining panel has yet to be fitted, a scrim sheet may be used to close the cavity and allow injection. The scrim is cut to length and stapled to the stud and intermediate noggings, ensuring the scrim is kept as tight as possible. The adjacent scrim layer should overlap the first by about 150 mm; taping is not necessary.

15.11 Injection proceeds as described in section 15.8.

15.12 To finish, the internal lining is fitted over the scrim.

## Factory filling — panels

15.13 Panels can be filled and lined in the factory using the Excel AutoFill machine. This Certificate does not cover the use of these panels.

## Technical Investigations

The following is a summary of the technical investigations carried out on Warmcel 500.

### 16 Tests

Tests were carried out to determine thermal conductivity and to assess the product's characteristics.

### 17 Other investigations

17.1 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.

17.2 A visit was made to a site in progress to establish the practicability of installation.

17.3 An examination was made of independent data relating to:

conformity to BS 5803 : Part 3 : 1985(1994)

$\lambda$  value

settlement under vibration

settlement under high humidity

condensation risk analysis

hygrothermal testing (trial wall)

fire resistance to BS 476 : Part 21 : 1987.

17.4 Independent reports on the behaviour and performance of breathing wall constructions were examined in respect of hygrothermal performance.

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

## Additional Information

The management systems of Excel Industries Ltd have been assessed and registered as meeting the requirements of BS EN ISO 9003 : 1994 by BSI Quality Assurance (Certificate No FM 372).

## Bibliography

BS 476 *Fire tests on building materials and structures*

Part 21 : 1987 *Methods for determination of the fire resistance of loadbearing elements of construction*

BS 1142 : 1989 *Specification for fibre building boards*

BS 5250 : 1989(1994) *Code of practice for control of condensation in buildings*

BS 5268 *Structural use of timber*

Part 2 : 1991 *Code of practice for permissible stress design, materials and workmanship*

Part 3 : 1985 *Code of practice for trussed rafter roofs*

Part 6 *Code of practice for timber frame walls*

Section 6.1 : 1988 *Dwellings not exceeding three storeys*

BS 5390 : 1976(1984) *Code of practice for stone masonry*

BS 5803 *Thermal insulation for use in pitched roof spaces in dwellings*

Part 3 : 1985(1994) *Specification for cellulose fibre thermal insulation for application by blowing*

BS EN ISO 9003 : 1994 *Quality systems. Model for quality assurance in final inspection and test*

CIBSE Guide A5 : 1986 *Thermal response of buildings*

## Conditions of Certification

### 18 Conditions

18.1 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) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (d) is copyright of the BBA.

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, shall be construed as 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 fabricating process(es) 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 by the BBA or its agents; and

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

18.4 In granting this Certificate, the BBA makes no representation as to:

- (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 of individual installations of the product, including methods and workmanship.

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, Warmcel 500 is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 94/3027 is accordingly awarded to Excel Industries Ltd.

On behalf of the British Board of Agrément

Date of Third issue: 3rd September 1999

A handwritten signature in black ink, appearing to read 'P. C. Newson', is written over a light grey background.

Chief Executive

*\*Original Certificate issued 6th June 1994. This amended version includes references to updated Building Regulations and associated text, reference to CDM Regulations, a revised thermal conductivity value and reference to Masonite stud constructions, additional fire data, and new Conditions of Certification.*

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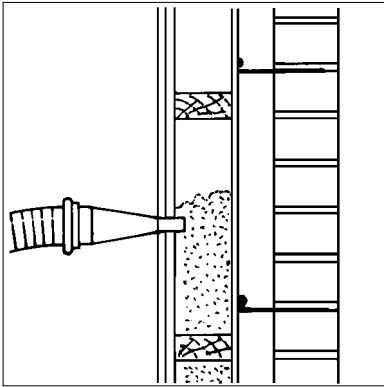
For technical or additional information,  
contact the Certificate holder (see  
front page).  
For information about the Agrément  
Certificate, including validity and  
scope, tel: Hotline 01923 665400,  
or check the BBA website.





**WARMCEL 500**  
**(BBA CERTIFICATE No 94/3027)**  
**IRISH BUILDING REGULATIONS STATEMENT**

Second issue\*



- THIS STATEMENT RELATES TO WARMCEL 500 AND SETS OUT THE OPINION OF THE BBA ON THE POSITION OF THE PRODUCT UNDER THE BUILDING REGULATIONS IN THE REPUBLIC OF IRELAND.
- It must be read in conjunction with BBA Certificate No 94/3027.
- It will remain valid provided BBA Certificate No 94/3027 is valid.

### The Building Regulations 1997–2002 (Ireland)

In the opinion of the BBA, Warmcel 500, if used in accordance with the provisions of Certificate No 94/3027, will satisfy or contribute to satisfying the relevant requirements.

Requirement:	<b>B3(1)</b>	Internal fire spread (structure)
Comment:		Walls filled with the product can meet this Requirement. See section 8.5 of BBA Certificate No 94/3027.
Requirement:	<b>D1</b>	Materials and workmanship
Comment:		The product is a proper material. See sections 13.1 and 13.2 of BBA Certificate No 94/3027.
Requirement:	<b>L1(a)</b>	Conservation of fuel and energy – Dwellings
Comment:		Walls incorporating the product will enable, or contribute to enabling, a wall to meet this Requirement. See sections 11.2 and 11.3 of BBA Certificate No 94/3027.

On behalf of the British Board of Agrément

Date of Second issue: 13th July 2005

Chief Executive

\*Original Statement issued 18th April 2005. This amended version includes a new line drawing.