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Agrément Certificate
02/3897
Product Sheet 2

UNILIN STRUCTURAL INSULATED PANELS

UNISPAN MW, UNISPAN PIR AND UNISPAN HPIR ROOF PANELS

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Unispan MW, Unispan PIR and Unispan HPIR Roof Panels, a range of structural roof panels manufactured from two layers of wood- or mineral-based boards with a core of mineral wool or rigid polyurethane insulation.

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

Strength and stability — the products have sufficient strength and stiffness to sustain the design loads (see section 5).

Behaviour in relation to fire — the external fire rating of a roof construction incorporating the panels will depend on the panel type used and the specification of the roof covering (see section 6).

Weathertightness — the panels, with the requisite correctly-installed roof covering, will be adequately weathertight (see section 7).

Condensation — the panels can adequately limit the risk of interstitial and surface condensation (see section 8).

Thermal performance — the products can satisfy or contribute to satisfying the relevant thermal resistance requirements (see section 9).

Airtightness — the panels, when installed properly, can adequately limit air leakage (see section 10).

Durability — the panels will have adequate durability provided the roof covering is kept in good repair and they are protected from recurring dampness or condensation (see section 12).

The BBA has awarded this Agrément Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Brian Chamberlain

Head of Approvals — Engineering

Greg Cooper

Chief Executive

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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, Unispan MW, Unispan PIR and Unispan HPIR Roof Panels, 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 2010 (England and Wales)

Requirement: A1	Loading
Comment:	The products have sufficient strength and stiffness to sustain the design loads in accordance with sections 5.1 to 5.8 of this Certificate.
Requirement: B2	Internal fire spread (linings)
Comment:	The products, with the requisite lining, can meet this Requirement. See sections 6.1 to 6.5 of this Certificate.
Requirement: C2(b)	Resistance to moisture
Comment:	The products, when used with a proper roof covering, will resist the passage of moisture to the inside of the building. See sections 7.1 and 7.2 of this Certificate.
Requirement: C2(c)	Resistance to moisture
Comment:	The products can adequately limit the risk of interstitial and surface condensation. See sections 8.1 to 8.4 of this Certificate.
Requirement: L1(a)(i)	Conservation of fuel and power
Comment:	The products can satisfy or contribute to satisfying the relevant requirements. See sections 9.1 to 9.5, 10.1 and 10.2 of this Certificate.
Requirement: Regulation 7	Materials and workmanship
Comment:	The products are acceptable. See sections 12.1 to 12.3 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)(2)	Fitness and durability of materials and workmanship
Comment:	The use of the products satisfies the requirements of this Regulation. See sections 11, 12.1 and 12.3 and the <i>Installation</i> part of this Certificate.
Regulation: 9	Building standards — construction
Standard: 1.1(a)(b)	Structure
Comment:	The products have the required strength and stiffness, as detailed in clause 1.1.1 ⁽¹⁾⁽²⁾ of this Standard, when designed in accordance with sections 5.1 to 5.8 of this Certificate.
Standard: 2.5	Internal linings
Comment:	The products, with the requisite lining, can meet the requirements of clause 2.5.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 6.1 and 6.5 of this Certificate.
Standard: 3.10	Precipitation
Comment:	The products, when used with the requisite roof covering, will resist the passage of moisture to the inside of the building, in accordance with clause 3.10.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 7.1 and 7.2 of this Certificate.
Standard: 3.15	Condensation
Comment:	The panels can adequately limit the risk of interstitial and surface condensation, in accordance with clauses 3.15.1 ⁽¹⁾ and 3.15.4 ⁽¹⁾ to 3.15.7 ⁽¹⁾ of the Standard. See sections 8.1 to 8.4 of this Certificate.
Standard: 6.1(b)	Carbon dioxide emissions
Standard: 6.2	Building insulation envelope
Comment:	The panels can satisfy, or contribute to satisfying, the relevant requirements of clauses 6.1.1 ⁽¹⁾ , 6.1.2 ⁽²⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽¹⁾⁽²⁾ and 6.2.5 ⁽²⁾ of this Standard. See sections 9.1 to 9.5, 10.1 and 10.3 of this Certificate. (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 products are acceptable. See sections 12.1 and 12.3 and the <i>Installation</i> part of this Certificate.
Regulation: B3(2)	Suitability of certain materials
Comment:	The products are acceptable. See section 11 of this Certificate.
Regulation: C4(b)	Resistance to ground moisture and weather
Comment:	The panels, when used with the requisite roof covering, will resist the passage of moisture to the inside of the building. See sections 7.1 and 7.2 of this Certificate.
Regulation: C5	Condensation
Comment:	The panels can adequately limit the risk of interstitial condensation. See sections 8.1 to 8.3 of this Certificate.
Regulation: D1	Stability
Comment:	The products have sufficient strength and stiffness to sustain the design loads in accordance with sections 5.1 to 5.8 of this Certificate.

Regulation:	E3(a)	Internal fire spread – Linings
Comment:		The panels, with the requisite lining, can meet this Requirement. See sections 6.1 to 6.5 of this Certificate.
Regulation:	F2(a)(i)	Conservation measures
Comment:		The panels can satisfy or contribute to satisfying the relevant requirements. See sections 9.1 to 9.5, 10.1 and 10.4 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: 2 *Delivery and site handling* (2.2 and 2.3) of this Certificate.

Non-regulatory Information

NHBC Standards 2011

NHBC accepts the use of Unispan MW, Unispan PIR and Unispan HPIR Roof Panels, when installed and used in accordance with this Certificate, in relation to *NHBC Standards, Part 7 Roofs, Chapters 7.1 Flat roofs and balconies and 7.2 Pitched roofs*.

General

Unispan MW, Unispan PIR and Unispan HPIR Roof Panels are suitable for use in roof constructions.

It is essential that constructions incorporating the panels are designed in accordance with the Certificate holder's recommendations. All design aspects of the construction should be checked by a suitably qualified engineer.

Installation should be carried out by contractors approved by the Certificate holder.

This Certificate is a Confirmation of a Belgian Agrément ATG 10/2538 issued by Union Belge pour l'Agrément technique dans la construction (UBAtc) to Unilin bvba – divisie SYSTEMS, Waregemstraat 112, B 8792 Desselgem (Belgium).

Technical Specification

1 Description

1.1 Unispan MW, Unispan PIR and Unispan HPIR Roof Panels are structural insulated roof panels comprising an insulated core glued between internal (ceiling) and external boards. Details of the product range are given in Table 1 and Figures 1 to 3.

Table 1 Unispan MW, Unispan PIR and Unispan HPIR Panels – product details⁽¹⁾

Component	Unispan MW	Unispan PIR and HPIR
Internal (ceiling) board	Moisture-resistant OSB, water-resistant plywood, plain and white-painted water-resistant chipboard, gypsum fibreboard or moisture-resistant plasterboard (for thicknesses see Table 2)	Moisture-resistant OSB, water-resistant plywood, plain and white-painted water-resistant chipboard, gypsum fibreboard or moisture-resistant plasterboard (for thicknesses see Table 2)
Core	Mineral wool insulation laid between additional integral rafters ⁽²⁾	Polyisocyanurate foam incorporating integral vapour barrier
External board	Moisture-resistant OSB, water-resistant plywood, water-resistant chipboard (for thicknesses see Table 2)	Moisture-resistant OSB, water-resistant plywood, water-resistant chipboard (for thicknesses see Table 2)
Standard width (mm)	1200	1200
Width tolerance (mm)	±3	±3
Standard length (mm)	2000-8000 ⁽³⁾	2000-8000 ⁽³⁾
Length tolerance (mm)	±10	±10
Thickness tolerance (mm)	±5	±5

(1) All panels are available with optional counter battens fixed along the length of the external face

(2) Panels are available with an additional vapour barrier at the inner facing of the insulation for use in high humidity applications

(3) Maximum length for boards with the optional white painted chipboard inner facing is 6650 mm.

Figure 1 Unispan MW panel



Figure 2 Unispan PIR panel



Figure 3 Unispan HPIR panel



1.2 The boards used in the panels have the following specifications:

- plywood — birch or softwood with class 2 or class exterior bonding to BS EN 636 : 2003 and CE marked to BS EN 13986 : 2004
- chipboard — types 3 and 5 in accordance with BS EN 312 : 2010 and CE marked to BS EN 13986 : 2004 (type 3 is only used as an internal board in panels with ribs)
- OSB — type 3 in accordance with BS EN 300 : 2006 and CE marked to BS EN 13986 : 2004
- plasterboard — type H2 in accordance with BS EN 520 : 2004
- gypsum fibreboard — strength and stiffness in accordance with CUAP 05.04/04.

1.3 The insulation cores used in the panels have the following specifications:

- mineral wool — nominal density $35 \text{ kg}\cdot\text{m}^{-3}$, aluminium foil coated on the inner side and with thickness dependent on the type of panel
- polyisocyanurate foam — nominal density $30 \text{ kg}\cdot\text{m}^{-3}$, aluminium foil coated on the inner side (PIR) or on both sides (HPIR) and with thickness dependent on the type of panel.

1.4 Rafters used in the panels are made of softwood with structural strength class C24 in accordance with BS EN 338 : 2009, and come in thicknesses of 21 mm, 24 mm and 30 mm, with length and height dependent on the panel size. Planed side tolerances are ± 2 mm on width and height. The rafters are finger jointed and the outer ones have a slot cut into them along the length of their outer face. The outer sides may be post-treated to resist mould and insect infestation (for further information and guidance, the Certificate holder should be consulted).

1.5 Counter battens have nominal sizes of 20 mm x 30 mm, 15 mm x 40 mm and 20 mm x 40 mm and are treated against mould and insect infestation (for further information and guidance, the Certificate holder should be consulted).

1.6 Ancillary components used in conjunction with the panels in a typical installation include:

- particleboard battens for joining PIR panels which do not incorporate rafters
- PVC profiles for covering longitudinal joints on white-painted chipboard panels
- single component, type 1, polyurethane adhesive to BS EN 15425 : 2008 for joining boards to rafters or insulation to boards
- type 1 MUF glue to BS EN 301 : 2006 for joining boards to each other
- foil made from paper or paper/metal polyethylene for covering the bottom surface of the panels.

1.7 Ancillary components for use with the panels but outside the scope of this Certificate include:

- galvanized (6 µm) 6 mm diameter wood screws or 5.6 mm diameter ring shank nails (length determined by rafter height/insulation thickness) for fixing the panels to the roof substructure
- single component polyurethane foam supplied in containers for filling longitudinal joints when the temperature exceeds 5°C
- cold-applied bitumen mastic (eg Platicol from *Deitermann* or Mexcoat from *Shell*) for filling cross joints.

1.8 The complete range of available panels is shown in Table 2.

Internal board		External board								
		Chipboard				Plywood		OSB		
		8 mm	12 mm	18 mm	22 mm	12 mm	18 mm	12 mm	15 mm	18 mm
Chipboard	8 mm	A,B	A,B,C	A,B,C	A,B,C	A,B,C	A,C	A,B,C	C	A,B,C
	12 mm	A,B	A,B,C	A,B,C	A,B,C	A,B,C	A,C	A,B,C	C	A,B,C
	18 mm	A	A,B,C	A,B,C	A,B,C	A,B,C	A,C	C	C	A,B,C
	19 mm	A,B	C	C	C	C	A,C	A,B,C	C	C
	22 mm	-	A,B,C	A,B,C	A,B,C	A,B,C	A,C	-	C	A,B,C
Plywood	9 mm	-	C	C	C	C	C	C	C	C
	12 mm	A,B	A,B,C	A,B,C	A,B,C	A,B,C	A,B,C	A,B,C	A,B,C	A,B,C
OSB	18 mm	-	A,C	A,C	A,C	A,C	A,C	A,C	A,C	A,C
	12 mm	A,B	A,B,C	A,B,C	A,B,C	A,B,C	A,B,C	A,B,C	C	A,B,C
	15 mm	-	C	C	C	C	C	C	C	C
Gypsum fibreboard	18 mm	A,B	A,B,C	A,B,C	A,B,C	A,B,C	A,C	A,B,C	C	A,B,C
	12 mm	A,B	A,B,C	A,B,C	A,B,C	A,B,C	A,C	A,B,C	C	A,B,C
Plaster-board	15 mm	-	C	C	C	C	C	C	C	C
	10 mm	A	A	A	A	A	A	A	-	A
	13 mm	A	A	A	A	A	A	A	-	A
	18 mm	A	A	A	A	A	A	A	-	A

KEY (ALL DIMENSIONS IN MM):

ID	PANEL TYPE	WIDTH	INSULATION THICKNESS	RAFTER THICKNESS
A	HPIR	600-1200	50-205	-
B	PIR	1225 with two rafters	50-160	21 x 85-160 max 24 x 98-170 max
C	MW	810 with 3 rafters	60-215	21 x 58-160 24 x 98-170 30 x 98-215

1.9 Quality control checks are carried out on the incoming material and throughout the production process, including checks on rafter quality and moisture content, uniformity of glue spread and thickness and properties of insulation.

2 Delivery and site handling

2.1 The panels are protected by a waterproof covering during transportation.

2.2 Panels should be stored flat in an enclosed, dry building, and should be supported on timber bearers at a maximum of 1 m centres. Where temporary storage outside cannot be avoided, the panels should be covered with polyethylene or tarpaulin sheet and be kept well clear of the ground. It is recommended that the panels are separated to allow free circulation of air. Prolonged storage on site should be avoided.

2.3 The panels can withstand normal site handling and usage. Damaged panels which cannot be repaired easily or effectively must not be used.

2.4 Each panel bears the BBA identification mark incorporating the number of this Certificate.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Unispan MW, Unispan PIR and Unispan HPIR Roof Panels.

Design Considerations

3 General

3.1 Unispan MW, Unispan PIR and Unispan HPIR Roof Panels are satisfactory for use in buildings as an insulating, structural support for roofs with pitches from 15° to 60° and where access is limited to maintenance and repair only.

3.2 Weatherproofing systems applied to the panels should comply with the requirements of the relevant Standards, although other, non-standard systems may also be used. Weatherproofing systems used with the panels are outside the scope of this Certificate.

3.3 Where buildings need to comply with the NHBC Standards, specifiers should observe the requirements laid down therein.

3.4 The structural, fire and hygrothermal design and detailing of roofs incorporating the panels must be carried out by suitably qualified persons in accordance with UK building practice and the relevant Building Regulations.

4 Practicability of installation

The products should only be installed by installers who have been trained and approved by the Certificate holder.

5 Strength and stability



5.1 The panels will have adequate strength and stiffness to sustain the anticipated loads when designed, installed and used in accordance with the provisions of this Certificate.

5.2 Design of the installation should be checked by a suitably qualified engineer in accordance with BS EN 1995-1-1 : 2004 and for a given loading, the flexural strength of roof panels may be checked using the principles outlined in EOTA Technical Report TR 019.

5.3 Dead loads should be calculated from the unit weights given in BS 648 : 1964 or from the actual weights of the materials used. Imposed loads should be estimated in accordance with the recommendations of BS EN 1991-1-1 : 2002. Imposed snow loads should be calculated in accordance with BS EN 1991-1-3 : 2003 and wind loads should be calculated in accordance with BS EN 1991-1-4 : 2005.

5.4 The required mechanical properties for wood and wood-based products taken from the relevant Standards are listed below, and for plywood and gypsum boards are given in Table 3:

- solid timber — strength class C24 to BS EN 338 : 2009
- plywood — strength class F10 to BS EN 12369-2 : 2004
- particleboard — Type 5 to BS EN 12369-1 : 2001
- OSB — Type 3 to BS EN 12369-1 : 2001.

Table 3 Mechanical properties ($N \cdot mm^{-2}$) — plywood and gypsum boards

Property	Plywood 12 or 15 mm (along grain)	Plywood 12 mm (across grain)	Birch-faced plywood 9 mm	Gypsum fibreboard	Gypsum plasterboard
$E_{t,c \text{ mean}}$	6000	5000	6000	3800	2800
$f_{m,k}$	10.0	5.7	10.0	2.8	1.2
$f_{t,k}$	5.0	3.5	6.4	1.7	1.2
$f_{c,k}$	7.0	6.3	8.2	5.9	3.8
$f_{y,k}$	3.5	3.5	7.0	1.7	0.9
$f_{r,k}$	0.6	0.6	1.7	1.7	0.9

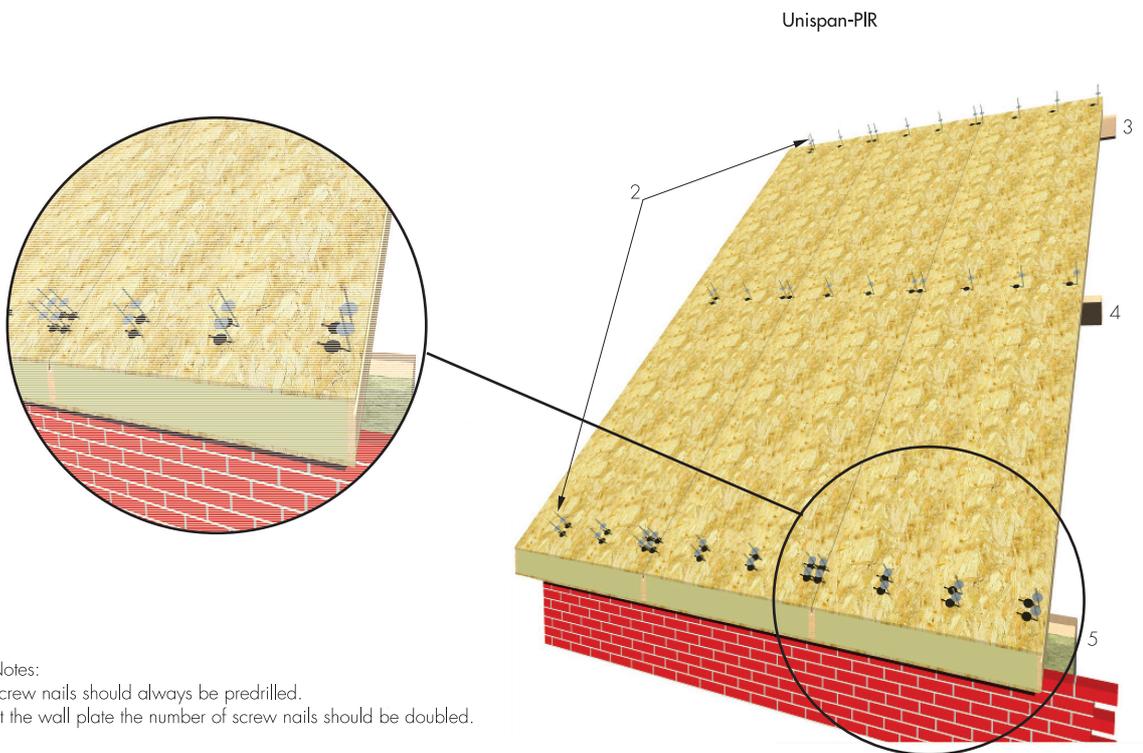
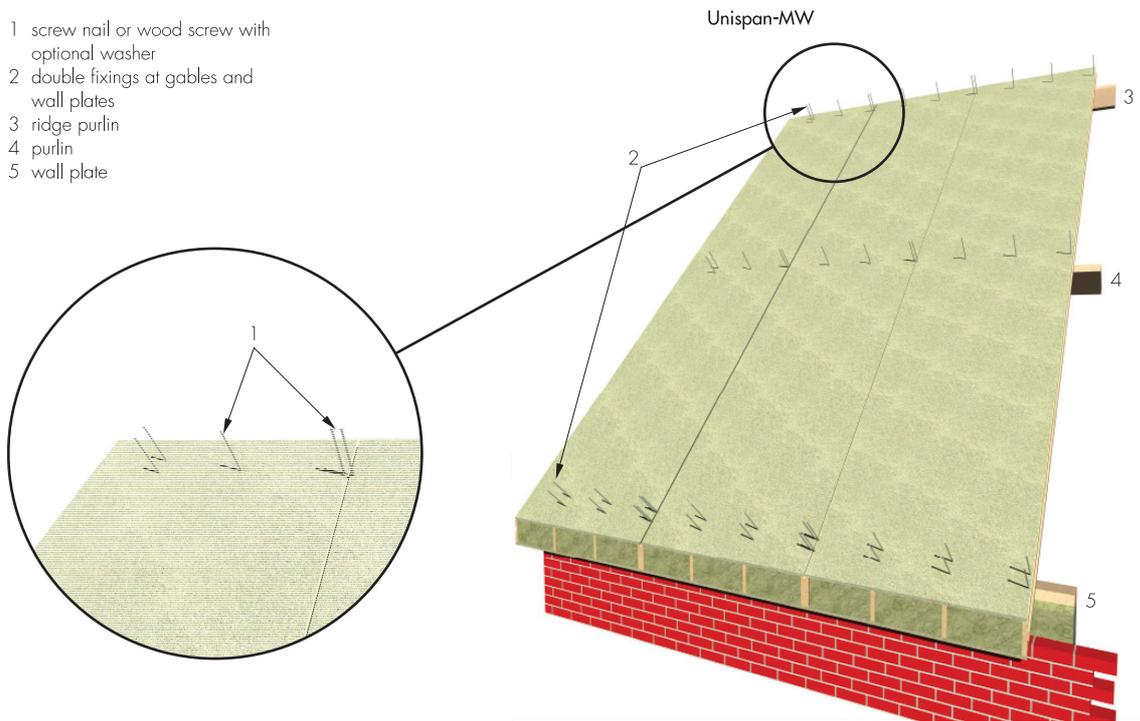
5.5 Material factors (γ_M), modification factors (k_{mod}) and deformation factors (k_{def}) for the timber rafters and the panel face board should be taken from BS EN 1995-1-1 : 2004, Section 3.

5.6 Guidance on the maximum allowed deflection for the serviceability limit state can be found in BS EN 1995-1-1 : 2004, Section 7.2 and NA to BS EN 1995-1-1 : 2004, Table NA.4.

5.7 The panels are attached to the substructure by means of ring-shank nails or wood screws, as detailed in Figure 4. The fixings may be located at a rafter, adjacent to the rafter, or between rafters, as appropriate. The connections should be designed in accordance with BS EN 1995-1-1 : 2004 using pull-through values as shown in Table 4. Further guidance on fixings may be obtained from the Certificate holder.

Figure 4 Typical fixing to substructure — detail

- 1 screw nail or wood screw with optional washer
- 2 double fixings at gables and wall plates
- 3 ridge purlin
- 4 purlin
- 5 wall plate



Notes:
Screw nails should always be predrilled.
At the wall plate the number of screw nails should be doubled.

Table 4 Fixings — pull-through values⁽¹⁾ (N)

Board type and thickness	Fixing type and diameter		
	Ring-shank nail (diameter 4.2 mm)	Ring-shank nail (diameter 5.6 mm)	Wood screw (diameter 6 mm)
Plywood 12 mm	1500	1800	4160
Particleboard 8 mm	900	1000	4160
Particleboard 12 mm	1400	1600	4160
OSB 12 mm	1400	1600	4160
Gypsum fibreboard 12 mm	700	800	4160
Gypsum plasterboard 13 mm	500	600	4160

(1) Values include a safety factor of 2.2

5.8 Transverse joints (perpendicular to span) between roof panels should be avoided if possible. Where used, they should be supported on battens by a minimum bearing 70 mm.

6 Behaviour in relation to fire



6.1 The external fire rating of a roof incorporating the panels will depend on the panel type used and the specification of the roof covering.



6.2 Gypsum plasterboard and fibre-reinforced plasterboard may be regarded as having a Class 1 surface spread of flame and fire reaction class A2-s1, d0 to BS EN 13501-1 : 2007.

6.3 Particleboard, white-painted particleboard, plywood and OSB can be regarded as having a Class 3 surface spread of flame rating. Hence, building regulations limit their use in residential buildings to an area of 4 m² without additional protection. To comply with regulations in such cases, application of a suitable treatment to provide a Class 1 surface will be required.

6.4 Where necessary, cavity barriers should be incorporated as required by the relevant building regulations. Where the roof panels carry over between dwellings, suitable barriers must be installed over any cavity.



6.5 The OSB panel skins can be regarded as having a Class 3⁽¹⁾ surface spread of flame designation.

(1) 'High risk' in Scotland.

6.6 In situations where the internal side of the panel has been covered by a plasterboard lining, the reaction to fire classification of the plasterboard can be determined without further testing in accordance with BS EN 520 : 2004, Annex B.

7 Weathertightness



7.1 The long-term weathertightness of a roof constructed using the panels will depend upon the performance of the roof finish to be used. If required, the panels can be used in conjunction with an underlay.

7.2 It is important to ensure that the joints between the panels are adequately sealed. The roof finish should be installed as soon as possible after installation of the panels and they should be protected from rain and should be dry when the roof finish is applied.

7.3 The performance of roof windows installed within the panels is outside the scope of this Certificate.

8 Condensation risk



8.1 Calculations in accordance with BS 5250 : 2002 show that, for conventional tiled roofs with a well-ventilated external cavity, the risk of interstitial condensation under normal domestic or commercial use (humidity classes 1 to 4) does not arise, provided the panels are sealed to each other and the surrounding structure as detailed in sections 15.5 to 15.7, and the underlay, if used, has a vapour resistance of <math><1 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}</math>.

8.2 Where conditions differ to those given in section 8.1, a suitably positioned vapour control layer should be used unless a condensation risk assessment in accordance with BS 5250 : 2002 shows it not to be necessary.

8.3 The risk of interstitial condensation is greatest when the building is drying out after construction. Guidance on preventing condensation from this and other sources is given in the BRE Digest 369 *Interstitial condensation and fabric degradation* and BRE Report (BR 262) *Thermal insulation : Avoiding risks*.



8.4 Calculations in accordance with BS 5250 : 2002 show that the risk of surface condensation under normal domestic or commercial use (humidity classes 1 to 4) does not arise. Where high humidities may be expected (humidity class 5), project specific calculations relating to the internal relative humidity and the internal and external temperatures should be carried out.

9 Thermal properties



9.1 The thermal performance of each building incorporating the panels must be evaluated in accordance with the relevant national Building Regulations.

9.2 Calculations of thermal transmittance (U value) for a particular roof construction can be carried out in accordance with BS EN ISO 6946 : 2007 and BRE report (BR 443 : 2006) *Conventions for U-value calculations*. The following thermal conductivities ($W \cdot m^{-1} \cdot K^{-1}$) may be used to conduct a 'combined method' calculation:

- plywood, particleboard and OSB 0.120
- mineral wool insulation (MW) 0.037
- polyurethane insulation (PIR) 0.026
- polyurethane insulation (HPIR) 0.023

9.3 The overall U value will depend on the construction adopted. Typical design U values can be found in Tables 5, 6 and 7.

9.4 Junctions with other elements should be designed to limit heat loss. Detailed 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, or Accredited Construction Details (version 1.0)

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

Table 5 Typical design U values — England and Wales⁽¹⁾

Construction	U Value ($W \cdot m^{-2} \cdot K^{-1}$)
Notional dwelling	0.16
Existing building – new, replaced, renovated or retained roof	0.18
Notional non-domestic building	0.18
Dwelling new-build limit	0.20
Non-domestic new-build limit	0.25

(1) Flexible approaches on existing building are given in the Approved Documents.

Table 6 Typical design U values — Scotland⁽¹⁾

Construction	U Value ($W \cdot m^{-2} \cdot K^{-1}$)
Notional dwelling	0.13
New dwelling simplified method	0.13
Conversion unheated building (into dwellings)	0.15
Extension to dwelling	0.15
New non-dwellings limit for shell and fit-out	0.15
Conversion of unheated building	0.15
Non-domestic extension, alterations and reconstructions	0.15
Notional non-dwelling (pitched roof)	0.16
Alterations and reconstructions to a dwelling	0.18
Stand alone building <50 m ² to a dwelling	0.18
New dwelling limit	0.18
New non-domestic limit	0.20
Conversion of heated building	0.25
Notional non-dwelling	0.25

(1) Flexible approaches on existing buildings are given in the Technical Handbooks.

Table 7 Typical design U values — Northern Ireland⁽¹⁾

Construction	U Value ($W \cdot m^{-2} \cdot K^{-1}$)
Notional dwelling	0.16
Existing building – new roof	0.20
Building new-build limit	0.25
Notional non-domestic building	0.25
Existing building – replaced, renovated or retained roof	0.25

(1) Flexible approaches on existing buildings are given in the Technical Booklets.

9.5 Junctions constructed from the panels can adequately limit heat loss by conduction and, when installed to limit air infiltration (see section 10.1), comply with the requirements of *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings* TSO 2002, and the relevant Accredited Construction Details. The relevant default psi values quoted in BRE Information Paper IP 1/06, therefore, may be used in calculations for these junctions.

10 Airtightness



10.1 To minimise air leakage, the panels must be installed and sealed at all joints, junctions and penetrations in accordance with the Certificate holder's recommendations.



10.2 Completed buildings in England and Wales are subject to pre-completion testing for airtightness in accordance with the requirements of Approved Documents L1A and L2A, Section 20B.



10.3 Completed buildings in Scotland are only subject to pre-completion airtightness testing if the target air permeability of the proposed building is less than $10 \text{ m}^3 \cdot \text{h}^{-1} \cdot \text{m}^{-2}$, or if the figure is between $10 \text{ m}^3 \cdot \text{h}^{-1} \cdot \text{m}^{-2}$ and $15 \text{ m}^3 \cdot \text{h}^{-1} \cdot \text{m}^{-2}$ and the designer does not wish to use the $15 \text{ m}^3 \cdot \text{h}^{-1} \cdot \text{m}^{-2}$ default figure in the proposed building, in accordance with Mandatory Standard 6.2, clauses 6.2.5⁽¹⁾ and 6.2.6⁽²⁾.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



10.4 In Northern Ireland, completed buildings are subjected to pre-completion testing for airtightness in accordance with the requirements of Technical Booklets F1, sections 2.46 to 2.54, and F2, sections 2.57 to 2.61.

11 Maintenance



As they are confined beneath the roof covering, maintenance of the panels is not required provided the roof covering is maintained in good repair and kept weathertight.

12 Durability



12.1 The timber rafters are treated with a boron-based preservative to meet the requirements of BS EN 335-1 : 2006 and, therefore, are suitable for use in roof spaces in areas where the House Longhorn beetle (*Hylotrupes bajulus* L) is active, as defined in the Approved Document to Regulation 7 : 1992, Table 1, of the Building Regulations (England and Wales) 1991. Proposals are under consideration to revise Approved Document A with regard to the areas where the House Longhorn beetle is active. In the interim, Approved Document to Regulation 7 : 1992, Table 1, remains valid.



12.2 The timber ribs are not preservative treated and therefore are not suitable for use in roof spaces in areas where the House Longhorn beetle (*Hylotrupes bajulus* L) is active.



12.3 The panels will have adequate durability provided they are not exposed to repeated condensation and the roof covering is installed in accordance with BS 5534 : 2003 and is kept in good repair. The underside of the panels should be protected against dampness at the eaves and gable projections by such measures as painting, boarding or panelling.

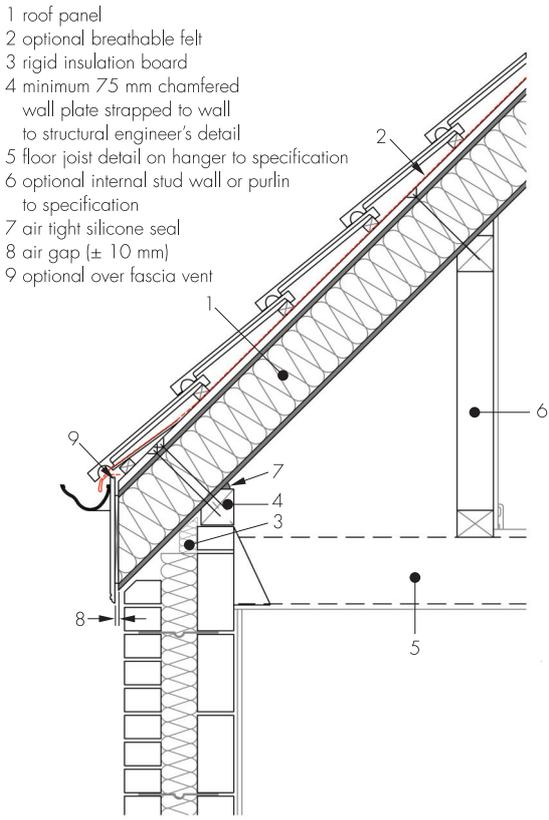
12.4 Timber used in areas that could be at risk, eg screed rails, should be preservative-treated in accordance with the recommendations given in BS 1282 : 1999.

Installation

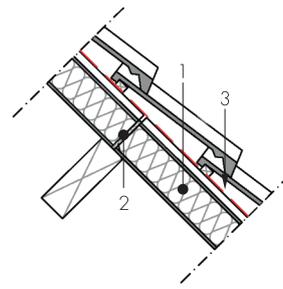
13 General

13.1 Unispan MW, Unispan PIR and Unispan HPIR Roof Panels should be fitted by specialist roof contractors approved by Unilin. The company's technical literature contains recommendations for the installation of the roof panels. Typical installation details are shown in Figure 5.

Figure 5 Typical installation details

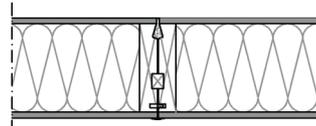


eaves detail

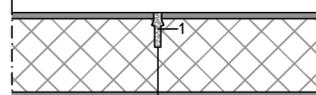


finishing of cross joints (horizontal)

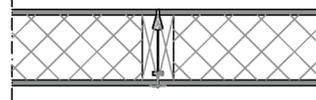
Unispan MW range



Unispan PIR range without rafter



with rafter



finishing of longitudinal joints (vertical)

- 1 roof panel
- 2 PU foam
- 3 mandatory breathable felt

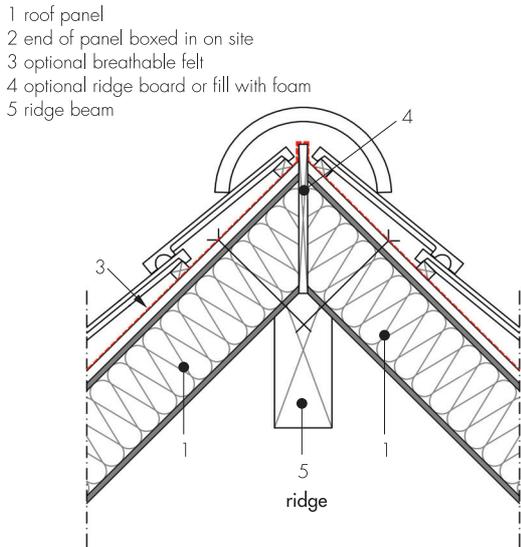
- 1 PU foam
- 2 timber fillet
- 3 finishing (white PVC profile)



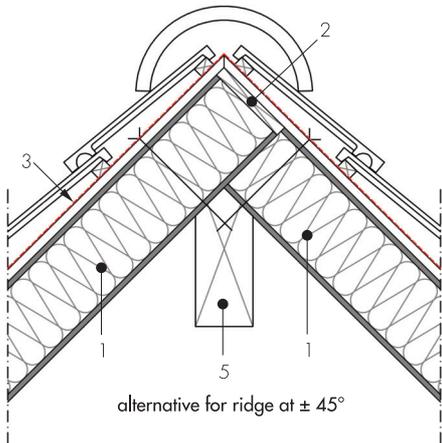
with chamfered edges



with chamfered edges



ridge

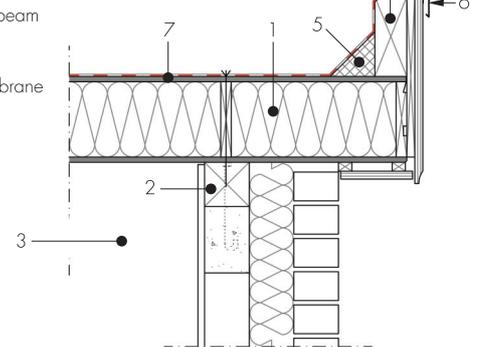


alternative for ridge at $\pm 45^\circ$

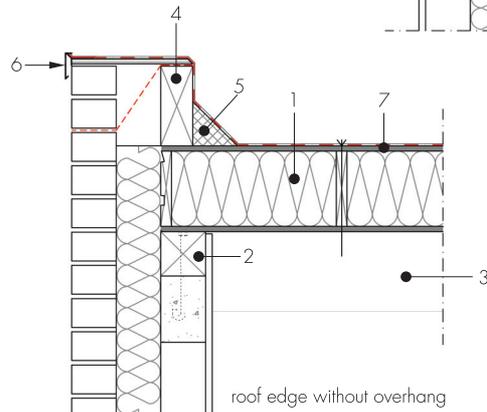
ridge detail

- 1 roof panel for flat roofs
- 2 wall plate
- 3 purlin
- 4 upstand edge beam
- 5 chamfer
- 6 roof edge trim
- 7 single ply membrane

roof edge with overhang



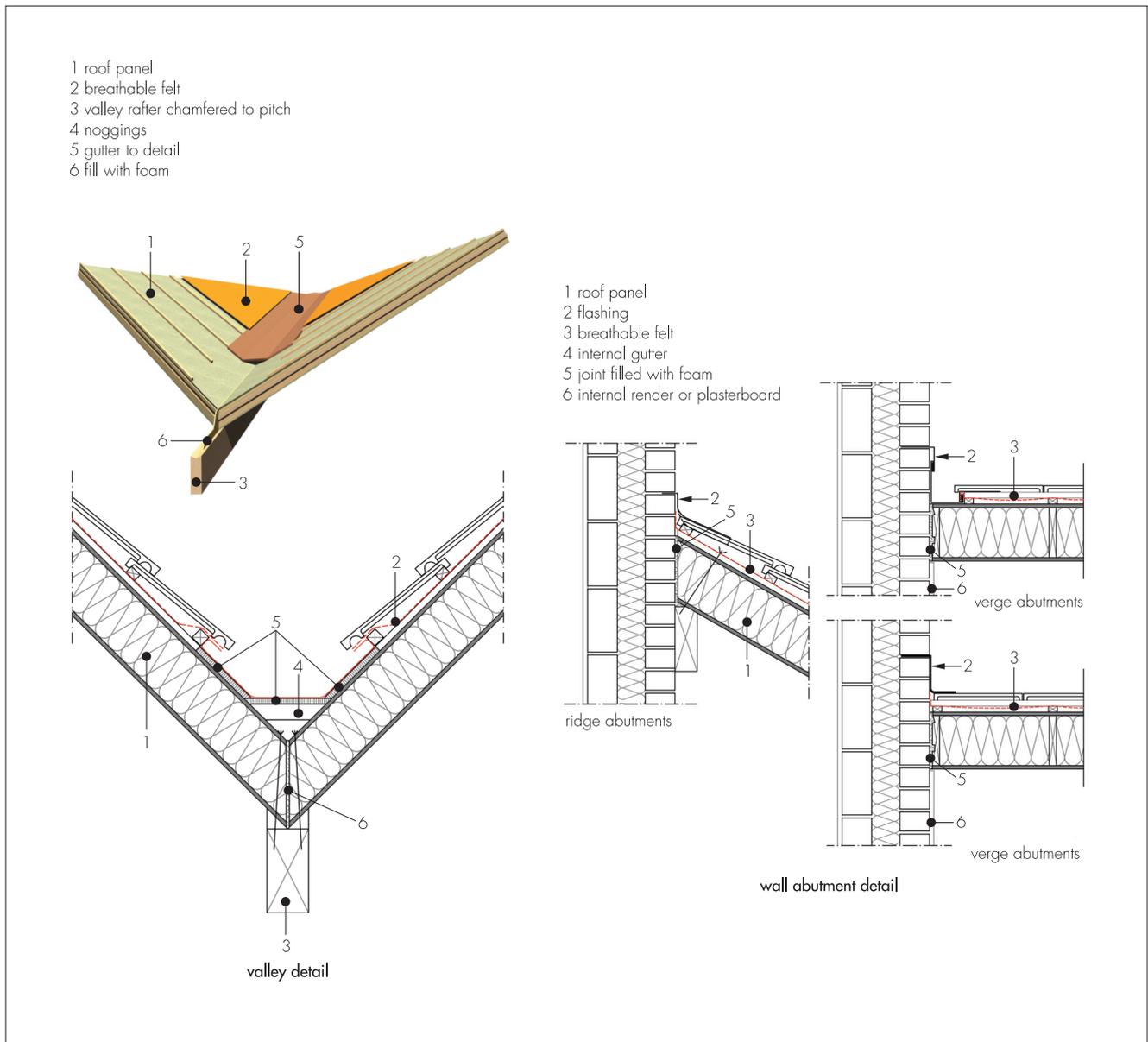
3



roof edge without overhang

verge detail

Figure 5 Typical installation details (continued)



13.2 The number and centres of the fixings are found by calculation (see section 5).

13.3 Each roof panel must have a minimum bearing of 30 mm at each support. At transversal joints (perpendicular to span) the minimum bearing of the support must be 70 mm.

13.4 The panels may be cut on site using a power saw. The minimum and maximum width of a sawn panel is 300 mm and 600 mm respectively. The sawn edge of the panel should be laid near the gable wall, and supported by a 38 mm by 50 mm timber rib.

13.5 For standard panels, holes with a diameter up to 300 mm are permitted without additional support. The edges of holes with diameters greater than 300 mm should be supported by additional timber ribs. Appropriate steps should be taken to weatherproof any penetration.

14 Preparation

14.1 Before starting installation, it should be ensured that all the support structure is in place and correctly secured.

14.2 String lines can be set out to assist in aligning the panels to the required overhangs.

15 Procedure

15.1 A wall plate is fixed onto the top of the head plate with the top angled to suit the pitch of the roof.

15.2 Roof panels are positioned working from one gable wall to the other. The first panel is secured to the support structure by the appropriate number and type of fixings.

15.3 The next panel is butted against the first and fastened to the support structure with appropriate fasteners. Subsequent panels are fastened to complete the roof. Typical ridge and eaves details are shown in Figure 5.

15.4 The last panel should be trimmed lengthways and secured. If necessary, panels can be butt jointed end to end over a support.

15.5 When the installation is complete, the joints must be sealed. Vertical joints are sealed on the top surface using the appropriate foam. Excess amounts must be trimmed.

15.6 The panels are joined internally using a plastic covering section fitting into the grooves of the longitudinal ribs (see section 1.4).

15.7 Panel joints along the ridges, hips, valleys and joints to the surrounding structure, e.g. walls, must also be sealed with the appropriate foam.

15.8 The roof structure must be protected from moisture by making all the joints waterproof as soon as possible and applying the roof covering soon afterwards.

15.9 Battens, roof coverings and underlay (if necessary), are laid in the traditional manner to provide the final roof finish and the primary weatherproof layer.

Technical Investigations

16 Investigations

An assessment was made under Belgian Agrément Certification of:

- the products' ability to comply with the requirements of BS EN 1995-1-1 : 2004
- thermal performance, leakage and condensation risk
- behaviour in relation to fire
- practicability of installation, maintenance and repair procedures
- durability.

Bibliography

- BS 648 : 1964 *Schedule of weights of building materials*
- BS 1282 : 1999 *Wood preservatives — Guidance on choice, use and application*
- BS 5250 : 2002 *Code of practice for control of condensation in buildings*
- BS 5534 : 2003 *Code of practice for slating and tiling (including shingles)*
- BS EN 300 : 2006 *Oriented Strand Boards (OSB) — Definitions, classification and specifications*
- BS EN 301 : 2006 *Adhesives, phenolic and aminoplastic, for load-bearing timber structures: Classification and performance requirements*
- BS EN 312 : 2010 *Particleboards — Specifications*
- BS EN 335-1 : 2006 *Durability of wood and wood-based products — Definition of use classes — General*
- BS EN 338 : 2009 *Structural timber — Strength classes*
- BS EN 520 : 2004 *Gypsum plasterboards — Definitions, requirements and test methods*
- BS EN 636 : 2003 *Plywood— Specifications*
- BS EN 1991-1-1 : 2002 *Eurocode 1 : Actions on structures — General actions— Densities, self-weight, imposed loads for buildings*
- BS EN 1991-1-3 : 2003 *Eurocode 1 : Actions on structures — General actions — Snow loads*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- BS EN 1995-1-1 : 2004 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*
- NA to BS EN 1995-1-1 : 2004 *UK National Annex to Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*
- BS EN 12369-1 : 2001 *Wood-based panels — Characteristic values for structural design : OSB, particleboards and fibreboards*
- BS EN 12369-2 : 2004 *Wood-based panels — Characteristic values for structural design — Plywood*
- BS EN 13501-1 : 2007 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*
- BS EN 13986 : 2004 *Wood-based panels for use in construction — Characteristics, evaluation of conformity and marking*
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- BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings*
- BRE report (BR 262 : 2002) *Thermal insulation: avoiding risks*
- BRE report (BR 443 : 2006) *Conventions for U-value calculations*
- EOTA Technical Report TR 019 (February 2005), *Calculation models for prefabricated wood-based Loadbearing stressed skin panels for use in roofs.*

17 Conditions

17.1 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.

17.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

17.3 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
- remain covered by a valid Belgian Agrément
- are reviewed by the BBA as and when it considers appropriate.

17.4 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.

17.5 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.

