



Hemsec Sips Ltd

Stoney Lane
Rainhill
Prescot
Merseyside L35 9LL
Tel: 0151-426 7171 Fax: 0151-493 1331
e-mail: sales@hemsec.com
website: www.hemsecsips.com

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**Agrément
Certificate
No 06/4374**

Designated by Government
to issue
European Technical
Approvals

HEMSEC SIPS — SIP LOADBEARING WALL AND ROOF PANELS

Système pour constructions
Bausystem

Product



• THIS CERTIFICATE RELATES TO HEMSEC SIPS — SIP LOADBEARING WALL AND ROOF PANELS, STRUCTURAL INSULATED PANELS MANUFACTURED FROM OSB/3 AND RIGID POLYURETHANE INSULATION.

- The panels are for use above the damp-proof course in domestic applications up to four storeys high (including room-in-roof) as the loadbearing inner leaf of an external cavity wall.
- The panels may also be used as part of a separating wall, internal walls and in roof constructions.

continued

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 building systems with the Building Regulations. In the opinion of the BBA, buildings constructed using Hemsec Sips – SIP Loadbearing Wall and Roof Panels, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: A1	Loading
Comment:	Walls and roofs constructed from the panels will have sufficient strength and stiffness when designed in accordance with sections 9.1 to 9.3 of this Certificate.
Requirement: B3(1)(2)(3)	Internal fire spread (structure)
Comment:	The panels, with appropriate lining, can be used in walls required to have a fire resistance in excess of 60 minutes. See sections 13.1 to 13.3 and 13.5 of this Certificate.
Requirement: C2(e)	Resistance to moisture
Comment:	The panels can adequately limit the risk of surface condensation and will contribute to minimising the risk of interstitial condensation. See sections 10.1 and 10.2 of this Certificate.
Requirement: E1	Protection against sound from other parts of the building and adjoining buildings
Comment:	When installed with suitable flanking elements, separating walls incorporating the panels can meet this Requirement. See sections 15.1 to 15.3 of this Certificate.

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continued

- *It is essential that the system is designed in accordance with the Certificate holder's recommendations and all constructions incorporating the system assessed and approved by a chartered engineer.*
- *Installation must be carried out by contractors approved by the Certificate holder.*

Requirement:	E2(a)	Protection against sound within a dwelling-house etc
Comment:		A single leaf non-loadbearing partition, incorporating suitable plasterboard linings, can meet this Requirement. See section 15.2 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		Walls and roofs can contribute to a building meeting its' Target Emission Rate. See sections 11.1 to 11.4 and also sections 12.1 and 12.2 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The products are acceptable. See sections 17.1 and 17.2 of this Certificate.

2 The Building (Scotland) Regulations 2004



In the opinion of the BBA, Hemsec Sips – SIP Loadbearing Wall and Roof Panels, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Mandatory Standards as listed below.

Regulation:	8	Fitness and durability of materials and workmanship
Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The products can contribute to a construction meeting this Regulation. See sections 17.1 and 17.2 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards — construction
Standard:	1.1(a)	Structure
Comment:		Walls and roofs incorporating the system panels will have sufficient strength and stiffness when designed and constructed in accordance with sections 9.1 to 9.3 of this Certificate, with reference to clause 1.1.1 ⁽¹⁾ of this Standard.
Standard:	2.2	Separation
Comment:		Walls using the appropriate lining, can achieve a 'medium' duration of fire resistance, with reference to clauses 2.2.1 ⁽¹⁾ , 2.2.2 ⁽¹⁾ , 2.2.4 ⁽¹⁾ and 2.2.5 ⁽¹⁾ . See sections 13.1 and 13.2 of this Certificate. See also sections 13.4 and 13.5 of this Certificate, with reference to clauses 2.2.7 ⁽¹⁾ and 2.2.10 ⁽¹⁾ respectively.
Standard:	2.3	Structural protection
Comment:		Walls using the appropriate lining can achieve a period of fire resistance of 'medium' duration, with reference to clauses 2.3.1 ⁽¹⁾ and 2.3.3 ⁽¹⁾ . See sections 13.1 and 13.2 of this Certificate. See also section 13.4 of this Certificate, with reference to clause 2.3.2 ⁽¹⁾ .
Standard:	2.4	Cavities
Comment:		Cavities in wall and roof constructions must incorporate suitable cavity barriers, with reference to clauses 2.4.1 ⁽¹⁾ , 2.4.2 ⁽¹⁾ and 2.4.7 ⁽¹⁾ . See sections 13.3, 13.5 and 13.6 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		Walls using the appropriate lining, can achieve a period of fire resistance of 'medium' duration, with reference to clause 2.6.1 ⁽¹⁾ . See sections 13.1 and 13.2 of this Certificate.
Standard:	3.15	Condensation
Comment:		The panels can adequately limit the risk of surface condensation and will contribute to minimising the risk of interstitial condensation, with reference to clauses 3.15.1 ⁽¹⁾ to 3.15.4 ⁽¹⁾ . See sections 10.1 and 10.2 of this Certificate.
Standard:	5.1	Resisting sound transmission to dwellings
Comment:		When installed with suitable flanking elements, separating walls incorporating the panels can satisfy this Standard, with reference to clauses 5.1.1 ⁽¹⁾ , 5.1.2 ⁽¹⁾ and 5.1.12 ⁽¹⁾ . See section 15.1 of this Certificate.
Standard:	6.2	Building insulation envelope
Comment:		The panels will enable a wall or roof to satisfy the Elemental Method of limiting fabric heat loss, with reference to clause 6.2.1 ⁽¹⁾ . The panel junctions and openings can also adequately limit heat loss by conduction and by air infiltration, with reference to clauses 6.2.4 ⁽¹⁾ and 6.2.5 ⁽¹⁾ respectively. See sections 11.1 to 11.4 and 12.1 of this Certificate.

(1) Technical Handbook (Domestic).

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3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Hemsec Sips — SIP Loadbearing Wall and Roof Panels, 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 products are acceptable. See sections 17.1 and 17.2 of this Certificate.
Regulation:	C5	Condensation
Comment:		The panels will contribute to minimising the risk of interstitial condensation. See section 10.2 of this Certificate.
Regulation:	D1	Stability
Comment:		Walls and roofs constructed from the panels will have sufficient strength and stiffness when designed and constructed in accordance with sections 9.1 to 9.3 of this Certificate.
Regulation:	E4(1)(2)(3)	Internal fire spread — Structure
Comment:		The panels can be used in walls required to have a fire resistance of 60 minutes. See sections 13.1 to 13.3 and 13.5 of this Certificate.
Regulation:	F2	Building fabric
Comment:		The panels will enable a wall or roof to satisfy the Elemental Method of limiting fabric heat loss. See sections 11.1 to 11.4 and 12.1 of this Certificate.
Regulation:	G2(1)	Separating walls and separating floors
Comment:		When installed with suitable flanking elements, separating walls incorporating the panels can satisfy this Regulation. See section 15.1 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 sections: 5 *Description* (5.2), 6 *Delivery and site handling* (6.1 and 6.3) and 8 *Practicability of installation*.

Technical Specification

5 Description

5.1 Hemsec Sips — SIP Loadbearing Wall and Roof Panels are structural elements consisting of internal and external skins of oriented strand board, Type 3 (OSB/3) to BS EN 300 : 2006, with an insulation core of closed cell polyurethane (PUR).

5.2 The panels have nominal characteristics of:

overall thickness (mm)	100 ⁽¹⁾ , 125, 150, 180
OSB thickness (mm)	15
insulation thickness (mm)	70, 95, 120, 150
insulation density (kgm ⁻³)	42
overall maximum panel size (m)	6.5 x 1.2
weight (kgm ⁻²)	22.1, 23.1, 24.2, 25.5.

(1) For use as internal non-loadbearing partition wall only.

5.3 The panels are connected by the use of OSB/3 splines, 15 mm by 100 mm by 1200 mm (cut to length as required), located in preformed rebates within the PUR core (see Figure 1). Openings are formed with pre-cut panels. Timber framing and inserts for openings and at junctions are installed on site.

5.4 Ancillary items to defined specifications and for use with the panels but outside the scope of this Certificate include:

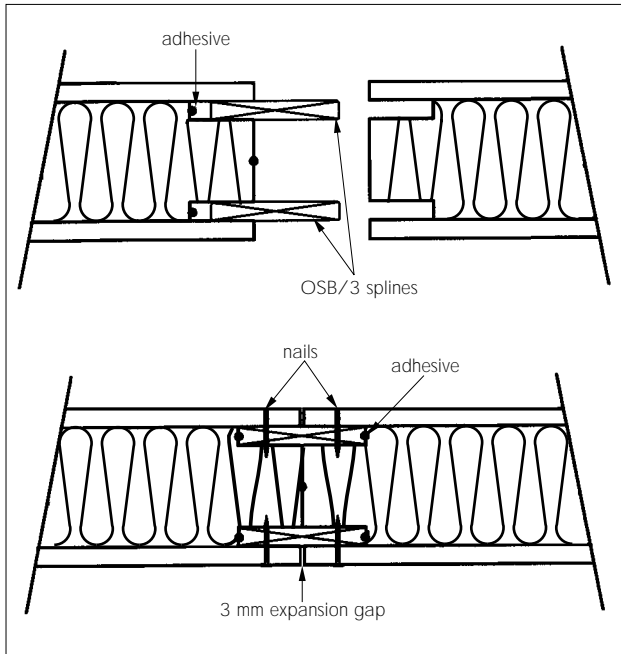
- sole plate — 70, 95, 120 and 150 mm by 50 mm deep, C24 timber to EN 338 : 2003, preservative treated for hazard class 2 to BS 1282 : 1999 used to locate and support the bottom of the panel
- head plate — 70, 95, 120 and 150 mm by 50 mm Grade C16 treated softwood
- edge timber — minimum 50 mm by 70 mm, grade C16 treated timber for use around openings
- lintels — treated softwood timber to Structural Engineer's design
- framing for openings (supporting lintels) — treated softwood timber to Structural Engineer's design
- polyurethane adhesive — Apollo 7150
- fasteners — SIPS type screws
- nails — 2.8 mm diameter, galvanized for use with nail gun.

Note:

Timbers may be treated with an Alkaline Copper Quaternary (ACQ) preservative by vacuum

pressure, an organic solvent preservative by double vacuum or diffusion treatment.

Figure 1 Typical detail of spline connection

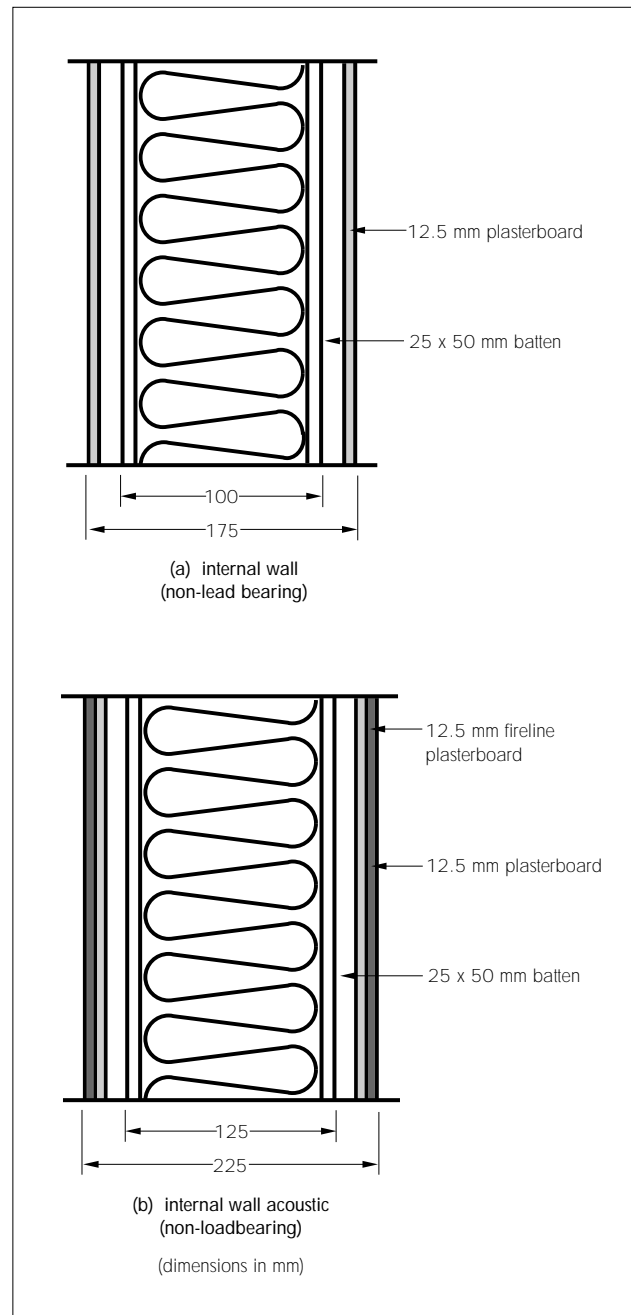


5.5 Other ancillary items used, but outside the scope of this Certificate, include:

- Glulam purlins
- standard nails — in accordance with BS 5268-2 : 2002
- sole plate anchor bolts — to engineers' design
- joist hangers — with top plate support as specified for the project with maximum eccentric loading from the joist within the wall panel. Fixings to be to the Certificate holder's instructions
- dry lining battens — minimum 50 mm wide by 10 mm or 25 mm deep softwood
- wall ties — Simpson Strong-tie BTS4 TEK wall-tie kits using ABC Spax stainless steel, flange-head, pozi-drive screws 30 mm by 4 mm
- counter battens — treated softwood counter battens, minimum 50 mm wide by 25 mm deep
- tiling/slate battens — sizing as per BS 5534 : 2003
- vapour permeable membrane — for use as a roof tile underlay
- breather membrane — approved for use in wall construction
- cavity closers
- cavity barriers
- sealant
- plasterboard
- fireline plasterboard.

5.6 The detail of types of internal wall that can be constructed from the panels are given in Figure 2.

Figure 2 Internal wall specification



6 Delivery and site handling

6.1 The panels are delivered in shrink-wrap, with edge protectors and banded packaging used for initial transit and temporary protection. They should be stored flat (no more than 10 panels high for up to 125 mm thickness and 8 high for 150 mm and 180 mm thickness) over suitable sillage to a slight fall (to allow rain run-off). Bearers should be at 600 mm (maximum) centres, (end bearers no more than 150 mm from end of panel), and aligned vertically between individual packs in accordance with the Certificate holder's guidelines.

6.2 The panels and all components should be stored inside, or in dry, sheltered conditions at least 150 mm off the ground, covered with opaque polyethylene sheeting or tarpaulin until the panels and components are to be used for erection.

6.3 Some individual panels can be lifted by two persons, large panels and packs of panels must be lifted with mechanical means. Temporary timber blocks must be used to protect panel edges during lifting operations.

6.4 The panels can withstand the normal loads associated with site handling and installation. Damaged panels should not be used.

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

Design Data

7 General

7.1 Hemsec Sips — SIP Loadbearing Wall and Roof Panels are suitable for use as non-loadbearing partitions, loadbearing and pitched roofs separating walls, and inner leaf of external walls and pitched roofs in dwellings up to four storeys high (including room-in-roof). All structural calculations should be undertaken by a Chartered Structural Engineer who should contact the Certificate holder for full design guidance.

7.2 Openings for windows and doors are created by using appropriately sized panels which allow the timber framings and lintels to be installed on site.

7.3 When panels are used to construct the inner leaf of an external cavity wall, the outer masonry leaf and all masonry below dpc must be built in accordance with BS 5628-3 : 2005 and, when used as roof panels, roof tiles and slates applied in accordance with BS 5534 : 2003.

7.4 Foundations and floors (outside the scope of this Certificate) must be approved for use by the Certificate holder's technical staff and should be suitably level and square to accept the wall panels.

7.5 Where buildings need to comply with NHBC Standards or *Zurich Building Guarantee Technical Manual*, specifiers should observe the requirements of these Standards.

7.6 Other wall and roof weatherproofing systems can be used, but are not covered by this Certificate.

8 Practicability of installation

The panels may be readily installed by contractors who have been trained and assessed to undertake this work. Any installation work should follow the details and information contained in the construction drawings, as prepared by the Certificate holder or approved designers.



9.1 The wall and roof panels will have adequate strength and stiffness when used in accordance with the provisions of this Certificate. Due consideration must also be given to any fire-resistance restrictions (see section 13).

Wall panels

9.2 The permissible design load values for the effective span of the panels based on the results of tests undertaken for 125 mm thick panels with 15 mm thick OSB/3 skins and analysed in accordance with BS 5268-2 : 2002 are given in Table 1.

Table 1 Design loading⁽¹⁾ for 125 mm thick SIP wall panels

Loading ⁽²⁾ (maximum allowable)	Maximum distance between panel supports (m)					
	2.0	2.2	2.4	2.6	2.8	3.0
Vertical ⁽³⁾ (kNm ⁻¹)	38	38	38	38	38	38
Lateral						
for strength (kNm ⁻²)	8.14	7.40	6.79	6.26	5.82	5.43
for deflection (kNm ⁻²)	2.40	1.80	1.39	1.09	0.87	0.71
Racking resistance ⁽⁴⁾ (kNm ⁻¹)	4.08	3.71	3.40	3.14	2.91	2.72

(1) The load/span values for vertical and lateral loads use a factor of safety of 1.5, and are working load values.

Load/span values based on deflection limit are based on a simply supported span with a maximum deflection of span/333.

The values are derived from short-term loading tests. When assessing deflections, the Engineer must take into account simple bending, shear deflection and the effects of creep.

The values are for simply supported spans with a uniformly distributed load; information on other conditions is available from the Certificate holder.

The provision of holes or notches (eg for services, windows) will affect the design assumptions — further advice must be sought from the Certificate holder.

The table may also be used for 150 mm and 180 mm walls.

(2) Where a panel is loaded axially only, the allowable vertical load should have an eccentricity less than 21 mm from the panel centre line.

(3) The vertical load includes an allowance for eccentricity [see note (2)] and is intended for use where the panel is loaded in combination with lateral loads.

(4) The racking resistance values may be modified by factors K_{105} to K_{108} in accordance with BS 5268-2 : 2002, Section 6.1 to obtain design values.

The racking resistance values assume nail spacing of 75 mm and glued joints, and a basic resistance derived from panel tests to BS EN 594 : 1996 and analysed in accordance with BS 5268-6.1 : 1996.

Anchor bolts for racking resistance tests were 10 mm diameter at 450 mm centres.

Roof panels

9.3 The permissible design load values for the effective span of the panels based on the results of tests undertaken for 180 mm thick panels with 15 mm thick OSB/3 skins and analysis in accordance with BS 5268-2 : 2002 are given in Table 2.

Table 2 Load/span table⁽¹⁾ for 180 mm thick SIP roof panel

Loading (maximum allowable)	Span of panel (m)						
	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Vertical (kNm ⁻²)	7.89	6.31	5.06	3.19	2.13	1.50	1.09

(1) The load/span values for maximum shear or bending use a factor of safety of 2.50 and are working loads.

Load/span values based on deflection limit are based on a simply supported span with a maximum deflection of span/333.

The values are derived from short-term loading tests. When assessing deflections, the Engineer must take into account simple bending, shear deflection and the effects of creep.

The values are for simply supported spans with a uniformly distributed load; information on other conditions is available from the Certificate holder.

The provision of holes or notches (eg for services, windows) will affect the design assumptions — further advice must be sought from the Certificate holder.

9.4 The strength of all connection details which tie walls to other structural elements (such as walls, floors, roofs) must be evaluated and provide adequate stability for the overall building design. The specification and design for these items must be determined by the engineer responsible for the stability of the building. Guidance on the design of connection details may be obtained from the Certificate holder.

9.5 Lintels and framing around openings, form an integral part of the loadbearing wall panels (see Figure 3). The sizing of lintels must be determined by the engineer responsible for the design.

9.6 As part of the structural design, consideration should be given to the support of eccentric loads imparted by central heating systems or kitchen appliances.

9.7 Stainless steel wall ties Type 5 or 6 to BS DD 140-2 : 1987 can be directly attached to the OSB/3 face of the panel using stainless-steel screw fasteners.

10 Condensation

Surface condensation



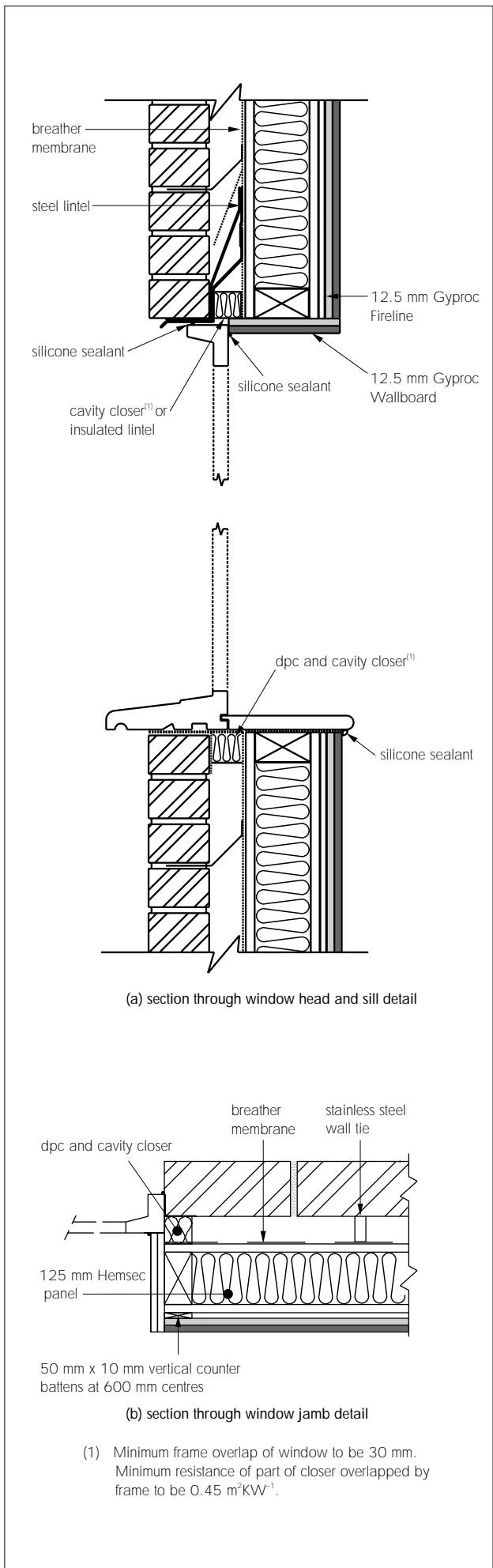
10.1 The risk of surface condensation in roofs and external walls, and at junction and opening details (see relevant Figures 3, 4, 5, 6, 7, 8 and 9), will be minimal.

Interstitial condensation



10.2 The risk of interstitial condensation will be minimal when the panels are used in conjunction with a vapour check plasterboard lining, or other suitably installed vapour control layer.

Figure 3 Typical opening details



11 Thermal properties



11.1 The thermal performance of each building incorporating the panels must be evaluated in accordance with the relevant national Building Regulations, and is the responsibility of the overall designer of the building.

11.2 Calculations of the thermal transmittance of specific constructions should be based on thermal conductivity values ($\text{Wm}^{-1}\text{K}^{-1}$) of:

polyurethane insulation core	0.026
OSB/3	0.13

11.3 Typical U values for building elements, calculated in accordance with BS EN ISO 6946 : 1997 and BRE report (BR 443 : 2006) *Conventions for U-value calculations* are given in Table 3.

Table 3 Typical U values

Element	Panel thickness (mm)	U value ($\text{Wm}^{-2}\text{K}^{-1}$)	Improvement in Elemental value (%) ⁽¹⁾
External wall ⁽²⁾	125	0.22	37
	150	0.18	49
	180	0.15	57
Roof ⁽³⁾	180	0.16	36

(1) Compared to the 2002 amendment to the England and Wales Building Regulations of $0.35 \text{ Wm}^{-2}\text{K}^{-1}$ for walls and $0.25 \text{ Wm}^{-2}\text{K}^{-1}$ for roofs (see section 11.4).

(2) Based on panels lined as described in Table 4 with a 50 mm wide cavity and brick outer leaf.

(3) Based on panels lined internally with 12.5 mm thick plasterboard on battens with a slated or tiled exterior.

11.4 Constructions incorporating the panels can meet the requirements of the national Building Regulations:

England and Wales

- external walls and roofs incorporating the panels can contribute to a dwelling achieving the required overall carbon dioxide emission rate reduction of 20%. See Table 3 and Note 1 for U value improvements achieved by elements incorporating the panels
- junctions shown in Figures 3, 4, 5, 6, 7 and 9 adequately limit heat loss by conduction and, when installed to limit air infiltration, see section 12.1, comply with the requirements of the TSO publication *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings*, and the recently published *Accredited Construction Details*, version 1.0. The default psi values quoted in BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging and junctions and around openings*, Table 3, for these junctions may therefore be used in SAP 2005 calculations.

Scotland

- external walls and roofs can satisfy the target U value of 0.30 and $0.25 \text{ Wm}^{-2}\text{K}^{-1}$ respectively (see Table 3)
- constructions shown in Figures 3, 4, 5, 6 and 7, and 9 adequately maintain continuity of insulation.

Northern Ireland

- external walls and roofs can satisfy the target U value of 0.45 and $0.35 \text{ Wm}^{-2}\text{K}^{-1}$ respectively (see Table 3)
- constructions shown in Figure 3 adequately maintain continuity of insulation.

12 Air leakage



12.1 Buildings incorporating the panels can achieve adequate air barrier continuity provided there is effective sealing around junctions and openings.



12.2 In England and Wales, completed buildings are subject to pre-completion testing for airtightness in accordance with the requirements of section 20B of Approved Document L1A.

13 Behaviour in relation to fire



13.1 When tested to BS 476-21 : 1987, the panel system achieved the results shown in Table 4.

Table 4 Fire performance⁽¹⁾

Performance	Axial load (kNm^{-1})	Construction
FR60	13	125 mm thick Hemsec panel with vertical 10 mm by 50 mm softwood battens fixed at 600 mm centres, 12.5 mm fireline plasterboard fixed to the battens and 12.5 mm wallboard fixed by 3.5 mm by 50 mm bugle-headed screws at 300 mm centres on the exposed face.

(1) These tests were conducted on panels with an ultimate capacity of 285 kNm^{-1} . The design load for such panels is taken as 38 kNm^{-1} and, therefore, the fire test panels were subjected to 31% of the design load.

13.2 Assessment of test results and design details show that panels are suitable for use in external walls (with service loads up to the stated values in Table 4), not less than one metre from a relevant boundary, (more than one metre in Scotland) and in separating walls that require fire resistance periods not less than the following:

external walls 60 minutes⁽¹⁾ (from inside)
 separating walls 60 minutes⁽¹⁾ (from either side)


(1) 'Medium' duration in Scotland.


13.3 Constructions incorporating the wall and roof panels must include suitable provision for cavity barriers.



13.4 The panels can form part of a separating wall between dwellings or a wall in accordance with the exceptions permitted by Mandatory Standard 2.2, clause 2.2.7⁽¹⁾ and Mandatory Standard 2.3, clause 2.3.2⁽¹⁾ respectively. Separating walls in Scotland should not include any services.

(1) Technical Handbook (Domestic).

 13.5 Junctions between the panels in external and separating walls will adequately maintain the fire resistance of the separating wall.

 13.6 The OSB/3 panel linings have a 'high risk' surface spread of flame designation and therefore, the maximum vertical or horizontal distance between cavity barriers is 10 metres.

13.7 Where any other form of construction or junctions incorporating the panels (including any service penetrations) is subject to fire-resistance requirements, an appropriate assessment or test must be carried out by a UKAS (United Kingdom Accreditation Service) approved testing laboratory.

13.8 The external fire rating of any roof incorporating the system panels will depend on the specification of the roof covering used.

14 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

Mandatory Standard 3.18

Northern Ireland

Technical Booklet L.

15 Sound insulation


 15.1 Test data to BS EN ISO 140-3 : 1995 indicate that the separating wall construction detailed in Figure 4 can provide satisfactory resistance to airborne sound transmission, when used in conjunction with suitable flanking elements. See Tables 5, 6 and 7

Table 5 Airborne sound insulation (dB) — Laboratory test results

Construction	(dB)
Separating wall (Figure 4)	$R_w (C_i; C_{tr}) = 57 (-2; -7)$ $\therefore R_w - C_{tr} = 50$
Internal wall (Figure 2)	$R_w > 40$

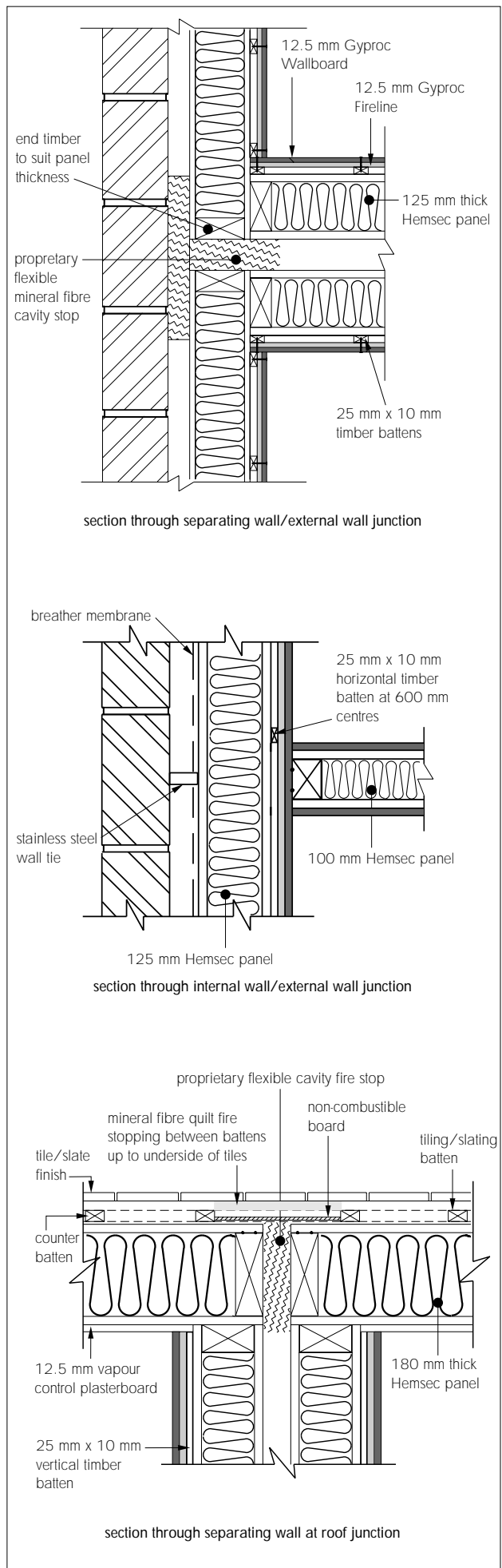
Table 6 Airborne sound insulation (dB). Deemed to satisfy — Scotland and Northern Ireland

Construction	Mean value (dB)
Separating walls — dwelling-houses and flats	$D_{nT,w} \geq 53$

Table 7 Airborne sound insulation (dB). Deemed to satisfy — England and Wales

Construction	Mean value (dB)
Separating walls — dwelling-houses and flats	$D_{nT,w} + C_{tr} \geq 45$
Internal walls — between a bedroom or a WC and other rooms	$R_w \geq 40$

Figure 4 Typical separating wall detail (fire stopping)





15.2 Test data to BS EN ISO 140-3 : 1995 indicate that the single leaf internal wall acoustic (non-loadbearing) construction detailed in Figure 2b can provide satisfactory resistance to airborne sound transmission within a dwelling for walls between a WC or bathroom and another room in England and Wales. See Tables 5 and 7.

15.3 In England and Wales, separating walls are subject to pre-completion testing in accordance with Section 1 of Approved Document E.

15.4 It is essential that care is taken in design and during installation to avoid direct paths for airborne sound transmission and to minimise paths for flanking sound transmission.

16 Weathertightness

16.1 When the panels are used to form the inner leaf of an external cavity wall, the outer masonry leaf must be designed and constructed in accordance with BS 5628-3 : 2005 incorporating damp-proof courses and cavity trays. A breather membrane is required with this type of construction.

16.2 Roofing should be in accordance with BS 5534 : 2003 detailed to ensure moisture is prevented from coming into contact with the panels.

17 Durability



17.1 The panels will have comparable durability to that of OSB/3 to BS EN 300 : 2006, therefore, provided the installation remains weathertight, a life of at least 60 years may be expected.

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

Installation

18 General

18.1 Erection of the Hemsec Sips — SIP Loadbearing Wall and Roof Panels must comply with the details given in the Certificate holder's construction manual and the provisions of this Certificate.

18.2 The main contractor must ensure that the accuracy of the foundation is in accordance with the Certificate holder's instructions, in particular, the following details must be within the tolerance of ± 5 mm:

- the level of the foundation or other bearing support
- the overall width and length of the building footprint
- the diagonals used for checking the overall squareness of the building.

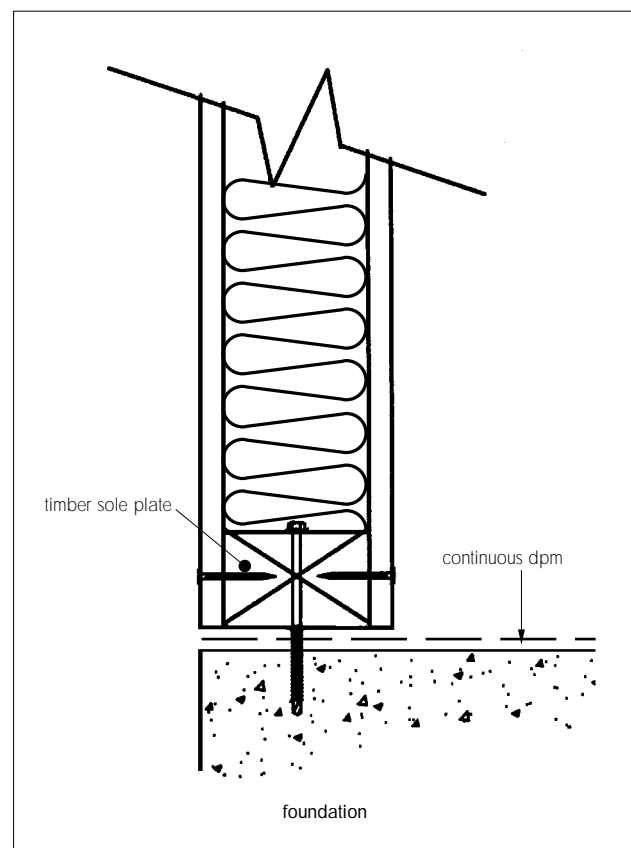
19 Procedure

Foundation construction

19.1 A suitable damp-proof course (dpc) is laid on top of the foundation.

19.2 A 50 mm deep, treated timber sole plate (see Figure 5) is positioned over the dpc and fixed to the foundation using fixings as approved by the Certificate holder and the Chartered Engineer's requirements. Typically, a holding down bolt arrangement should be used for securing into a concrete raft foundation, strapping where required onto masonry. Sole plates for internal walls are secured using appropriate screws. Sole plates can be adjusted using high-density polyethylene shims and proprietary injectable mortar grouting is introduced to seal against air infiltration, if required.

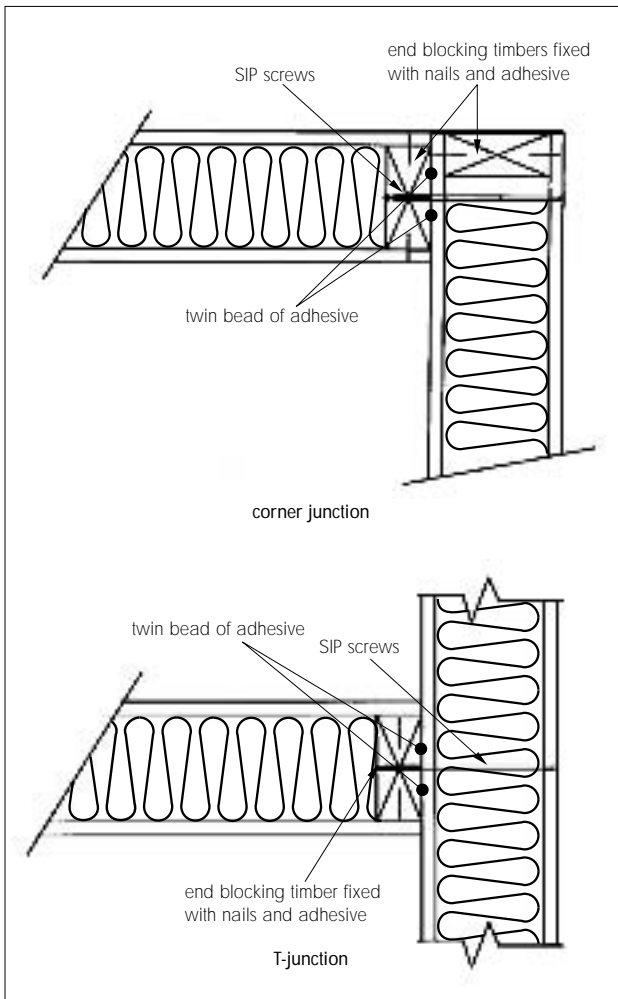
Figure 5 Typical sole plate fixing detail panel only



Ground-floor construction

19.3 A bead of adhesive is run along the top of sole plate. Starting at one corner (see Figure 6), the first panel is positioned correctly on the sole plate, plumbed vertical and fixed to the sole plate section with galvanized ring-shank nails at a maximum of 100 mm centres approved by the Certificate holder, through the OSB inner and outer skins. Apollo 7150 adhesive is run inside each recess and the splines inserted. This forms the standard basis for connecting all ground-floor panel runs or corner junctions. Panels are temporarily braced to maintain stability. Beads of adhesive are applied to the bottom and vertical recesses of subsequent panels and fitted together, plumbed and secured with nails as described above.

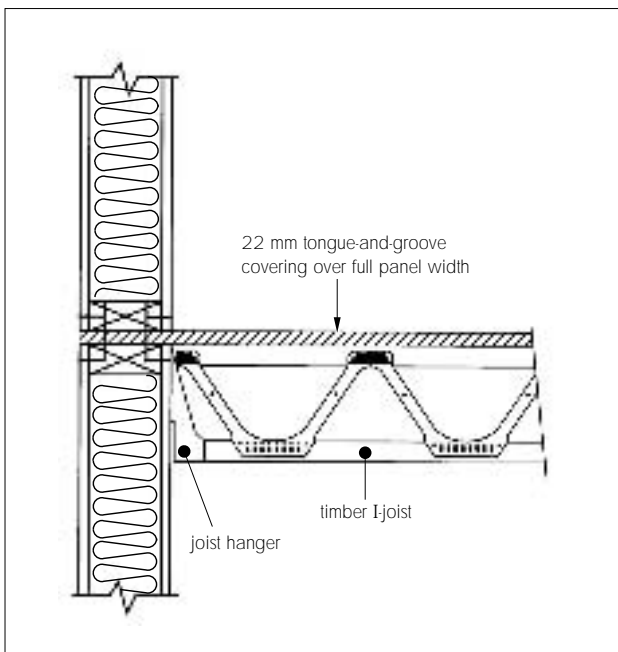
Figure 6 Typical corner and T-junction (panel only)



First floor and room-in-roof construction

19.4 Engineered or traditional timber floor joists are supported on joist hangers, fixed by nailing into the head plate using galvanized ring-shank nails or screws approved by the Certificate holder (see Figure 7).

Figure 7 Typical first-floor junction (panel detail only)



19.5 A 50 mm deep timber bottom plate (see Figure 7) is nailed through the floor decking into the head plate. The procedure used for the ground-floor construction is followed.

Roof construction

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

19.7 Roof panels are positioned working from one gable wall to the other. Panels are joined (as for the wall construction) and fixed through to the structural supporting timber members using SIP screws or the Certificate holder's approved screw fasteners and to the engineer's design requirements. Typical ridge and eaves details are shown in Figures 8 and 9.

19.8 The construction of the roof is outside the scope of the Certificate but the normal construction is as follows. The panels are overlaid with a vapour permeable membrane. Treated softwood counter battens, minimum 25 mm deep by 50 mm wide, are then fixed through to the roof panel using stainless-steel screws. Tiling laths and slates or tiles are applied in accordance with the relevant recommendations of BS 5534 : 2003.

Figure 8 Ridge detail (panel only)

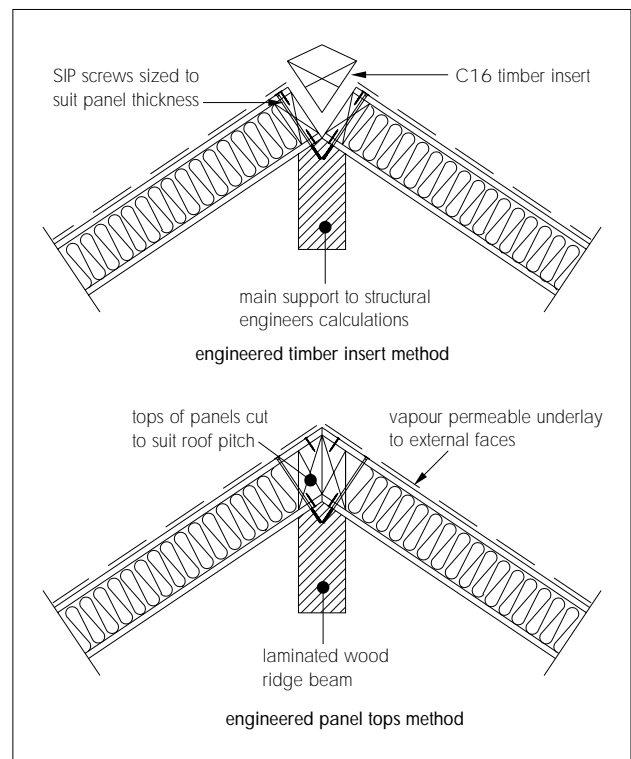
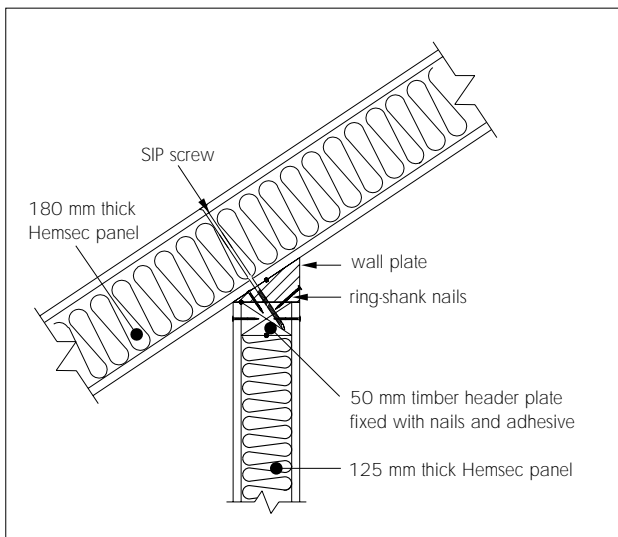


Figure 9 Eaves detail (panel only)



Technical Investigations

The following is a summary of the technical investigations carried out on the Hemsec Sips — SIP Loadbearing Wall and Roof Panels.

20 Tests

Tests were carried out to determine:

- racking resistance in accordance with BS 5268-6.1 : 1996 and BS EN 594 : 1996
- resistance to axial and eccentric loads
- pull-out strength of wall fixings
- fire-resistance to BS 476-21 : 1987
- flexural strength.

21 Investigations

An examination was made of technical data relating to:

- structural properties and design calculations
- airborne sound insulation tests
- thermal performance.

22 Other investigations

22.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of materials.

22.2 A visit was made to a site in the UK to assess the installation process.

Bibliography

- BS 476-21 : 1987 *Fire tests on building materials and structures — Methods for determination of the fire resistance of loadbearing elements of construction*
- BS 1282 : 1999 *Wood preservatives — Guidance on choice, use and application*
- BS 5268-2 : 2002 *Structural use of timber — Code of practice for permissible stress design, materials and workmanship*
- BS 5268-6.1 : 1996 *Structural use of timber — Code of practice for timber frame walls — Dwellings not exceeding four storeys*
- BS 5534 : 2003 *Code of practice for slating and tiling (including shingles)*
- BS 5628-3 : 2005 *Code of practice for the use of masonry — Materials and components, design and workmanship*
- BS DD 140-2 : 1987 *Wall ties — Recommendations for design of wall ties*
- BS EN 300 : 2006 *Oriented Strand Boards (OSB) — Definitions, classification and specifications*
- BS EN 594 : 1996 *Timber structures — Test methods — Racking strength and stiffness of timber frame wall panels*
- BS EN ISO 140-3 : 1995 *Acoustics — Measurement of sound insulation in buildings and of building elements — Laboratory measurement of airborne sound insulation of building elements*
- BS EN ISO 6946 : 1997 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- EN 338 : 2003 *Structural timber — Strength classes*

23 Conditions

23.1 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.

23.2 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.

23.3 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.

23.4 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 or 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.

23.5 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 or in the future; nor is conformity with such information 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 manufacture, supply, installation, use and maintenance of this product/system.



In the opinion of the British Board of Agrément, Hemsec Sips — SIP Loadbearing Wall and Roof Panels are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 06/4374 is accordingly awarded to Hemsec Sips Ltd.

On behalf of the British Board of Agrément

Date of issue: 15th November 2006

Chief Executive