

CERTIFICATE NO. 07/0280

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easi-joist®
Solives; Bodenbalken

The **Irish Agrément Board** is designated by Government to issue European Technical Approvals. Irish Agrément Board Certificates establish proof that the certified products are '**proper materials**' suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997 to 2006**.

The **Irish Agrément Board** operates in association with the **National Standards Authority of Ireland (NSAI)** as the National Member of UEAtc.



PRODUCT DESCRIPTION

This Certificate relates to **easi-joists®**. The joists are comprised of strength graded parallel timber flanges, connected by engineered V-shaped galvanised steel webs, incorporating integral nailplates.

Wolf Systems Ltd is responsible for the engineering design of the metal web joist, and the supply of metal webs and system design software to IAB approved fabricators, for the fabrication of **easi-joists®**, to a project specific design.

The structural design of specific projects, incorporating **easi-joists®** in floor or roof construction, is outside the scope of this certificate.

USE

easi-joists® are suitable for use as structural members in floor and roof construction, in domestic, light industrial and commercial units, up to and including four storeys high. The joists may be used in place of traditional solid timber joists.

The joists are for internal use only, in Service Class 1 or 2 environments as defined in BS5268-2: 2002 *Structural use of timber. Code of Practice for permissible stresses, design, materials and workmanship* and IS EN 1995-1-1: 2005 Eurocode 5: *Design of timber structures – Part 1-1: General – Common rules and rules for buildings*.

Pre-cambered **easi-joists®** are excluded from the scope of this Certificate.

Design, Manufacture and Marketing

Metal Web System and Software design

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Manufacture of easi-joists®

IAB Approved Fabricators

Project specific design

IAB Approved Fabricators

Marketing

Wolf Systems Limited and
IAB Approved fabricators.

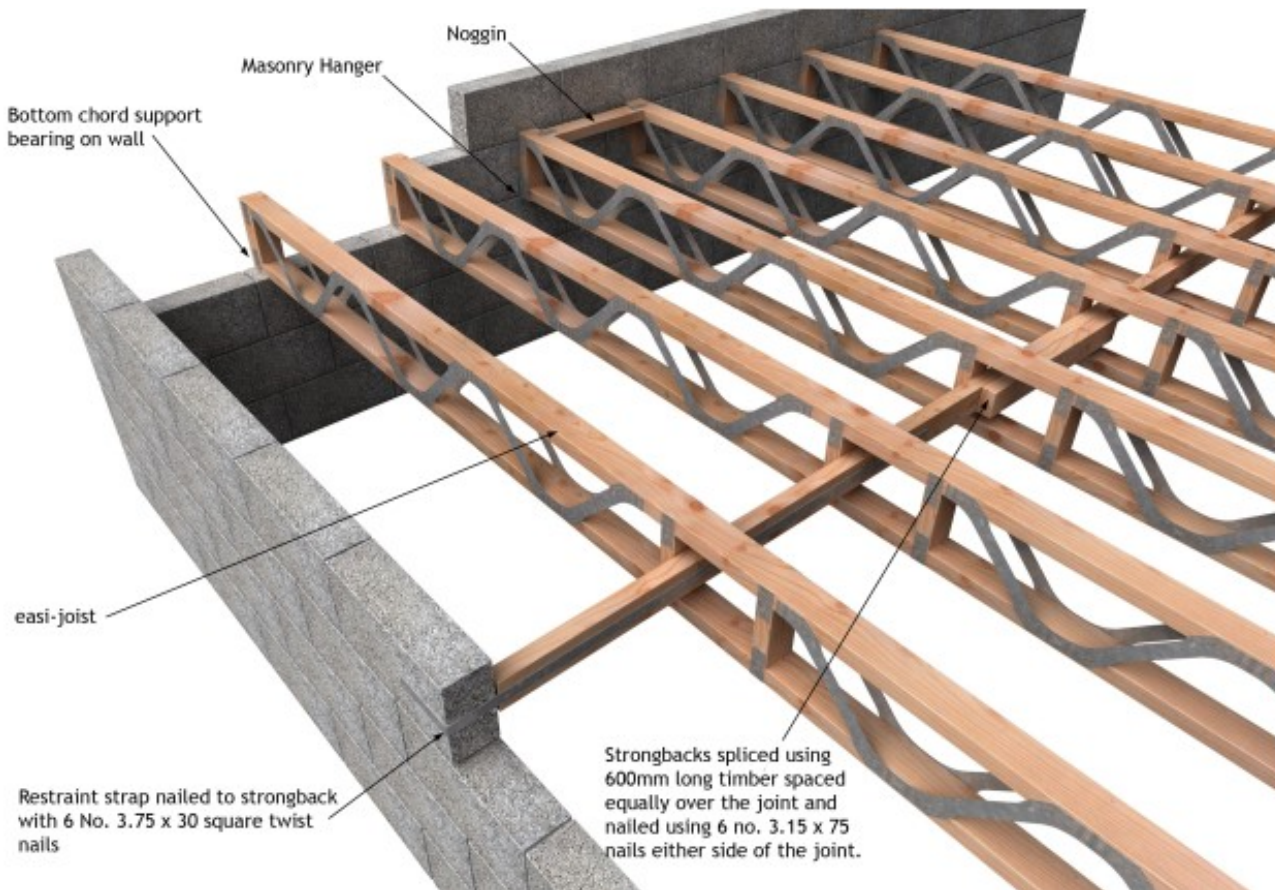


Figure 1 General arrangement

1.1 ASSESSMENT

In the opinion of the Irish Agrément Board (IAB), **easi-joists**[®], when used in accordance with the requirements of this Certificate, are satisfactory for the use defined above and can meet the requirements of the Building Regulations 1997 to 2006, as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2006

REQUIREMENT:

Part A – Structure

A1 - Loading

easi-joists[®], when used as certified, have adequate strength and stiffness. See Part 3 of this Certificate.

Part B – Fire Safety

B3 – Internal Fire Spread (structure)

The fire resistance of floors incorporating **easi-joists**[®], varies according to the type of floor construction. See Part 3 of this certificate.

Cavity barriers may be required, as indicated in Building Regulations 2006 Technical Guidance B Fire Safety Section 3.3. See Part 4 of this Certificate.

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to weather and ground moisture

easi-joists[®], when used as certified, can meet the requirements.

Part D – Materials and Workmanship

D1 – easi-joists[®], when used as certified, can meet the requirements for workmanship.

D3 – easi-joists[®], as certified in this Certificate, are comprised of proper materials, fit for their intended use. See Parts 2, 3 and 4 of this Certificate.

Part E – Sound

E2 Airborne sound (floors)

A floor construction incorporating **easi-joists**[®] has been shown to have the equivalent resistance to airborne sound, as a floor construction incorporating solid timber joists, but similar in all other respects. See Part 4 of this certificate.

E2 Impact Sound (floors)

A floor construction incorporating **easi-joists**[®] has been shown to have the equivalent resistance to impact sound, as a floor construction incorporating solid timber joists, but similar in all other respects. See Part 4 of this certificate.

2.1 PRODUCT DESCRIPTION

2.2.1 Elements

easi-joists[®] comprise steel webs, timber flanges, timber webs, nailplates and galvanised mild steel nails. Specifications for components are as follows:

- a) Webs: Steel webs are punched from Grade 300 Z275 hot dipped galvanised steel to AS 1397: 2001 *Steel sheet and strip – Hot-dipped zinc-coated or aluminium/zinc-coated*, yield stress range 300 N/mm² to 320 N/mm². The process produces a V shaped web, with integral nailplates at each end, and at the root of the web. Web dimensions are given in Table 1.
- b) Timber flanges, webs and strong backs: flanges, webs and strong backs are cut from planed softwood, in accordance with IS EN336: *Structural timber – sizes, permitted deviations* and machine graded in accordance with IS EN14081: 2006 *Timber structures – Strength graded structural timber with rectangular cross section* or visually strength graded to IS 127:2002 *Structural timber – visual strength grading – sawn softwoods with rectangular cross-section*. Permitted strength classes are C24 or TR26 grade timber to BS 5268-2 or IS 444: 1998 *The structural use of timber in buildings*. Sawn timber is not permitted for use in flanges. For timber target sizes, see Table 3.

- c) Nailplates: Where necessary, flanges are spliced, using Wolf 101 nailplates (BBA Certificate No 89/2290 Detail Sheet 6) pressed into the top and bottom faces of both flanges.

2.1.2 easi-joists®

- a) easi-joists® are available in the widths and depths given in Table 2.
b) Dimensional tolerances of finished joists are given in Table 5.
c) easi-joists® lengths are dictated by design requirements and transportation methods.

2.1.3 Ancillaries

Strong backs

2.2 MANUFACTURE

a) Manufacture

Timber flanges are assembled on a fixture. Webs are then positioned in accordance with the production drawings, generated from **Wolf Systems Ltd** software. The webs are pressed into the timber flanges using a hydraulic platen press. Where necessary, joints are strengthened by nailing through the webs, at the flange locations. Flanges are spliced in accordance with design drawings.

b) Quality control

The Certificate holder and IAB approved fabricators have quality systems in place. The quality control checks required include those listed in Table 4. Dimensional tolerances are given in Table 5.

Table 1 Web dimensions

Dimensions	MS200	MS250	MS300	MS400
A	125	160	210	323
B	600	600	600	758
C	33	33	33	33
D	64	64	70	80
E	101	90	90	105
F	300	300	300	379
No of nails – end	38	36	36	48
No of nails - root	76	72	72	76
Metal thickness	01.00 +0.15/-0.05 mm			

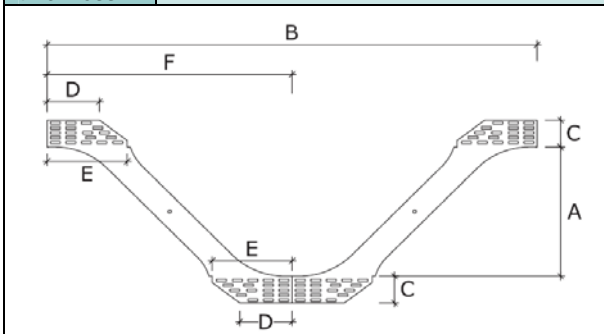


Table 2 Product range

Joist Designation	Nominal Joist Depth mm	Flange Depth x width mm x mm
MS200/72	219	47 x 72
MS200/97	219	47 x 97
MS250/72	254	47 x 72
MS250/97	254	47 x 97
MS300/72	304	47 x 72
MS300/97	304	47 x 97
MS400/72	417	47 x 72
MS400/97	417	47 x 97

Table 3 Permitted timber sizes for flanges

Target size mm	Commercial Nominal Size mm	Tolerance width x depth mm
46.5 x 72	47 x 75	±1 x ±1
46.5 x 97	47 x 100	±1 x ±1
46.5 x 122	47 x 125	±1 x ±1.5
46.5 x 147	47 x 150	±1 x ±1.5

Table 4 Quality control checks

Component	Quality check
Webs	Metal web profile, teeth location and squareness; material thickness; brittleness; web break point; galvanising thickness; visual inspection for corrosion, fractures and malformation
Timber flanges	Bow, spring, twist, cup, strength class/grade to EN 338, moisture content, size and tolerances, visual checks for abnormal defects.
Joist fabrication	Web and upright positioning, timber grade, moisture content, joist depth and width, splice locations and sizes. Visual check for web impress and folded nails; Overall length and depth of batch; labelling.

Table 5 Dimensional tolerances

Property	Tolerance
Length of joist	± 5 mm
Width of Joist	± 1 mm
Depth of joist	± 2 mm
Length of batch	± 10 mm
Web location	± 5 mm horizontally ± 2 mm vertically.

Table 6 Permissible domestic floor joist spans for easi-joists® using TR26 flanges

Joist Type	Flange dimensions mm x mm	Joist depth mm	Joist Centres mm	Double webs required adjacent to support	Maximum permissible span ⁽²⁾ mm
MS200	47 x 72	219	400	No	4950
	47 x 97		400	No	5300
	47 x 72		600	No	4360
	47 x 97		600	Double tension and compression	4700
MS250	47 x 72	254	400	No	5360
	47 x 97		400	Double tension	5740
	47 x 72		600	Double tension and compression	4770
	47 x 97		600	Double tension and compression	5080
MS300	47 x 72	304	400	Double tension and compression	5910
	47 x 97		400	Double tension and compression	6310
	47 x 72		600	Double tension and compression	5070
	47 x 97		600	Double tension and compression	5090
MS400	47 x 72	417	400	Double tension	6920
	47 x 97		400	Double tension	7370
	47 x 72		600	Double tension and compression	5940
	47 x 97		600	Double tension and compression	5970

Notes

1 Spans are calculated based on the following applied floor loadings:
Top chord (live) 1.50 kN/m²
Top chord (dead) 0.25 kN/m²
Bottom chord (dead) 0.25 kN/m²
Total load 2.00 kN/m²

2 Permissible spans assume 100mm wide supports at each end, with the permissible span being taken between the centrelines of the supports.

3 Spans are based on deflections being limited to 0.003 x span up to a maximum of 14 mm.

4 Joists are simply supported at each end, with a minimum bearing of 45 mm.

5 Lateral restraint is provided by a suitably fixed floor deck, which will prevent buckling of the compression flange.

6 The joists are assumed to be part of a load-sharing system as defined in BS 5268-2 Cl 2.9.

2.3 DELIVERY, STORAGE AND MARKING

2.3.1 Marking

- Each web is stamped with the manufacturer's name.
- easi-joists®** shall bear the manufacturer's and fabricator's name, product description, IAB certificate number, job reference and joist reference. Instructions for storage and installation are supplied. The upper flange is marked top at a minimum of two locations and points of support are indicated.

2.3.2 Delivery

The joists are delivered to site by the fabricator. They shall be protected from the elements and incidental damage, during transport and delivery. Unless otherwise specified, the fabricator is responsible for the joists until they are off-loaded on site, after which they become the contractor's responsibility.

2.3.3 Storage

Site storage is intended to be short term. The fabrication and delivery of joists should be scheduled to minimise storage time at the fabricators premises and on site. The joists should be handled and stored in accordance with the Certificate holder's instructions. Joists

shall be protected from prolonged exposure to heat or moisture.

easi-joists® shall be stored upright, in well ventilated, level, dry conditions, on timber bearers, clear of the ground and vegetation, to prevent distortion. The joists should be lifted, in an upright orientation, using protective gloves.

2.4 Installation

- Joists must be installed strictly in accordance with the Certificate holder's instructions, and the conditions specified in this Certificate.
- Workmanship shall be in accordance with the Building Regulations 1997 – 2006 and BS8000-5: 1990 *Workmanship on building sites. Code of practice for carpentry, joinery and general fixing.*
- All joists to be erected truly vertical, parallel and in the orientation indicated on floor layout plans. All roof construction to be fully in accordance with design specification and drawings.
- Joists are prefabricated. They shall not be notched, drilled or cut without both the express permission of the fabricator and unless the modification has been signed off by a competent person.

- 2.4.5 Joists should be handled and installed in the same way as solid timber joists. They should be protected from moisture during installation. BS 5268-2 Table 1 gives guidance on average moisture content attained in service and upper limits on moisture content at the time of installation.
- 2.4.6 Typical installation details are given in the Certificate holder's *Metal Web Floor System Site Installation and Handling Guides* and in Figures 1 to 10.
- 2.4.7 Joists are unstable unless fully braced. If necessary, temporary bracing should be provided to maintain joists in an upright and plumb position during installation.
- 2.4.8 Noggins, restraint straps, decking and strong backs (where applicable) should be properly installed as specified by the designer, and before the floor/roof system is used. Unrestrained joists should not be subjected to traffic or loading.
- 2.4.9 Loading and joist spacing must not exceed that stated on the design layout drawings.
- 2.4.10 Joists must be strapped to masonry gable walls to assist stability, using 30mm x 5 mm straps at 2 m max centres. Where joists are parallel to walls, straps shall be carried over at least two joists, and associated noggins should be provided. Where joists are perpendicular to walls, straps shall run along the joist for at least 600mm. In timber frame construction, lateral stability to external walls should be provided by nailing and strapping in accordance with timber frame design and the Certificate holder's instructions.
- 2.4.11 Where joist hangers are used, the joist must be fixed to the hanger fully in accordance with the instructions of both the joist manufacturer and the hanger manufacturer. Care should be taken to ensure at least three courses of block work or equivalent, have been laid and the mortar cured, before the floor is used.
- 2.4.12 Strong backs should be installed tight to the top chord of the **easi-joists**[®] and should be fixed to vertical timber webs with two 3.15 mm \varnothing x 75mm nails. Strong backs may be spliced where required using a 600mm long timber spaced equally over the joint and nailed using six 3.15mm \varnothing x 75mm nails on either side of the joint. Strong backs must be installed prior to joists being permanently fixed in position.
- 2.4.13 Adequate supervision is required to ensure that the necessary level of fire and sound resistance is achieved. The fire and sound resisting properties will be compromised by the introduction of services or openings in the floor/ceiling voids. Services and openings shall not be located within or through the voids unless specified in and installed strictly in accordance with the design drawings. Appropriate steps shall be taken to seal openings, to achieve the required performance levels e.g. fire stopping shall be provided at all soil and vent pipes. See CI 4.1 and Figure 8.
- 2.4.14 The floor/roof construction should be completed as soon as possible to minimise exposure to moisture or precipitation.
- 2.4.15 In ground floors, adequate provision should be made for ventilation of the under floor space and for provision of damp proof courses or damp proof membranes as required. See CI 3.11 of this Certificate.
- 2.4.16 Preservative treatment shall be provided where appropriate and shall comply with national and European regulations.
- 2.4.17 Health and safety regulations, for manual handling of heavy loads, and working at heights, shall be observed.

3.0 Design Data

3.1 Application

Joists are suitable for use as an alternative to traditional structural timber joists, in conventional floor and roof construction, in domestic, commercial and light industrial buildings up to and including four storeys high, where the loading is as defined in Building Regulations 1997 Technical Guidance Document A Structure.

3.2 Structural model

The structural model used for analysis of **easi-joists**[®] is as follows:

- The member forces in an **easi-joist**[®] are evaluated by modelling the joist as a linear elastic plane frame, in which the steel webs are pinned at the centrelines of the timber flanges, both at their ends and at their root, and the flanges are assumed to be continuous, past these pinned nodes.

- All joint slip is assumed to be translational and to occur only in the direction of each web.
- Double webs are represented as single members, though with differing properties to single webs, pinned at each end on the flange centrelines.

3.3 Structural Design

3.3.1 The design shall be carried out by Wolf Systems Ltd, or an approved fabricator, in accordance with the Building Regulations 1997-2006 and BS 5268-2:2002/IS 444. The design process is outside the scope of this certificate.

In addition to the design and detailing carried out by Wolf Systems Ltd or the approved fabricator, the overall floor construction shall be designed and detailed by competent persons in accordance with the Building Regulations 1997 – 2006, the Certificate holder's instructions and this Certificate.

3.3.2 The joists are designed to act as simply supported flat trusses, transferring load to internal and external load bearing walls or ridge beams. The design shall include for the provision of the necessary intermediate supports to meet the load span and deflection criteria.

3.3.3 Bearing strength at supports is limited by crushing at the underside of the bottom flange and should be calculated using relevant compression stress perpendicular to the grain, given in BS 5268-2/IS444. Bearing strength is rarely the governing design requirement. Walls should be designed to take account of bearing arrangement.

3.3.4 Flanges should be designed in accordance with the following:

- a) Combined bending and tension:- BS5268-2 Cl 2.12.3, using the relevant permissible stresses from BS5268-2/IS444
- b) Combined bending and compression:- BS 5268-2 Cl 2.11.6 using the relevant permissible stresses from BS5268-2/IS444
- c) Flange splice joists are formed using Wolf 101 nailplates and should be designed using the permissible anchorage and steel strengths given for Wolf 101 nailplates, in BBA Certificate No 89/2290 Detail Sheet 6.

3.3.5. Web strengths

For web design, the applied axial forces acting on the webs are evaluated, using the structural model described in Section 3.2 of this Certificate, and compared with the relevant permissible tensile or compressive axial strengths given in Table 7.

The permissible web strengths given in Table 7 are derived from testing carried out by TRADA Technology Ltd, in accordance with CUAP No 03/04/09¹.

The permissible web strengths given in Table 7 apply to:

- a) **easi-joists**[®] used as floor joists. For roof joists, the values shall be modified by a load duration factor of 1.12 (see Cl 3.3.7).
- b) webs used in conjunction with TR26 grade timber flanges. For C24 grade flanges, permissible web strength values shall be modified by a factor of 0.97 to reflect the lower density of C24 grade timber relative to TR 26 grade timber.

3.3.6 Member and joist stiffness

a) Deflections of **easi-joists**[®] are calculated by summing together:

- axial deflections of timber flanges
- axial deflections of steel webs
- joint slip deflections using the translational slip moduli given in Table 8.

¹ CUAP 03/04/09 *Common understanding of assessment procedure for a European Technical Approval (ETA) according to article 9.2 of the Construction Products Directive Metal Web Joists December 2005*

b) Deflection shall not exceed the following:

- Floors: 0.003 of the span up to a maximum deflection of 14mm;
- Roofs: 0.003 of the span.

Table 8 Translational slip moduli

Joist Type	Translational slip moduli for each pinned node/flange for	
	Single web N/mm	Double web N/mm
MS200	39000	28000
MS250	30000	29000
MS300	23500	17500
MS400	15500	12000

3.3.7 Load duration

a) Webs: The permissible strengths of **easi-joists**[®] given in Table 7 are for long term loading conditions and shall be adjusted for load duration effects, using the following modification factors:

Load duration factor - medium term loading 1.12
Load duration factor - short/very short term loading 1.25

b) Flanges: Permissible strength of flanges to be adjusted using the load duration factors given in BS5268-2.

3.4 Design criteria

The joists are designed to ensure that permissible stresses in shear, bending, tension and compression, will not be exceeded.

3.5 Permissible spans

Permissible spans for **easi-joists**[®] used as domestic intermediate floor joists, are given in Table 6. Spans for all other loadings, applications and timber grades must be calculated using Wolf Systems Ltd software, based on adjusted web strengths where appropriate (see Section 3.3.5).

3.6 Fire resistance

A building construction, incorporating **easi-joists**[®], shall be designed to have a fire resistance appropriate to its end use. See Section 4.1 of this Certificate.

3.7 Sound resistance

A building construction, incorporating **easi-joists**[®], shall be designed to have the resistance to sound that is appropriate to its end use. See Section 4.5 of this Certificate.

3.8 Roof design

easi-joists[®] for use in roof construction are designed in the same way as for use in floor construction i.e. as simply supported beams and take into account appropriate load duration factors and applied loadings. Cantilevered joists should be designed for wind uplift.

3.9 Pre-camber

Pre-cambered beams are excluded from the scope of this certificate

3.10 Joist hangers

Joist hangers should be selected in accordance with Wolf Systems Ltd and joist manufacturer's specifications

3.11 Preservative treatment

Wolf Systems Ltd recommends that where the joists are at risk from fungal or insect attack, the flanges should be treated with preservative. The preservatives used be in accordance with national and European regulations and shall not compromise the durability of the steel webs. Chromated Copper Arsenate (CCA) preservative shall not be used.

3.12 Services

Consideration should be given to the incorporation of services. Aperture dimensions are given in Table 10. The fire and sound resistance of the floor construction shall not be compromised by the introduction of services. See Sections 4.1 and 4.5 of this Certificate.

Table 10 Aperture Dimensions

Dimensions	MS200	MS250	MS300	MS400
A mm	125	160	210	323
D mm	100	150	200	280
H mm	W mm	W mm	W mm	W mm
50	300	300	330	500
100	100	200	250	410
150		70	170	330
200				250
250				170
300				70

Table 7 Permissible long-term web axial strengths for easi-joists® with TR26 Flanges

Joist Designation	Permissible axial strength for single web acting in:			Permissible axial strength for double web acting in:	
	Tension at support node kN	Tension at internal node kN	Compression kN	Tension kN	Compression kN
MS200	4.77	4.25	4.96	8.56	9.85
MS250	3.71	3.32	3.79	6.71	6.49
MS300	2.82	2.75	3.14	4.94	5.55
MS400	3.26	2.99	4.08	5.18	5.51

Notes
1 Permissible web strengths derived from TRADA tests undertaken in accordance with CUAP no. 03/04/09.

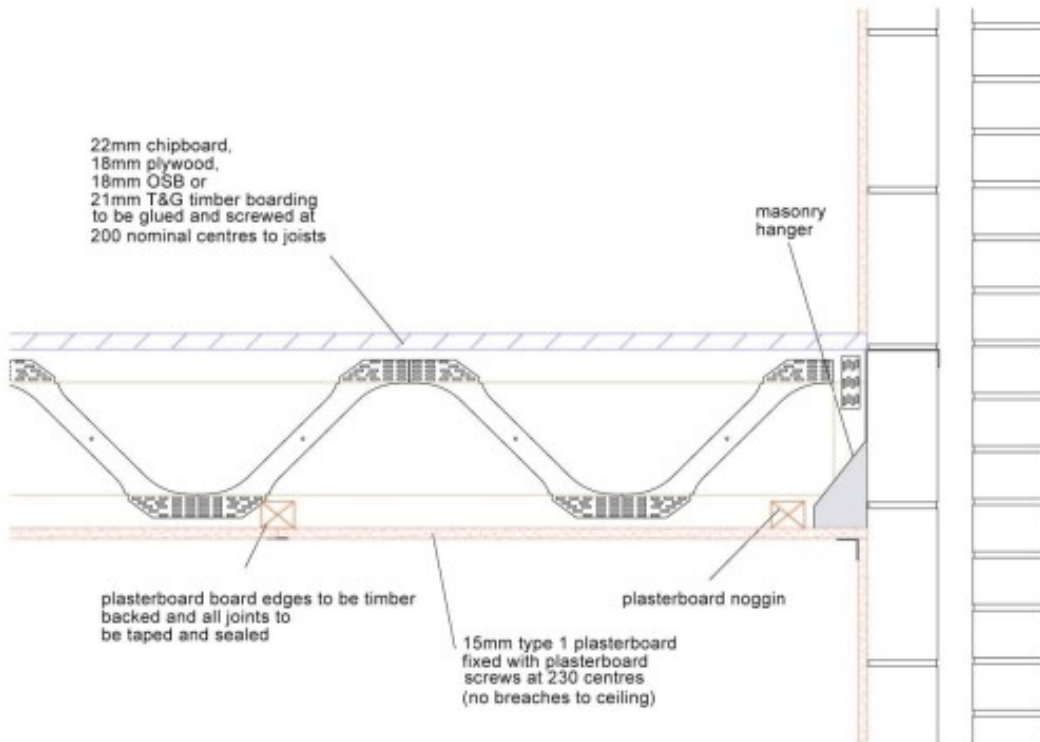


Figure 2 Cross section through intermediate floor:
 30 minutes fire resistance: easi-joists at > 400mm centres

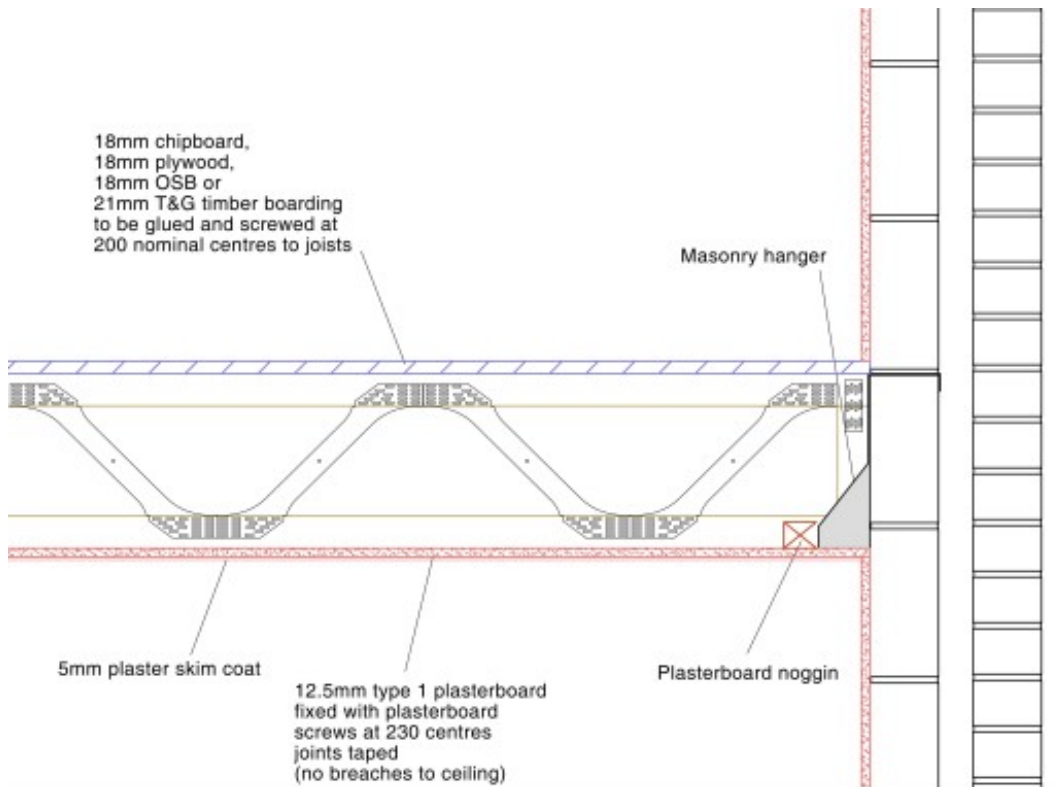


Figure 3 Cross section through intermediate floor;
 30 minutes fire resistance: easi-joists at 400mm centres

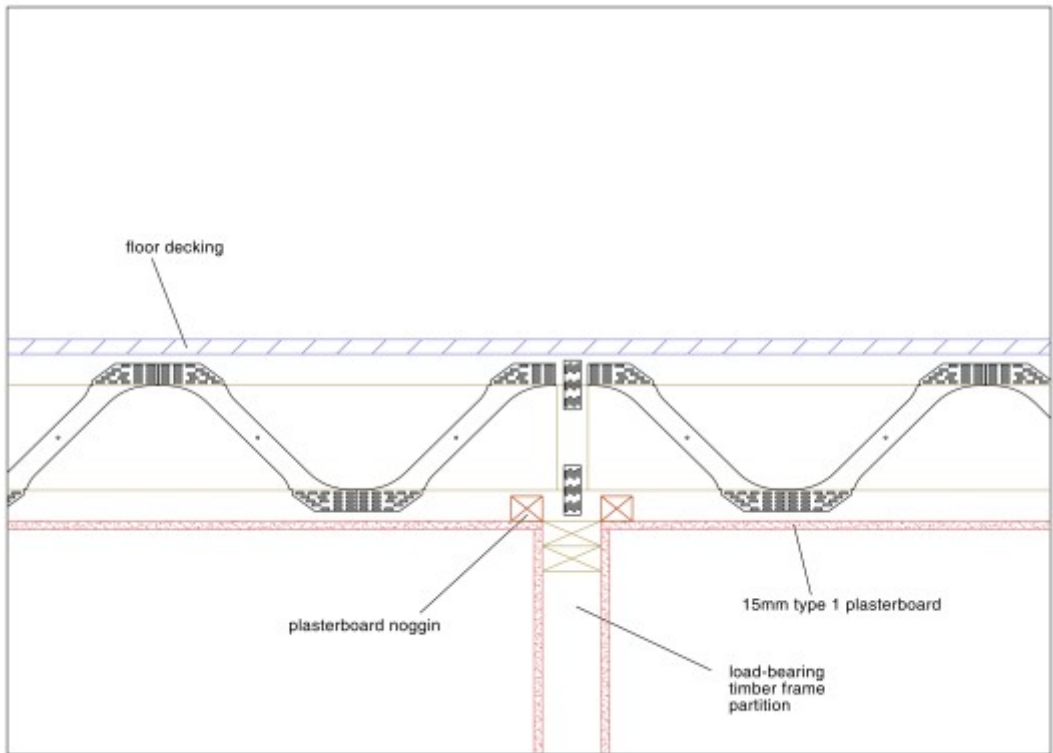


Figure 4 Cross section: load bearing timber frame wall perpendicular to joists; 30 minutes fire resistance; joist centres > 400mm

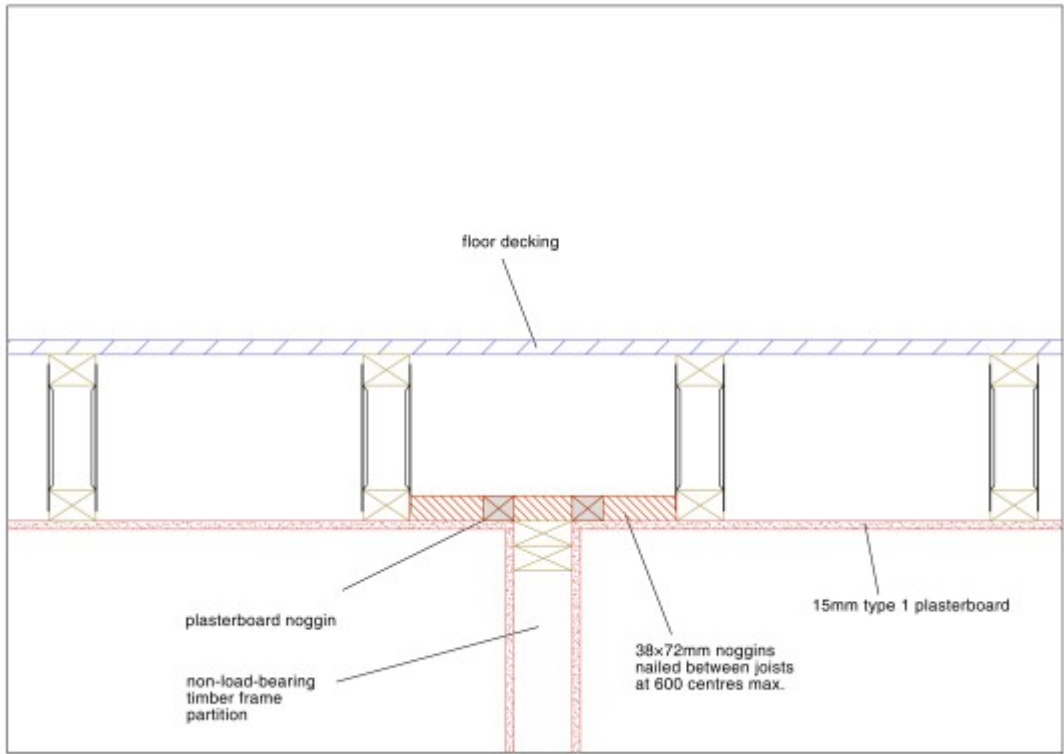


Figure 5 Cross section; non-load bearing timber frame wall parallel to joists; 30 minutes fire resistance; joist centres > 400mm

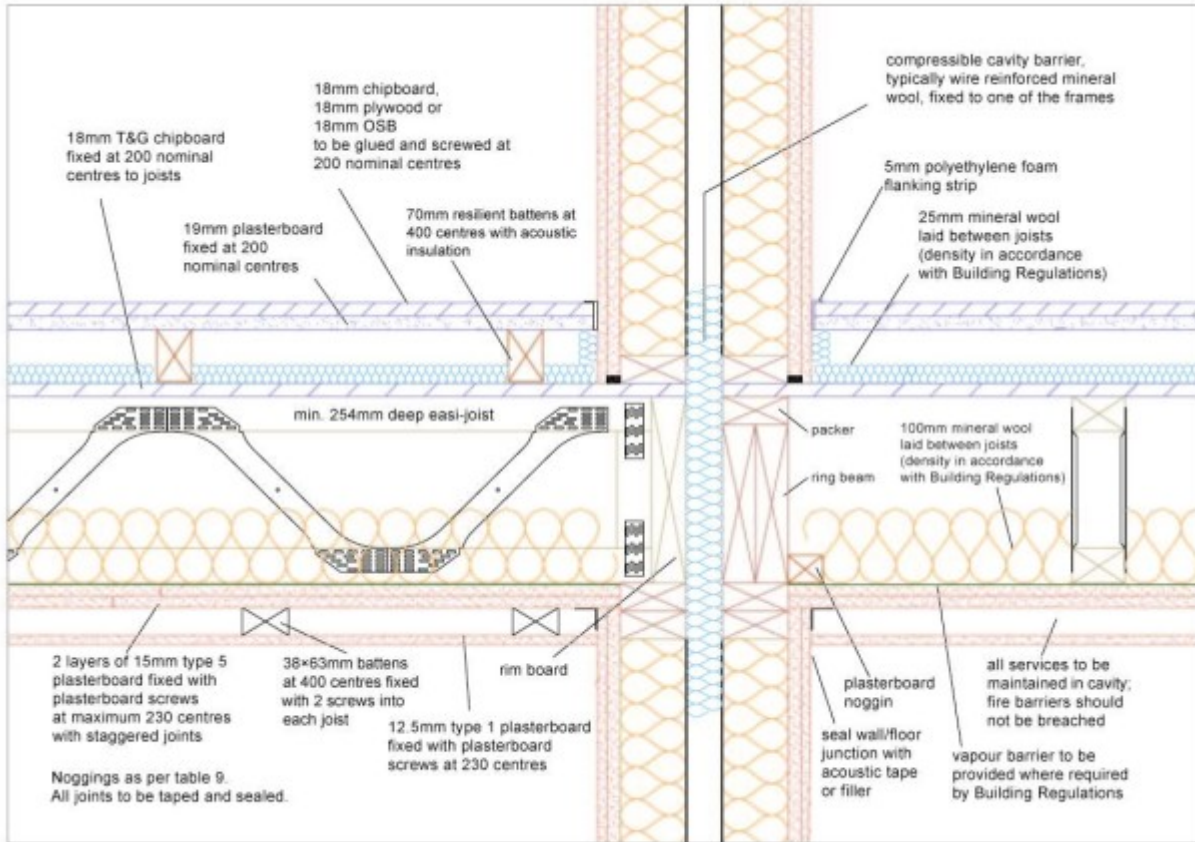


Figure 6 Cross section; compartment floor construction; junction with timber frame party wall; 60 minutes fire resistance

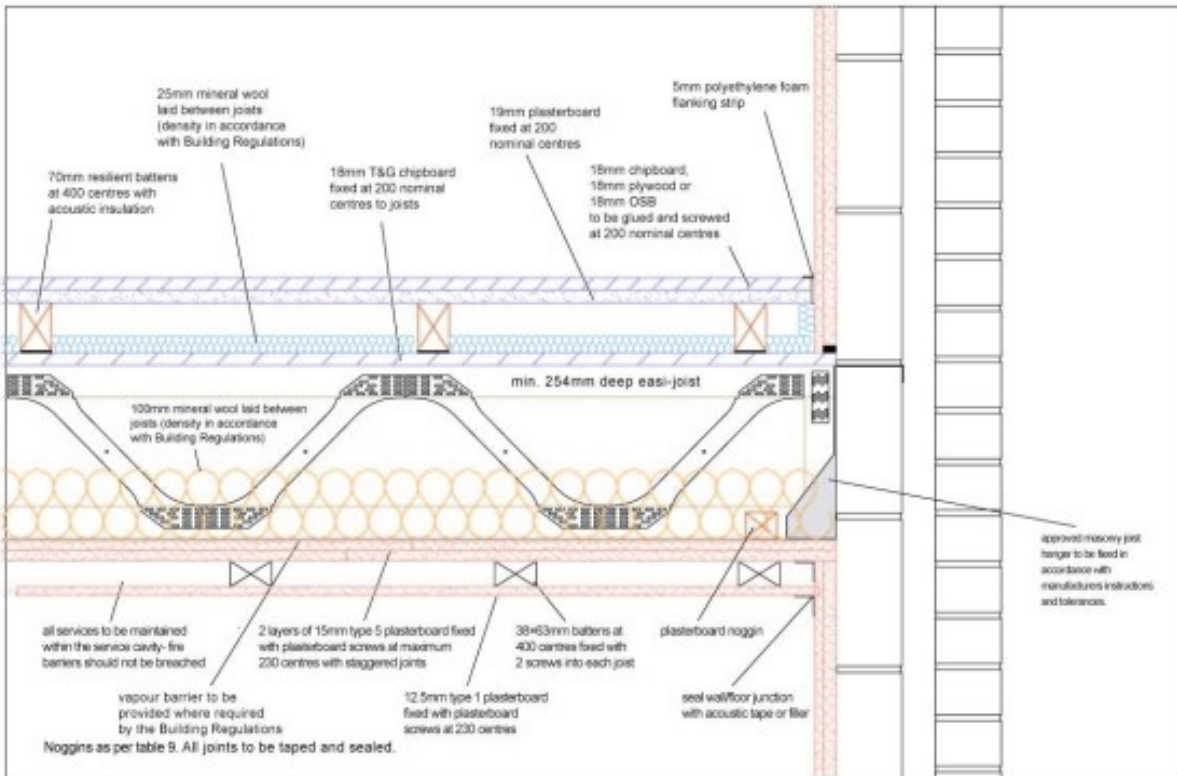


Figure 7 Cross section; easi-joist compartment floor construction; Junction with masonry wall; 60 minutes fire resistance

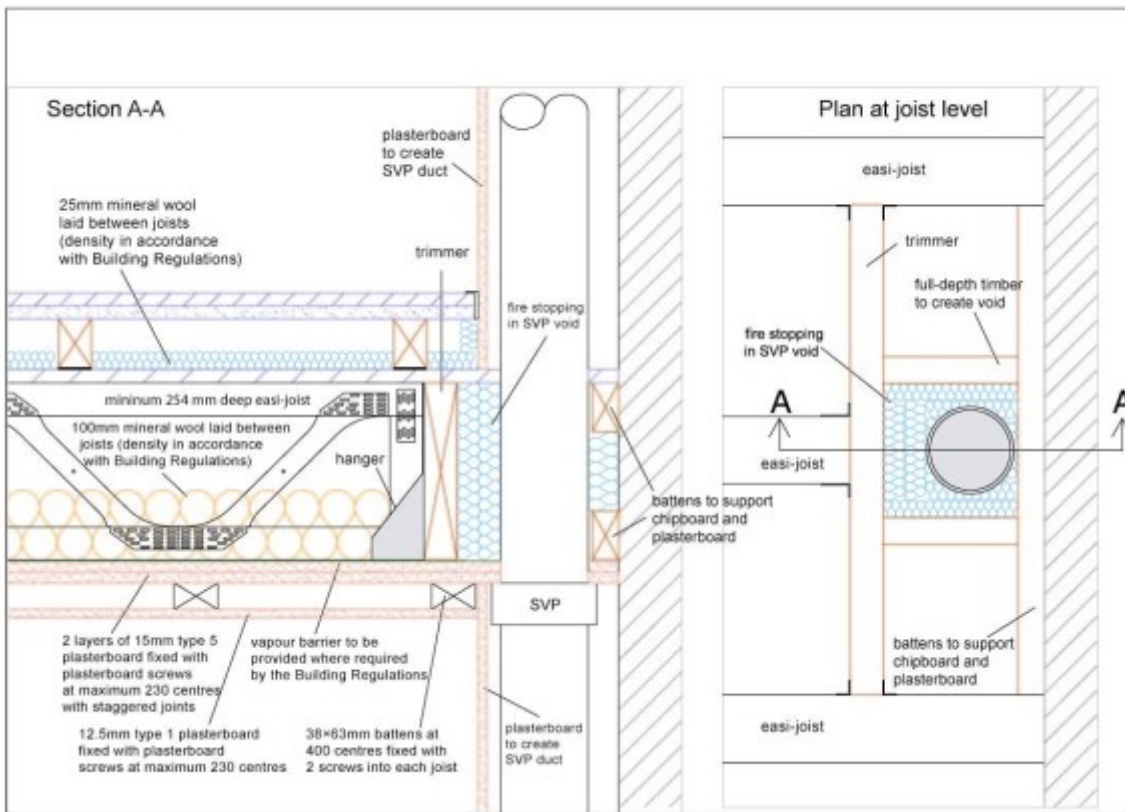


Figure 8 Cross section; compartment floor construction; Soil and vent pipe enclosure; 60 minutes fire resistance

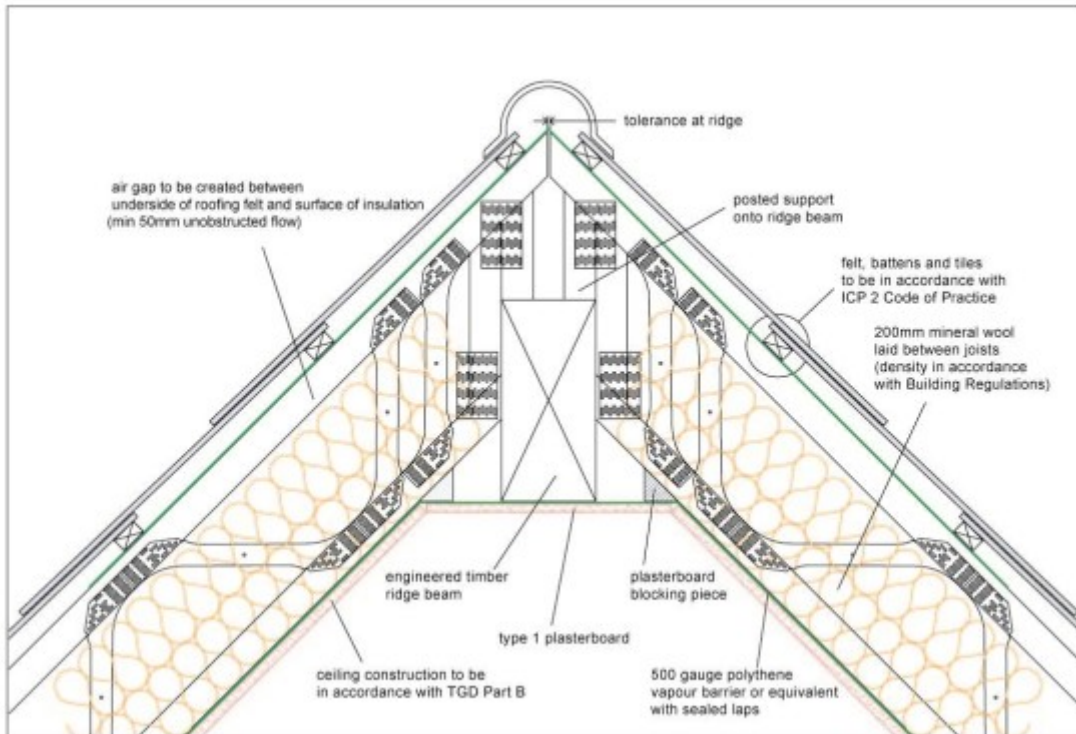


Figure 9 Cross section; roof construction; ridge detail

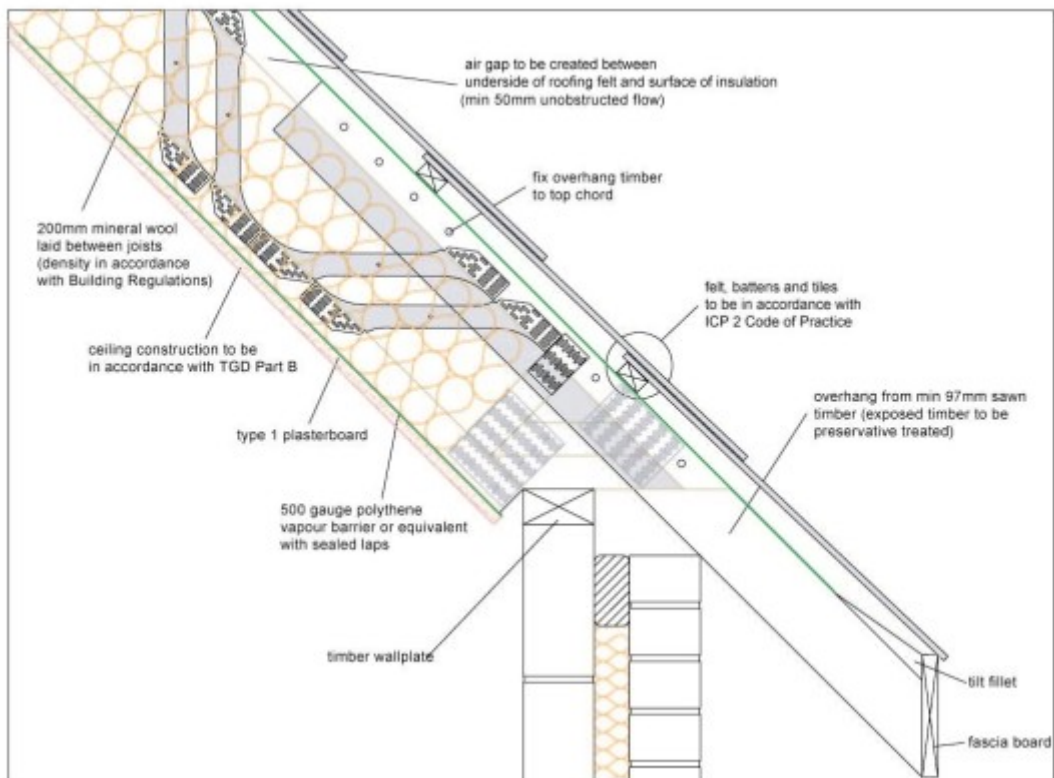


Figure 10 Cross section; roof construction; eaves detail

Table 9 easi-joists[®] floor construction providing fire resistance[®] in accordance with BS 476: Part 21

Fire resistance requirements	30 minutes fire resistance in accordance with BS 476-21:1987 <i>Fire tests on building materials and structures. Methods for determination of the fire resistance of load bearing elements of construction</i>
Joist description	easi-joists[®] of depths 219 mm, 254 mm, 304 mm, 417 mm; minimum nominal flange size 47 x 72 mm. Joist centres in the range 400 to 600 mm; maximum spans as defined by cold state structural requirements
Ceiling linings	Joist centres 400 mm ; 12.5mm Type 1 square edged plasterboard with perimeter noggins, screw fixed at 230 centres, joints taped. 5 mm plaster skim coat. Joist centres greater > 400 mm and ≤ 600 mm 15 mm Type 1 plasterboard, with perimeter and board edge noggins, screw fixed at maximum 230 centres 12.5 mm Type 5 plasterboard, with perimeter and board edge noggins, screw fixed at maximum 230 centres
Floor decking	a) Joist centres ≤ 450 mm: 18 mm T&G chipboard b) Joist centres ≤ 600 mm: 22 mm T&G chipboard c) 18mm OSB/3 d) 18 mm plywood e) 21 mm T&G softwood boarding
Fire resistance requirements	60 minutes fire resistance in accordance with BS 476-21:1987 <i>Fire tests on building materials and structures. Methods for determination of the fire resistance of load bearing elements of construction</i>
Joist description	easi-joists[®] of depths 254 mm, 304 mm, 417 mm; minimum nominal flange size 47 x 72 mm. Joist centres in the range 400 to 600 mm; maximum spans as defined by cold state structural requirements
Ceiling linings	2 layers of 15 mm Type 5 plasterboard, with perimeter and board edge noggins, screw fixed at maximum 230 centres or 2 layers of 15 mm Type 5 plasterboard, screw fixed at maximum 230 centres to resilient bar. Resilient bar at 450 centres, screw fixed to joists
Service void	1 layer 12.5 mm Type 1 plasterboard fixed to underside of fire resistant construction, using battens, to form a service void. The void will allow for installation of cables, ducting and recessed down lighters, while maintaining the integrity of the upper layers, thus maintaining the necessary level of protection against fire and sound penetration.
Floor decking	a) 18 mm T&G chipboard b) 15 mm OSB/3 c) 15 mm plywood
Notes	
1	Plasterboard is in accordance with BS 1230-1: 1985 <i>Gypsum plasterboard excluding materials submitted to secondary operations.</i>
2	Ceiling boards are positioned with the long edge perpendicular to the joist. Where a second layer is used, joints should be staggered /offset so that joints do not occur at the same location as the first layer of board. Each board to be fixed independently, to the underside of the joists, using black, phosphated steel screws positioned at 230 mm centres. Screw length, diameter and penetration to suit thickness of plasterboard, in accordance with manufacturer's instructions.
3	All joints to be filled using gypsum joint filler and taped with glass fibre tape, unless otherwise specified. All screw heads to be spotted.
4	a) Fire stopping around ceiling penetrations should be inspected and signed off by a competent person. b) 30 minutes fire resistance: Only openings fitted with an approved light fitting or an appropriate proven penetration system are satisfactory. No other openings are permitted. c) 60 minutes fire resistance: A service void shall be created beneath the fire resisting construction using battens and Type 1 plasterboard.
6	Perimeter and intermediate noggins are required as indicated, to support the boards at their edges. Perimeter noggins are required for all board thicknesses and joist centres. Intermediate noggins are only required for thinner boards at larger centres Minimum permitted perimeter noggin sizes (depth x width): 38 mm x 47 mm Minimum permitted intermediate noggin sizes (depth x width): 47 mm x 72 mm
7	The fixing and noggin requirements given above are minimum requirements. Manufacturer's instructions should be followed.
8	Flooring to be tongue and grooved and fixed in accordance with good practice. If square edged boards are used, timber noggins are required under board edges that are not supported on joists

4.1 BEHAVIOUR IN FIRE

Internal fire spread (structure) The fire resistance for floor constructions shown in Table 9 have been assessed against BS 476 Part 21: 1987 *Fire tests on building materials and structures. Methods for determination of the fire resistance of load bearing elements of construction* and are considered to be as indicated. Typical constructions are given in Figures 2 to 8.

All relevant requirements of the Building Regulations Part B Section 3 must be satisfied e.g. in relation to provision of fire stopping and cavity barriers.

The fire resisting properties depend on the integrity of the construction being maintained intact. Services and openings shall not be located within or through the voids unless specified in and installed strictly in accordance with the design drawings. Where openings are permitted, appropriate steps shall be taken to seal them, to achieve the required performance levels e.g. fire stopping shall be specified at all soil and vent pipes. See Figure 8.

4.2 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Where electrical cables pass through highly insulated materials, de-rating of the electric cables should be allowed for, in accordance with ET 101:2000 National Rules for Electrical Installations.

4.3 MAINTENANCE

easi-joists® will not require maintenance providing that the floor is maintained in good repair, i.e. intact and protected from excess moisture.

4.4 DURABILITY

When installed in accordance with the Certificate holder's instructions and this Certificate, and adequately protected from excessive moisture or condensation, the design life of the joist is considered to be at least 60 years.

4.5 SOUND

The type of floor construction used will determine the resistance to impact and airborne sound. Test data has been reviewed which indicates that the sound insulation properties of compartment floors, incorporating **easi-joists®**, are at least as good as those of similar construction, incorporating traditional timber joists.

The results of testing to 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* and BS EN ISO 140-6: 1998 *Acoustics. Measurement of sound insulation in buildings and of building elements. Laboratory measurements of impact sound insulation of floors* are given in Table 11.

Airborne sound resistance for an easi-joist intermediate floor construction is given in Table 12.

The sound resisting properties depend on the sealing and integrity of the construction being maintained intact. Services and openings shall not be located within or through the voids unless specified in and installed strictly in accordance with the design drawings. Where openings are permitted, appropriate steps shall be taken to seal them, to achieve the required performance levels.

4.6 TESTS/ASSESSMENTS

The following were assessed

- Trada Technology Ltd test data for testing in accordance with CUAP no 03/04/09
- Fire test reports to BS 476: Part 21 1987 CI 7
- Fire test reports to BS EN 1365-2:1999
- Acoustic test reports covering airborne sound insulation test on compartment floors to BS EN ISO 140-3:1995
- Acoustic test reports covering impact sound insulation test on compartment floors to BS EN ISO 140-6:1995
- Method of derivation of permissible web strengths and joint slip moduli for web-flange joints including assessment of proposed global adjustment factor.
- Verification of design method and load span tables.
- Assessment of installation instruction and typical construction details for Ireland.

4.7 OTHER INVESTIGATIONS

- (i) The manufacturing process was examined including methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- (ii) The IAB carried out visits to assess the practicability of installation of the product.

Table 11 Results of comparative airborne sound insulation and impact sound insulation tests on a compartment floor construction incorporating easi-joists® and a compartment floor construction incorporating timber joists

Sound Properties	Requirement (See Note 1)	Structural floor construction		Test method	Comment
		254 mm deep easi-joist® (See Note 2)	219 mm deep timber joist		
Airborne sound - weighted standardised level difference - $D_{nT,w}$ (dB)	52	58	58	BS EN ISO 140-3: 1995	The higher the value, the better the acoustic performance of the floor
Impact Sound – weighted standardised sound pressure - $L_{n,T,w}$ (dB)	61	59	60	BS EN ISO 140-6: 1995	The lower the value, the better the acoustic performance of the floor
<p>Floor construction:</p> <p>Floating floor 18 mm T&G chipboard, with perimeter flanking strip, glued and screwed at 200 mm nominal centres to, 19 mm plasterboard plank screwed at 200 mm nominal centres 70 mm x 50 mm resilient battens at 400 centres, with 25mm mineral wool laid between battens, laid on 18 mm T&G chipboard deck glued and screwed at 200 mm nominal centres to:</p> <p>Structural Floor</p> <p>Timber joist construction: 219 x 47 mm timber joists at 600 c/c, with 100 mm mineral wool laid between joists or easi-joist® construction: 254 mm x 72 mm easi-joist® at 600 centres with 100 mm mineral wool laid between joists</p> <p>Ceiling construction 2 layers 15 mm Type 5 plasterboard, screwed at 150 centres to joists 38 mm x 63 mm battens at 400 centres, screwed to joists 12.5 mm Type 1 plasterboard screwed at 230 centres to battens, all joints taped and skimmed, perimeter sealed.</p>					
<p>Notes:</p> <p>1 Reference Building Regulations Technical Guidance E Sound Table 1 Mean requirement for sound transmission in separating floors when tested in at least 4 pairs of rooms 2 For separating floors, minimum easi-joist® depth permitted is 254 mm</p>					

Table 12 easi-joist intermediate floor construction providing an airborne sound resistance of greater than 40 dB

Element	Description
Joist	Easi-joists of depth 219 mm with a nominal flange size of 47x72mm; joist centres of 600mm
Ceiling lining	15mm type 1 plasterboard screw fixed at maximum 230mm centres.
Floor decking	22mm thick T&G chipboard glued & screwed to joists
<p>Notes:</p> <p>1 There are no regulatory requirements in Ireland for airborne sound resistance of intermediate floors. 2 Testing was carried out in accordance with BS EN ISO140-3: 1995. Results demonstrated that the above floor construction had an airborne sound resistance of 41 dB. On the basis that acoustic performance improves with increasing floor depth, an airborne sound resistance in excess of 40 dB should also be provided by intermediate floors using Easi-joists of depths 254mm, 304mm and 417mm.</p>	

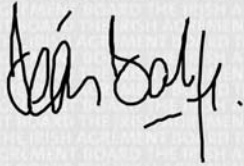
- 5.1** National Standards Authority of Ireland ("NSAI") following consultation with the Irish Agrément Board ("IAB") has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:
- (a) the specification of the product is unchanged.
 - (b) the Building Regulations 1997 to 2006 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.
 - (c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.
 - (d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.
 - (e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.
 - (f) the registration and/or surveillance fees due to IAB are paid.
- 5.2** The IAB mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the IAB mark and certification number and must remove them from the products already marked.
- 5.3** In granting Certification, the NSAI makes no representation as to;
- (a) the absence or presence of patent rights subsisting in the product/process; or
 - (b) the legal right of the Certificate holder to market, install or maintain the product/process; or
 - (c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.
- 5.4** This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.
- 5.5** Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act. 1989, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.
- 5.6** The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.
- 5.7** Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, Manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

The Irish Agrément Board

This Certificate No. 07/0280 is accordingly granted by the NSAI to **Wolf Systems Ltd** on behalf of The Irish Agrément Board.

Date of Issue: **June 2007**

Signed



Seán Balfe
Director of the Irish Agrément Board

Readers may check that the status of this Certificate has not changed by contacting the Irish Agrément Board, NSAI, Glasnevin, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. www.nsai.ie