

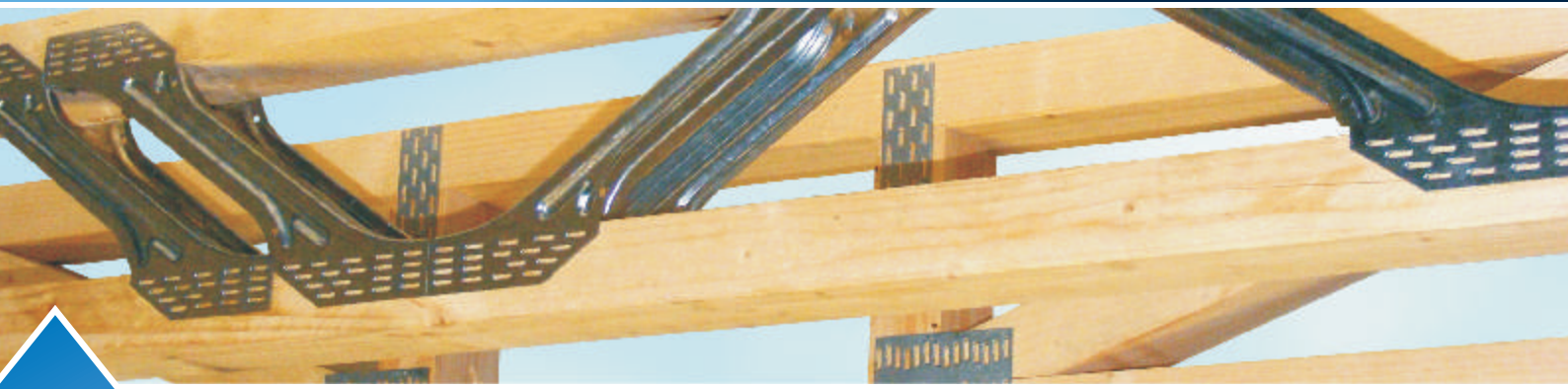
ALPINE

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MCL

T-GL

006



OPEN WEB JOIST MANUAL



A member of the Trussed Rafter Association



Certificate no. THE-006
(for Waveplate - the nailplate used in FloorTrus)



A member of the UK Timber Frame Association



NHBC Acceptance (FloorTrus)



SpaceJoist tests carried out at The Building Test Centre:
Sound test - report no. 15870A

B.R.E.

FloorTrus tests carried out at the Building Research Establishment:
Sound test - report no. 231884
30 min fire test - report no. 230795
60 min fire test - report no. 230475

SpaceJoist tests carried out at the Building Research Establishment:
30 min fire test - report no. 242562
60 min fire test - report no. 245288

NOTE: FloorTrus was formerly known as System 42.
In some cases, testing has been carried out under it's earlier name

Recommended additional reading: "Engineered Wood Products" by the UKTFA

//TWIndustry

Advancing timber frame fabrication

ITW Industry, a division of Illinois Tool Works (ITW), specialises in products and services for the timber construction industry - offering a complete package including software, components, fasteners and equipment.

ITW is a leading international business corporation with revenues in excess of \$US16 billion. With almost 100 years of experience in the design, development and manufacture of fasteners & components, and equipment & consumable systems, as well as a variety of speciality products for customers all around the world.

ITW's financial performance is generated by some 825 decentralised business units, employing over 60,000 people in 52 countries. Typically amongst the top 100 patent holders in the USA, ITW holds over 5,000 product lines and ranked 360th in the FT's global list of the worlds largest companies. ITW is well positioned to meet the challenges of today's global markets.

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Overview

To maintain a competitive edge you need to build fast, build to last and build for less. That's why construction professionals are turning to open web floor solutions to meet these demands and more.

The most common open web system on the market is the metal web joist such as Alpine's SpaceJoist™. The open web construction allows for service runs without the need for drilling or notching, eliminating typical errors that incur costly remedial work. The consistent depth of these off-site manufactured joists allows for easier floor deck and ceiling installation. These benefits reduce the amount of time contractors spend on site, speeding up construction, and ultimately saves the builder money.

Timber web joists have all the key features and benefits of their metal web counterparts and more! Alpine's FloorTrus™ system is the pioneering system of

this type in the UK and Ireland. FloorTrus can be typically made to any depth between 219mm and 600mm, with freedom in web configuration to allow for large services in any position. Robust in transit, and with exceptional resistance to dynamic loading, FloorTrus is unrivaled by any other timber engineered alternative. FloorTrus is also the ideal choice for the environmentally conscious, as off-cuts from roof truss production can be recycled for the webs, and the system stands as a serious competitor to concrete floors.

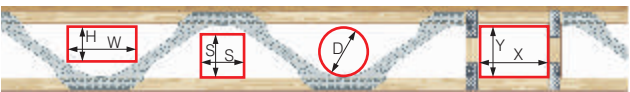
When time scales are tight, TrimTrus™ is the answer, offering an instant engineered timber web solution - purchased over the counter in stock lengths and trimmable by up to 600mm for site adjustment. For more information on TrimTrus, please call us on 01872 245450.

Opening Sizes

These diagrams indicate the sizes of the voids created by the open web feature with information on the maximum size of services to be passed through them.



Maximum SpaceJoist opening sizes

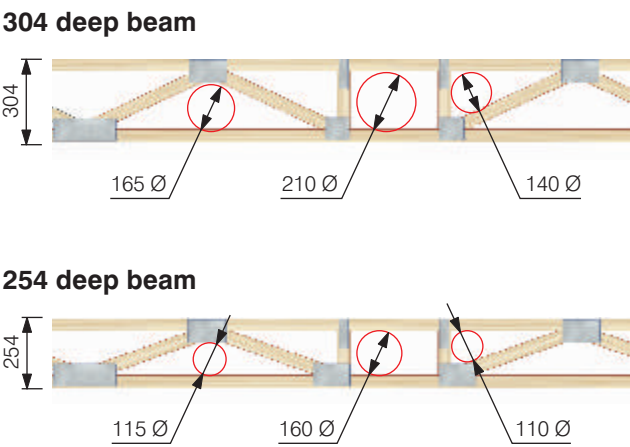


Depth	D*	H*	W*	S*	X	Y
195	120	73	208	107	605	125
219	120	73	208	107	605	125
254	154	97	208	133	605	159
304	192	121	215	155	605	210
424	265	178	264	212	705	330

*These dimensions include a 3mm clearance. These are approximate dimensions as discrepancies may occur in manufacture.



Typical FloorTrus opening sizes



NOTE: FloorTrus depths may be altered to suit particular duct requirements.

Features & benefits

	Sj SpaceJoist	F FloorTrus	T TrimTrus
Fast and simple installation of services, without drilling or notching allowing tradesmen to work more productively on site.	●	●	●
Excellent resistance to dynamic loading and low sound transmission.		●	●
More robust in transport and less prone to damage on site.		●	●
Design flexibility to locate bearing walls and partitions.	●	●	
High strength and rigidity over long clear spans - in excess of 8 meters achievable, reducing the necessity for using intermediate load bearing walls.		●	
Bespoke design eliminates site alterations, saving timber resources by reducing the amount of waste timber generated during construction.	●	●	
No glues used in manufacture.	●	●	●
Off-cuts from roof truss manufacture can be used for webs.	●	●	●
All timber construction ensures no cold bridging when incorporating the joists in roof or wall designs.		●	●
Lower carbon footprint than concrete floors.	●	●	●
Wide spacing requires fewer joists and reduces the need for intermediate load bearing walls and partitions.	●	●	●
The wide nailing surface allows for quicker application of the floor and ceiling.	●	●	●
300mm trimmable ends allow bearing location errors to be fixed instantly on site.			●
Manufactured offsite ensuring consistent quality and reliability.	●	●	●
The Alpine design software enables floor designs to an enormous number of specifications.	●	●	
Lightweight construction.	●		
Off the shelf product means no lead time for design			●

● The statement applies to the floor system.

● The statement applies to the floor system, but to a lesser extent

Span tables

Due to the design flexibility of the SpaceJoist and FloorTrus systems, there are many variables affecting the maximum span of a joist, so these span tables are indicative and are to be used only as an estimating tool.

Floor loading table

Loading (kN/m²)	Floor deck (dead)	Ceiling (dead)	Floor (imposed)
Domestic	0.16	0.25	1.5
Domestic + Partition	0.38	0.25	1.5
General Office	0.16	0.25	2.5



FloorTrus span table

Design criteria	Timber grade/size	TR26 / 97 X 47						TR26 / 72 X 47					
	Joist Centres	400			600			400			600		
	Loading (refer to the loading table above)	Domestic	Domestic + partition	General office	Domestic	Domestic + partition	General office	Domestic	Domestic + partition	General office	Domestic	Domestic + partition	General office
Joist depths	219	5660	5460	4935	4960	4785	4310	5140	4955	4360	4490	4335	3910
	254	6210	6040	5515	5545	5350	4820	5740	5540	4990	5015	4840	4330
	304	6885	6690	6200	6225	6055	5515	6390	6220	5705	5730	5540	5000
	356	7525	7330	6755	6780	6610	6125	6995	6775	6290	6315	6150	5435
	418	8235	8015	7405	7435	7240	6665	7625	7430	6825	6905	6685	5970



SpaceJoist span table

Design criteria	Timber grade/size	TR26 / 97 X 47						TR26 / 72 X 47					
	Joist centres	400			600			400			600		
	Loading (refer to the loading table above)	Domestic	Domestic + partition	General office	Domestic	Domestic + partition	General office	Domestic	Domestic + partition	General office	Domestic	Domestic + partition	General office
Joist depths	219	5160	5160	4910	4770	4735	4140	4810	4810	4480	4450	4295	3695
	254	5630	5630	5530	5310	5230	4375	5245	5245	5060	4955	4735	4185
	304	6240	6240	6240	6150	5920	4515	5810	5810	5810	5745	5470	4490
	424	7490	7490	7490	7320	6995	5315	6970	6790	6970	6840	6785	5295

A close-up photograph of a wooden floor joist system. Several blue pipes are visible, running parallel to the joists. Metal brackets are used to secure the pipes. The joists are made of light-colored wood. The image is partially covered by a dark blue overlay at the bottom.



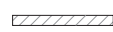

FLOOR DETAILS

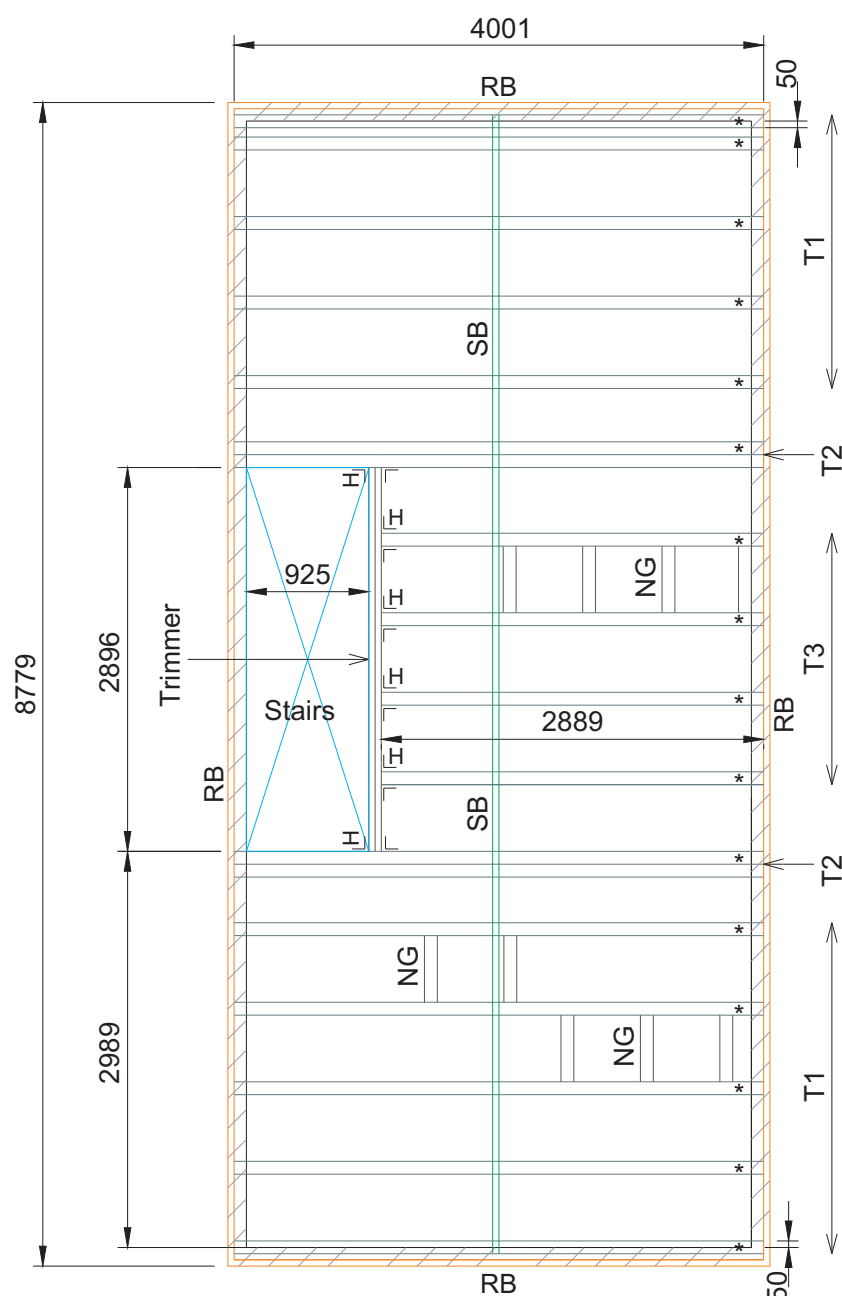
Picture

A feature of both SpaceJoist and FloorTrus is that services such as pipes and cabling can be passed through the open webs while specially designed chases can be incorporated into the joists to allow for larger services such as air conditioning units.

Typical open web joist layout

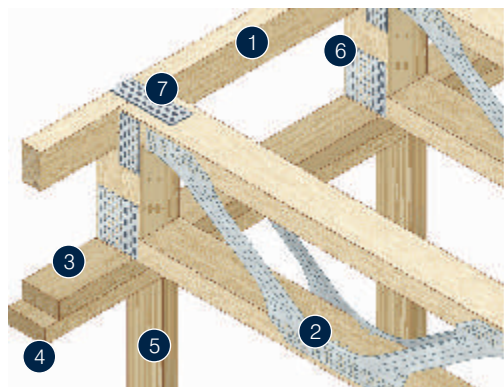
Sj SpaceJoist & **F** FloorTrus

-  **SB** Strongback
-  **RB** 35mm wide prefabricated rim beam
-  Load bearing wall
-  **NG** 47 x 97 flat (or equivalent) noggins at 600 centres to support non-load bearing walls (see the detail on page 09), fixed with Z-Clips
- H** Joist Hanger
- *** Align end of joists marked so that the webs line through to provide a straight run for services



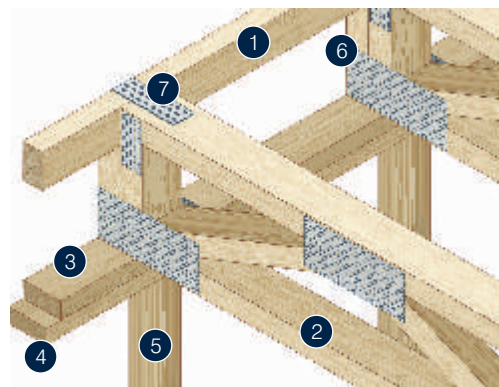
Continuous end restraint (ribbon notch)

Sj SpaceJoist



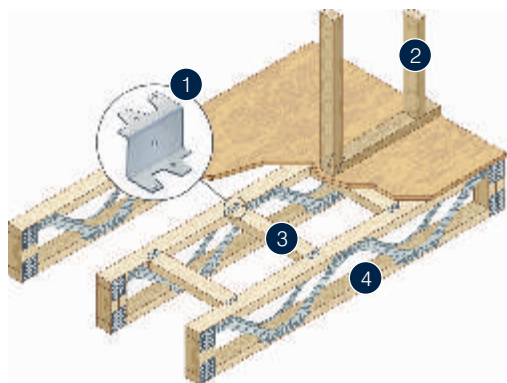
- (1) Continuous end restraint (ribbon beam)
- (2) SpaceJoist or FloorTrus
- (3) Panel head binder
- (4) Panel top rail
- (5) Stud
- (6) Block supporting the ribbon beam
- (7) 80 x 150 hand nail plate

F FloorTrus



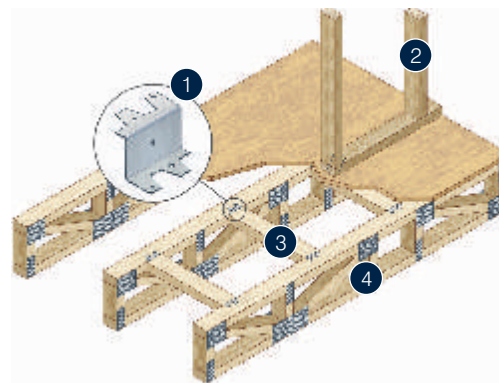
Non load-bearing partitions parallel to joists

Sj SpaceJoist



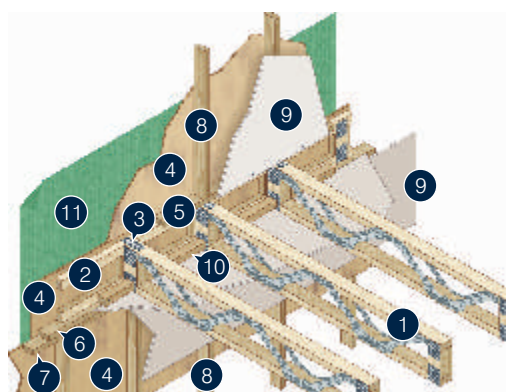
- (1) Z-clip
- (2) Non load bearing partition
- (3) Timber noggin
- (4) SpaceJoist or FloorTrus

F FloorTrus



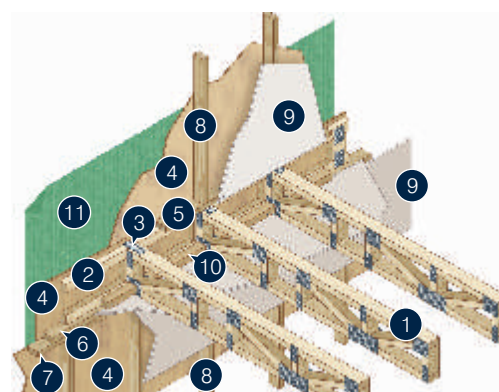
Timber frame rim beam (perpendicular to wall)

Sj SpaceJoist



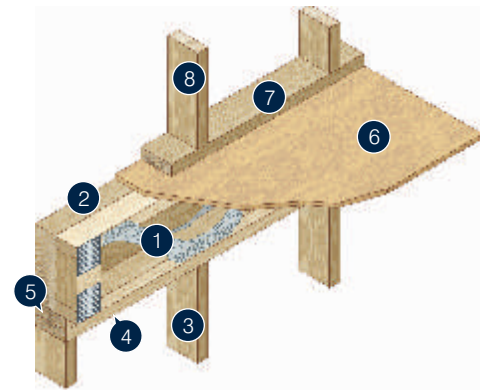
- (1) SpaceJoist or FloorTrus
- (2) 35 wide rim beam
- (3) 80 x 150 hand nail plate
- (4) Sheathing
- (5) Base plate
- (6) Panel head binder
- (7) Panel top rail
- (8) Stud
- (9) Plasterboard
- (10) Timber noggin for fixing plasterboard
- (11) Breather membrane

F FloorTrus



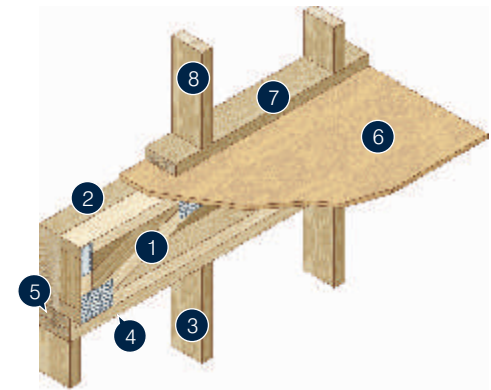
Timber frame rim beam (parallel to wall)

 SpaceJoist



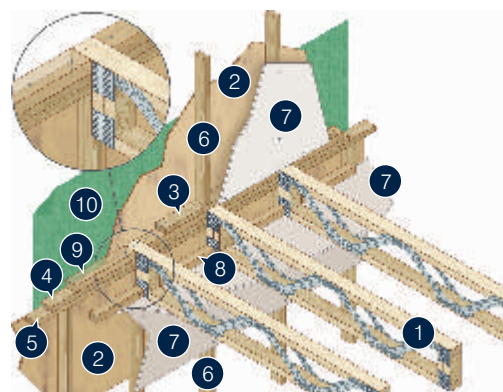
- (1) SpaceJoist or FloorTrus
- (2) Rim beam
- (3) Supporting stud
- (4) Panel top rail
- (5) Panel head binder
- (6) Floor deck
- (7) Panel bottom rail
- (8) Upper floor stud

 FloorTrus



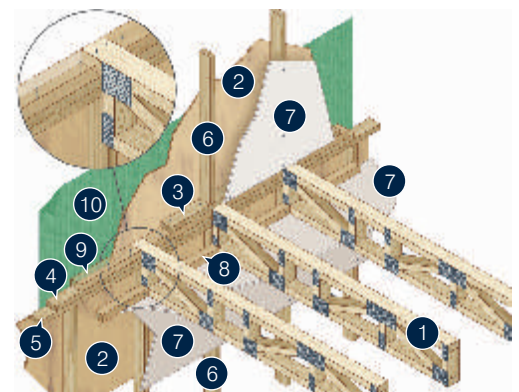
Timber frame top hung joist

 SpaceJoist



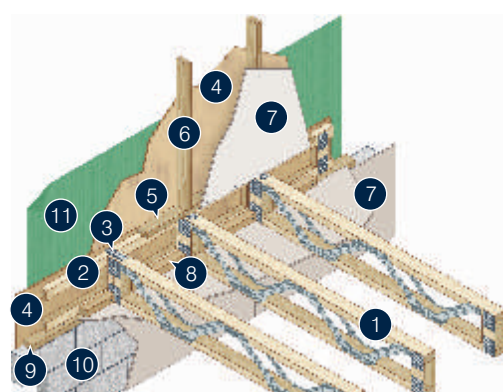
- (1) SpaceJoist or FloorTrus
- (2) Sheathing
- (3) Base plate
- (4) Panel head binder
- (5) Panel top rail
- (6) Stud
- (7) Plasterboard
- (8) Timber noggin
- (9) Noggin - size to match panel head binder width and joist top chord depth
- (10) Breather membrane

 FloorTrus



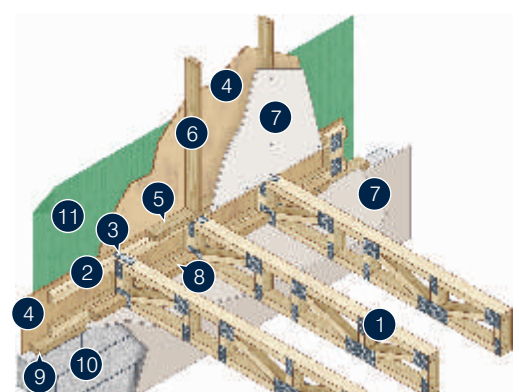
Masonry/timber frame rim beam (perpendicular to wall)

 SpaceJoist



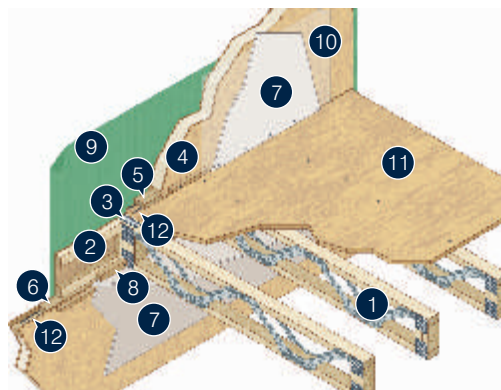
- (1) SpaceJoist or FloorTrus
- (2) 35 wide rim beam
- (3) 80 x 150 hand nail plate
- (4) Sheathing
- (5) Base plate
- (6) Stud
- (7) Plasterboard
- (8) Timber noggin
- (9) Wallplate
- (10) Masonry wall
- (11) Breather membrane

 FloorTrus



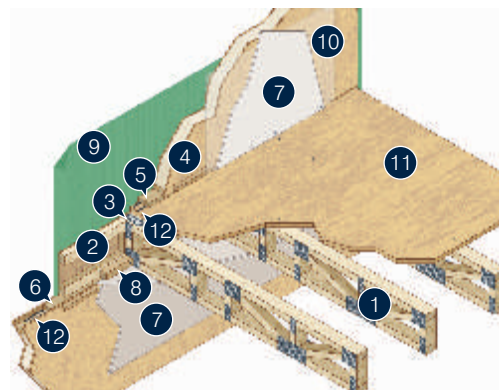
Structural insulated panel (sip) rim beam

 SpaceJoist



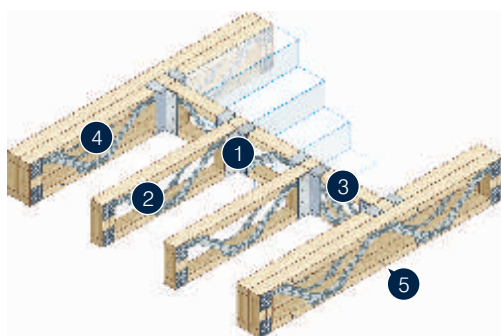
- (1) SpaceJoist or FloorTrus
- (2) 35 wide sheathed rim beam
- (3) 80 x 150 hand nail plate
- (4) Structural insulated panel (SIP)
- (5) Sole plate
- (6) Head plate
- (7) Plasterboard
- (8) Timber noggin
- (9) Breather membrane
- (10) Vapour control layer
- (11) Floor deck
- (12) Mastic sealant

 FloorTrus



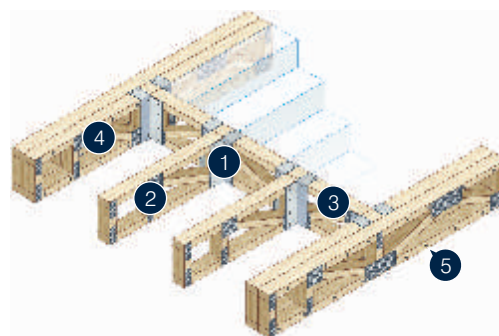
Stair opening

 SpaceJoist



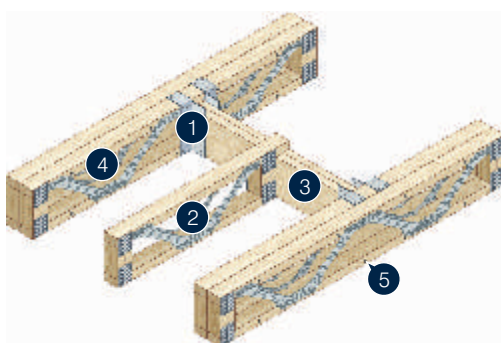
- (1) Hanger
- (2) SpaceJoist or FloorTrus
- (3) SpaceJoist or FloorTrus trimmer
- (4) Multiple SpaceJoist or FloorTrus
- (5) Drive screw (refer to page 20 for spacing)

 FloorTrus



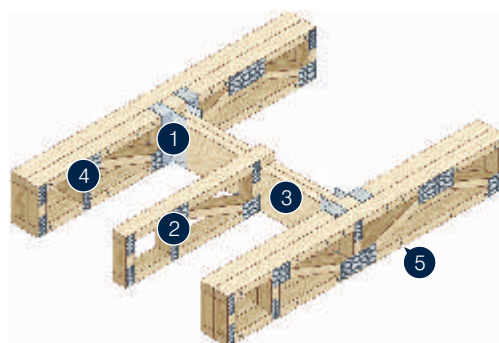
Stair opening (engineered timber trimmer)

 SpaceJoist

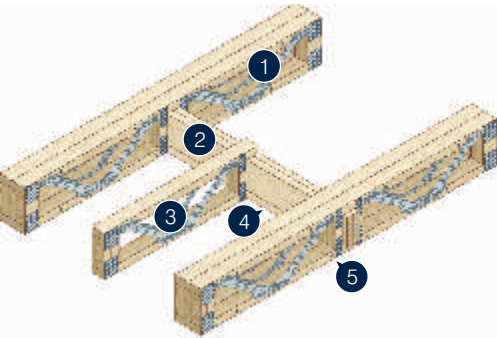


- (1) Hanger
- (2) Top hung SpaceJoist or FloorTrus
- (3) Engineered timber trimmer
- (4) Multiple SpaceJoist or FloorTrus
- (5) Drive screw (refer to page 20 for spacing)

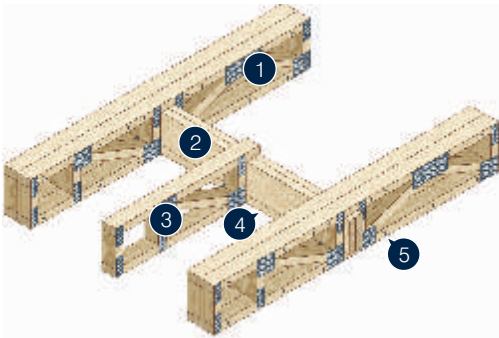
 FloorTrus



Narrow opening (pocket beam)



- (1) Multiple SpaceJoist or FloorTrus
- (2) Engineered timber trimmer (depth to suit)
- (3) Top hung FloorTrus or SpaceJoist
- (4) Packing piece for fixing ceiling
- (5) Drive screw (refer to page 20 for spacing)



Strongback tables

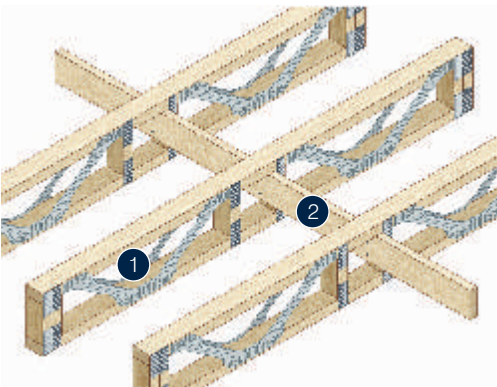


Span (m)	Strongback spacing
Less than 4.0	None
4.0 - 6.0	1 at centre of span
6.0 - 8.0	2 at equal spacing
More than 8.0	3 at equal spacing

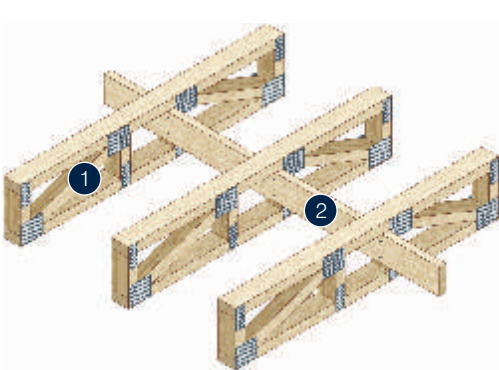
Depth (mm)	Strongback size (mm x mm)
Up to 250	35 x 72 TR26 or 44 x 72 C16
250 - 300	35 x 97 TR26 or 44 x 97 C16
Over 300	35 x 147 TR26 or 44 x 147 C16

NOTE: these tables are to be read in conjunction with all strongback details

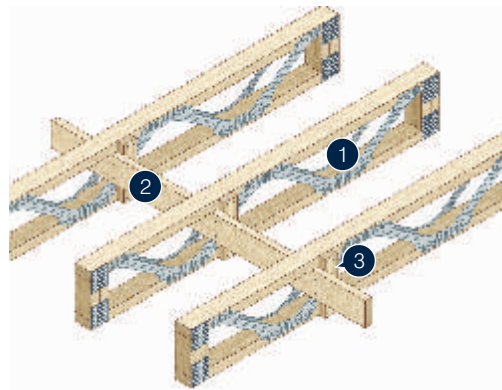
Strongback detail (fixed to vertical webs)



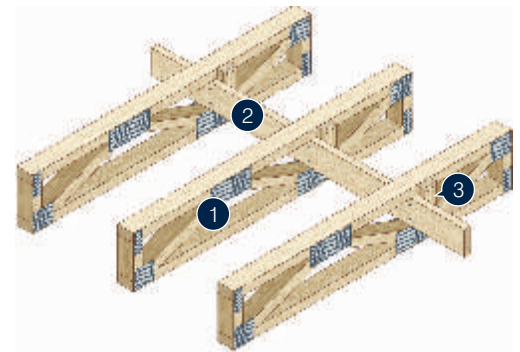
- (1) SpaceJoist or FloorTrus
- (2) Strongback fixed at every joist against underside of top chord as shown using 2 no. 3.35mm dia x 75mm long galvanised round wire nails (refer to the table above for strongback size)



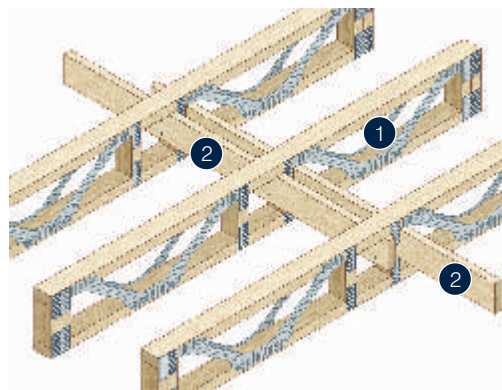
Strongback detail (fixed to timber nailer blocks)



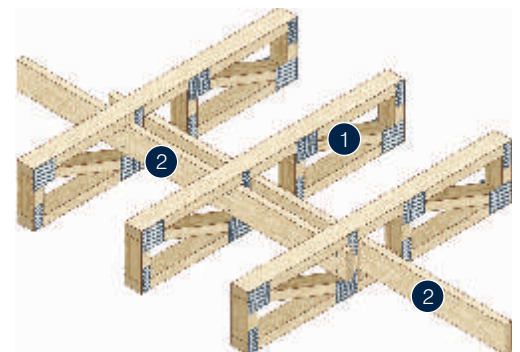
- (1) SpaceJoist or FloorTrus
- (2) Strongback fixed at every joist against underside of top chord as shown using 2 no. 3.35mm dia x 75mm long galvanised round wire nails (refer the table on page 12 for strongback size)
- (3) 35 x 97 Nailer block fixed to top and bottom chord using 2 no. 3.35mm dia. x 75mm long galvanised round wire nails



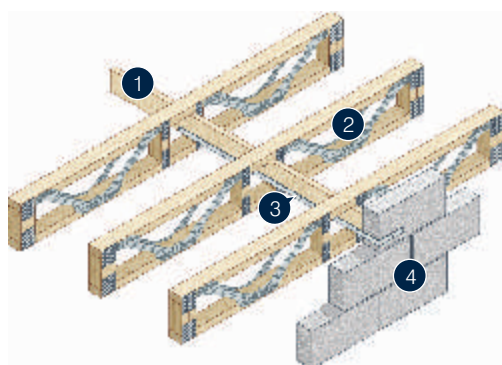
Strongback joint detail (fixed to vertical webs)



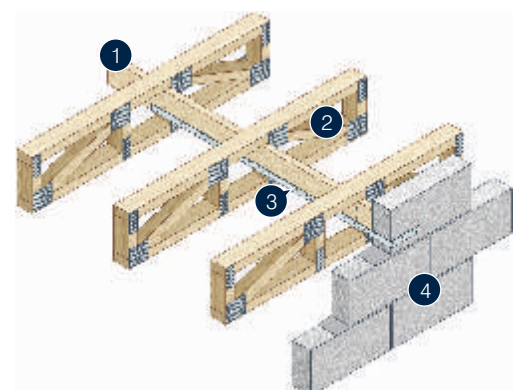
- (1) SpaceJoist or FloorTrus
- (2) Strongback fixed at every joist against underside of top chord as shown using 2 no. 3.35mm dia x 75mm long galvanised round wire nails (refer the table on page 12 for strongback size)



Horizontal restraint strap (A)

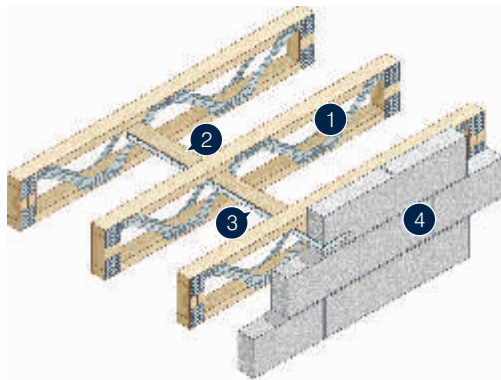


- (1) Strongback fixed at every joist against underside of top chord as shown using 2 no. 3.35mm dia x 75mm long galvanised round wire nails (refer the table on page 12 for strongback size)
- (2) SpaceJoist or FloorTrus
- (3) Restraint strap (fixing to be determined by building designer)
- (4) Masonry wall



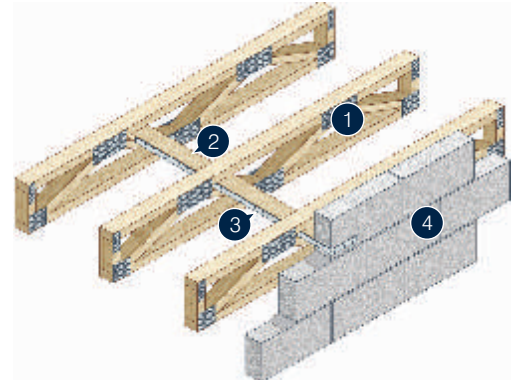
Horizontal restraint strap (B)

 SpaceJoist



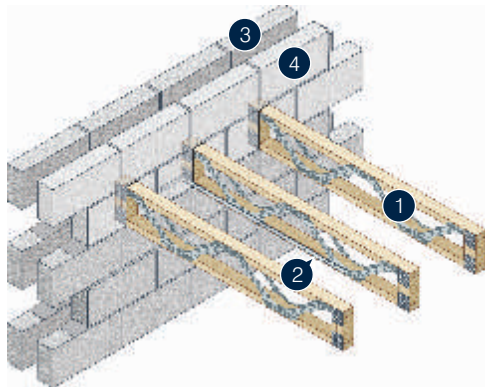
- (1) SpaceJoist or FloorTrus
- (2) Timber brace twice nailed to each joist using 3.35 x 75mm long galvanised round wire nails, fixed over 3 joists (min) and tight to the face of the wall
- (3) Restraint strap (fixing to be determined by the building designer)
- (4) Masonry wall

 FloorTrus



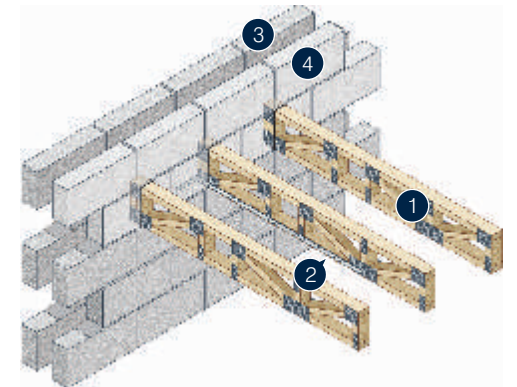
Parallel restraint strap

 SpaceJoist



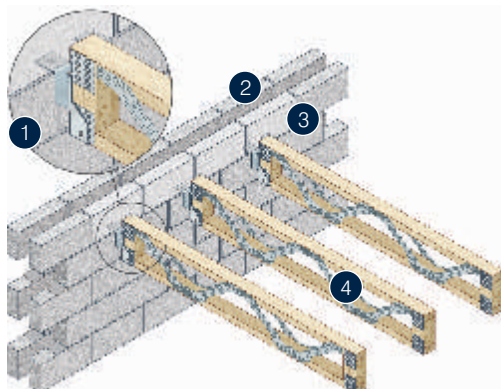
- (1) SpaceJoist or FloorTrus
- (2) Restraint strap (fixing to be determined by the building designer)
- (3) Outer wall
- (4) Masonry load bearing wall

 FloorTrus



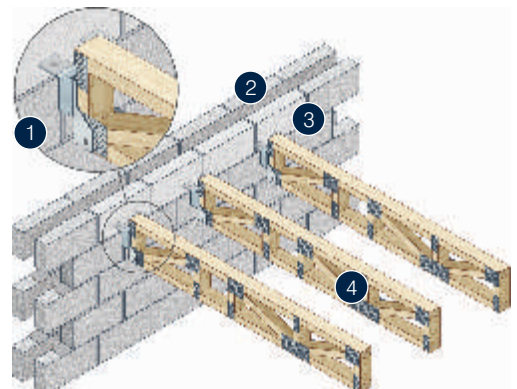
Joists on masonry hangers

 SpaceJoist



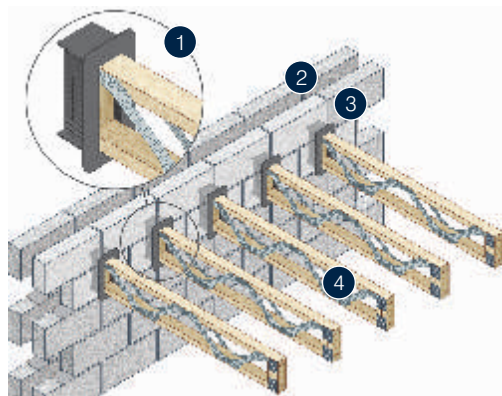
- (1) Masonry hanger - all masonry must be fully cured and a min. of 3 block course (675mm) must be constructed above the hanger before loading
- (2) Outer wall
- (3) Masonry load bearing wall
- (4) SpaceJoist or FloorTrus

 FloorTrus



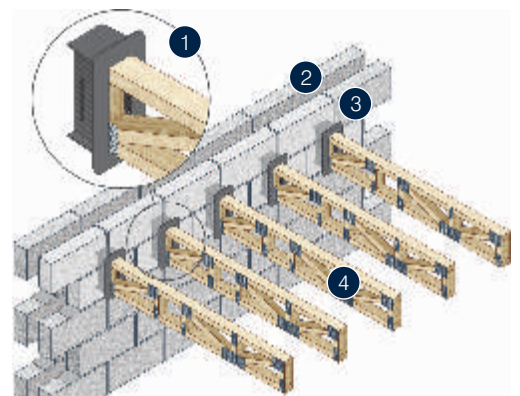
Joists built into masonry in plastic seals

 SpaceJoist



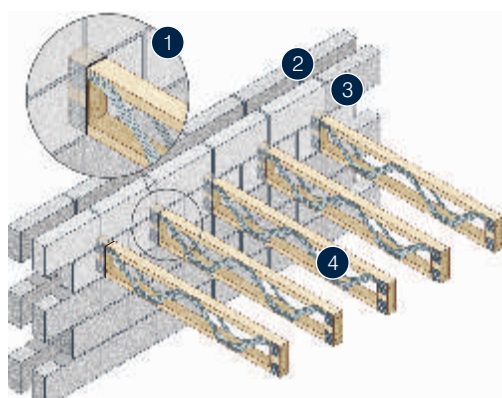
- (1) Plastic joist seal to prevent air leakage (refer to manufacturers specification)
- (2) Outer wall
- (3) Masonry load bearing wall
- (4) SpaceJoist or FloorTrus

 FloorTrus



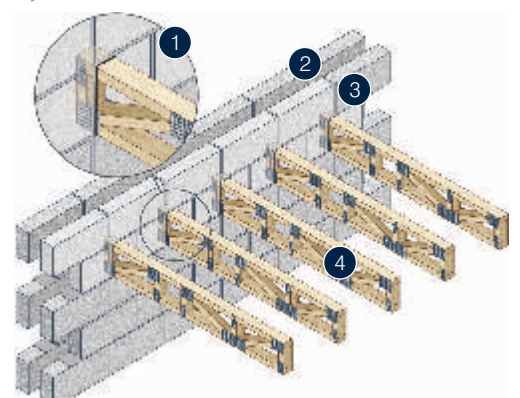
Joists built into masonry and sealed with mastic

 SpaceJoist



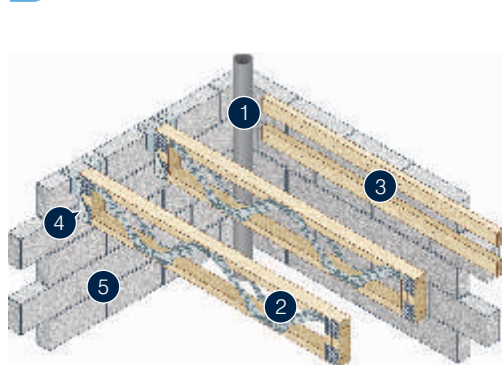
- (1) Mastic sealant to prevent air leakage
- (2) Outer wall
- (3) Masonry load bearing wall
- (4) SpaceJoist or FloorTrus

 FloorTrus



Soil pipe corner detail with bearers

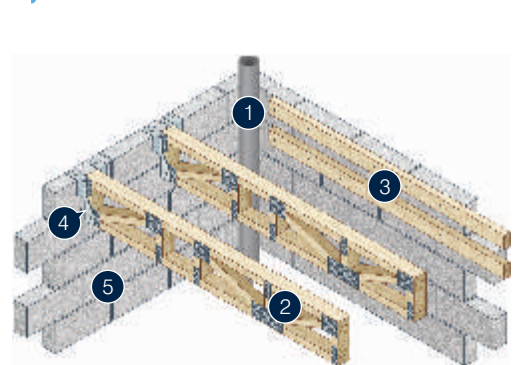
 SpaceJoist



- (1) Soil pipe
- (2) SpaceJoist or FloorTrus
- (3) Timber bearers fixed to the wall for floor and ceiling fixing
- (4) Masonry hanger
- (5) Masonry load bearing wall

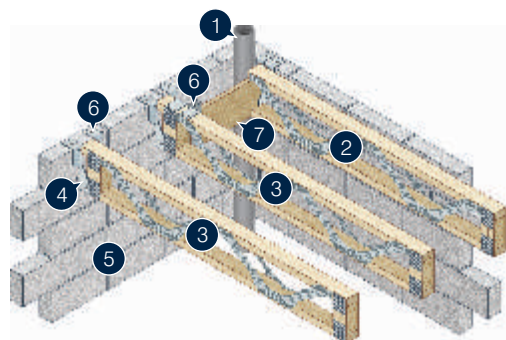
NOTE: THIS CONSTRUCTION DETAIL MAY NOT PERFORM WELL IN THE TRANSMISSION OF SOUND

 FloorTrus



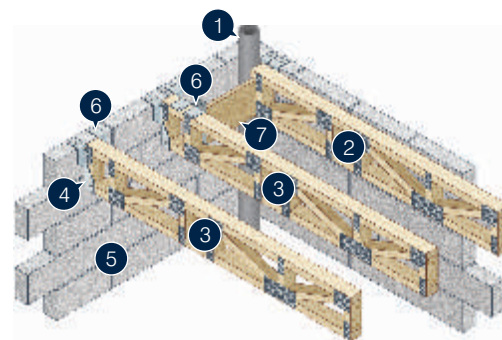
Soil pipe corner detail with trimmer

 SpaceJoist



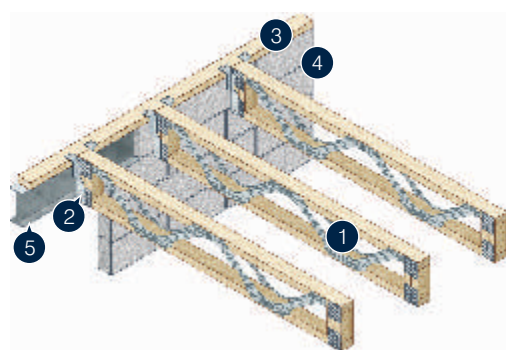
- (1) Soil pipe
- (2) SpaceJoist or FloorTrus trimmed back to allow for soil pipe
- (3) SpaceJoist or FloorTrus
- (4) Masonry hanger
- (5) Masonry load bearing wall
- (6) Hanger
- (7) Trimmer

 FloorTrus



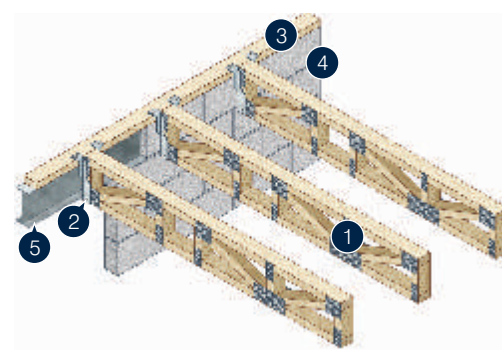
Block or steel beam top hung detail

 SpaceJoist



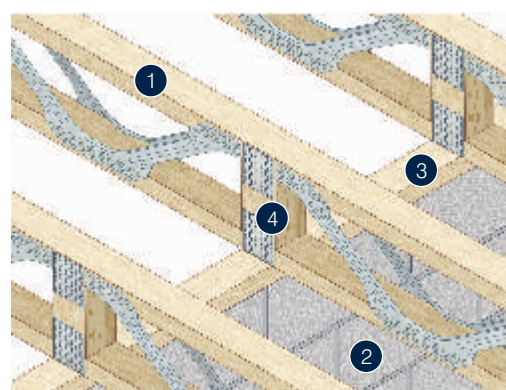
- (1) SpaceJoist or FloorTrus
- (2) Hanger
- (3) Wallplate
- (4) Masonry load bearing wall
- (5) Steel beam

 FloorTrus



Internal bearing

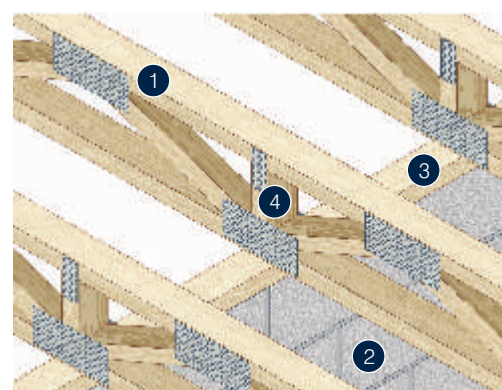
 SpaceJoist



- (1) SpaceJoist or FloorTrus
- (2) Internal load bearing wall
- (3) Wallplate
- (4) Single or double vertical web positioned centrally over the wallplate

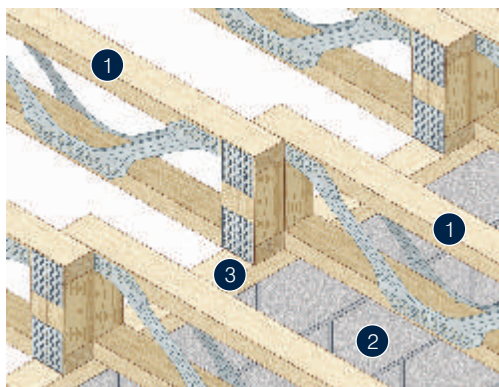
NOTE: BLOCKING IS REQUIRED BETWEEN JOISTS UNLESS WALLS ARE BUILT UP BETWEEN JOISTS

 FloorTrus



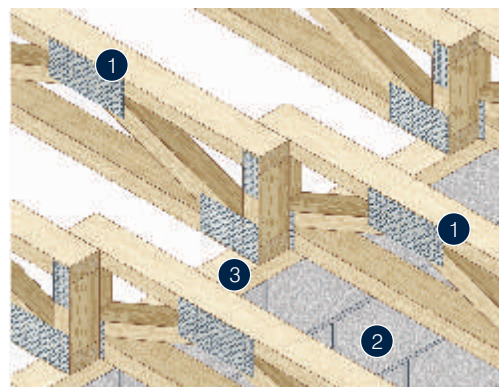
Shared internal bearing

 SpaceJoist



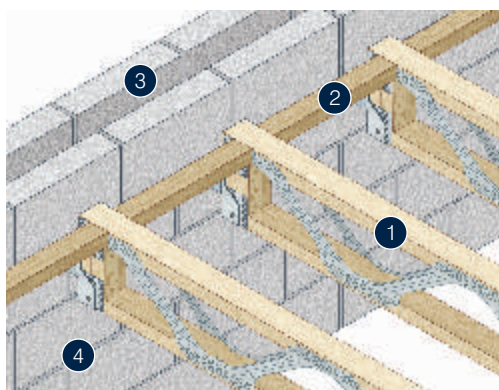
- (1) SpaceJoist or FloorTrus
- (2) Internal load bearing wall
- (3) Wallplate

 FloorTrus



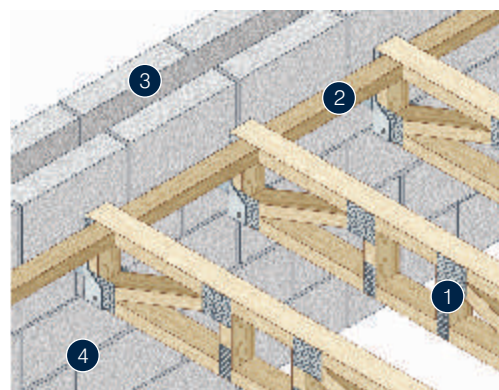
Top chord perimeter restraint noggins

 SpaceJoist



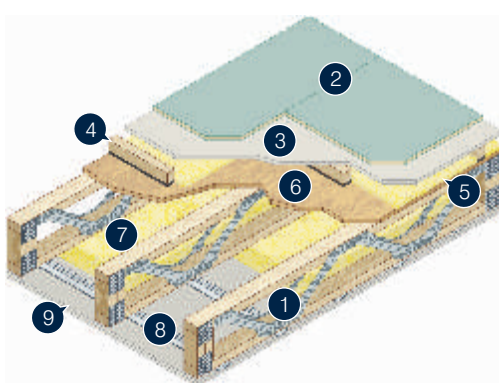
- (1) SpaceJoist or FloorTrus
- (2) Timber noggin
- (3) Outer wall
- (4) Masonry load bearing wall

 FloorTrus



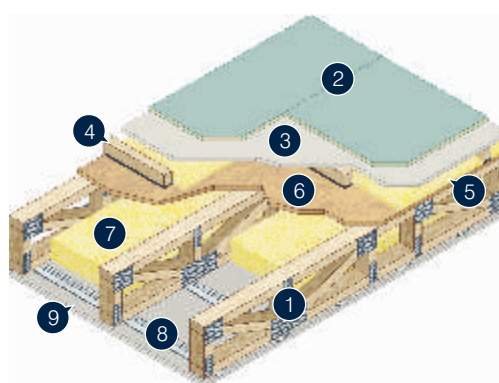
Separating floor (isometric)

 SpaceJoist



- (1) SpaceJoist or FloorTrus
- (2) 18mm min T&G floor deck
- (3) 19mm Gypsum board (min 13.5kg/m²)
- (4) Resilient composite deep batten system (min 70mm deep)
- (5) 25mm insulation (10-36kg/m³)
- (6) 18mm min wood based board (min density 600kg/m³) Sub Deck
- (7) 100mm min insulation quilt (10-36kg/m³)
- (8) 16mm min resilient bars at 400ctrs perpendicular to joists
- (9) 2 ply 15mm Gypsum based plank (nominal 11.7kg/m²) fixed with 25 & 42 mm screws

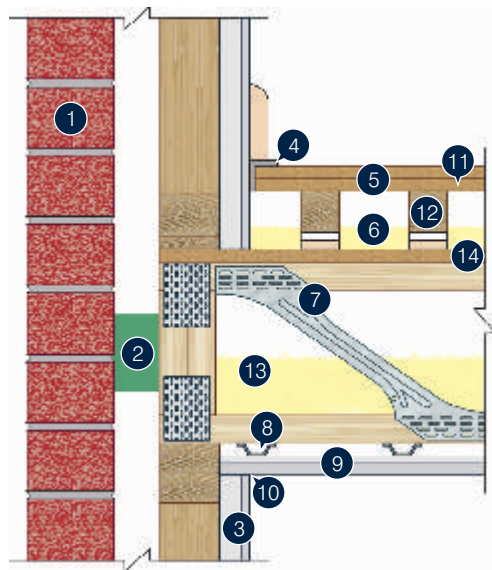
 FloorTrus



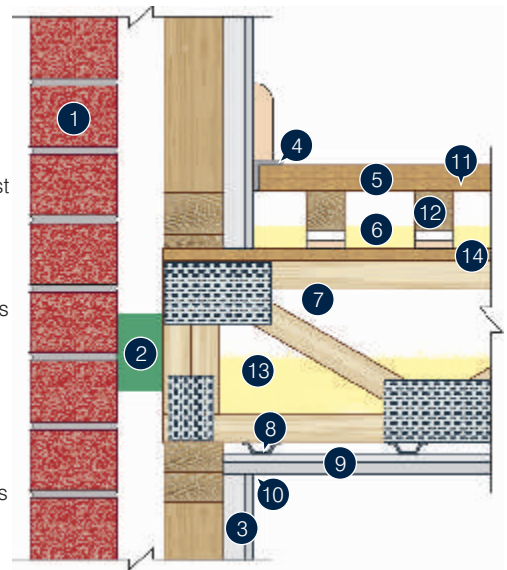
Separating floor (section)

Sj SpaceJoist

F FloorTrus



- (1) Masonry outer leaf
- (2) Cavity stop
- (3) 2 layers of gypsum-based board, normal weight of 8kg/m² per layer
- (4) Minimum 5mm foamed polyethylene flanking strip
- (5) Minimum 18mm T&G floor deck
- (6) Mineral wool between battens 25mm min 10-36kg/m²
- (7) Minimum 254mm deep SpaceJoist or FloorTrus
- (8) Resilient bar
- (9) 2 layers of gypsum-based board, combined weight of 23 kg/m², all joints staggered
- (10) Seal with tape or caulk with sealant
- (11) 19mm gypsum based board 13.5kg/m²
- (12) Min 70mm deep resilient battens
- (13) 100mm quilt insulation 10-36kg/m²
- (14) 18mm chipboard subfloor



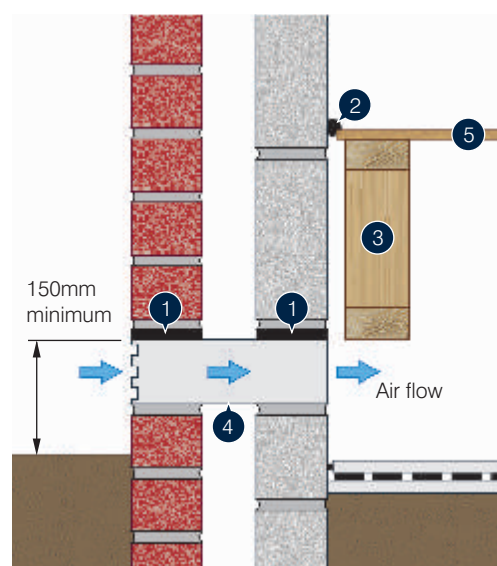
NOTE: THIS DETAIL IS SUBJECT TO PRE-COMPLETION TESTING

Ground floor - joists parallel to wall (external and internal ground at same grade)

Sj SpaceJoist & F FloorTrus

- (1) DPC
- (2) Sealant
- (3) Spacejoist or FloorTrus, minimum of 25mm from face of wall
- (4) Include open perpend at 1500mm centres between vents
- (5) Floor deck

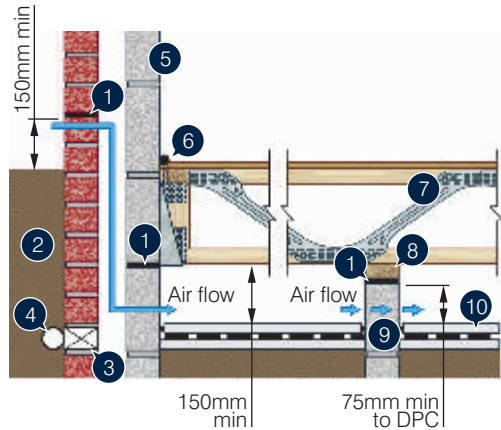
NOTE: ALL INSULATION OMITTED FOR CLARITY



Ground floor - joists perpendicular to wall (A)

(external ground above or level with internal floor)

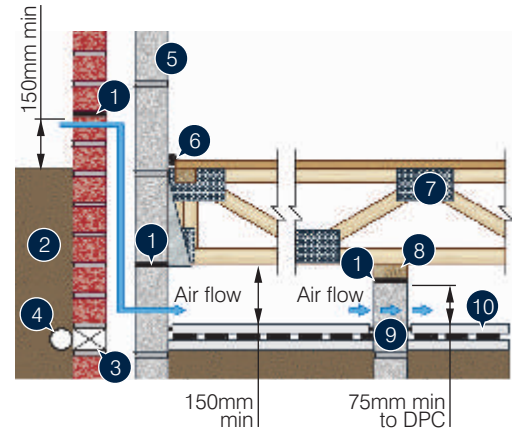
SpaceJoist



- (1) DPC
- (2) Granular fill
- (3) Open perpend
- (4) Preformed drain
- (5) Masonry load bearing wall
- (6) Sealant
- (7) SpaceJoist or FloorTrus
- (8) Optional wallplate
- (9) Intermediate support with cross ventilation
- (10) Subfloor ground level to fall to outlet / drain

NOTES: ALL INSULATION OMITTED FOR CLARITY. JOISTS CAN BE BUILT INTO WALL OR SUPPORTED ON HANGERS.

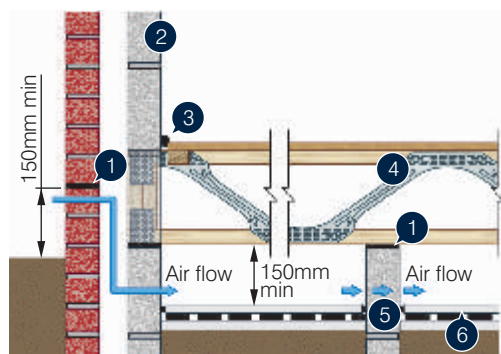
FloorTrus



Ground floor - joists perpendicular to wall (B)

(external ground below internal floor)

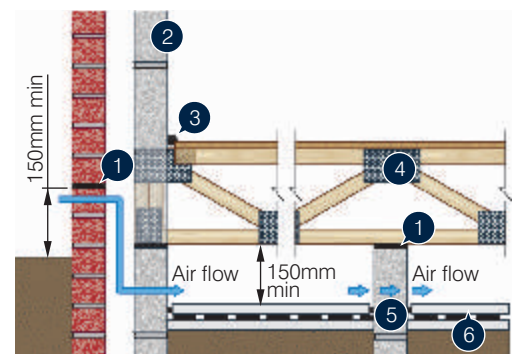
SpaceJoist



- (1) DPC
- (2) Masonry load bearing wall
- (3) Sealant
- (4) SpaceJoist or FloorTrus
- (5) Intermediate support with cross ventilation
- (6) Subfloor ground level to fall to outlet / drain

NOTES: ALL INSULATION OMITTED FOR CLARITY. JOISTS CAN BE BUILT INTO WALL OR SUPPORTED ON HANGERS.

FloorTrus

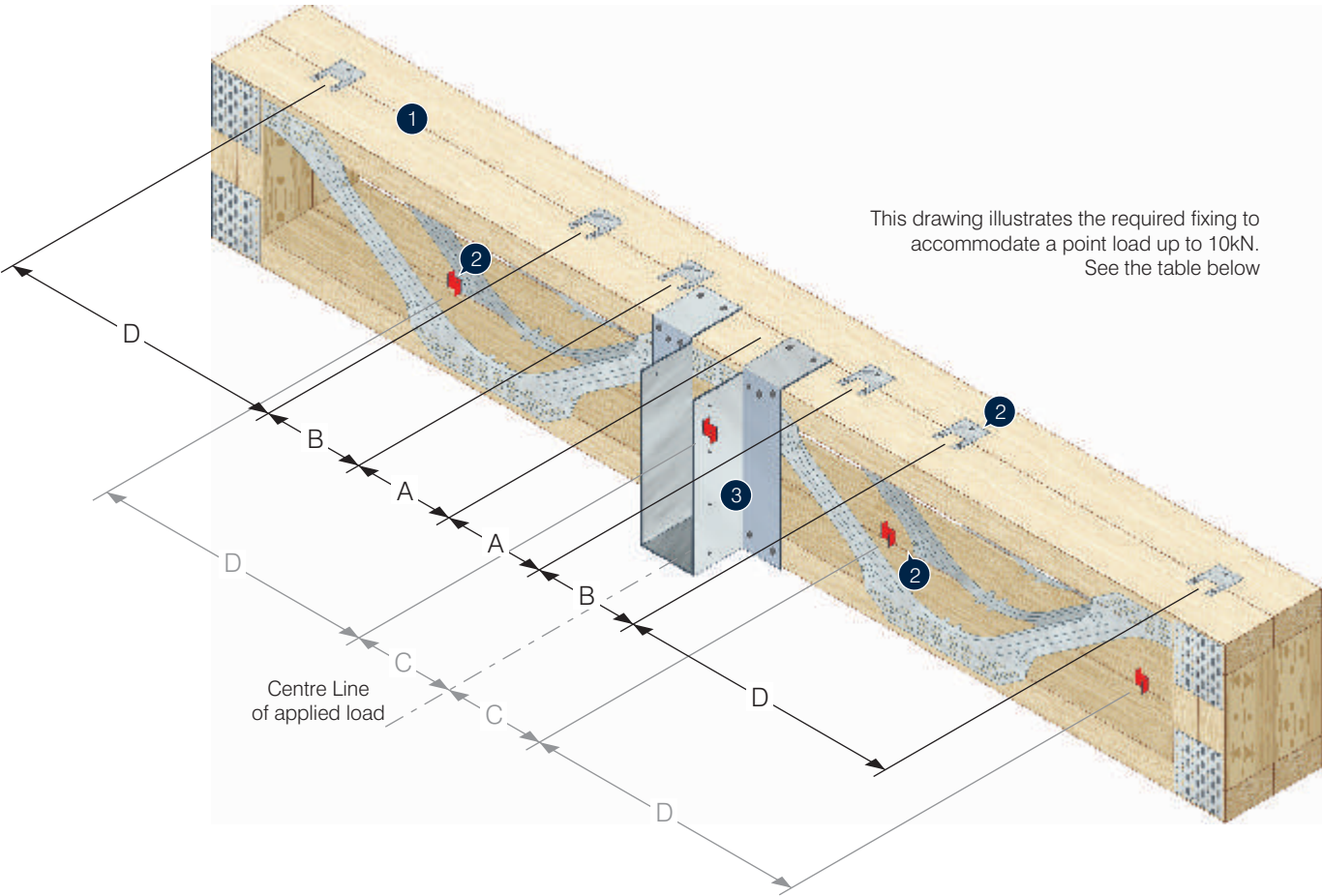


Multiple joist OW-Clip fixing

(preferred method)



- (1) Multiple SpaceJoist, FloorTrus or TrimTrus
- (2) OW-Clip (OW-Clips on the bottom chord are coloured red, and are shown through for clarity. Refer to manufacturers details)
- (3) Hanger (A Hanger is shown to indicate a point load acting on the joist. A point load may be administered another way, by an engineered timber beam built into the open web joist for example)



OW-Clip spacing on multiple open web joist

OW-Clips to be typically spaced at 600mm centres (Dim D) unless where shown:					
Load on hanger*	No. of top chord OW-Clips	No. of bottom chord OW-Clips	Dim. A (mm)	Dim. B (mm)	Dim. C (mm)
6 kN	2	2	150 (max)	n/a	150 (max)
10 kN	4	2	150 (max)	150 (max)	150 (max)

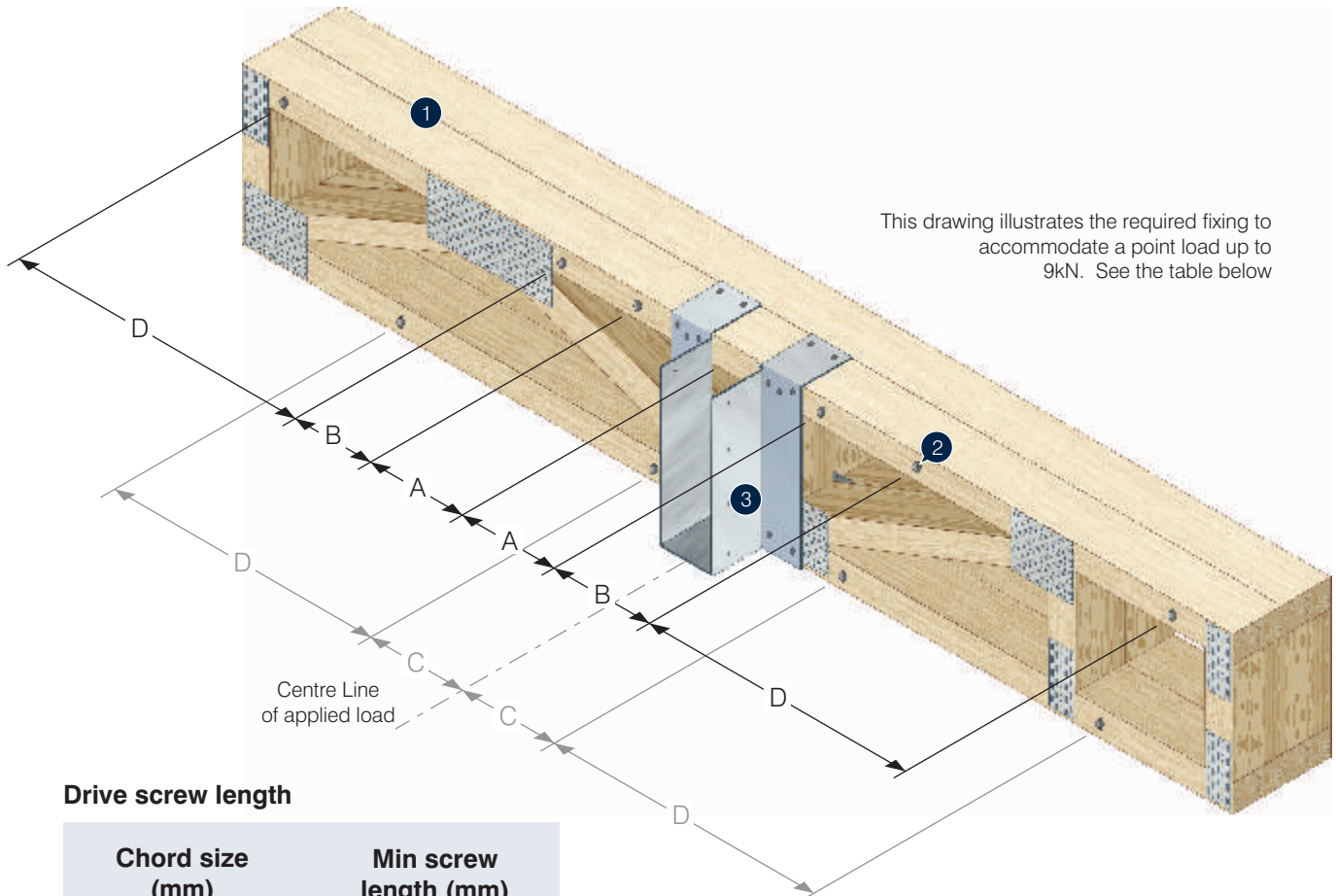
* Applied load must be checked against safe working load

Multiple joist drive screw fixing

(alternative method)



- (1) Multiple SpaceJoist, FloorTrus or TrimTrus
- (2) Drive screw inserted along the centre line of the chords with the screw head on the same side as the hanger (refer to manufacturers details)
- (3) Hanger (A Hanger is shown to indicate a point load acting on the joist. A point load may be administered another way, by an engineered timber beam built into the open web joist for example)



Drive screw length

Chord size (mm)	Min screw length (mm)
2 ply 47 x 72	125
2 ply 47 x 97	150

Drive screw spacing on multiple open web joist

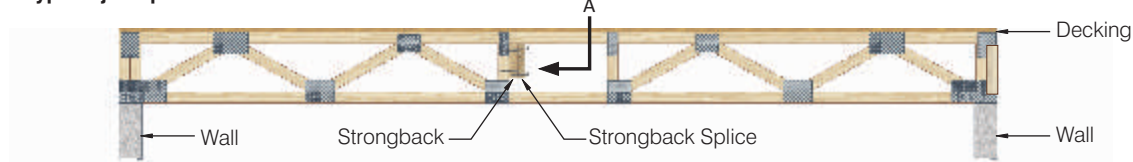
Drive screws to be typically spaced at 600mm centres (Dim D) unless where shown:

Load on hanger*	No. Of top chord screws	No. of bottom chord screws	Dim. A (mm)	Dim. B (mm)	Dim. C (mm)
6 kN	2	2	150 (max)	n/a	150 (max)
9 kN	4	2	150 (max)	150 (max)	150 (max)

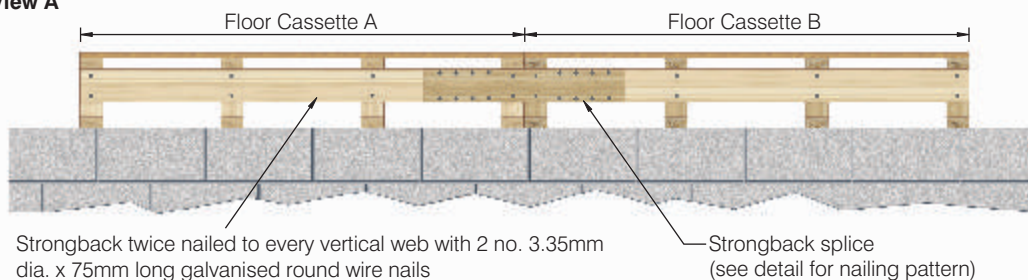
* Applied load must be checked against safe working load

Cassette floor strongback detail

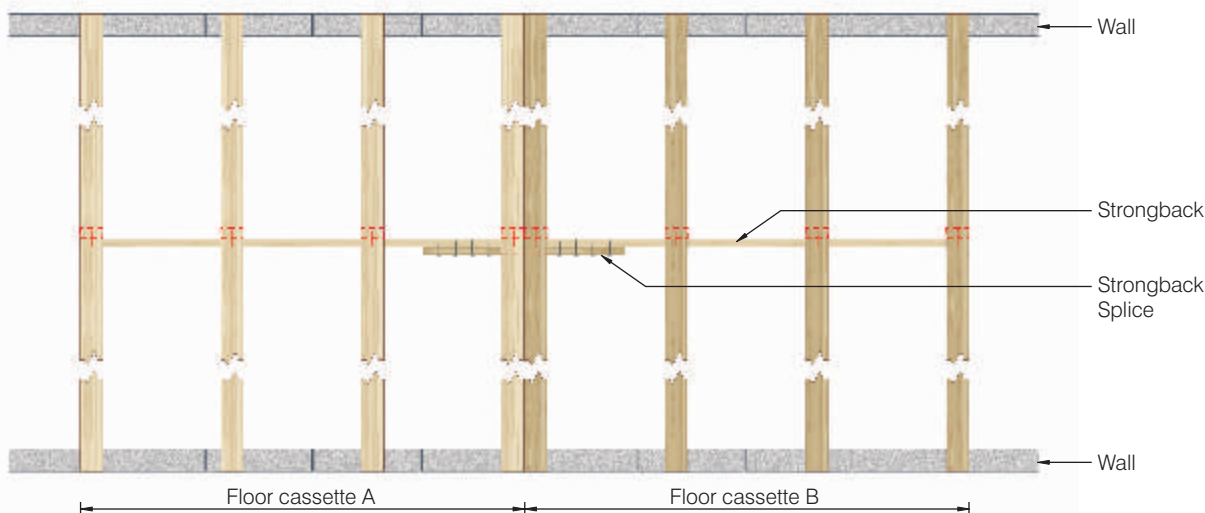
Typical joist profile



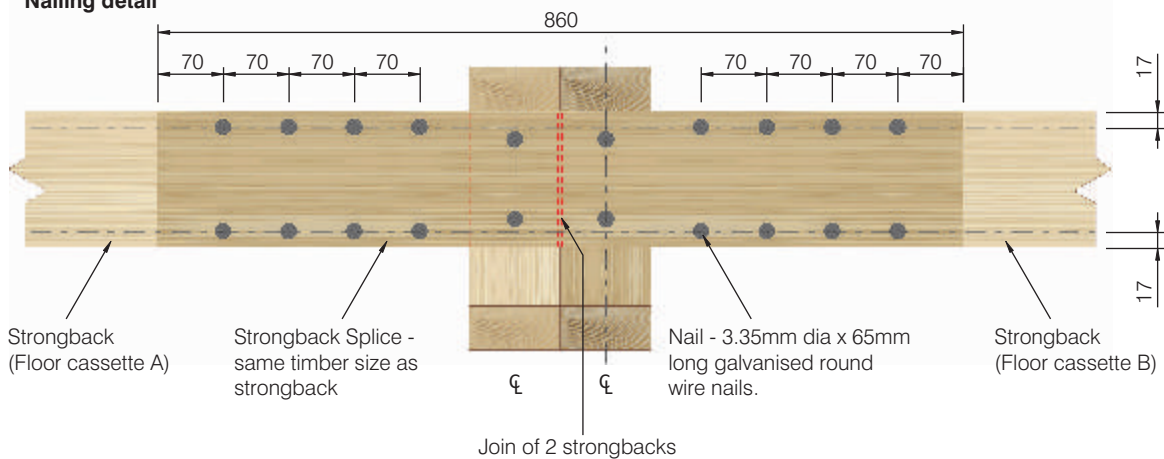
View A



Plan view (decking omitted for clarity)



Nailing detail





FLAT ROOF DETAILS

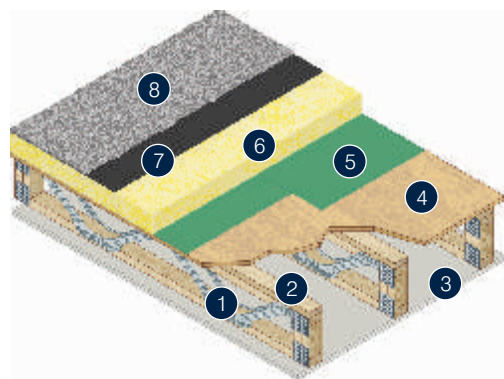


Picture

The wide nailing surface allows for quick and easy application of the floor deck and ceiling materials.

Warm roof

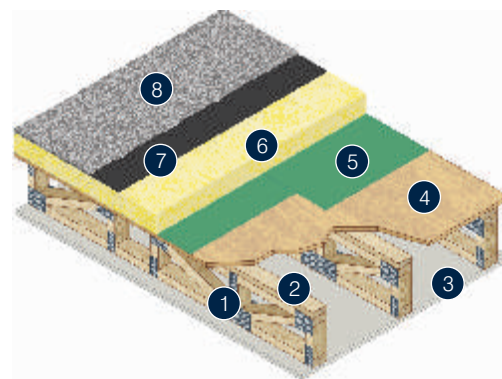
Sj SpaceJoist



- (1) SpaceJoist or FloorTrus
- (2) Furring piece
- (3) Plasterboard
- (4) Deck
- (5) Vapour control layer
- (6) Insulation
- (7) Waterproof membrane
- (8) Surface treatment

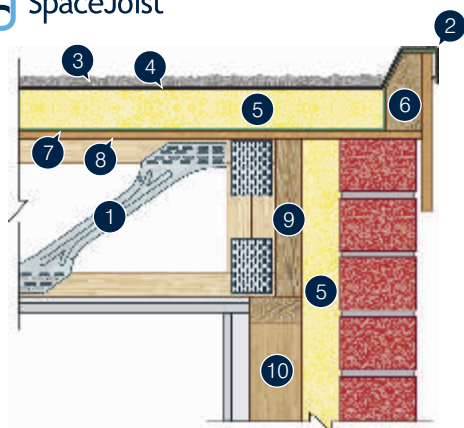
NOTE: FALLS CAN BE CREATED BY EITHER FIRRINGS OR TAPERED INSULATION

Ft FloorTrus



Typical verge with warm roof

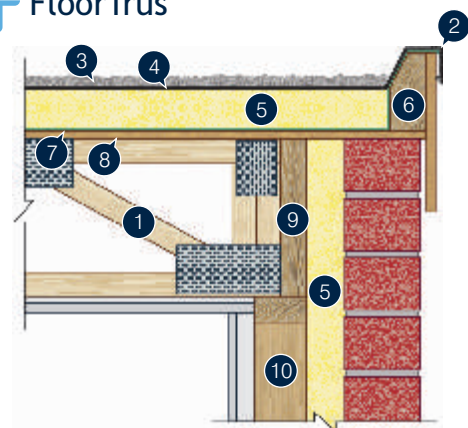
Sj SpaceJoist



- (1) SpaceJoist or FloorTrus
- (2) Edge trim
- (3) Protective surface treatment
- (4) Waterproof membrane
- (5) Insulation
- (6) Built-up timber kerb
- (7) Vapour control layer
- (8) Decking
- (9) Rim board
- (10) Wall panel

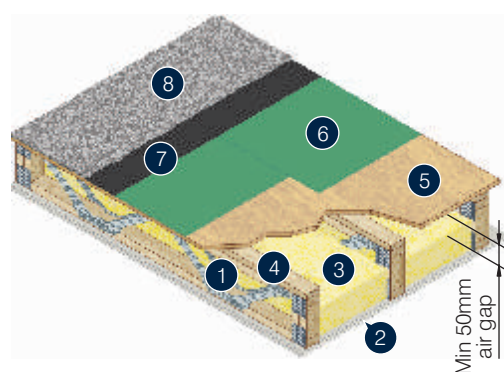
NOTE: FALLS CAN BE CREATED BY EITHER FIRRINGS OR TAPERED INSULATION

Ft FloorTrus



Cold roof

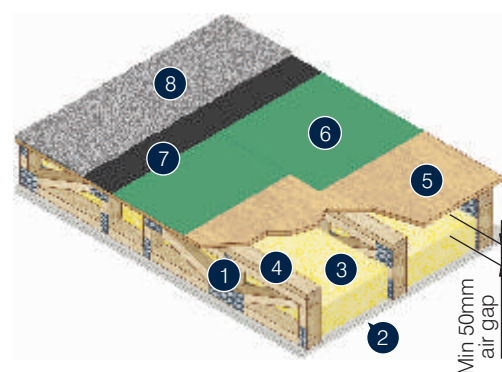
Sj SpaceJoist



- (1) SpaceJoist or FloorTrus
- (2) Plasterboard
- (3) Insulation
- (4) Furring piece
- (5) Deck
- (6) Vapour control layer
- (7) Waterproof membrane
- (8) Surface treatment

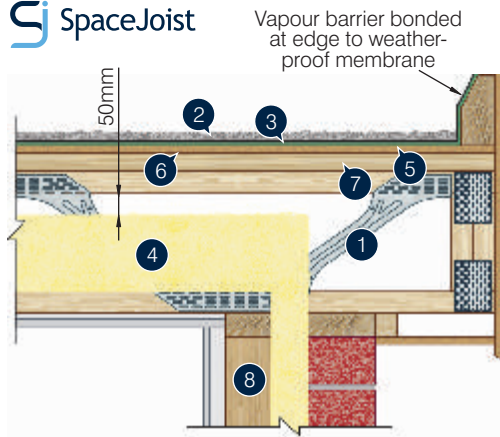
NOTE: FALLS CAN BE CREATED BY EITHER FIRRINGS OR TAPERED INSULATION

Ft FloorTrus



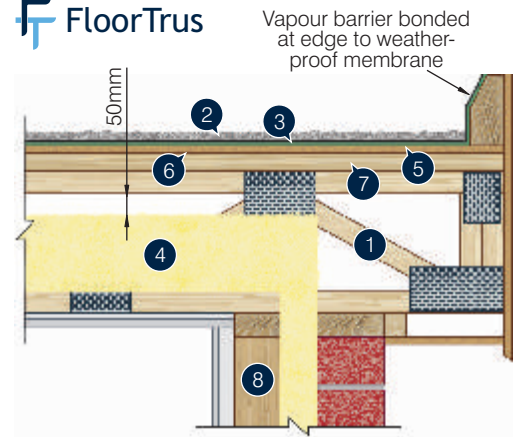
Typical verge with cold roof (timber deck)

SpaceJoist



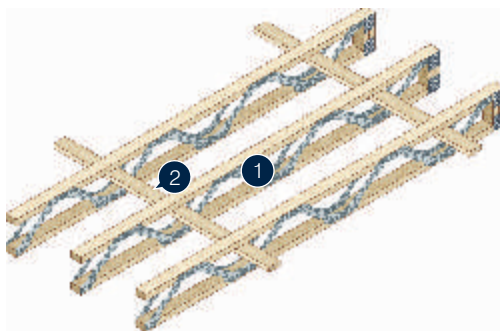
- (1) SpaceJoist or FloorTrus
- (2) Protective surface treatment
- (3) Waterproof membrane
- (4) Insulation
- (5) Vapour control layer
- (6) Decking
- (7) Furring piece
- (8) Wall panel

FloorTrus



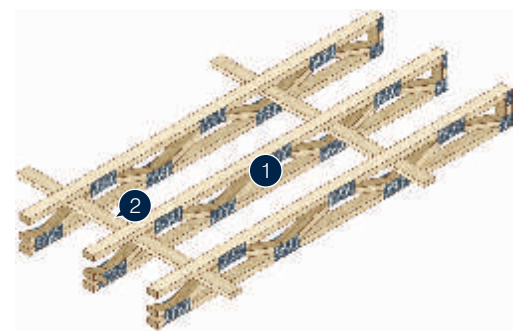
Top chord restraint

SpaceJoist



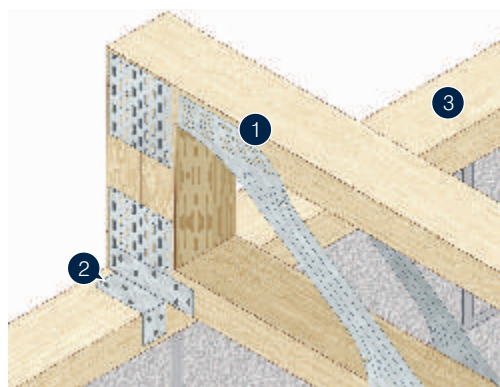
- (1) SpaceJoist or FloorTrus
- (2) Timber brace

FloorTrus



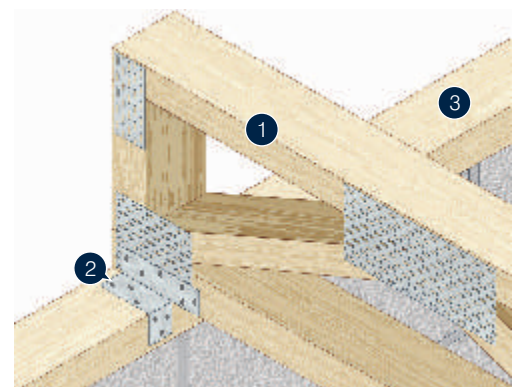
Joist to wallplate fixing

SpaceJoist



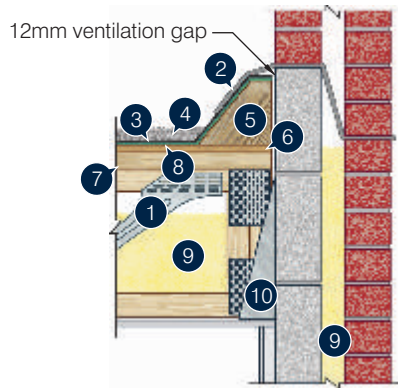
- (1) SpaceJoist or FloorTrus
- (2) Framing anchor fixed to each side of joist (2 no. per fixing point)
- (3) Wallplate

FloorTrus



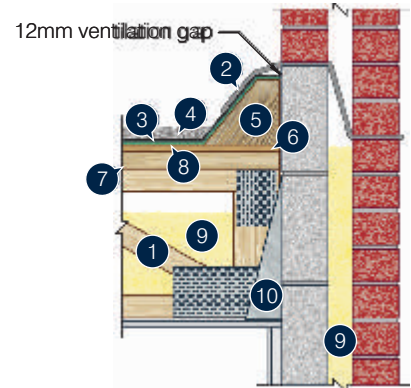
Parapet roof

Sj SpaceJoist



- (1) 304mm deep SpaceJoist or FloorTrus
- (2) Code 4 lead flashing
- (3) Waterproof membrane
- (4) Surface treatment
- (5) Built-up timer kerb
- (6) Decking
- (7) Furring piece
- (8) Vapour control layer
- (9) Insulation
- (10) Joist hanger

F FloorTrus



GOOD PRACTICE



Picture

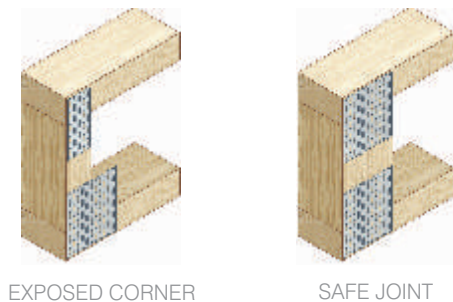
Off-cuts from roof truss production can be utilised for FloorTrus and TrimTrus webs, saving money and reducing environmental impact.

Standard webs can be cut and stocked when required to optimise production.

Hints & tips for design

Exposed nailplate corners

Avoid joints with exposed nailplate corners to eliminate the risk of injury while handling.

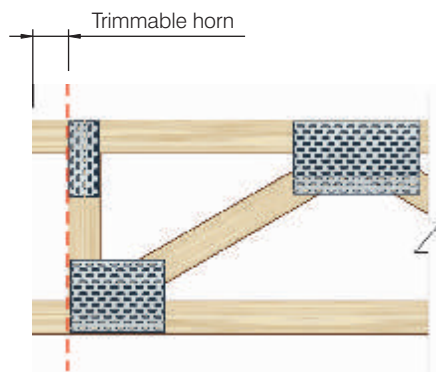


Timber preservative treatment

This should be carried out in geographical areas defined in A1/2 Section 2B of the Approved Document A to the Building Regulations or if specified by the client.

Trimable horn

In some circumstances, such as when overall dimensions are not precise or when walls are not true, it may be wise to add a trimmable horn on the ends of the joists to allow for site adjustment. Usually a 50mm horn is sufficient. The joist designer should design the joist with supports in the worst case position, usually at the end of the horn.



Partition load

The VIEW software applies a partition load of 0.22kN/m^2 to all joists to allow for any walls there might be on the floor above. However, if it is known that there is a partition running directly along a joist, a uniform load of 0.64kN/m should be added along it (partition of timber construction 2400mm high).

Balustrade load

If it is known that there is a balustrade around a stair well for example, a uniform load of 0.27kN/m should be applied to the beam carrying it.

Trimmer spacing

A trimmer supporting a run of incoming joists can be designed at the reduced spacing of 100mm (to allow for self weight) as the incoming joists are designed with a uniform load along their full length which is then transferred to the trimmer. When doing this, it is important to refer to the plans and then add the appropriate balustrade or partition loads.

Spans & depths (FloorTrus)

Huge flexibility in design and rigidity give FloorTrus unrivalled span and depth capabilities.

Feature rooms, commercial applications and terraced developments without load bearing partitions are all possible.

FloorTrus can be designed to any depth from 219-600mm. Large services such as commercial air handling systems can be run through the floor, as FloorTrus can be designed with a large chase.

Floors can be designed to known hanger depths to speed up installation although most hanger manufacturers will make special hangers if required. Here is a list of beam depths (in mm) with readily available hangers: 219, 254, 304, 380, 418.

Important note -maintaining quality (FloorTrus)

Increasing the number of bays between vertical webs, and/or allowing the bays to get too long may compromise the quality of the product.

Vertical webs (FloorTrus)

Adding a vertical web at approximately every third bay or 2400mm will help to maintain the depth of the beam, and make setting up easier.

Web length (FloorTrus)

Your saw may not be able to cut webs if they are very short. All machines are different, so you should establish the limits of your saw, and bear this in mind at the design stage.

Do's and don'ts on site

Do's

Store as described in the Installation Guide (page 32)

Lift the joists in a vertical position

Use the open web feature for installation of services

Protect joists from inclement weather

Install the joists as they have been designed: Refer to the joist designer's drawings for the correct orientation, spacing etc.

Don'ts

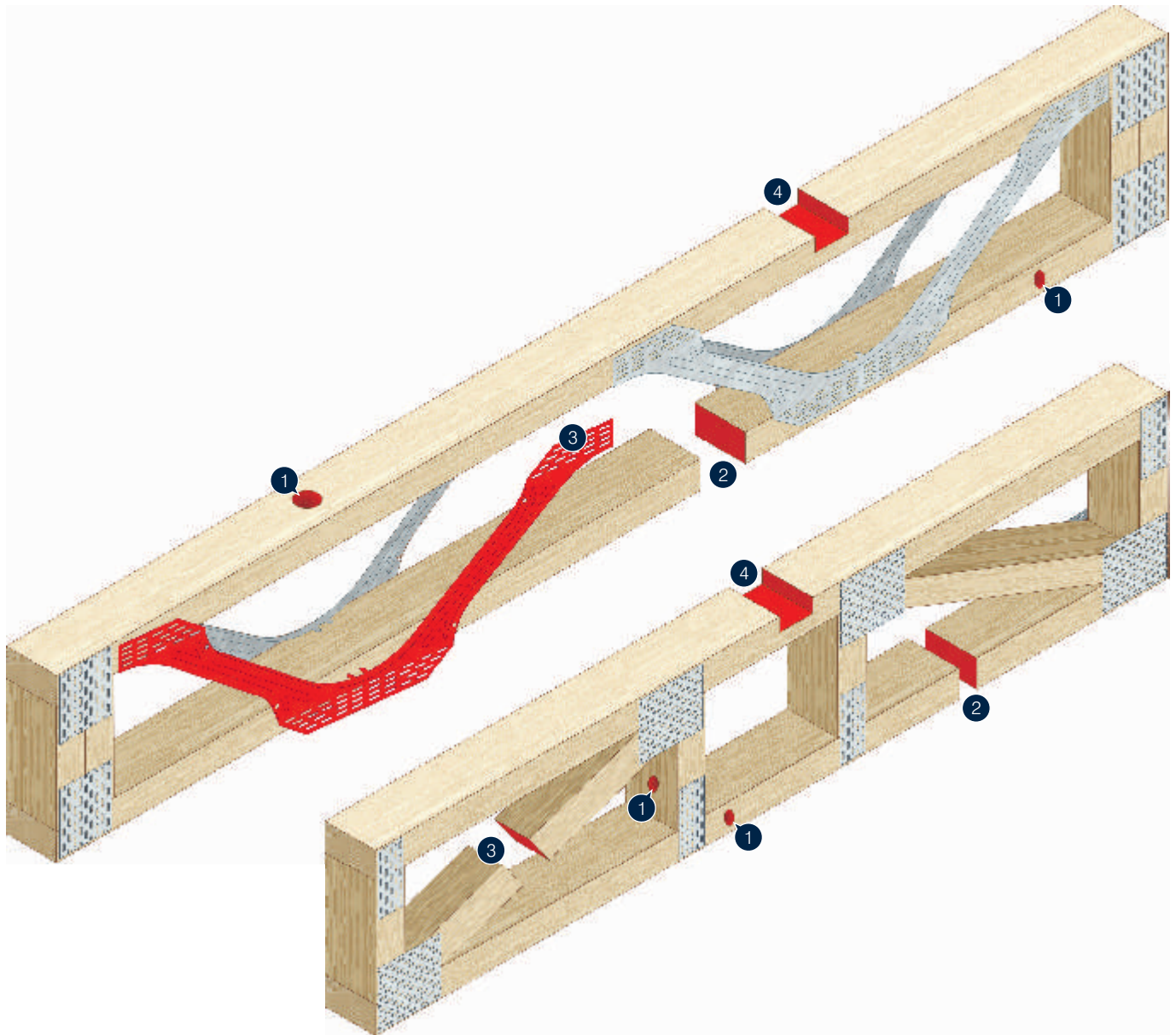
(1) Do not drill holes through any part of the joist

(2) Do not cut through the chords

(3) Do not cut through or remove the webs

(4) Do not cut notches in any part of the joist

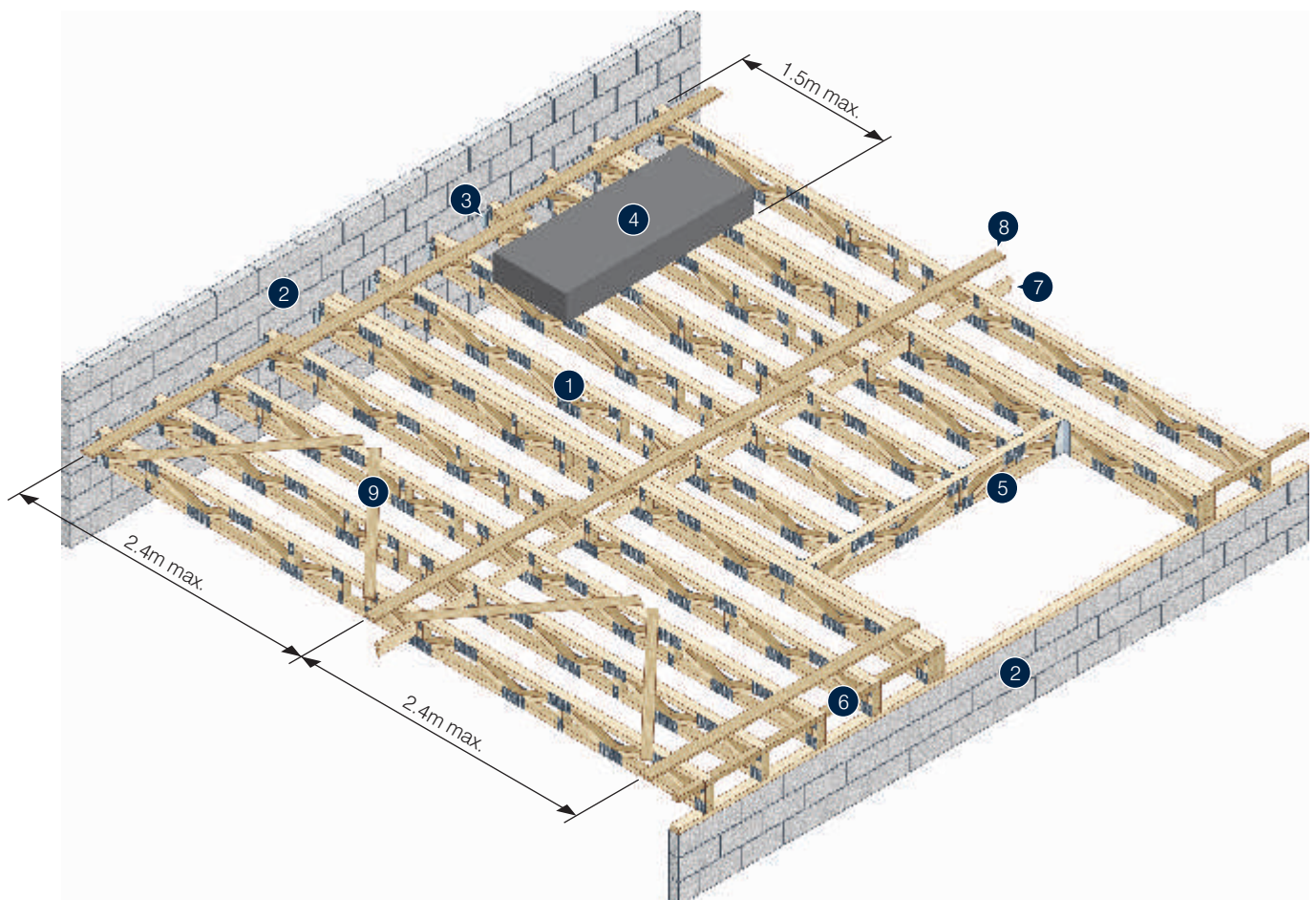
Do not walk on unbraced joists



Temporary safety bracing for floors



- (1) SpaceJoist or FloorTrus
- (2) Load bearing wall
- (3) Masonry hanger - all masonry must be fully cured and a min. of 3 block course (675mm) must be constructed above the hanger before the joists can be loaded
- (4) Construction materials may only be stored on the joists when all bracing is in place, the material should be spread over at least 4 joists and not more than 1.5m from a support. Floor/ceiling boards may be stacked up to 250mm high (150kg per joist at 600mm centres, 100kg per joist at 400mm centres) on braced floors.
- (5) Trimmer - Do not store construction material close to trimmers
- (6) Top chord restraint noggins
- (7) Strongback (fixed as described on page 12)
- (8) 22 x 97 longitudinal temporary bracing twice nailed to each joist using 3.35 dia x 65mm long round wire nails, and connected to diagonal bracing at one end of the joist run
- (9) 22 x 97 diagonal temporary bracing across at least 3 joists, twice nailed to each using 3.35 dia x 65mm long round wire nails (decking can be laid and fixed in lieu of diagonal bracing)



A close-up photograph of a metal joist web. The web is a light blue-grey color and features a series of dark, pointed nails or spikes protruding from its top surface. The background is a blurred wooden surface.

INSTALLATION GUIDE



Picture

SpaceJoist webs are available to manufacture joists from 195mm to 424mm deep. The webs have punched nails at the top and bottom which are pressed into the respective timber chords. The struts incorporate inwardly pressed ribs which increases the strength without impeding manufacture.

Installation guide

Unloading of joists and loose timber components

At all times the contractor responsible should allocate sufficient resources in terms of equipment and personnel to safely undertake the relevant work operations in accordance with both an Approved Method Statement and the Site Health and Safety Plan.

As a general principle, joists and associated components should be lifted and moved on a minimum number of occasions; the most preferred option being to unload and transfer units directly to the final level of use for immediate assembly.

Where uncertainty is encountered as to the correct method of supporting and lifting components, advice should immediately be sought from the Joist Designer. Where necessary, strongbacks or lifting beams should be securely and properly attached to the components to prevent buckling during lifting operations.

In situations where components are unloaded using fork lifts or modified front loaders then the contractor should again ensure that the method of lifting does not overstress or damage the joists.

At all times, joists and bundles of joists should be kept vertical when being moved. Where damage to components is suspected as a result of a breach of lifting procedures, this should be immediately reported to the Joist Designer.

The site storage of joists and loose timber components

Where it is necessary to store joists and associated timber components on site this should be undertaken with full consideration of the following matters:

- The proposed storage area should be level, well drained and free from vegetation.
- Joists should preferably be stored vertical (to minimise the risk of distortion) using suitable bearers located at positions where support has been assumed in the design. Where joists are stacked horizontally, a level support should be provided at approximately 1000 mm centres.
- Support bearers should be of sufficient height to ensure that joists do not come into contact with the ground.
- At all times consideration should be given to the moisture content of the timber products. Where it is considered that weatherproof protection is

necessary this should be arranged so as to allow proper ventilation and the free passage of air around all components.

- Adequate props should be installed on both sides of vertically stored joists in order to ensure overall stability and to allow the safe removal of units as they are required.

Manoeuvring joists and loose timber components prior to assembly

At all times the Primary Health and Safety initiative of Prevention and Protection should be observed according to the standard hierarchy of risk control.

Where units are transferred to temporary storage/working platforms prior to fixing these shall be of sufficient strength and conform to all the requirements given for permanent storage noted above.

In all cases except those involving the lightest of loads (see the current Manual Handling Regulations) all lifting work shall be undertaken using mechanical lifting equipment. Roof Joists CANNOT be safely manhandled into their final position at roof level.

No personnel shall be allowed to enter the areas required for slewing or lifting, nor beneath any areas of roof under construction.

Packs of bundled joists should be adequately propped or braced to ensure overall stability is maintained prior to their release and assembly.

All areas where personnel are required to work shall be adequately constructed and protected in appropriate accordance with the Regulations or as assumed in the Approved Method Statement.

Safe erection procedures

Only where proper and full consideration has been given to the circumstances relevant to any given site can detailed erection procedures be given. However, certain aspects of good practice are relevant across a broad spectrum of floor and roof configurations.

Beamed Roofs should preferably be assembled through the use of a temporary safe working platform situated no more than 300 mm below wall plate level.

Under no circumstances should temporary bracing members be removed prior to permanent bracing members having been installed.

Joists should not be cut or modified in any way

without first obtaining approval from the Joist Designer.

No cladding/decking work shall be allowed to commence until ALL permanent bracing members have been installed.

Care should be taken to ensure that joists and allied components are located in their design positions and accurately spaced.

Multi-ply joists units should be fixed together in accordance with the details supplied by the Joist Designer (if not undertaken at works).

All roof/floor areas where a fall might occur shall be guarded by suitable and adequate edge protection in accordance with the requirements of the current Construction (Health, Safety and Welfare) Regulations.

Installation fixings table

Items to be joined	Fixings required
Joist (spanning) to Wall Plate	2 skew nails 4.0 mm dia. x 90 mm long.
Joist (header) to Wall Plate	2 skew nails 4.0 mm dia. x 90 long @ 780 mm centres,
Joist (spanning) to Joist (header)	80 mm x 150 mm nail plate with 3.75 mm x 30 mm long square twisted nails.
Joist to Joist (multi-ply)	Drive Screws - see page 20 Z-clips - see page 21
Decking to Joists	Flat headed 3.0 mm dia. x 65 long annular grooved nails @ 260 centres. Some decking may also require gluing to the beam and in the t+g joints.
Plasterboard to Joists	Plasterboard nails, 3.35 mm x 40 mm long @ 150 mm centres, Screws, 3.4 mm dia. x 38 mm long @ 150 mm centres.
Joist (spanning) to Joist (trimmer)	Hangers to be suitable for loading.
Strongback Nailer Block to Joist	2 nails 3.35 mm dia. x 75 long, to top + bottom chords each side.
Strongback to Strongback Plate	2 nails 3.35 mm dia. x 75 long, each side.

NOTE: All nails or screws to be hot dipped galvanised, zinc electroplated or sheradized steel

Hangers are usually required when installing SpaceJoists or FloorTrus. ITW industry has strong technical links with fellow ITW business and metalwork connector manufacturer Cullen Building Products Limited. They can be contacted directly – see below:

Cullen Building Products Limited

1 Wheatstone Place
Southfield Industrial Estate
Glenrothes
Fife
KY6 2SW

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fax : +44(0)1592 771182
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website : www.cullen-bp.com

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TEST REPORTS

Picture

A loaded floor construction before fire testing at the Building Research Establishment.

Test reports



Sound: BTC test report 15870a

SpaceJoist has been tested at the Building Test Centre for compliance with requirement E2 of the Building Regulations for single occupancy residential dwellings.

The floor construction tested was 219mm deep SpaceJoists at 600mm centres with 22mm thick P5 tongued and grooved chipboard decking and 15mm type 1 plasterboard ceiling both were screw fixed to the joists at the manufacturers recommended centres. The testing was in accordance with BS EN ISO 140-3 1995 and BS EN ISO 140-6 1998.

Fire

SpaceJoist has been tested at the Building Research Establishment (BRE) in accordance with BS 476 part 21: 1987 for both 30 and 90 minute fire resistance.

30 minute fire: BRE test report 242562

30 min construction: 219mm deep SpaceJoists at 600mm centres with 22mm P5 tongued and grooved chipboard decking glued and screwed to the manufacturers recommendations and 15mm type 1 plasterboard ceiling drywall screwed to the manufacturers recommendations.

90 minute fire: BRE test report 245288

90 min construction: 254mm deep Spacejoists at 600mm centres with 18mm P5 tongued and grooved chipboard decking glued and screwed to the manufacturers recommendations with a ceiling comprising of two layers of 15mm type 5 plasterboard, both drywall screwed at the recommended centres to RB1 resilient bars at 400mm centres.

This construction with the addition of a proprietary floating floor system is ideal for a compartment floor and should easily comply with the sound and fire regulations for flats.



Sound: BRE test report 231884

FloorTrus has been tested at the Building Research Establishment (BRE) for compliance with requirement E2 of the Building Regulations for single occupancy residential dwellings.

The floor construction tested was 219mm deep FloorTrus at 600mm centres with 22mm thick P5 tongued and grooved chipboard decking and 15mm wallboard plasterboard ceiling both were screw fixed to the joists at the manufacturers recommended centres.

The testing was in accordance with BS EN ISO 140-3 1995 and BS EN ISO 140-6 1998.

Fire

FloorTrus has been tested at BRE in accordance with BS 476: part21: 1987 for both 30 minute and 60 minute fire resistance

30 min fire: BRE test report 230475

30 minute construction: 219mm deep FloorTrus at 600 mm centres with 22mm P5 tongued and grooved Chipboard decking glued and screwed to the manufacturer's recommend-ations and 15mm wallboard plasterboard ceiling drywall screwed to the manufacturer's requirements.

60 min fire: BRE test report 230795

60 minute construction: 254mm deep FloorTrus at 600mm centres with 22mm P5 tongued and grooved chipboard decking glued and screwed to the manufacturer's recommend-ations with a ceiling comprising one layer of 19mm plasterboard plank and one layer 15mm wallboard plasterboard both screwed to British Gypsum RB1 resilient bars at the recommended centres. 100mm of fibreglass insulation was inserted between the joists.

This would be an ideal base for a compartment floor and with the addition of a floating floor should comply with the sound regulations for flats.



MACHINERY



Picture

The Alpine Floor Master press requires at least one third less physical effort by workers. Combined with powered joist lifting, easy access to plates from table pockets, and smooth, efficient operation of the trackless gantry, the Floor Master is the industry's floor joist production leader.

SpaceJoist™ fabrication equipment

Option 1 - low volume production

Saw requirements

The vertical timber webs may be cut on your existing machinery such as a Randek saw.

Press requirements

You will require a table press with platten at least 320 x 450mm with a minimum open height of 150mm. This will allow for production of joists up to 304mm deep with a single pass. A 35 tonne Birch table press or similar would be suitable.

Option 2 - high volume production

Press requirements

We would suggest that you consider either of the following presses for high volume production:

- Alpine Floor Master
- Birch Double Sided Floor Beam Press

RANDEK SPL728 SAW



BIRCH SINGLE SIDED FLOOR BEAM PRESS



FloorTrus™ fabrication equipment

Option 1 - low volume production

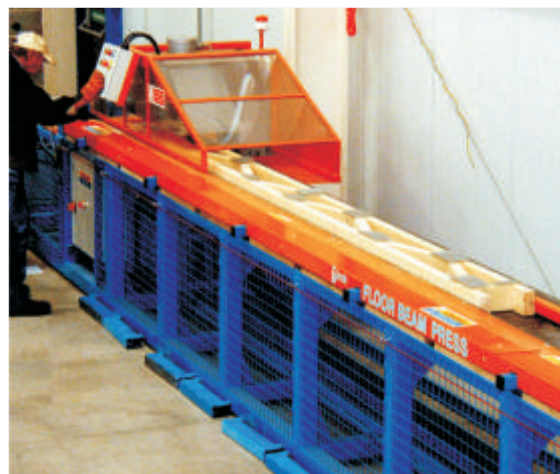
Buy in pre-cut webs

Option 1 removes the requirement to invest in capital equipment. Some web sizes can be cut on existing machinery such as Randek saws or Alpine can provide a solution where pre-cut standard web sizes can be bought in as stock items.

Press requirements

You will require a table press with platten at least 320 x 450mm with a minimum open height of 150mm. This will allow for production of joists up to 304mm deep with a single pass. A 35 tonne Birch table press or similar would be suitable.

BIRCH FLOOR BEAM PRESS



Option 2 - high volume production

Cut your own webs

To cut your own webs you will need to have a Webpro-E saw (available from Alpine) dedicated to cutting FloorTrus webs. The Webpro-E has been proven to cut enough timber to manufacture 400 linear metres of FloorTrus an hour in the United States.

This option will also allow the scope for making FloorTrus of non-standard depth and bay length etc.

Press requirements

To match the productivity of the Webpro-E saw, you will need a dedicated high capacity floor beam press. We would suggest that you consider either of the following presses:

- Birch Floor Beam Press
- Alpine Floor Master

WEBPRO E SAW



FLOOR MASTER PRESS





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