



Strong,
lightweight
composite
structural
'I'-Beam.

TEC BEAM

Installation Guide

This Installation Guide has been prepared as a source of information to provide general guidance to consultants – and in no way replaces the services of the professional consultant and relevant engineers designing the project.

It is the responsibility of the architectural designer and engineering parties to ensure that the details in this Installation Guide are appropriate for the intended application.

The recommendations of this guide are formulated along the lines of good building practice, but are not intended to be an exhaustive statement of all relevant data.

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Introduction

TECBEAM™ is a composite structural 'I'-Beam which has a continuous galvanized steel web and timber flanges resulting in a lightweight beam with structural properties closely resembling those of a steel beam rather than a solid beam. TECBEAM™ is designed and manufactured in Australia by licensed fabricators and holds worldwide patents for its technology.

1.1 General Notes

Conventional framing practices can also apply to TECBEAM™ installations: however, to gain maximum benefit from using the TECBEAM™ system, builders are strongly advised to take advantage of its unique features by adopting the following guidelines.

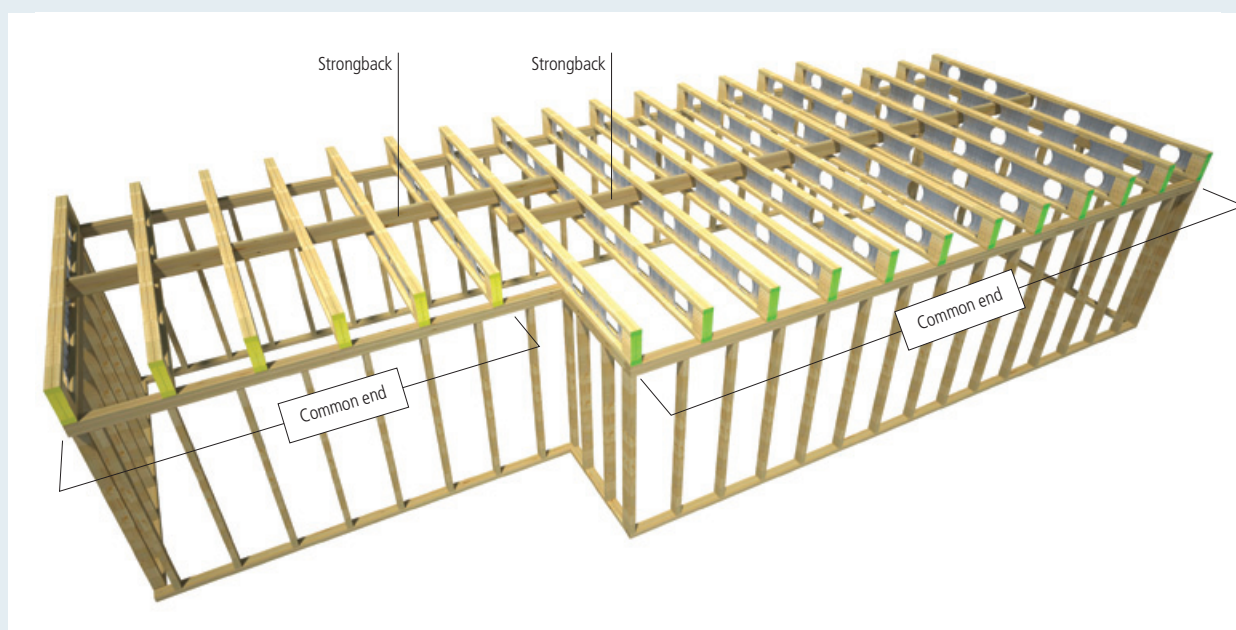
To meet the requirements of the Building Code of Australia (BCA), all works must comply with AS 1684.2-1999 and where applicable with TECBEAM™ Installation Guidelines.

For details not covered in this manual, please refer to either: TECBEAM Australasia P/L, local TECBEAM™ fabricator or a registered structural engineer.

1.2 Web Hole Alignment

For installation of strongbacks (SB) and services

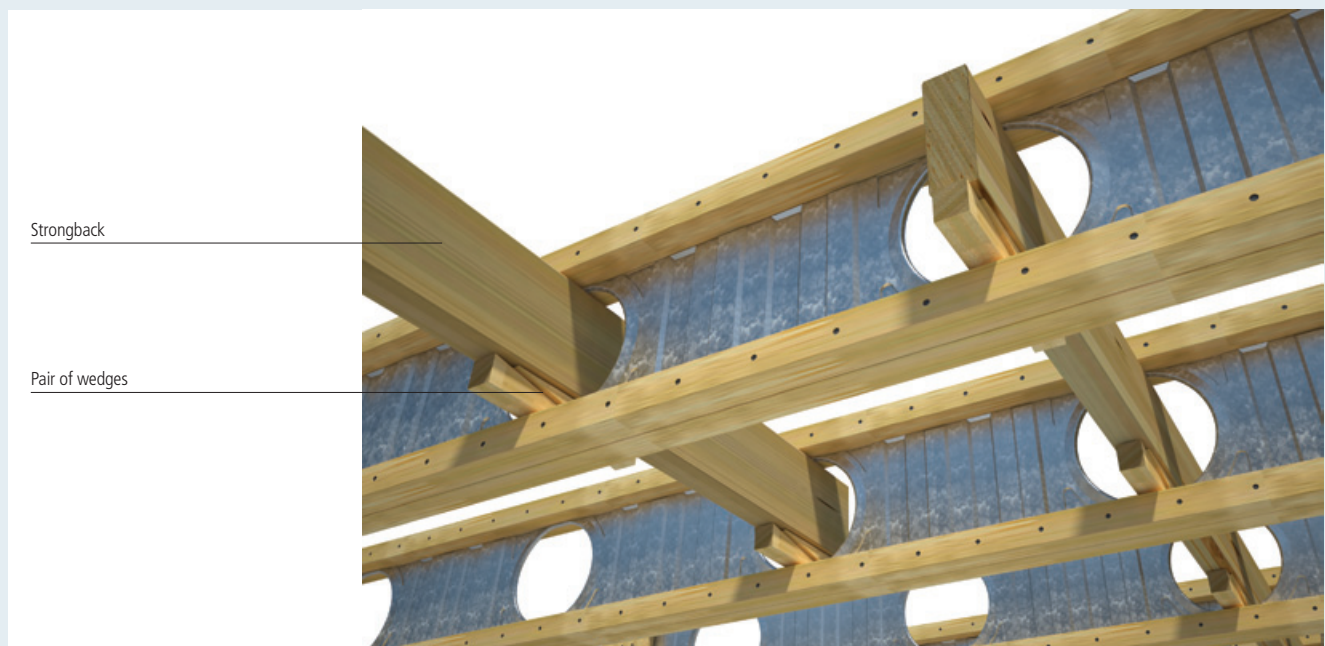
To achieve alignment of web holes, for the installation of strongbacks and services, TECBEAM™ joists have been colour marked at one end, called the COMMON END. Refer to the Floor Framing Plan for set out reference lines (RL)



1.3 Strongbacks (SB)

Strongbacks have been proven to:

- significantly reduce floor vibration
- load share a concentrated load
- be more effective than solid blocking
- act as internal support beams



1.3.1 General

- Before securing wedges, ensure strongbacks are below 15% Moisture Content to avoid squeaky floors
- Minimum MGP10 grade
- If higher comfort levels from floor vibration are required, use MGP12, F17, LVL or increase the number of strongbacks

Recommended Sizes

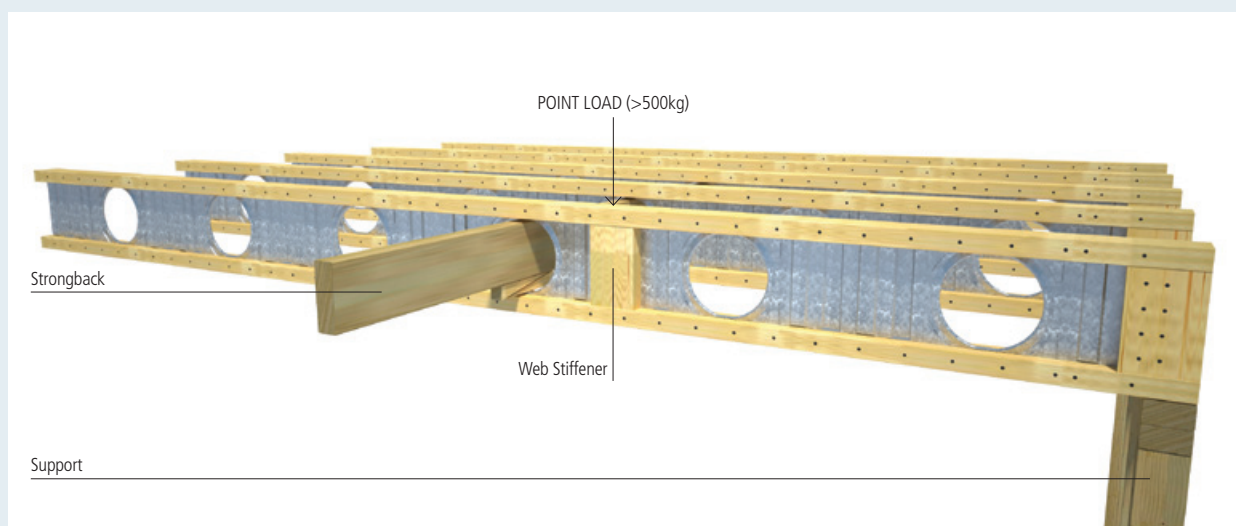
- T25 series – 140 x 45
- T30 series – 190 x 45 or 200 x 45 LVL
- T35 series – 190 x 45 or 200 x 45 LVL
- For higher loading, steel sections can be used as strongback or internal beams; refer to TECBEAM Australasia or a structural engineer

Restrictions

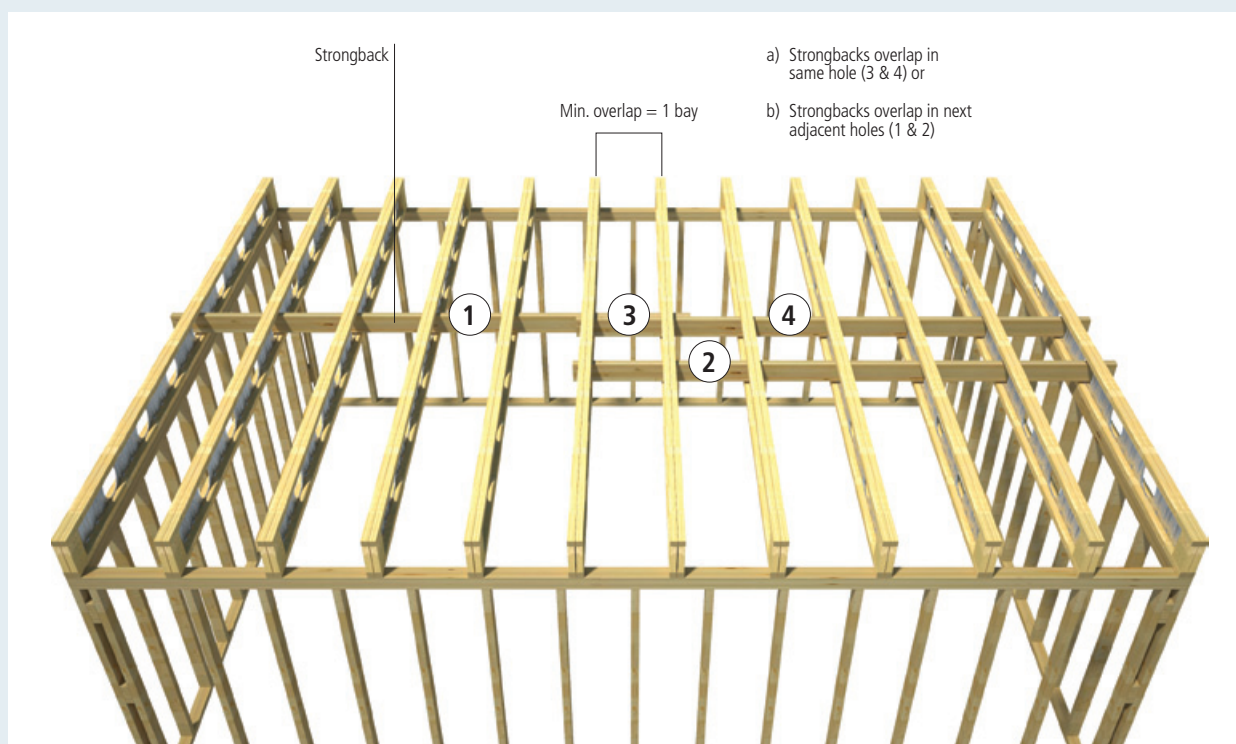
- For maximum efficiency, avoid cutting holes with a diameter greater than one third the depth of the strongback
- For long joist spans, plan the location of services and position of strongbacks to avoid cutting as much as possible. This is to keep floor vibration under control

1.3.2 Installation

- Strongbacks must be secured tight with a pair of wedges at each joist; it is recommended wedges are glued and nailed. See 1.3.4 Wedges
- Where a point load occurs, locate a strongback through the web hole closest to the point load and long enough to fix through at least two joists each side of the joist carrying the load



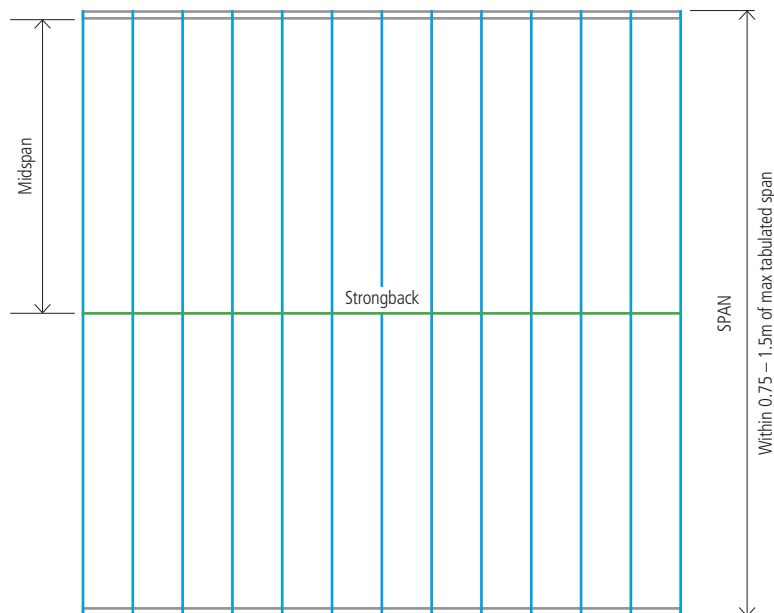
- Install strongbacks with a minimum lap of one (1) bay
- Laps in strongbacks may be installed in
 - a) the same hole or
 - b) the next adjacent hole
- Min. strongbacks lengths: 2100mm for 450 crs and 2400mm for 600 crs



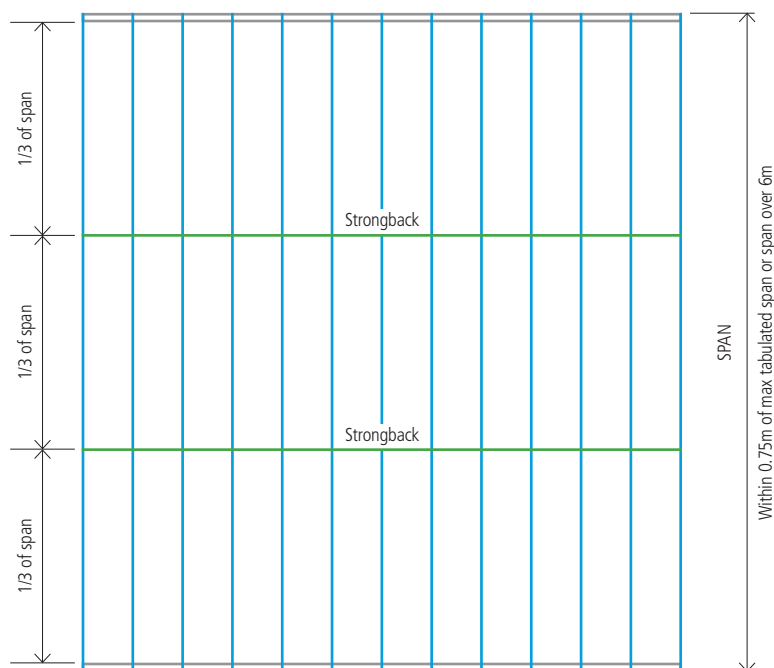
1.3.3 Specifications

Minimum recommendations for vibration control

- Install one row of strongbacks mid span where the joists are within 0.75m to 1.5m of the tabulated span.



- Where the joist span is over 6m or within 0.75m of the tabulated span, install two rows of strongbacks; placed approximately at one third points of the joist span.



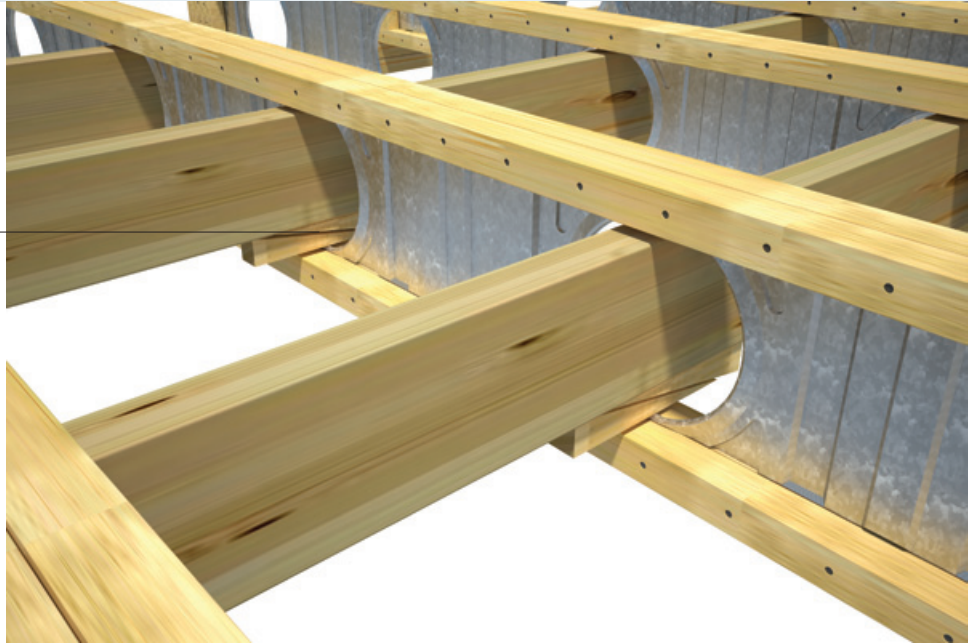
- For continuous spans – add a Strongback in the shorter span even if it is less than the spans indicated above.

1.3.4 Wedges

- Wedges are used to secure the strongback to each joist. Loose or poorly fitted wedges may result in the floor squeaking
- It is recommended that wedges are installed in pairs, hammered hard against the opposing wedge then glued & nailed
- Must be dry with a Moisture Content <15% before fixing

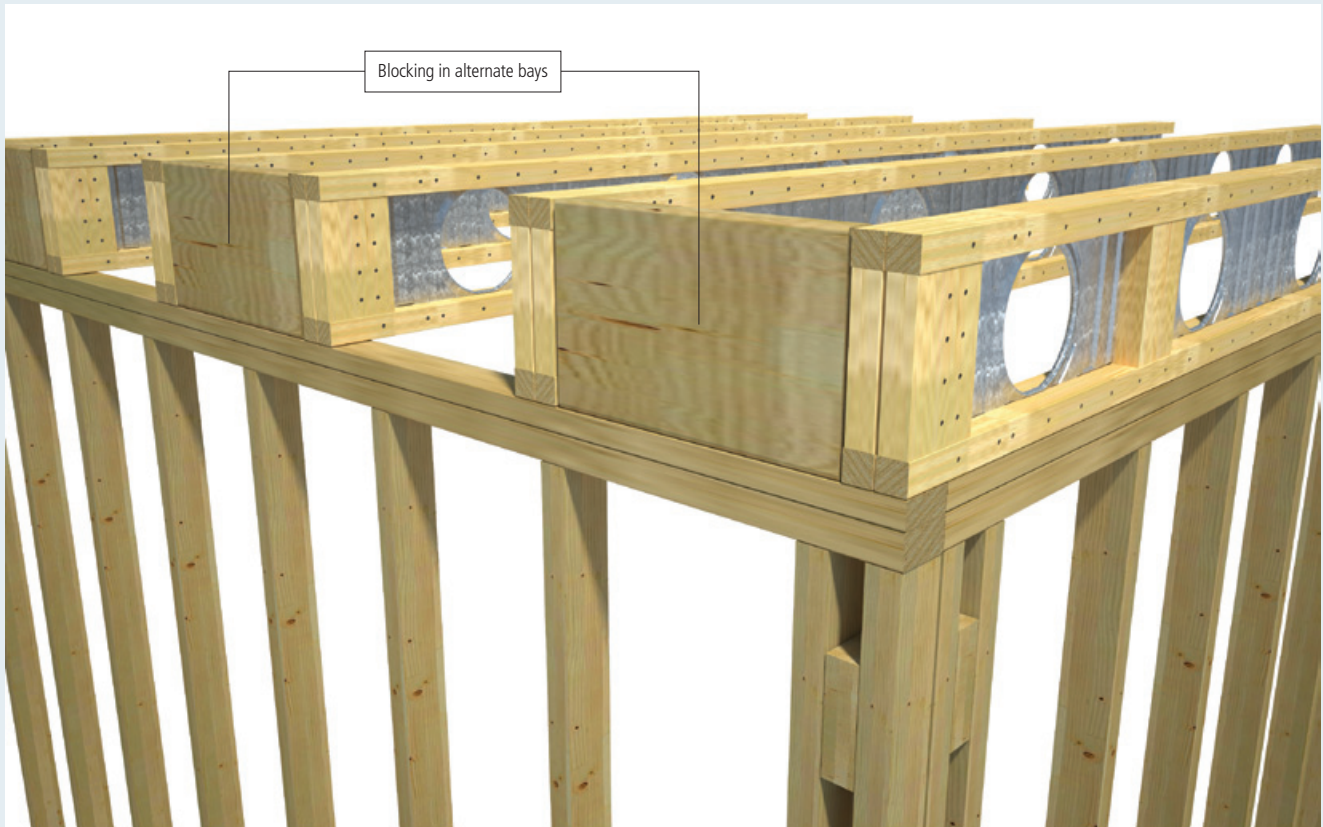
Timber wedges glued and nailed or screw fixed, centred about the web

(Alternative: wedges can be fixed on top of web)



1.4 Blocking & Bracing (in the floor plane)

- TECBEAM™ joists do not require intermediate blocking where there is either full floor sheeting and ceiling lining, or strongbacks (Note: Strongbacks are more effective than solid blocking)
- Install blocking in the following locations:
 - a) at cantilevers along the support line and in alternate bays at the outer end if no trimmer is indicated,
 - b) along all support lines – maximum spacing 1.8m,
 - c) in continuous spans – along intermediate supports,
 - d) under partition walls running parallel to the joists.



1.5 Load Spreaders (or rimboards)

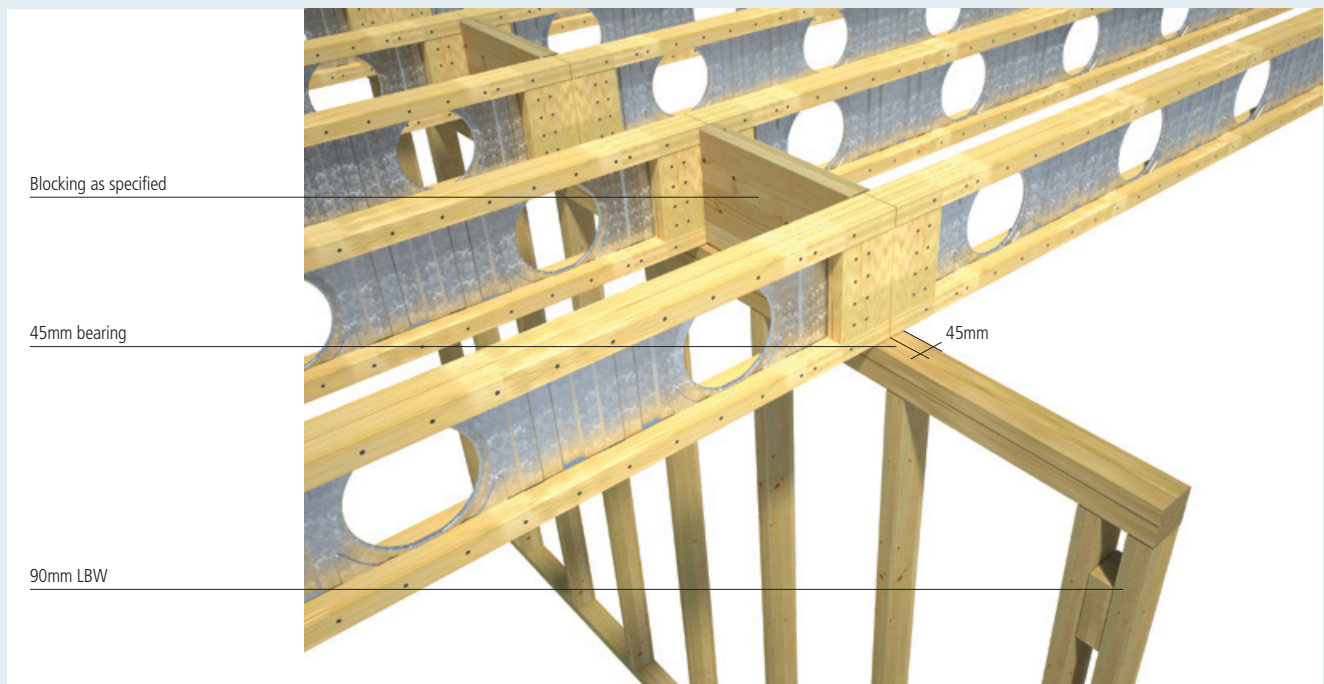
- Where joists are offset from loadbearing studs, Plywood Load Spreaders (or rimboards) can be used instead of extra studs, wall plate blocking or a double top plate



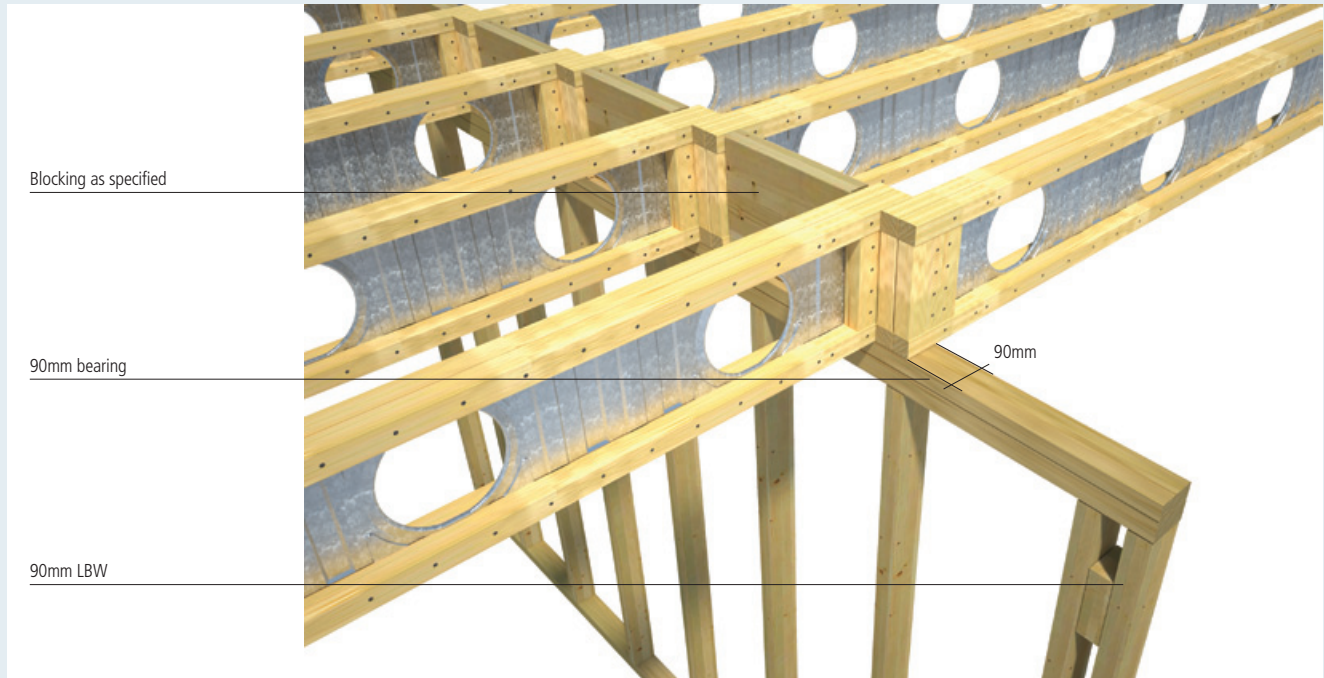
- Load spreaders should be minimum 12mm F11 construction plywood, cut to the exact joist depth and fitted tight between the wall plate and flooring
- Install joists with a 15mm setback from the outside face of the wall frame. Fix each offset joist with a minimum 8/40 x 2.8mm nails
- Load Spreaders should span at least three studs or minimum 1350mm
- Offset joists carrying loads in addition to normal residential floor loads, may require extra fixings – refer to structural engineer
- Plywood Load Spreaders also provide in-floor-plane bracing, eliminating end blocking, or cross strapping
- When used as end bracing only, the 15mm setback is not required; fix with a minimum of four nails per joist

1.6 Bearing Support

- Recommended minimum bearing length: 45mm



Alternately, TECBEAM™ joists can be staggered at internal load bearing walls for full 90mm bearing



1.7 Web Stiffeners (or web blocks)

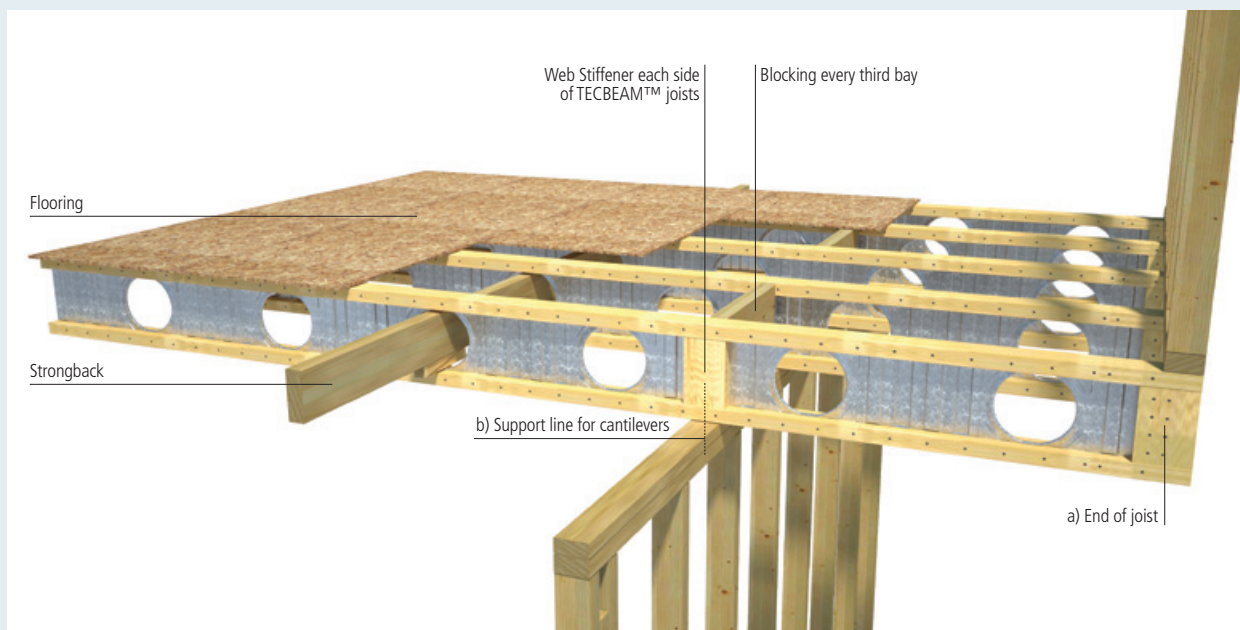
- are required to transfer shear loads into or out of the steel web
- are used to brace the web in high load cases

1.7.1 Minimum Requirements:

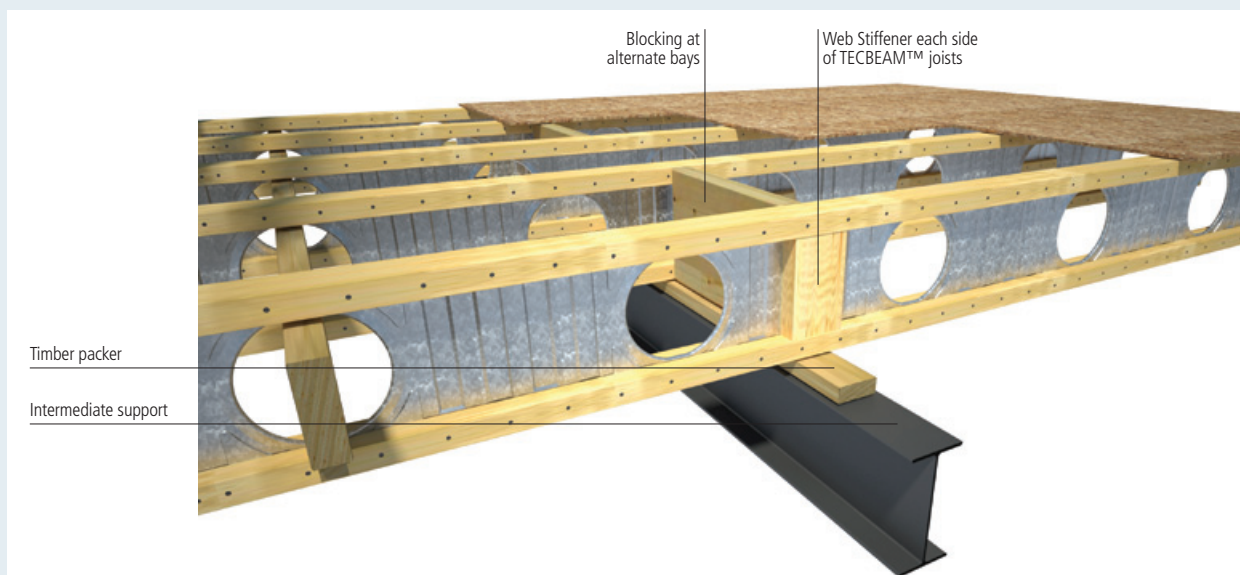
- Minimum Size: 70 x 35 seasoned timber, tight fitting between timber flanges on each side of the web and nailed together
- Minimum nailing: T25 – 8/65 x 2.7mm
T30 – 8/65 x 2.7mm

Web stiffeners are required at:

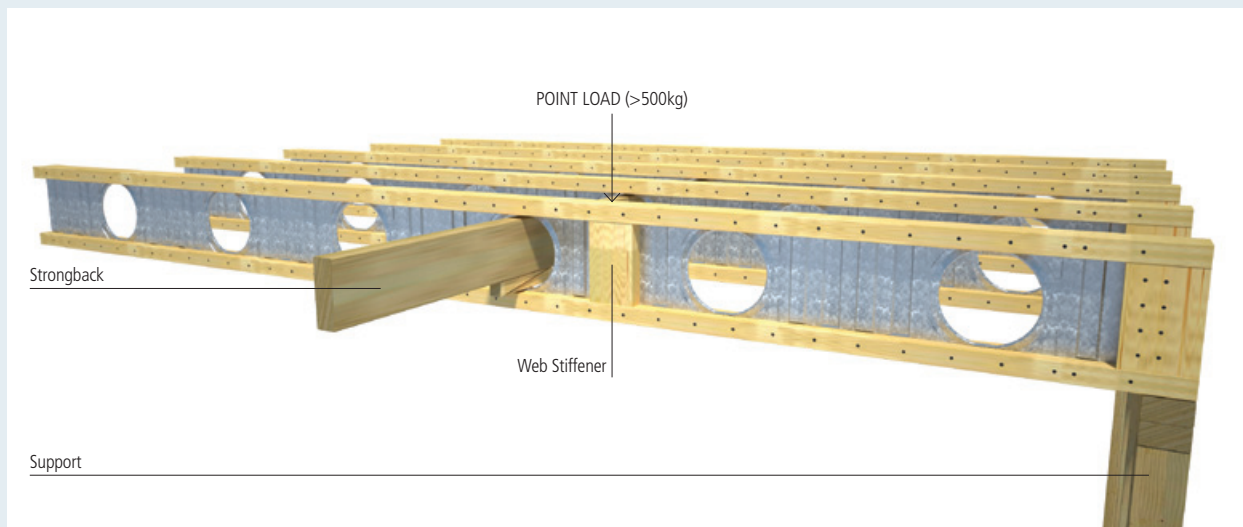
- a) the ends of all joists
- b) the support line for cantilevers



- c) at the supporting walls, beams, posts, in continuous spans



d) under point loads exceeding 500kg



e) perimeter walls

- Under perimeter load bearing walls, a single TECBEAM™ joist fitted with extra web stiffeners replaces two solid timber joists
- Recommended web stiffener spacing:

Metal Roofs: 1350mm crs

Tile Roofs: 900mm crs up to 10m span

Heavier Loads: 600mm crs



Note: If a web hole occurs over the support, add a pair of web stiffeners as close to the support as possible but covering the steel web sufficiently to fix the minimum nailing required through the web.

1.8 Internal Walls (non load-bearing)

Crossing Floor Joists – For a single wall within the middle half of the joist span and also within 300mm of the tabulated span, one of the following measures is required:

- add an extra joist every 1800mm crs or
- reduce joist spacing, e.g. 600mm to 450mm crs, 450mm to 350mm crs, or
- upgrade to next joist size

Note: for additional walls crossing the joists, check with TECBEAM Australasia or a structural engineer

Parallel to Floor Joists – Where a wall covers over 65% of the joist span, check the following:

- Joists @ 600 crs – if the span is within 500mm of the tabulated span, add an extra joist under the wall
- Joists @ 450 crs – if the span is within 900mm of the tabulated span, add an extra joist under the wall

Notes:

1. Install a strongback at midspan 2100mm long to even out deflections
2. Support walls located between joists with either short strongbacks or solid blocking @ 1800mm crs

1.9 Trimming, Notching or Docking

- Trimming, notching or docking is permissible only at end supports
- The “Common End” has a pair of either 140mm or 190mm wide web stiffeners fitted with the steel web setback 70mm or 90mm respectively. This feature allows for the timber trimming, notching, or docking

1.9.1 Restrictions on Notching:

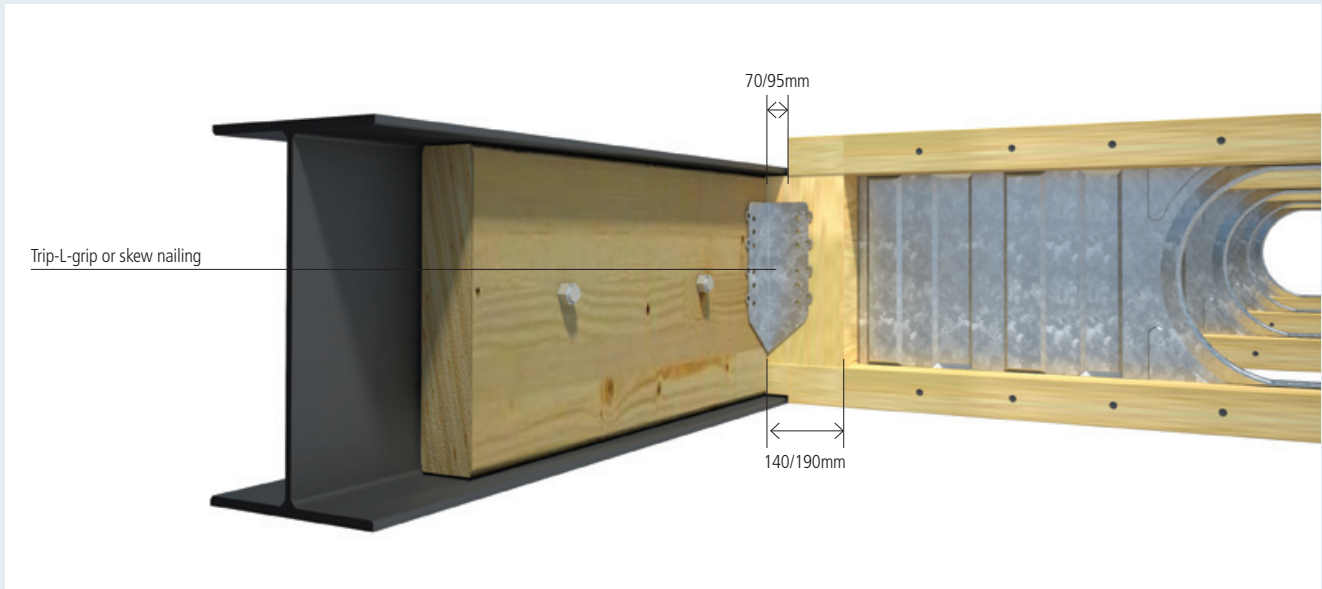
Bottom Flanges

TECBEAM™ joist bottom flanges can be notched up to 15mm and no longer than 100mm. If greater notching is required, refer to TECBEAM Australasia, or a structural engineer.



Top Flanges

Can be notched to the full depth of the flange and half the width of the stiffener.

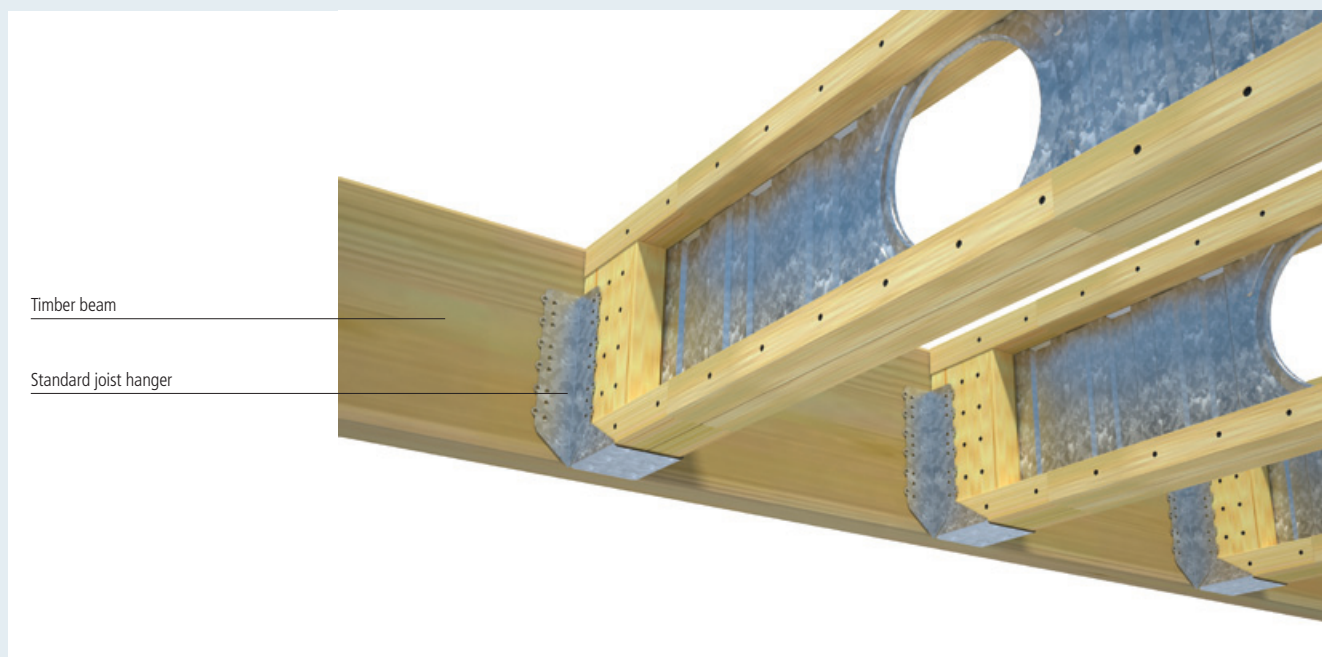


1.10 Connection and Fixing Details

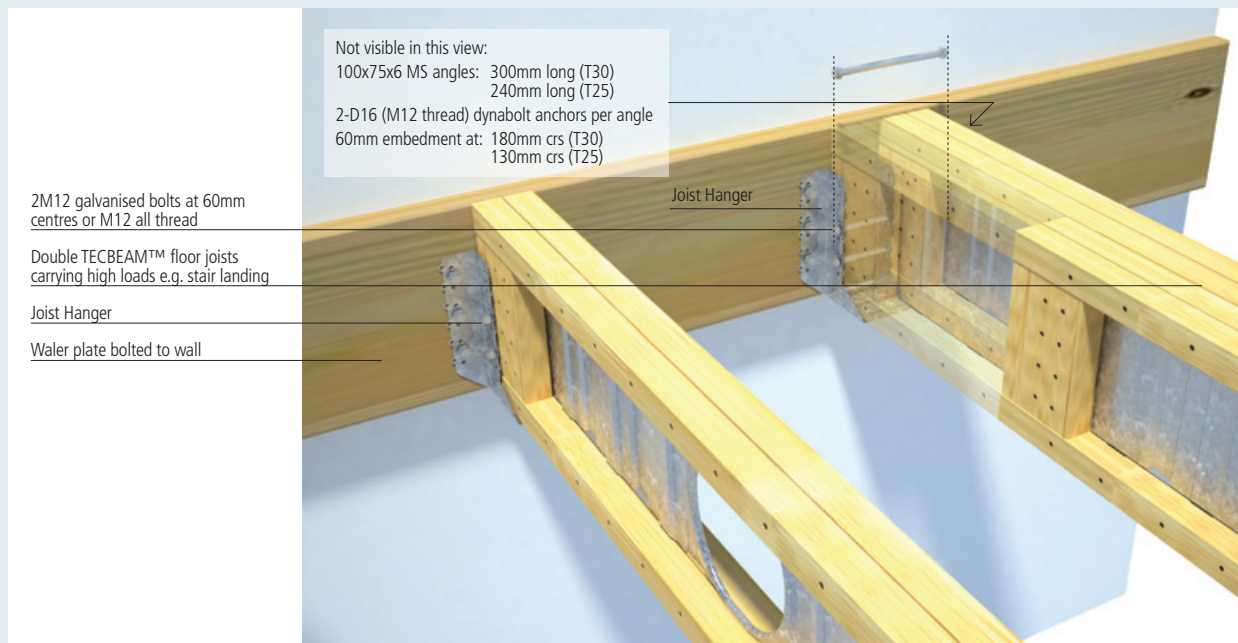
- Generally, standard timber framing connectors and framing methods are suitable with TECBEAM™ joists
- For higher load capacity applications, heavy duty connectors maybe necessary (refer to a structural engineer)

1.10.1 Connection to Timber Beams

- Under normal floor loads, Standard Joist hangers are used to connect TECBEAM™ joists to timber beams



- Where TECBEAM™ joists carry higher loads e.g. double joist at stair void, a combination of a joist hanger on one joist and a steel angle bracket fixed with 2M12 bolts on the other joist can be used. Refer to TECBEAM™ Standard Details



1.10.2 Connection to Steel Beams

A. Notching – install against the beam web and bearing on the flange

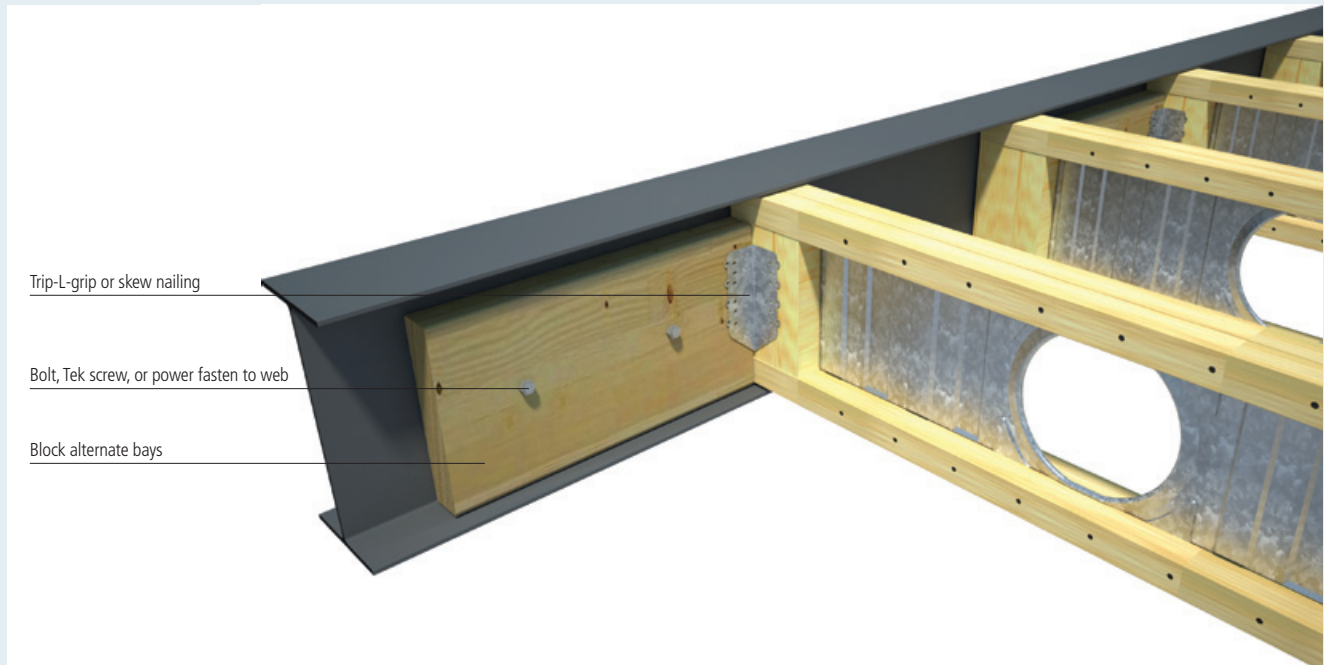
A1. Steel beams with a height similar to TECBEAM™ joists

- Notch the joist inside the steel beam (refer notching limitations) with the joists bearing on the bottom flange of the steel beam



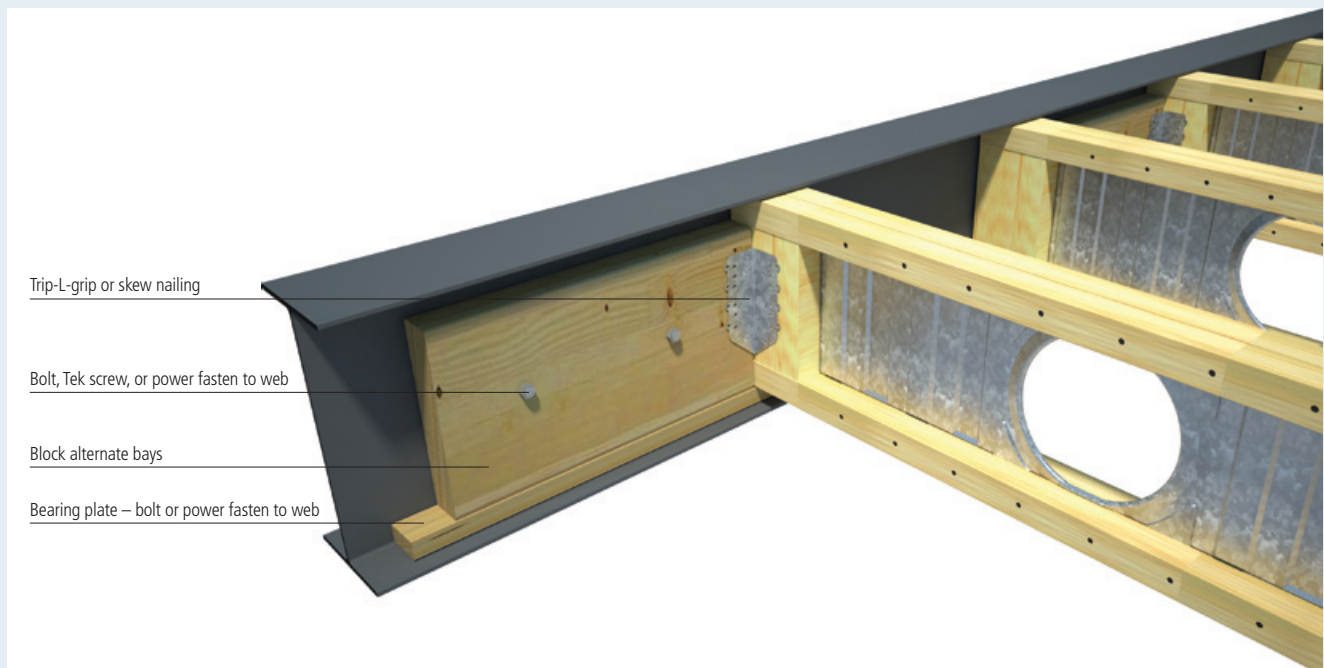
A2. Larger Steel beams – TECBEAM™ joists shallower in depth than steel beams (no notching)

- Install solid timber blocking in alternate bays
- Fix blocking securely to the web of the steel beam by bolting, Tek screws or Ramset power fasteners



A3. Larger Steel beams – Shallower TECBEAM™ joists with timber bearing plate

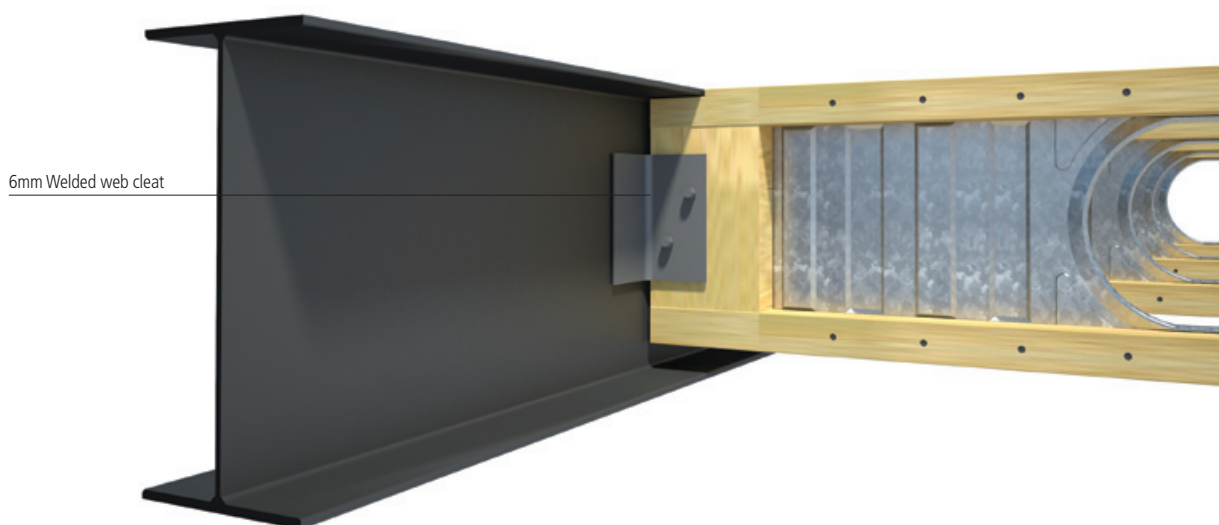
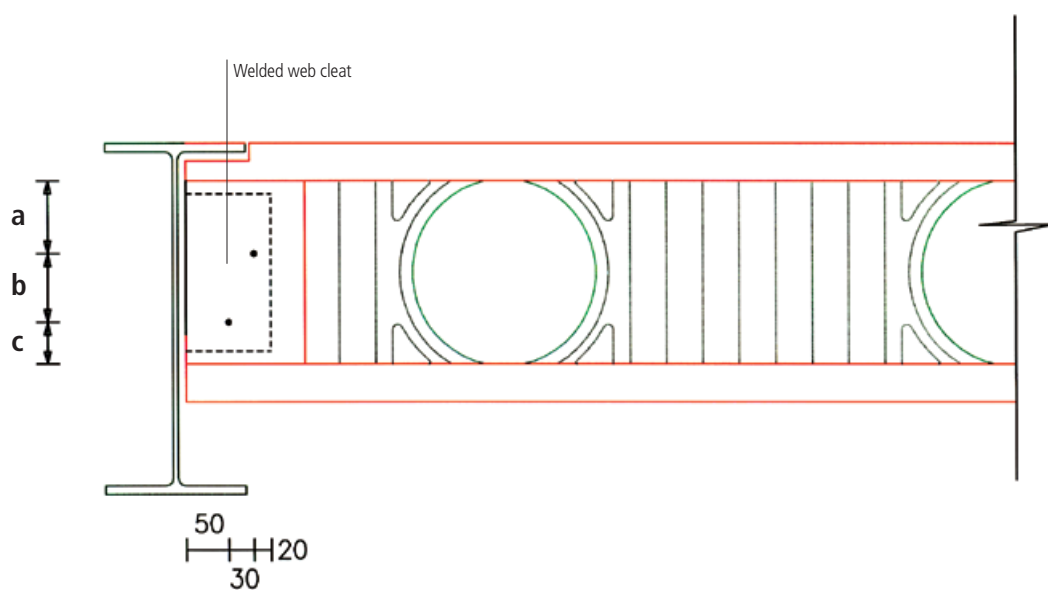
- Install solid timber blocking in alternate bays
- Fix blocking securely to the web of the steel beam by bolting, Tek screws or Ramset power fasteners



B. Beam Cleats – use where it is not practical to bear on the flange

- Weld steel cleats, or fix angles to the beam web and install bolts through the joist web stiffener as shown
- Bolts indicated are for normal floor loads only

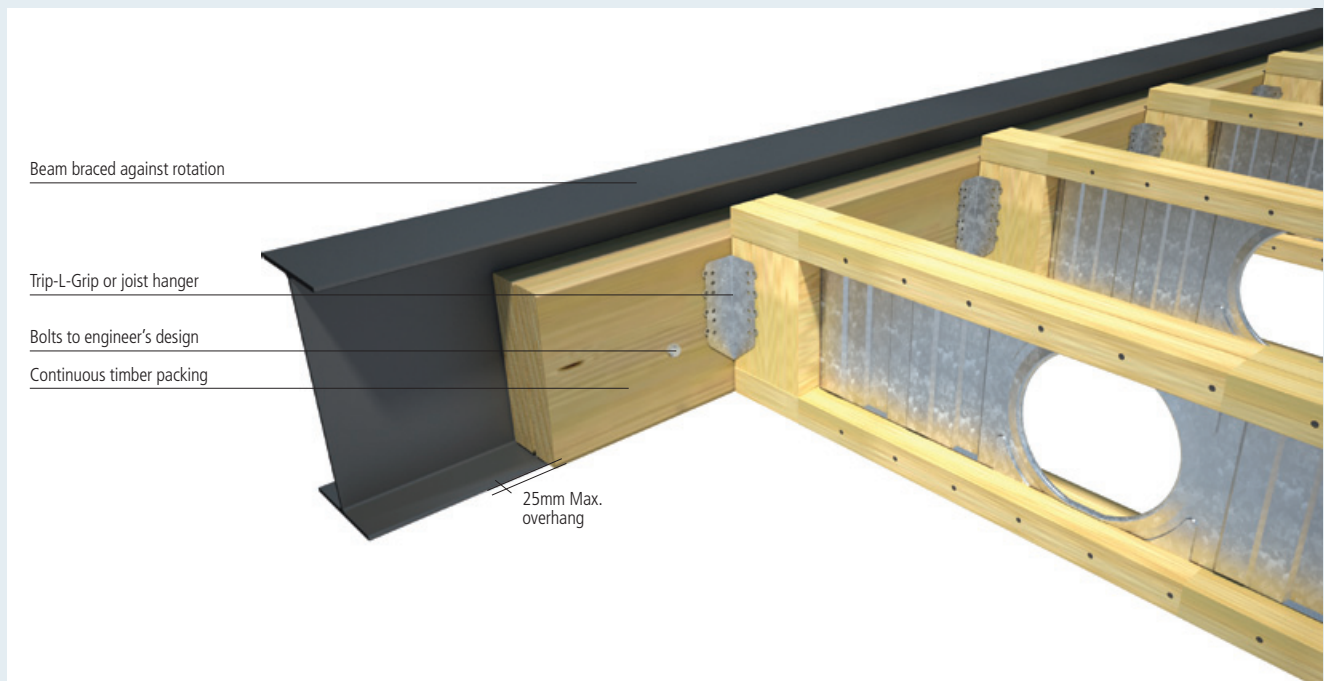
Joist	Bolts	Minimum		
		a	b	c
T25	2M10	70	50	25
T30, T35	2M12	85	80	30



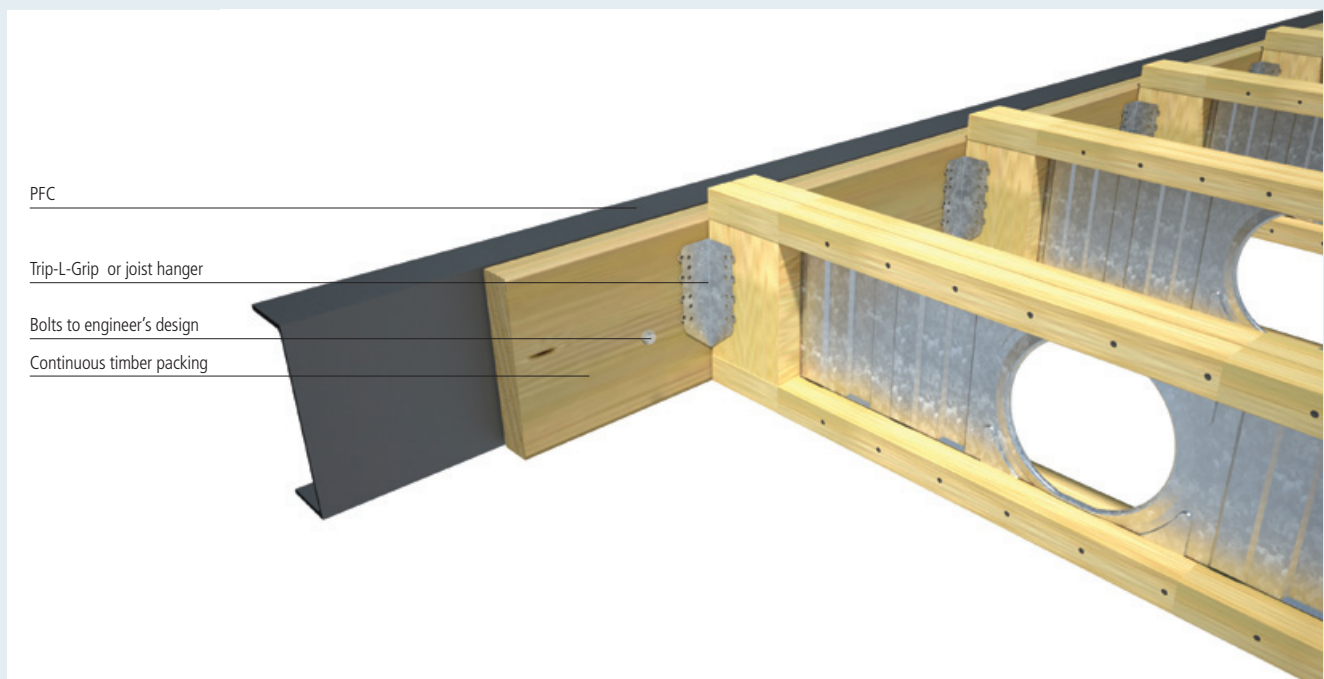
C. Continuous solid timber packing

- Pack the steel beam with continuous solid timber
- Bolt packing to steel beam web as per engineer's specifications and fix TECBEAM™ with joist hanger or Trip-L-Grip
- Ensure the steel beam is braced against rotation caused by the offset loading

'I' Beam



or (PFC):



Design notes:



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