

FUTUREBUILD[®] LVL
ENGINEERED I-JOIST

hy
JOIST[®]

INSTALLATION GUIDE

AUGUST 2023

FUTUREBUILD® LVL ENGINEERED I-JOISTS

hy JOIST®

Contents

1.0	hyJOIST® Installation	3
1.1	designIT® sITe App.....	4
2.0	Basic Installation Requirements	5
2.1	Joist Placement	5
2.2	Fixing to Supports	5
2.3	Supports.....	5
2.4	Blocking & Bearing at Supports (for Support of Gravity Loads)	5
2.5	Bearing Support	6
2.6	For Joists Transferring Upper Storey Wall & Roof Loads at Supports	6
2.7	Lateral Restraint	7
2.8	Intermediate Restraint (Between Supports).....	8
2.9	Notching/Cut Backs/Holes with hyJOIST®	9
2.10	Product Faults.....	10
2.11	Storage & Handling	10
2.12	Health & Safety.....	10
3.0	Installation Details Requiring Design & Specification.....	11
3.1	Method for Framing Cantilevers Supporting Load Bearing Walls	12
3.2	Tie Down & Transfer of Lateral Forces Through the Floor	12
4.0	Compliance with the New Zealand Building Code (NZBC)	20
4.1	Disclaimer	20
	Appendix A - hyJOIST® Selection Guide.....	21
	Appendix B - Joist Hangers for hyJOIST®	22



1.0 hyJOIST® INSTALLATION

hyJOIST® is a cost-effective, lightweight i-joist used in residential and commercial construction. hyJOIST is easy to install and available in 5 different depths, with 3 flange widths across the 240 and 300mm depth range and available in lengths up to 12.6m providing the ability to optimise design solutions and provide economical joist layouts.

Many of the hyJOIST installation requirements contained in this brochure have been successfully applied and implemented by builders for over 20 years.

By separating design considerations from installation requirements the intention is to help builders and designers sort out 'who does what' and minimise the potential for critical matters to 'slip between the cracks'.

There are some aspects of installation that can be regarded by designers and builders as 'basic requirements' to be adopted for installation in the absence of other or additional requirements specified in the design documentation. Requirements that fit into this category are defined and detailed under 'Basic Installation Requirements'.

Other aspects, are categorised as 'Installation details requiring design and specification' because they need selection and individual specification in the design documentation to ensure the design intent is communicated to the builder.

This guide provides a variety of details specific to the use of hyJOIST floor systems for houses and similar buildings. Details contained in this publication have been appropriately engineer designed and/or tested to determine their suitability. In addition, many details in NZS 3604 and other industry publications are equally applicable to hyJOIST as for conventional timber joisted floors – use them. We do however, caution against any assumption that details published for third party I-joist products are suitable or sufficiently complete for use with hyJOIST.

In all cases it is assumed that installation will be carried out in accordance with a joist layout drawing showing the location, size (section code) and maximum spacings of joists together with reference to any specific engineering requirements not included in this guide.

The information contained in this manual relates specifically to Futurebuild® LVL products manufactured by Carter Holt Harvey® LVL Limited and cannot be used with any third party manufacturers LVL products no matter how similar they may appear.

Third party LVL products can differ in a number of ways which may not be immediately obvious. Substituting them is not appropriate and could in extreme cases lead to premature failure and/or buildings which do not meet the requirements of the New Zealand Building Code.

1.1 designIT® sITe App

The designIT® sITe App is a cut-down version of our own designIT for houses software and serves as a handy reference tool and calculator for specifiers or tradesmen who choose to use Futurebuild LVL products.

Features include:

- Access Futurebuild LVL installation details, including hyJOIST.
- Specify service holes in hyJOIST® and solid LVL joists.
- Detail common rafter overhangs in hyJOIST and our solid range of LVL products.
- Check or re-design bearers, joists and rafters as hyJOIST or our solid range of LVL products.
- Save all results to Design Certificates that can be managed across multiple designIT platforms.



GET THE APP NOW.

Use the App to access installation details, a floor joist and hole calculator and more.

Scan the QR Code or search for designIT® in the App Stores.



2.0 BASIC INSTALLATION REQUIREMENTS

Installation requirements specified in this section should be assumed to apply as minimum requirements in the absence of additional or other requirements specified in the design documentation.

2.1 JOIST PLACEMENT

Joists should be accurately placed at not more than the nominated maximum centre to centre spacing so as to provide the support required for flooring and load bearing walls or posts.

2.2 FIXING TO SUPPORTS

Joists are to be fixed accurately in position at supports using nails or screws as per Detail F5.

2.3 SUPPORTS

Supports shall be level, dry and have at least the rigidity implied by good framing practice and/or the design criteria specified for supporting components in NZS 3604. (A moisture barrier

is recommended where support is directly to masonry or brickwork). Brackets available for use with hyJOIST are listed in Appendix B.

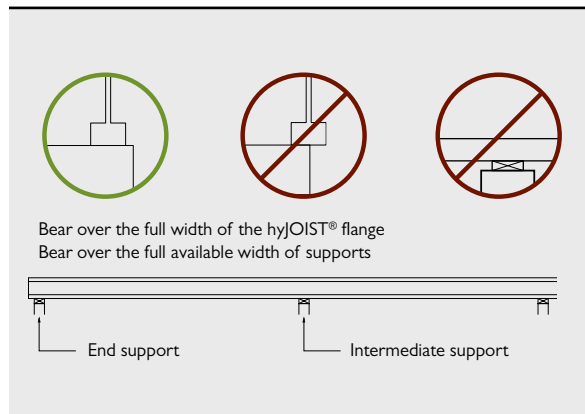
2.4 BLOCKING & BEARING AT SUPPORTS (FOR SUPPORT OF GRAVITY LOADS)

General

- Bearing should be provided to the full width of the hyJOIST bottom flange.
- It is good practice to bear over the maximum available width of supports.
- Use of web stiffeners can reduce the required bearing however this needs to be specified in the design documentation.
- Continuous blocking provides support for load bearing walls directly aligned above supports. At end supports, boundary joists can be used as an alternative to continuous blocking to support a load bearing wall.

In the absence of any alternative specification in the design documentation, bearing support details can be found in section 2.5 and 2.6.

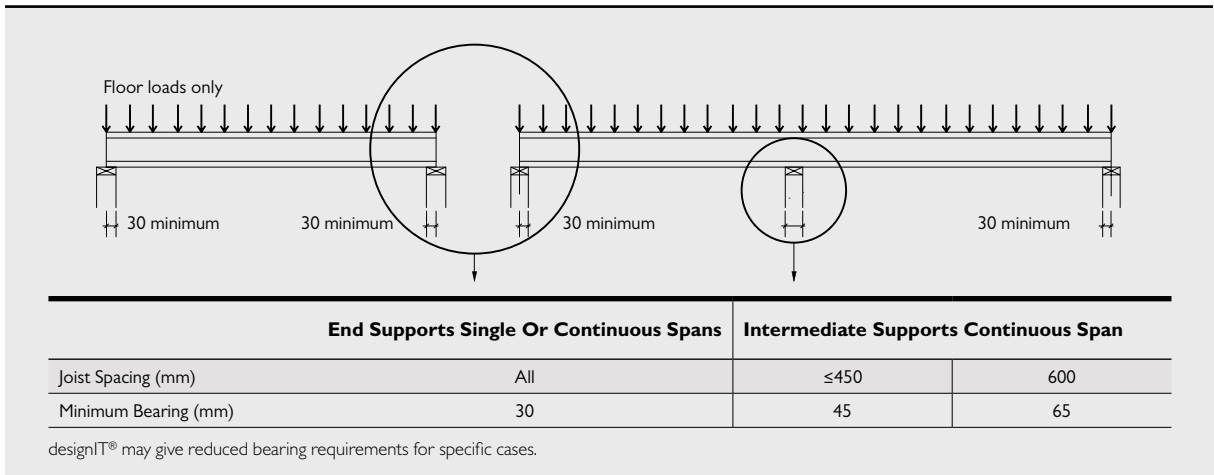
Figure 1



2.5 BEARING SUPPORT

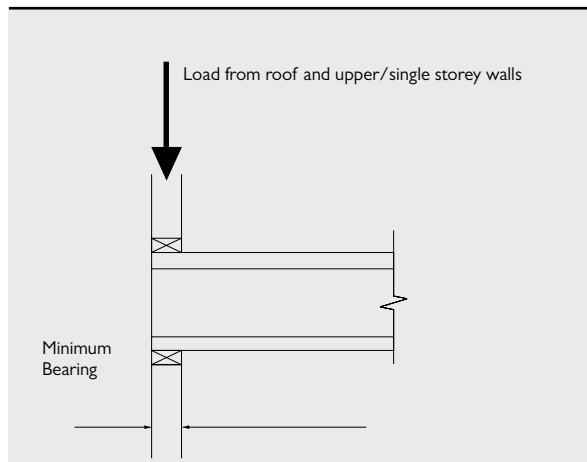
For Joists not Transferring Load From Upper Walls

Figure 2



2.6 FOR JOISTS TRANSFERRING UPPER STOREY WALL & ROOF LOADS AT SUPPORTS

Figure 3: End Supports - Single or Continuous Spans

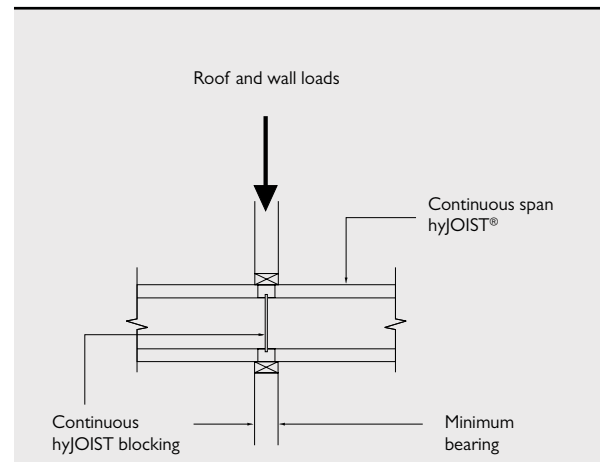


For joists supporting load bearing walls at end supports, provide bearing as specified in the Table below or alternatively install boundary joist.

Load Type	Joist Spacing (mm)	
	≤450	600
	Minimum Bearing (mm)	
Light Roof	45	65 ¹
Heavy Roof	65	90 ²

1. If web stiffeners installed bearing may be reduced to 45mm
2. If web stiffeners installed bearing may be reduced to 65mm
3. For all cases bearing may be reduced to 30mm if a boundary joist, continuous full depth blocking or compression blocks are installed
4. Web stiffener installation as per Detail F6
5. designIT® may give a reduced bearing requirement

Figure 4: Intermediate Supports - Continuous Spans



Minimum bearing to be as for joists supporting floor loads only. Load bearing wall to be supported by continuous full depth hyJOIST® blocking.

2.7 LATERAL RESTRAINT

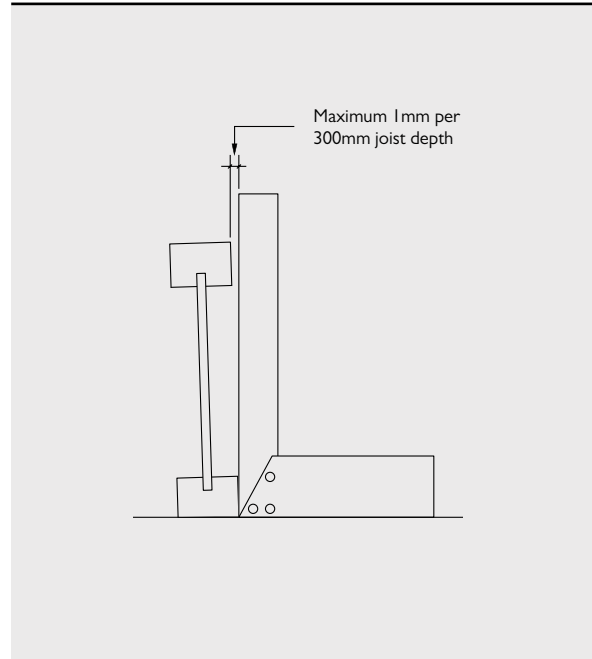
Intermittent Blocking (or equivalent) at Supports

The fundamental requirement is to install joists plumb and hold them upright at supports.

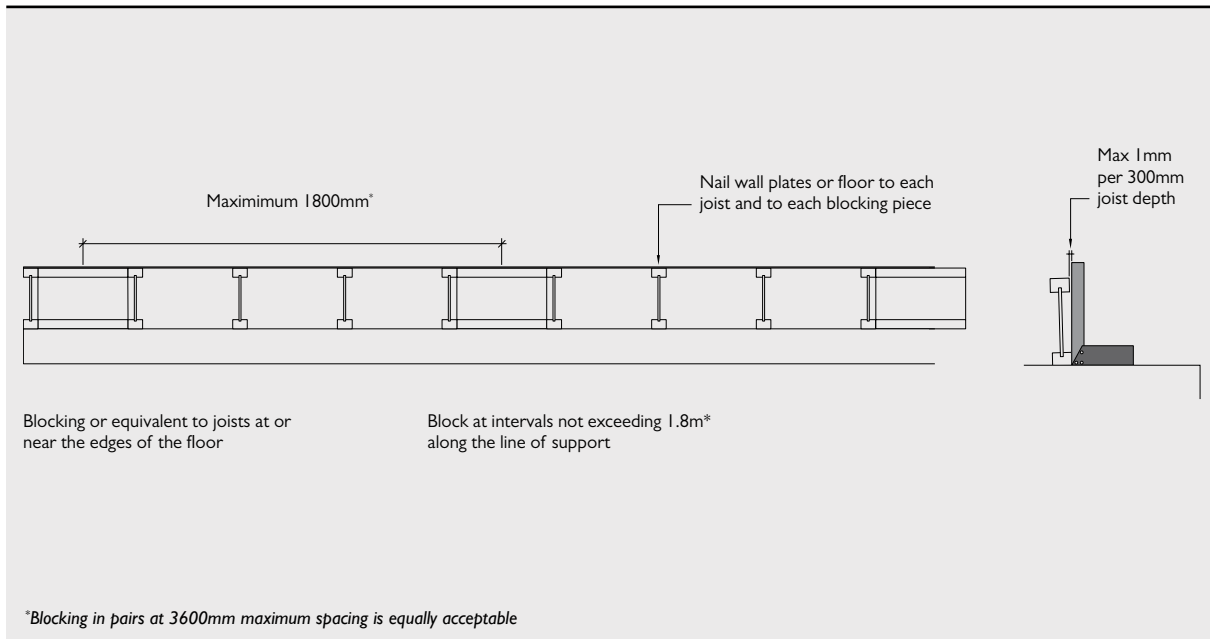
The simplest and most effective way of achieving this is to install square cut hyJOIST® blocking but alternative methods such as the use of metal strap/brace or boundary joist are acceptable.

For installation of blocking, boundary joist, metal strap/brace or plywood enclosures refer to Details F1, F2, F3 and F17.

Figure 5



Detail F24: Intermittent Blocking hyJOIST®



2.8 INTERMEDIATE RESTRAINT (BETWEEN SUPPORTS)

For best performance, the top flange of hyJOIST should be held straight between supports – (no more than 1mm per metre of span deviation from straight).

Before loading joists and attachment of flooring:

- Install blocking (or equivalent) at supports as described above, and

- Between supports, install temporary battens braced back to a point of rigidity (no more than 2.5 metres apart) to hold the top flange of each joist straight between supports.
- For installation of flooring, progressively work across the floor removing battens as required.

Note: Intermediate blocking is not required and can be a source of annoying nail creaks in the finished structure.

Figure 6

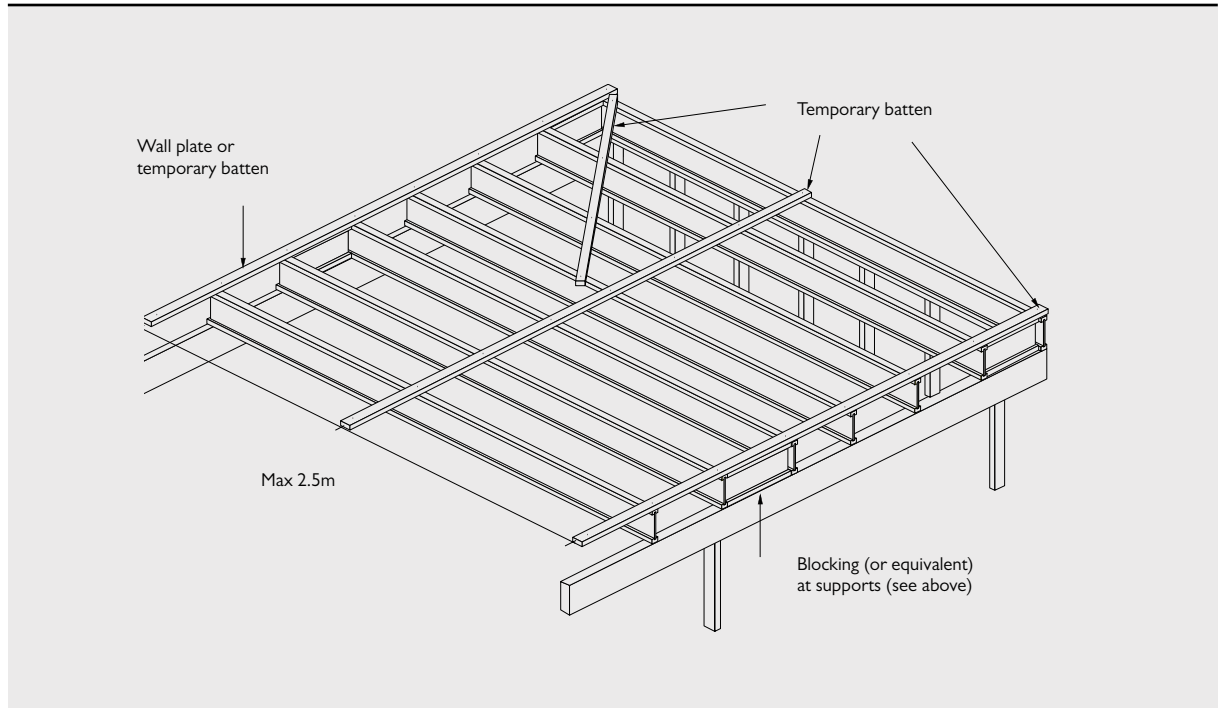
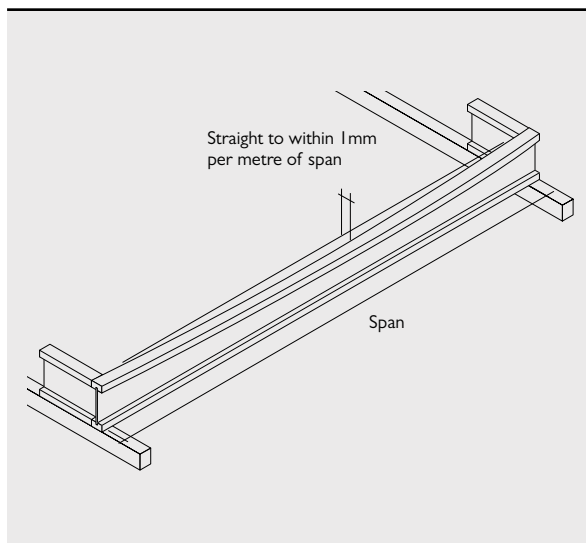


Figure 7



Fixing of Flooring

Flooring may be nailed to joists and to blocking using minimum 2.8mm diameter nails. Alternatively, for sheet flooring self-drilling Type 17 screws may be used. Fastener lengths should not exceed the lengths given in Table I. Nail or screw spacing should be at centres recommended for the particular flooring type. Where nail centres are less than 50mm it is good practice to stagger their location so as to avoid the possibility of splitting. It is strongly recommended that flooring adhesive is used in conjunction with fasteners.

Table I

Flooring Thickness	15-21mm	25mm
Maximum Nail/Screw Lengths	50mm	60mm

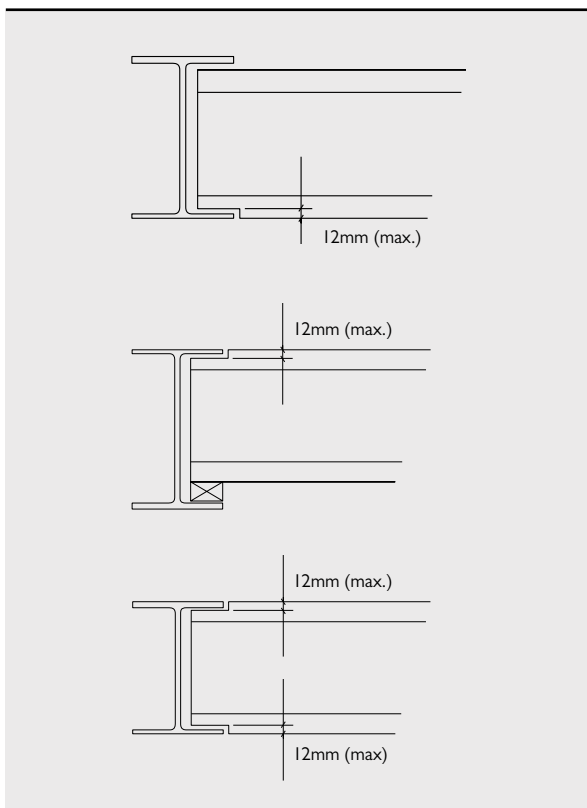
2.9 NOTCHING/CUT BACKS/HOLES WITH hyJOIST®

Notches or Holes in Flanges

Flanges may not be notched, planed or bored except as noted below:

1. At end supports only, one or both flanges may be notched to a maximum depth of 12mm (per flange) as shown in Detail F7.
2. At end supports flanges may be chamfer cut but not beyond the line of the support.
3. Do not bore holes through flanges. Holes up to 6mm for installation of nails or screws at supports allowed.

Figure 8



Notches or Holes in Webs

1. At end supports webs may be notched to accommodate the flange of a steel supporting beam within the limitations specified.
2. Holes may be cut through the web of hyJOIST® for the installation of service pipes and ducts but there are limitations on the placement, size and shape of holes. In general, larger holes must be located closer to midspan. Guidance on the positioning of web holes is given in designIT® sITe App or designIT® for Houses software. Alternative locations may be specified in the design documentation for specific load and support cases.

Figure 9

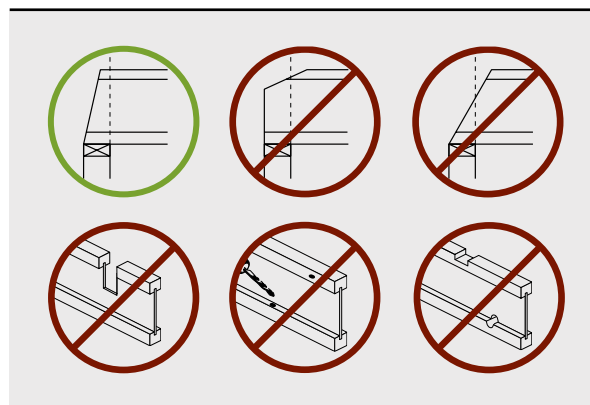


Figure 10

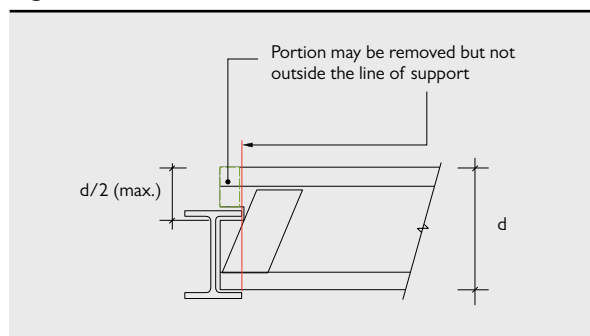
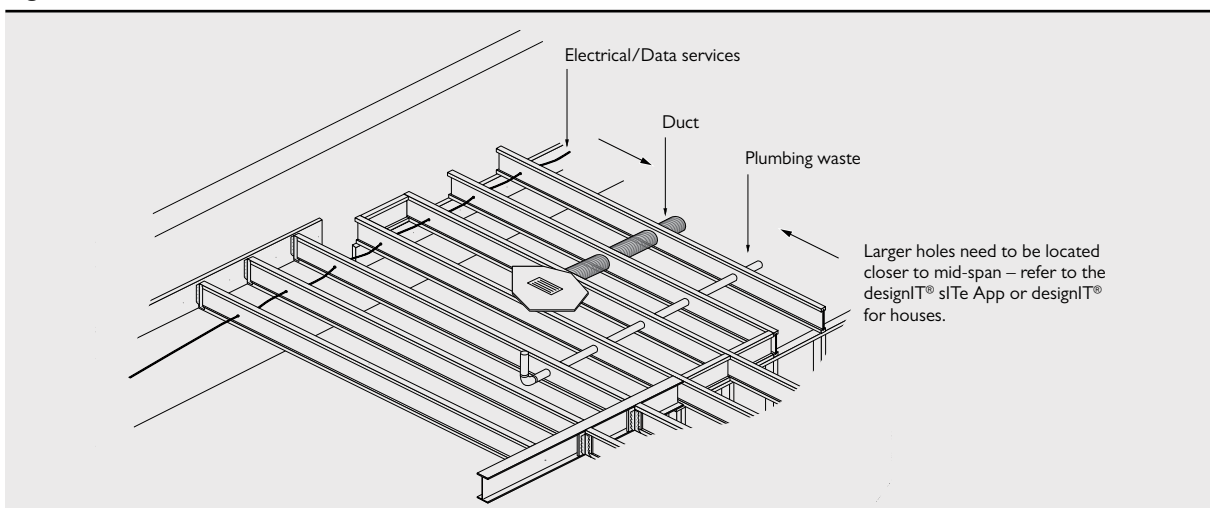


Figure 11



2.10 PRODUCT FAULTS

Faults in manufacture do sometimes occur and faulty product may from time to time reach the market despite even the most stringent controls of the manufacturing process and quality. Please let us know if you receive any product that you have

concerns with – call 0800 808 131 even if you have solved the problem and a claim 'is not worth the hassle'. We want to know so that we can do better.

2.11 STORAGE & HANDLING

Futurebuild® LVL products require care in storage and handling prior to installation.

- Stack well clear of the ground (at least 150mm) for good ventilation.
- Stack on level bearers to keep flat and straight.
- Store under cover prior to installation.

During construction Futurebuild LVL products may be exposed to limited sun and rain. Refer to the Futurebuild Durability Statement downloadable from www.futurebuild.co.nz for detailed information.

2.12 HEALTH & SAFETY

All Futurebuild LVL products should be installed and used as per the Safety Data Sheet (SDS) which can be accessed at www.futurebuild.co.nz.

Always wear safety glasses or non-fogging goggles when cutting.

If wood dust exposures are not controlled when machining (sawing, routing, planing, drilling, etc.) a class P1 or P2 replaceable filter or disposable face piece respirator should be worn.

Wear comfortable work gloves to avoid skin irritation and the risk of splinters. Wash hands with mild soap and water after handling products.

3.0 INSTALLATION DETAILS REQUIRING DESIGN & SPECIFICATION

The following items need design and specification in the design documentation to communicate the requirements for installation.

- Joist sizes and spacing for span, loading and flooring.
- Method of framing around openings in floors (e.g. stair voids).
- Method of framing cantilevers.
- Reinforcement requirements for cantilevers supporting load bearing walls.
- Bearing and support requirements differing from that specified under basic requirements for installation.
- Details for tie-down and transfer of lateral forces through the floor.
- Specification of web holes and permitted locations.

Framing Around Floor Openings

The size of members needed to frame around floor openings needs to be determined in design and specified in the design documentation for installation.

For convenience the depth of the trimmers and trimming joists are usually chosen to be the same as the depth of the floor joists. The ease of connecting and the greater strength and stiffness of hySPAN® relative to depth in comparison with hyJOIST® makes hySPAN the ideal material for framing both the trimmers and the trimming joists.

Trimmers and the supporting trimming joists may in some cases be hyJOIST, where structurally adequate. These can be connected using top mount hangers or stiffeners - see Joist Hangers for hyJOIST on Appendix B and Detail F10.

Methods of Framing Balcony Cantilevers

Balcony cantilevers are frequently exposed to wetting and in this circumstance there is a high risk of decay with subsequent loss of strength of the balcony structure. hyJOIST and hySPAN are not suitable for use in fully weather exposed applications but can be treated to a H1.2 level for protection against low level rot and decay. For fully exposed balconies H3.2 treated sawn timber outriggers can be specified and installed with confidence.

Design should include specification of either the 'adjacent' or 'nested' outrigger detail and the specification of the outrigger material. Outrigger length and quantities can be determined and the installation performed in accordance with the specified detail.

For internal balcony cantilevers Detail F13 may be used.

Figure 15

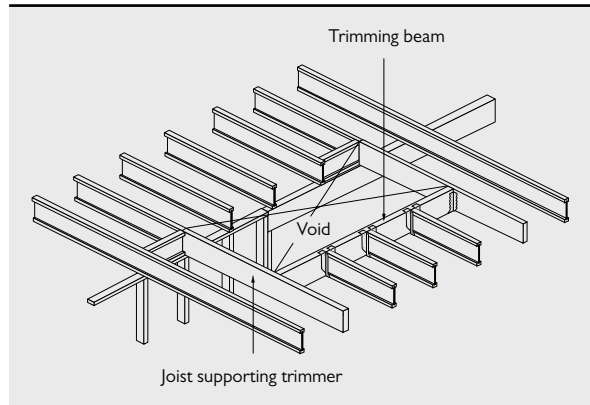


Figure 16: Balcony Cantilevers Using Outriggers

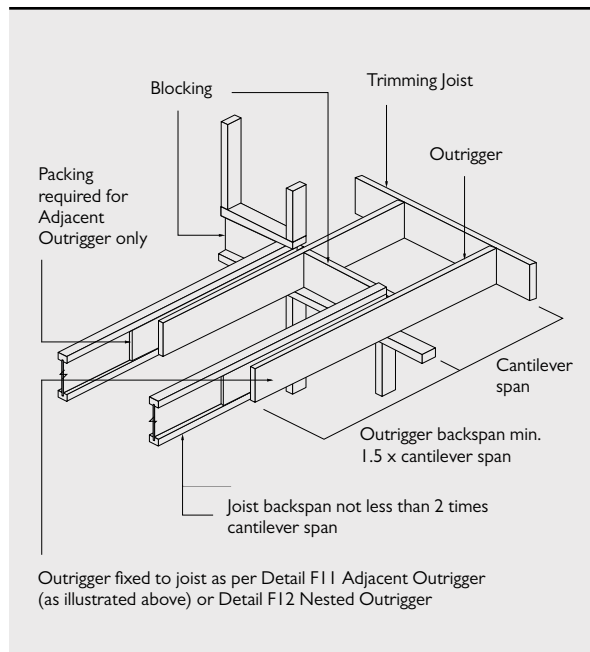
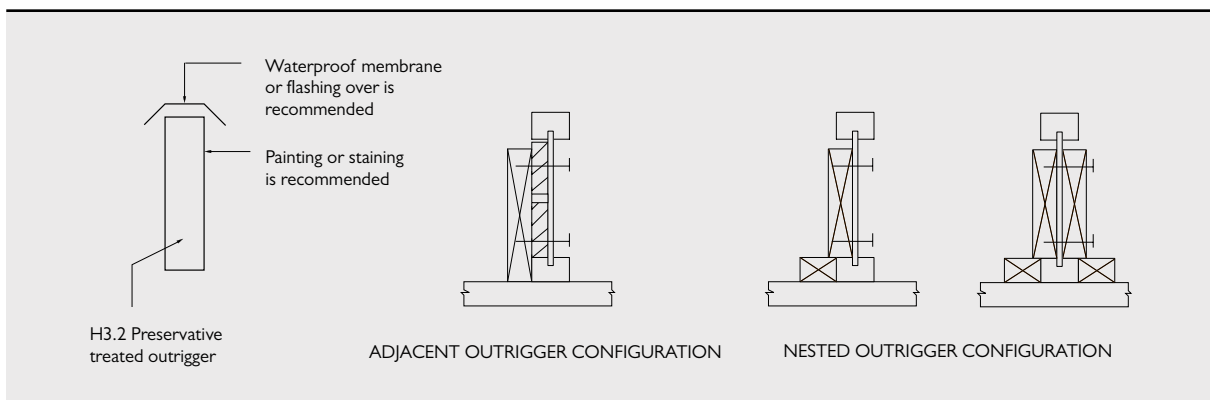


Figure 17



3.1 METHOD FOR FRAMING CANTILEVERS SUPPORTING LOAD BEARING WALLS

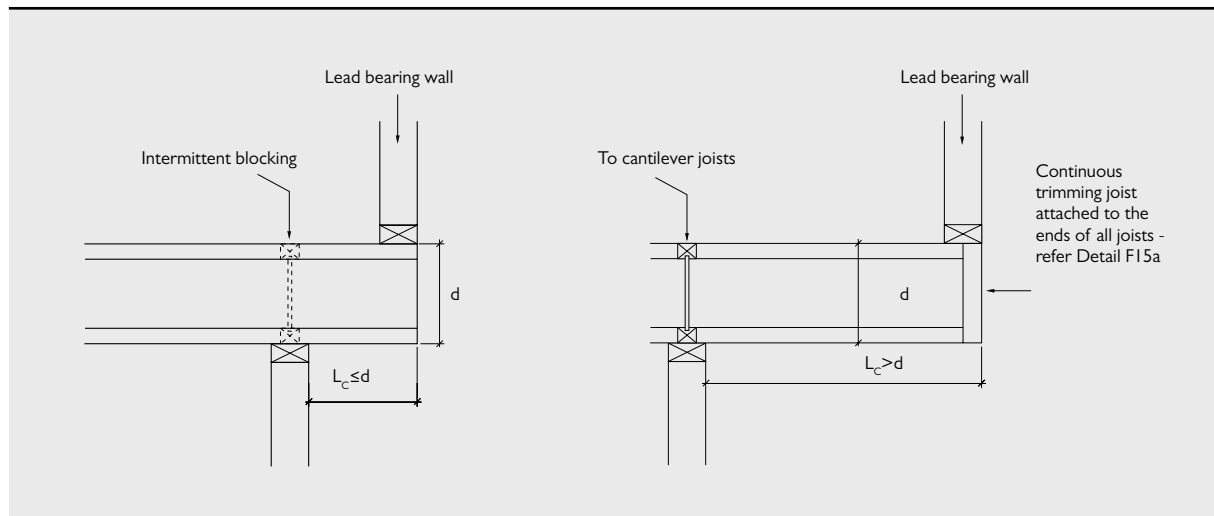
Some or all of hyJOIST® cantilevered to support a load bearing wall may require reinforcement. This requirement needs to be considered in design and specified in the design documentation. Details for reinforcement are given in Details F21 and F22.

Regardless of whether reinforcement is required or not, cantilevers with span greater than the joist depth are to be installed with continuous blocking at the cantilever support and a trimming joist (or equivalent) providing load distribution at

the ends of the cantilevered joists. The use of a trimming detail helps to both stiffen the balcony and limit long term differential deflections. For installation see Detail F15a.

Short cantilevers ($L_c \leq d$) may need reinforcement but intermittent blocking only is needed at the cantilever support and the trimming joist need not be included – see Detail F14.

Figure 18



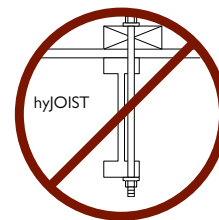
3.2 TIE DOWN & TRANSFER OF LATERAL FORCES THROUGH THE FLOOR

Requirements for tie down and bracing should be specified in the design documentation.

Tie Down

In general, tie down details applicable for solid timber joists as specified in NZS 3604 can also be used with hyJOIST except that bolting through the flanges of hyJOIST is not permitted.

Detail F9 shows how bracing walls may be tied down to a hyJOIST floor system.



Do not bolt through joists

Transfer of Lateral Forces Through the Floor

Lateral wind and earthquake forces determined for the upper storey must be transferred through the floor to the top plate (and the bracing system) of the lower storey. Where these forces are perpendicular to the direction of joists, intermittent blocking or the fixings to boundary joists are not likely to be adequate to transfer the full extent of the forces. For most external walls the simplest answer is to just continue the upper storey bracing (and associated tie-down) through the floor to the top plate of the lower storey wall.

Alternatively, or where continuation of bracing is not possible, such as where joists or outrigger joists are cantilevered (or for internal walls) it is recommended that sufficient blocking is provided to accommodate the nailing attachment of the upper storey wall bottom plate to the blocking and the blocking bottom flange to the top plate of the lower storey wall to match the capacity of the nailing of the upper storey bracing to the bottom wall plate. Tie-downs using proprietary brackets, metal strap or tie rods at the beginning and end of each braced portion of the wall should be carried through the floor to lower storey wall.

Figure 12

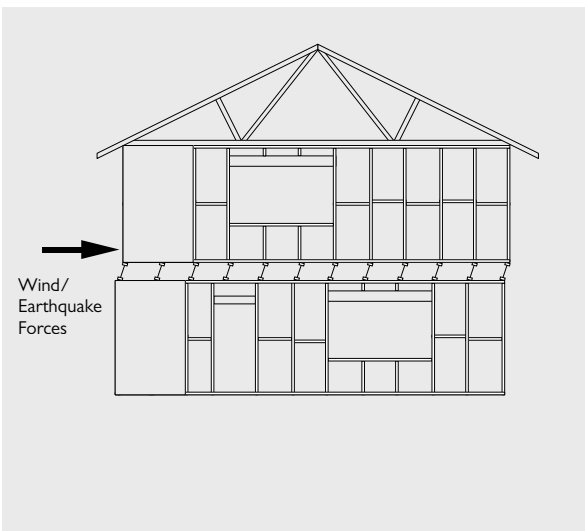


Figure 13

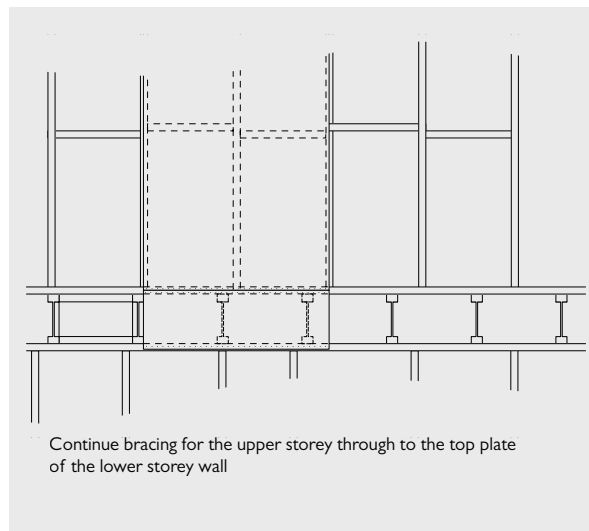
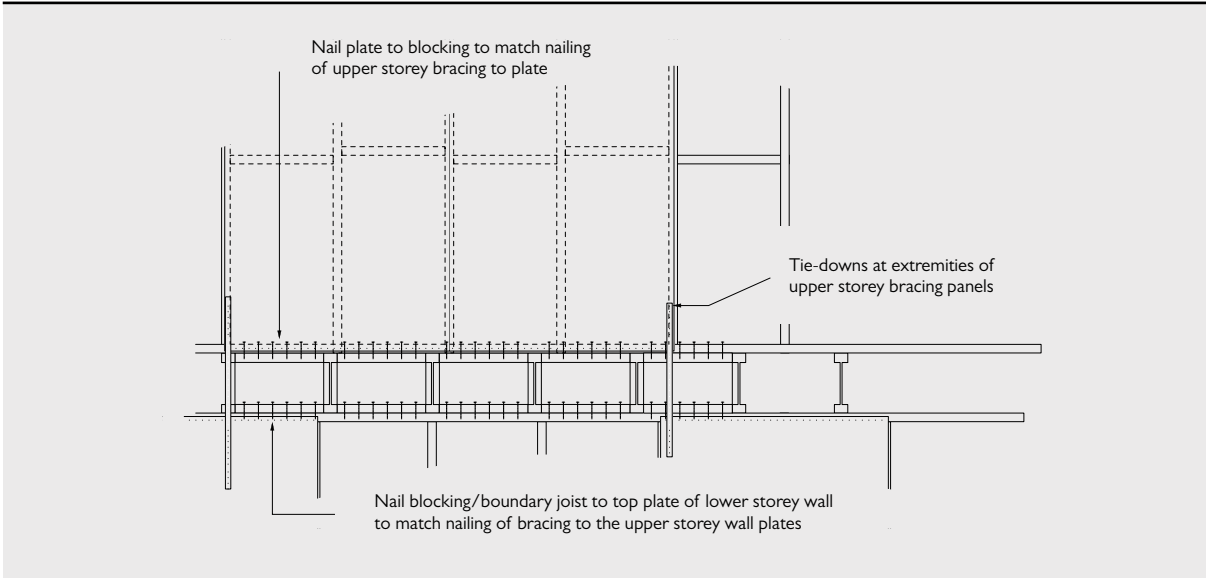
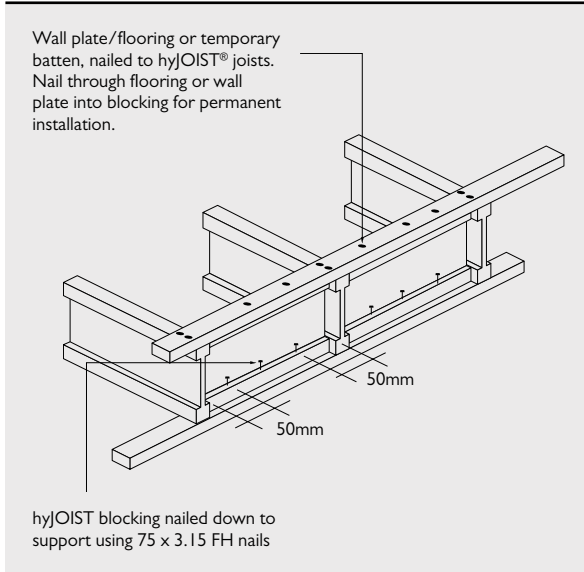


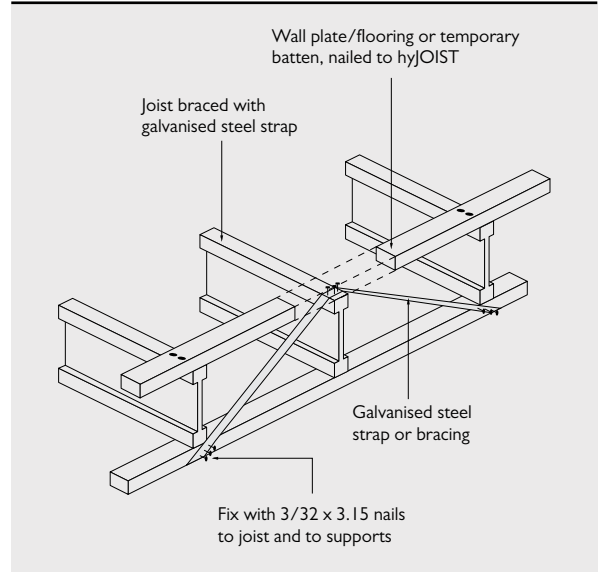
Figure 14



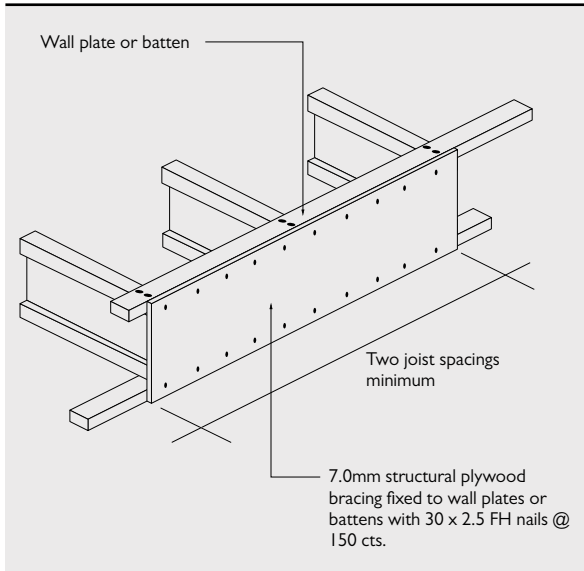
Detail F1: End Restraint - Blocking with hyJOIST®



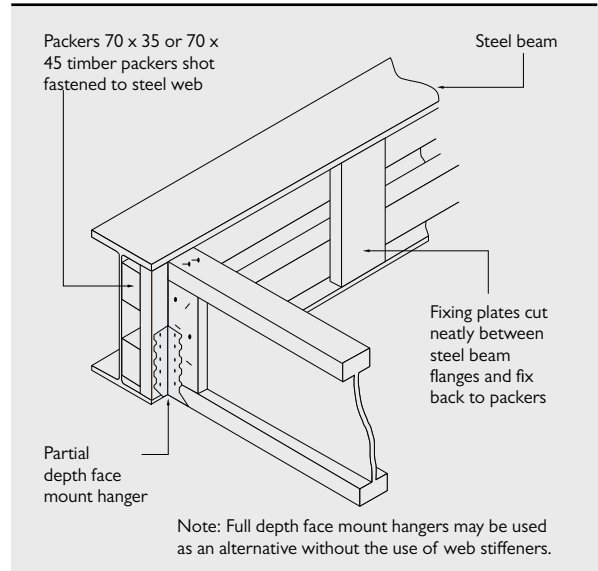
Detail F2: End Restraint - Using Steel Strap or Bracing



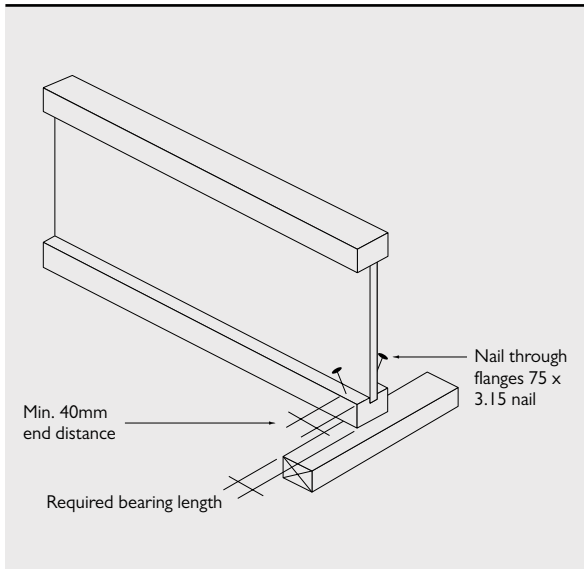
Detail F3: End Restraint - Using Ply



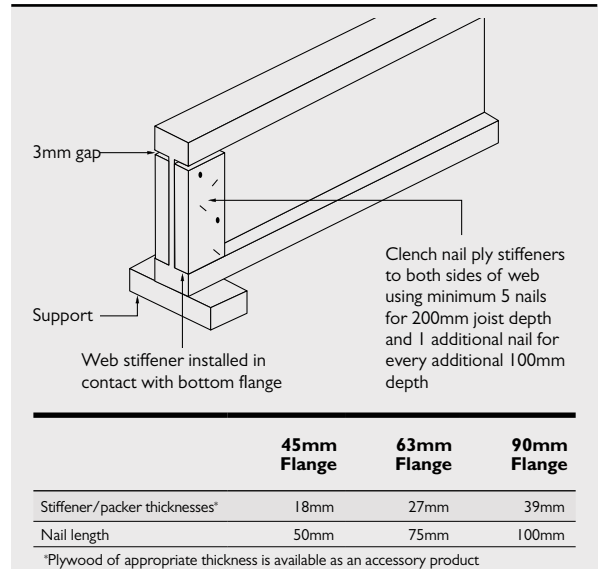
Detail F4: Fixing hyJOIST to Steel Beams - Using Partial Depth Face Mount Hangers



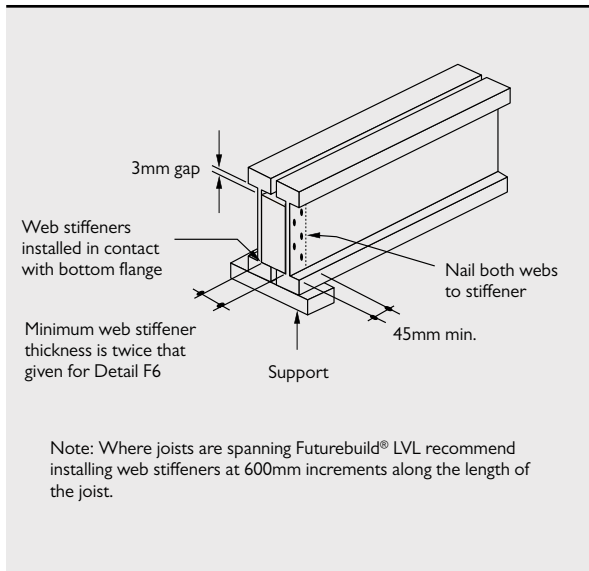
Detail F5: Nailing Down to Supports



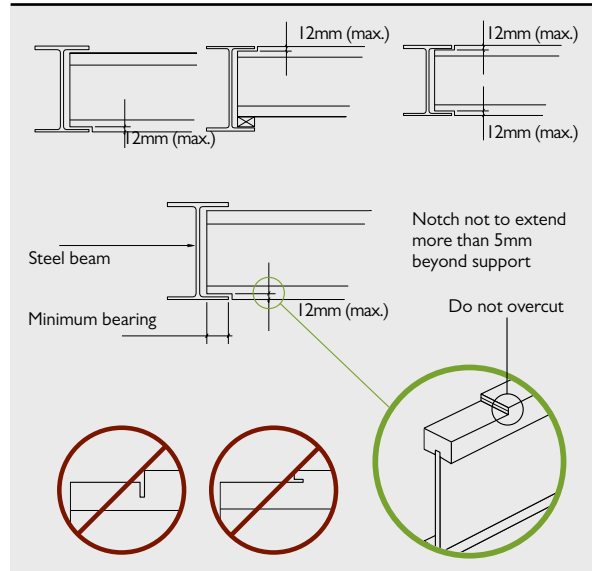
Detail F6: Installation of Web Stiffeners



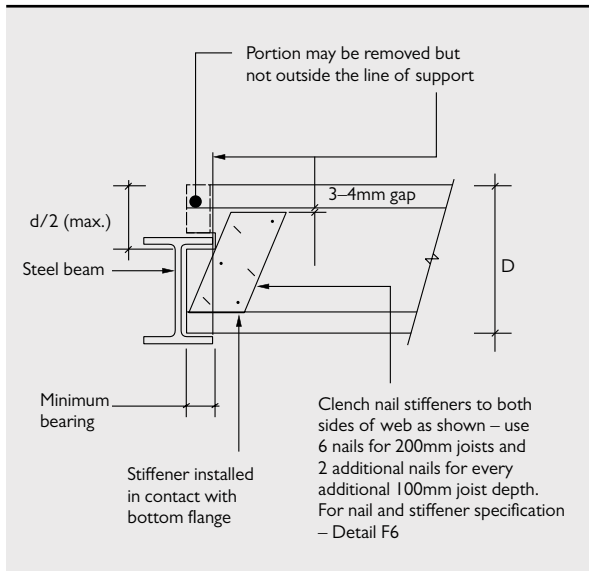
Detail F6A: Web Stiffeners for Double Joists



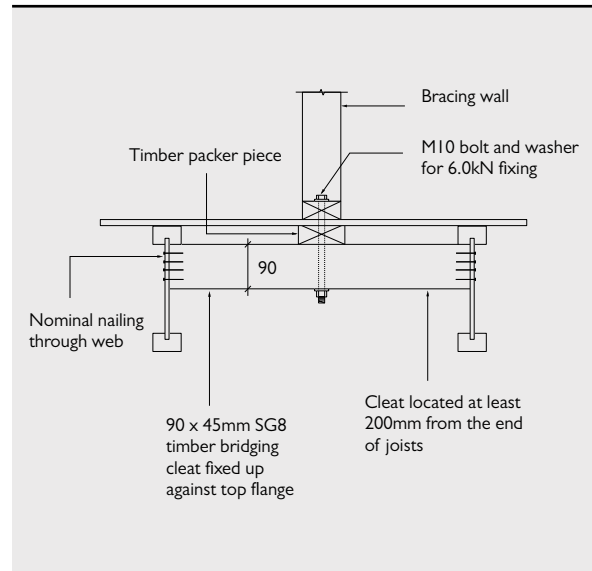
Detail F7: Notching of Flanges at End Supports



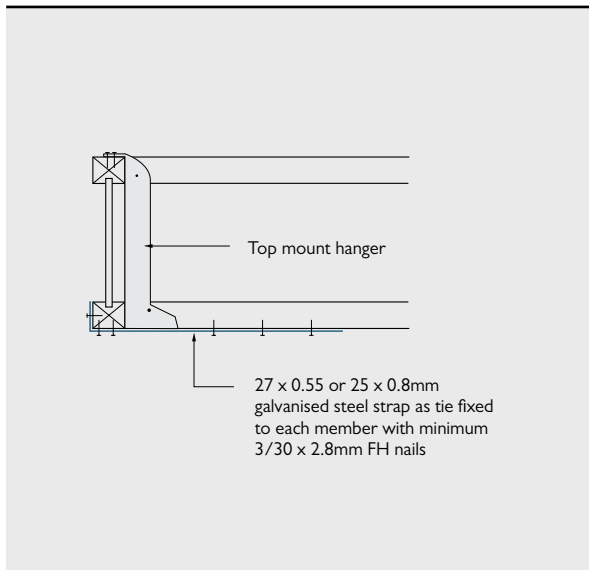
Detail F8: Notching of Webs for Steel Beam Flange



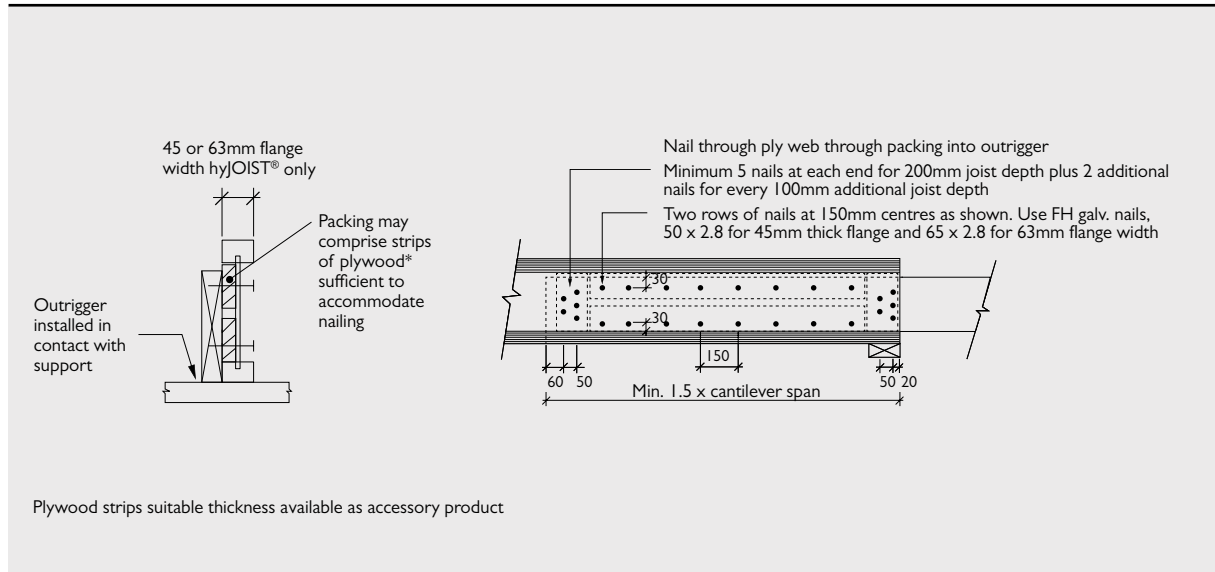
Detail F9: Tie-down to Internal Bracing Wall



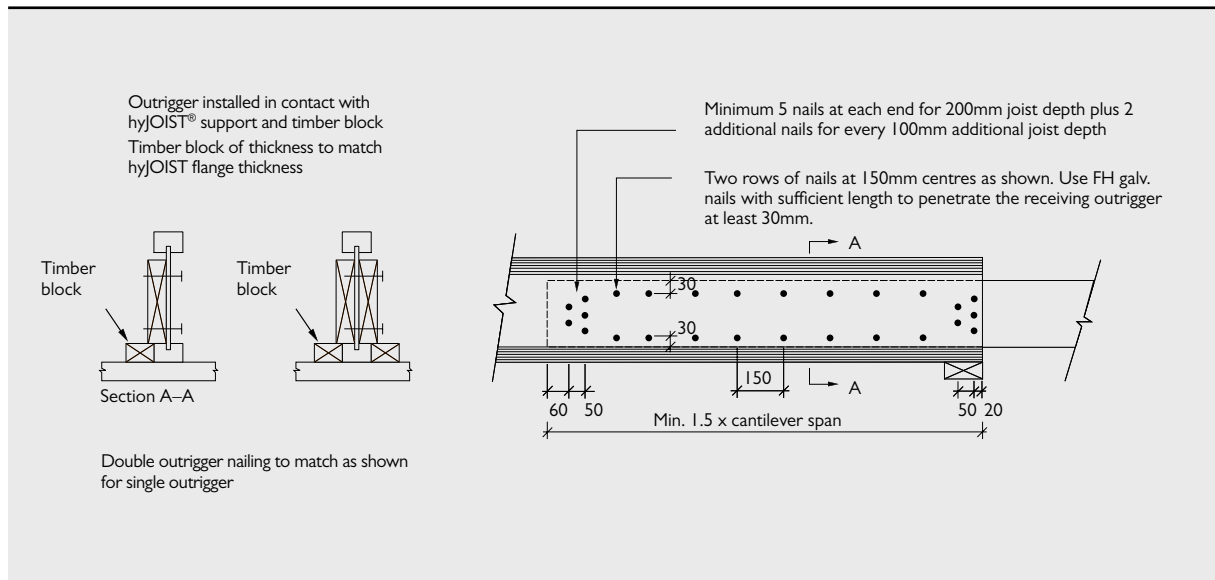
Detail F10: hyJOIST/hyJOIST Connection



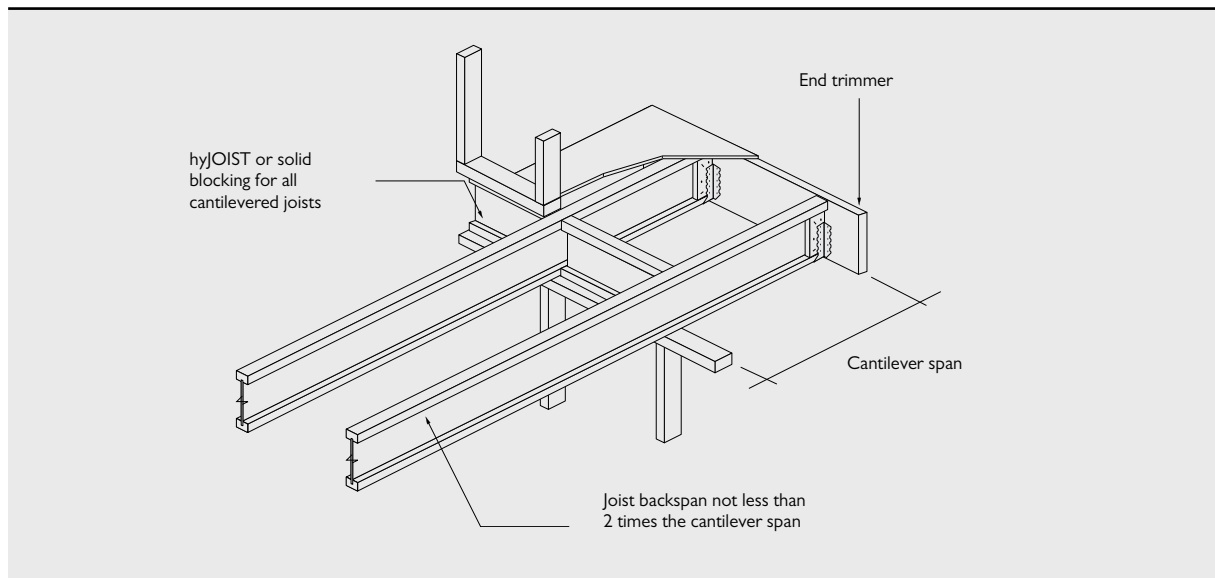
Detail F11: Adjacent Outrigger



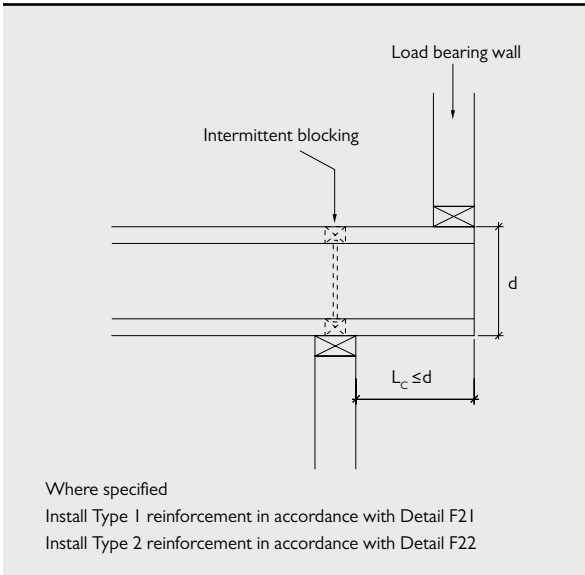
Detail F12: Nested Outrigger Installation



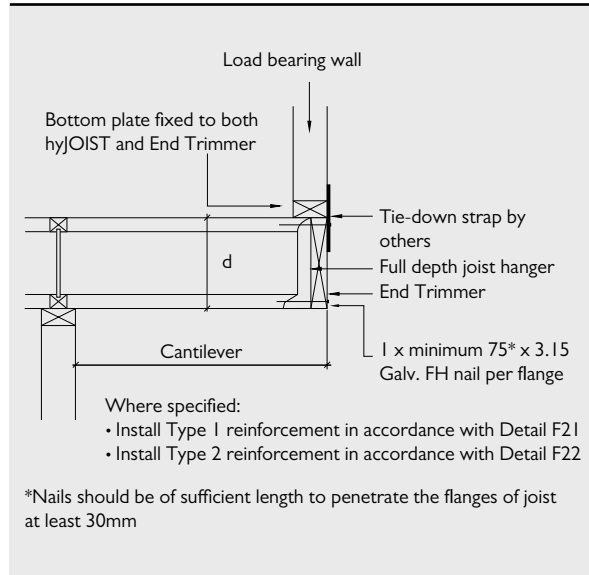
Detail F13: hyJOIST Cantilever for Internal Balcony Application



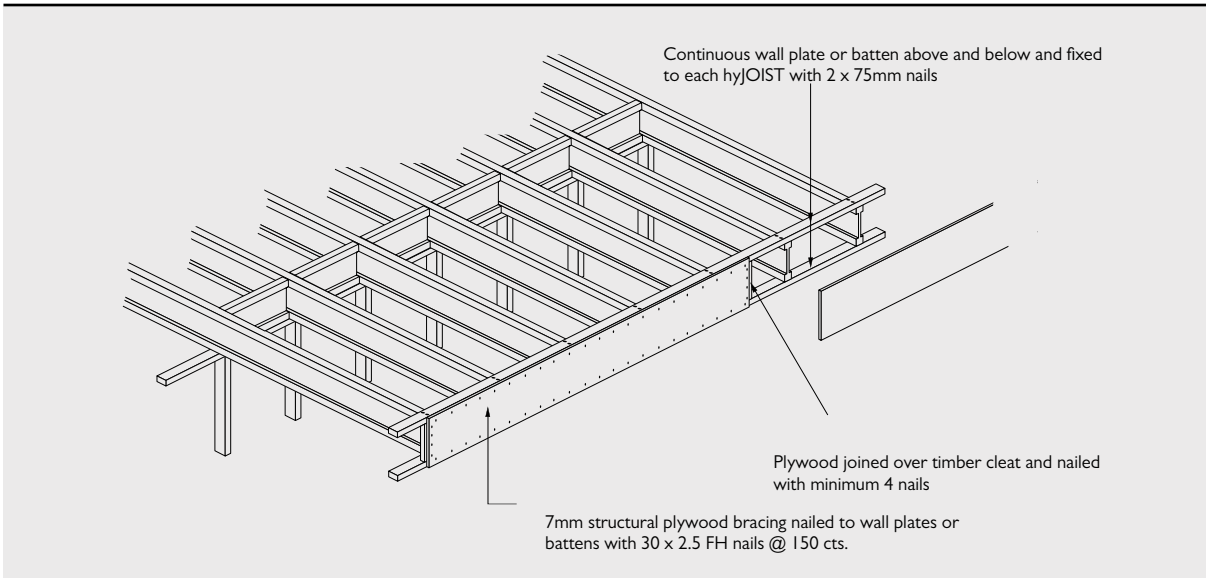
Detail F14: Short Cantilever Supporting Load Bearing Wall



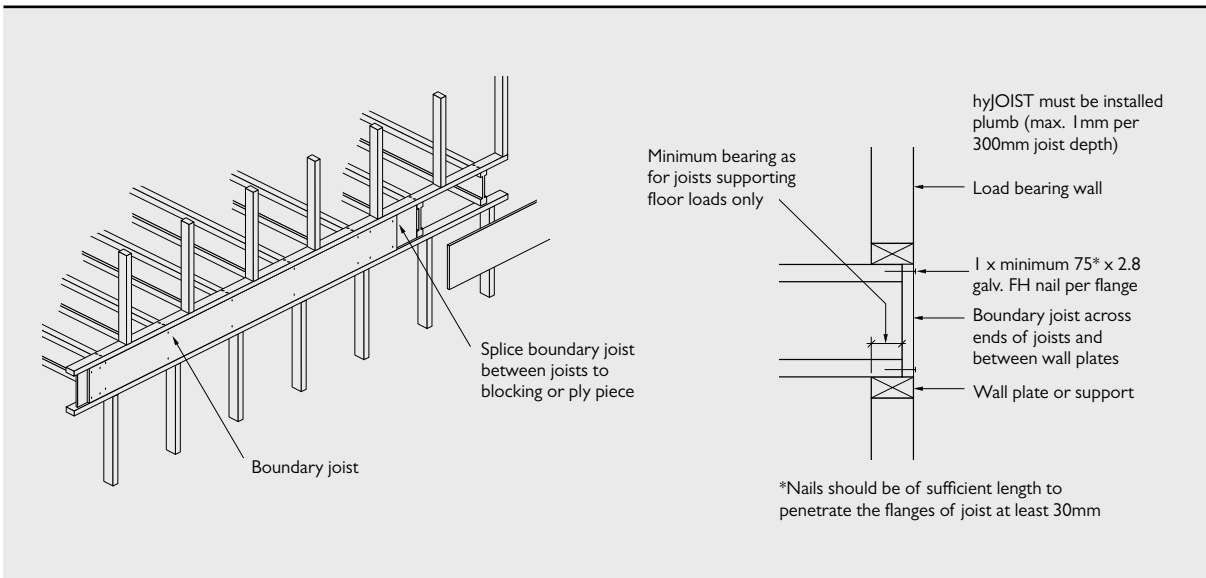
Detail I5a: Cantilever Supporting Load Bearing Wall



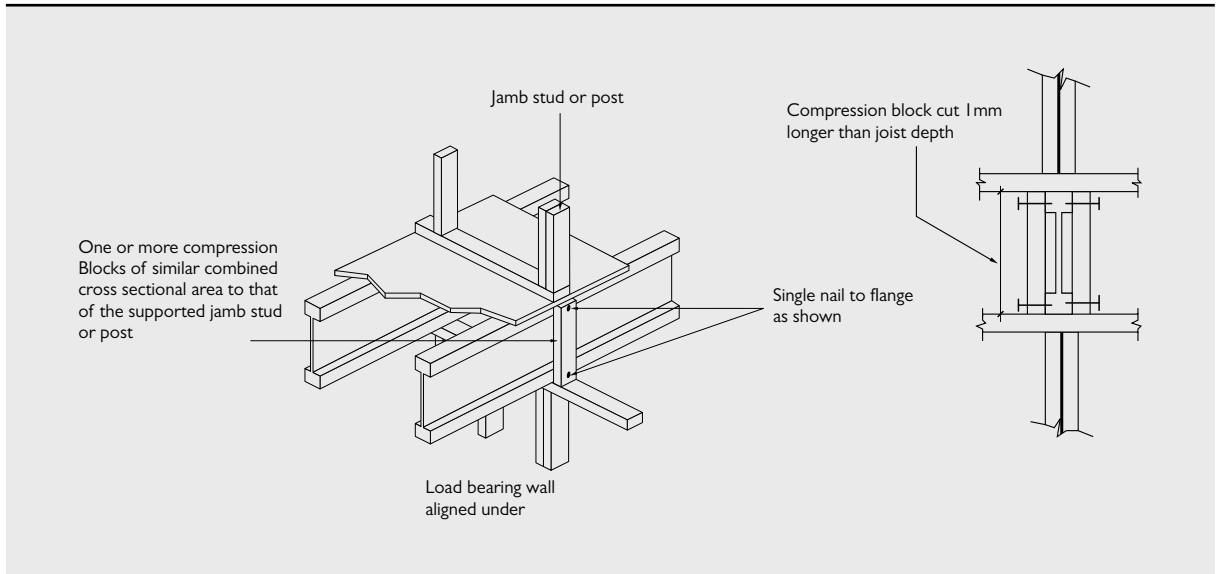
Detail F16: Cantilever Supporting Load Bearing Walls - Installation of End Trimmer



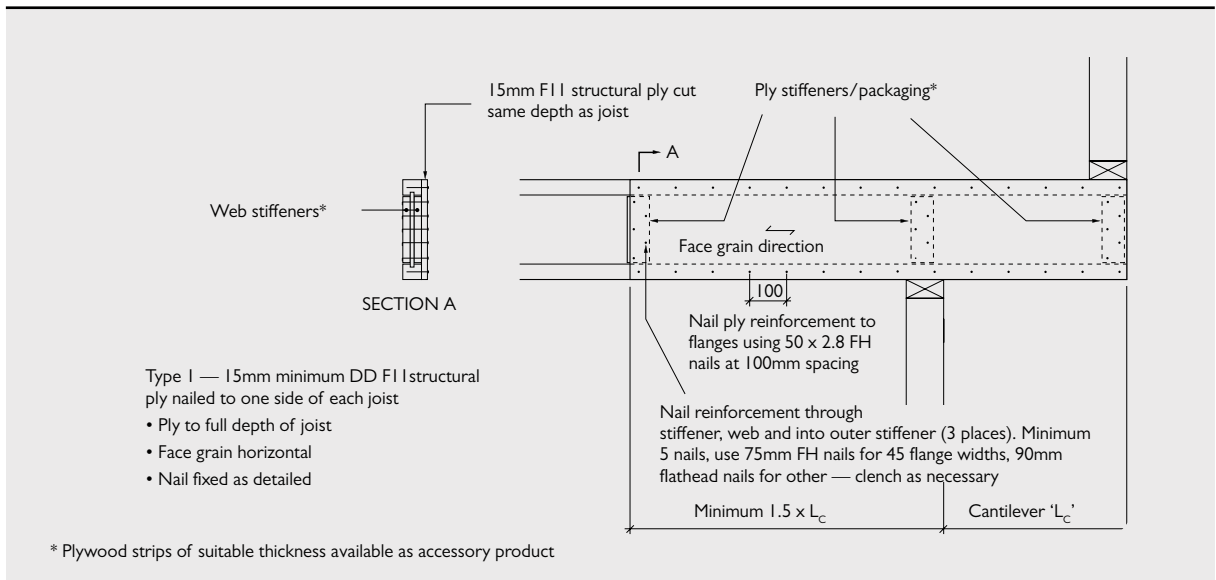
Detail F17: End Restraint - Using Boundary Joist



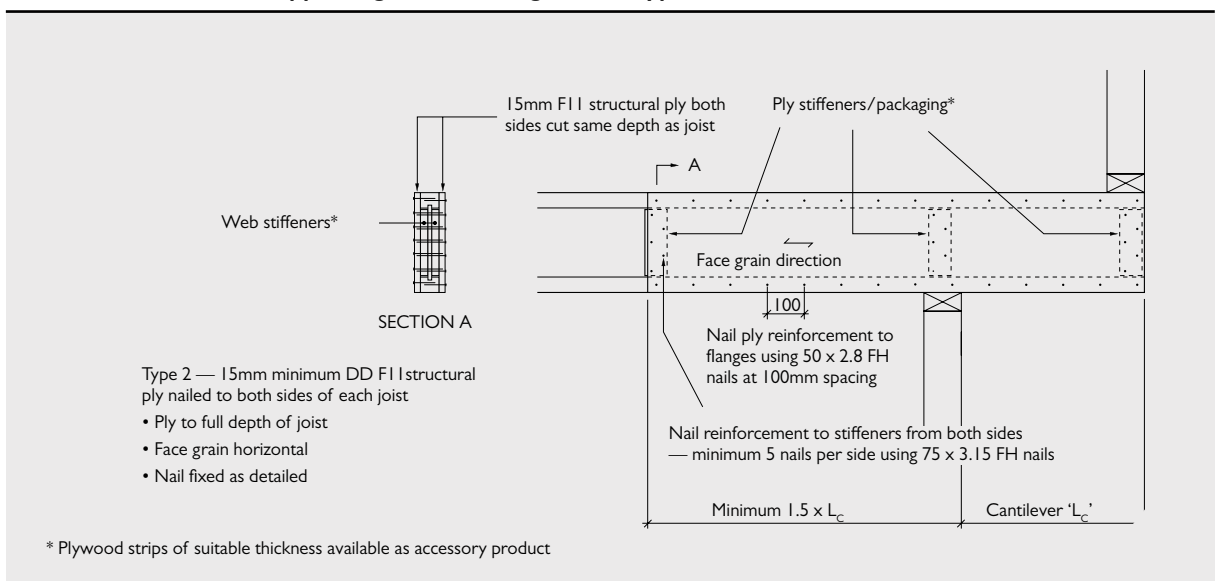
Detail F18: Installation of Compression Blocks



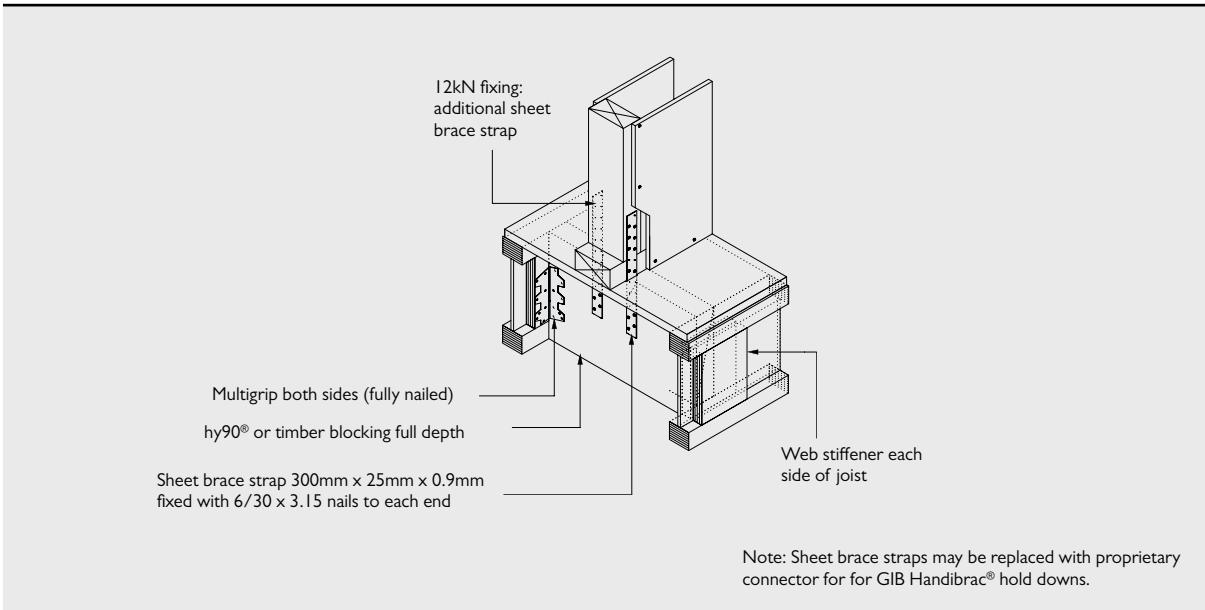
Detail F21: Cantilever Supporting Load Bearing Walls - Type 1 Reinforcement



Detail F22: Cantilever Supporting Load Bearing Walls - Type 2 Reinforcement



Detail TD4: Tie-down for Internal Bracing Walls



4.0 COMPLIANCE WITH THE NEW ZEALAND BUILDING CODE (NZBC)

This guide provides information for the installation of hyJOIST® engineered I-joists as floor joists and rafters in domestic and residential buildings. Further installation guidance can also be obtained from the designIT® for houses desktop or sITe App available from Futurebuild® LVL.

Manufacture

hyJOIST is an engineered I-joist. The flanges are Laminated Veneer Lumber (LVL) intended for structural use and conforming with the requirements of AS/NZS 4357:2005 Structural Laminated Veneer Lumber. The webs are structural plywood. hyJOIST is Product Certified by the Engineered Wood Products Association of Australasia (EWPAA). The EWPAA is accredited for product certification by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Durability

The expected service life of hyJOIST members is in excess of 50 years in dry protected areas, where moisture content is maintained below levels specified in NZS 3602:2003. Designers and building owners must ensure that a building remains weather-tight and hyJOIST remains protected from both external and internal moisture. Exposure to weather during normal construction periods is not a cause for concern. hyJOIST is not recommended for fully weather exposed applications.

Treatment Compliance

Untreated hyJOIST

LVL and plywood have an inherent increased resistance to moisture uptake and decay when compared to sawn timber and as such, in accordance with NZS 3602, can be installed untreated in low risk of moisture penetration applications. These applications include Category E, Members not exposed to weather or ground atmosphere and in dry conditions, in Table 1 NZS 3602, including, but not limited to "All mid-floor framing excluding boundary joists". In specific reference to the plywood web component, Clause 104.2.3 notes "Plywood conforming to AS/NZS 2271 or AS/NZS 2269, used in interior dry situations, (i.e. protected from the weather or dampness) does not need to be treated".

H1.2 Treated hyJOIST

NZS 3602 does not specifically reference any applications where H1.2 treatment is required for LVL. B2/AS1 provides a compliance path for the use of LVL in areas where H1.2 treatment is required for applications including wall and roof framing covered by category D, Members protected from the weather but with a risk of moisture penetration conducive to decay (see Section 109) via NZS 3604.

NZS 3604:2011, Timber Framed buildings, section 2.3.9.4 denotes "The preservative treatment for engineered wood products shall comply with NZS 3602 provided however that where engineered wood products are not already specified, the level of treatment shall be the same as that required for kiln-dried radiata pine structural grades to comply with NZS 3602.

4.1 DISCLAIMER

The information contained in this document is current as of August 2023 and is based on data available to CHH LVL Ltd at the time of going to print. This publication replaces all previous hyJOIST Installation literature. CHH LVL reserves the right to change the information contained in this literature without prior notice. It is important that you call 0800 808 131 to confirm that you have the most up to date information available or refer to futurebuild.co.nz.

CHH LVL has used all reasonable endeavours to ensure the accuracy and reliability of the information contained in this document. This information does not replace professional advice and we recommend that professional advice should be obtained specific to your circumstances. To the extent permitted by law, CHH LVL will not be liable for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.

APPENDIX A - hyJOIST® SELECTION GUIDE


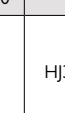



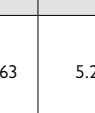

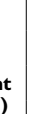



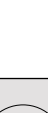
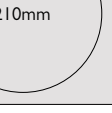

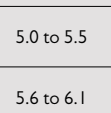
The concepts of acceptable deflection and floor rigidity in floors are subjective and not easily definable by calculation to everyone's personal 'acceptance' levels. Typically, design software solutions like designIT for houses provide designs with deflection limits that have been applied over a number of decades in design codes and guidance across Australasia.

These deflection limits, however, may not be acceptable to some homeowners and a tighter level of deformation/deflection may produce more satisfactory results. Some options to provide 'stiffer' floors include:

- Using a deeper joist or wider flange.
- Reducing the joist spacing.
- Using a more rigid or thicker flooring product.
- Fixing cross battens or installing a 'strong back' to enhance load sharing across the floor system.

To endeavour to achieve a tighter level of deflection and reduce the effects of floor dynamics and vibration, Futurebuild LVL has developed a concept around 'span range' taking into account the effects of reduced deflection and increased stiffness across floors.

Table A1: hyJOIST® Span Tables – Floor Joists Supporting Floor Loads Only – Dead Load 40kg/m², Live load 1.5kPa/1.8kN.

Overall Depth (mm)	Nominal Clear Distance Between Flanges (mm)	Dimensions for Detailing			hyJOIST® Section Code	Weight (kg/m)	Maximum Hole Size for Services ^{2,3}	Floor Joists for Houses	
		Flange Width (mm)						Single Span	
		45	63	90				Joist Spacing (m)	
		Flange Outstand ¹ (mm)						450	600
			18	27	39	Recommended Span Range (m)			
200	116				HJ200 45	3.3		3.0 to 3.5	3.0 to 3.3
240	156				HJ240 45	3.5		3.7 to 4.3	3.4 to 3.9
					HJ240 63	4.5		4.4 to 4.8	4.0 to 4.4
					HJ240 90	6.4		4.9 to 5.3	4.5 to 4.9
300	216				HJ300 45	3.9		4.8 to 5.1	4.2 to 4.7
					HJ300 63	4.9		5.0 to 5.5	4.6 to 5.1
					HJ300 90	6.9		5.6 to 6.1	5.2 to 5.6
360	276				HJ360 63	5.2		5.6 to 6.1	5.2 to 5.6
					HJ360 90	7.3		6.3 to 6.8	5.8 to 6.3
400	316				HJ400 90	7.6		6.8 to 7.2	6.3 to 6.7

1. Used to determine the thickness of packing to pack web flush with flanges.
2. Refer to designIT for houses or designIT sTe APP for permitted hole locations and limitations.
3. Includes an allowance for a 3mm clearance between the hole and the flange-web joint.

Information provided should only be considered a general guide and is specific to the Futurebuild® LVL range of LVL products and cannot be used with any other LVL products no matter how similar they may appear.

For further information contact our technical team on 0800 585 244 or visit www.futurebuild.co.nz.

APPENDIX B - JOIST HANGERS FOR hyJOIST®

Table B1: Joist Hangers for hyJOIST® for use in houses or similar structures

hyJOIST® Section Code	Manufacturer	Face Mount Hangers		Top Mount Hangers¹
		Full Depth¹	Partial Depth¹	Hanger Code²
		Hanger Code²	Hanger Code²	
HJ200 45	Ecko	JH47190	JH47120	-
	Mitek	JH47190	JH47120	IBHT20050
HJ240 45	Ecko	JHIB24050	JH47190	-
	Mitek	IBHF24050	JH47190	IBHT24050
HJ240 63	Ecko	JHIB24065	BSH220	-
	Mitek	IBHF24065	SPH180	IBHT24065
HJ240 90	Ecko	JHIB24090	BSH220	-
	Mitek	IBHF24090	JH95165	IBHT24090
HJ300 45	Ecko	JHIB30050	JH47190	-
	Mitek	IBHF30050	JH47190	IBHT30050
HJ300 63	Ecko	JHIB30065	BSH220	-
	Mitek	IBHF30065	SPH220	IBHT30065
HJ300 90	Ecko	JHIB30090	BSH220	-
	Mitek	IBHF30090	SPH220	IBHT30090
HJ360 63	Ecko	JHIB36065	BSH220	-
	Mitek	IBHF36065	JH65270 or SPH220	IBHT36065
HJ360 90	Ecko	JHIB36090	BSH220	-
	Mitek	IBHF36090	JH95270 or SPH220	IBHT36090
HJ400 90	Ecko	JHIB40090	-	-
	Mitek	IBHF40090	JH95270	IBHT40090

1. Refer Figure B2 for definition of Face Mount (Full Depth, or Partial Depth) and Top Mount brackets. Note SPH and BSH brackets are 'Split Hangers', refer to manufacturer for details.
2. Brackets to be installed strictly in accordance with bracket manufacturers' recommendations. For minimum number of fasteners refer to designIT for Houses.

Figure B1: Skew Angle Bracket for Oblique Joists

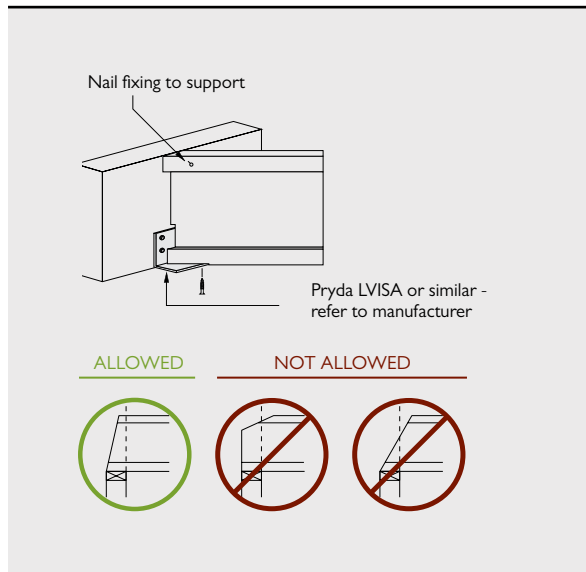
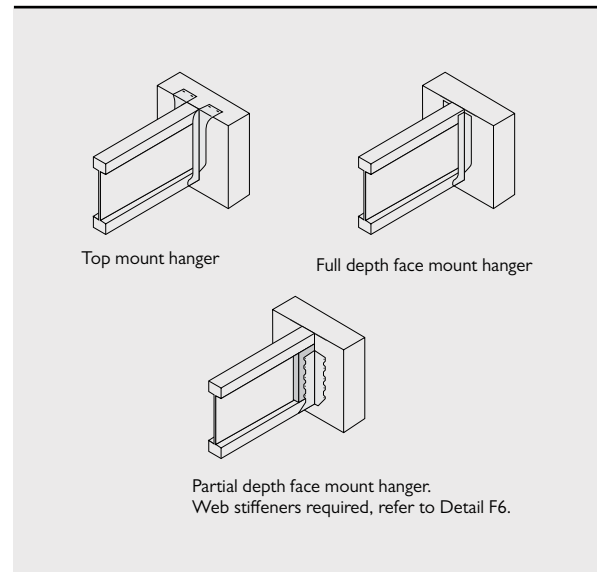
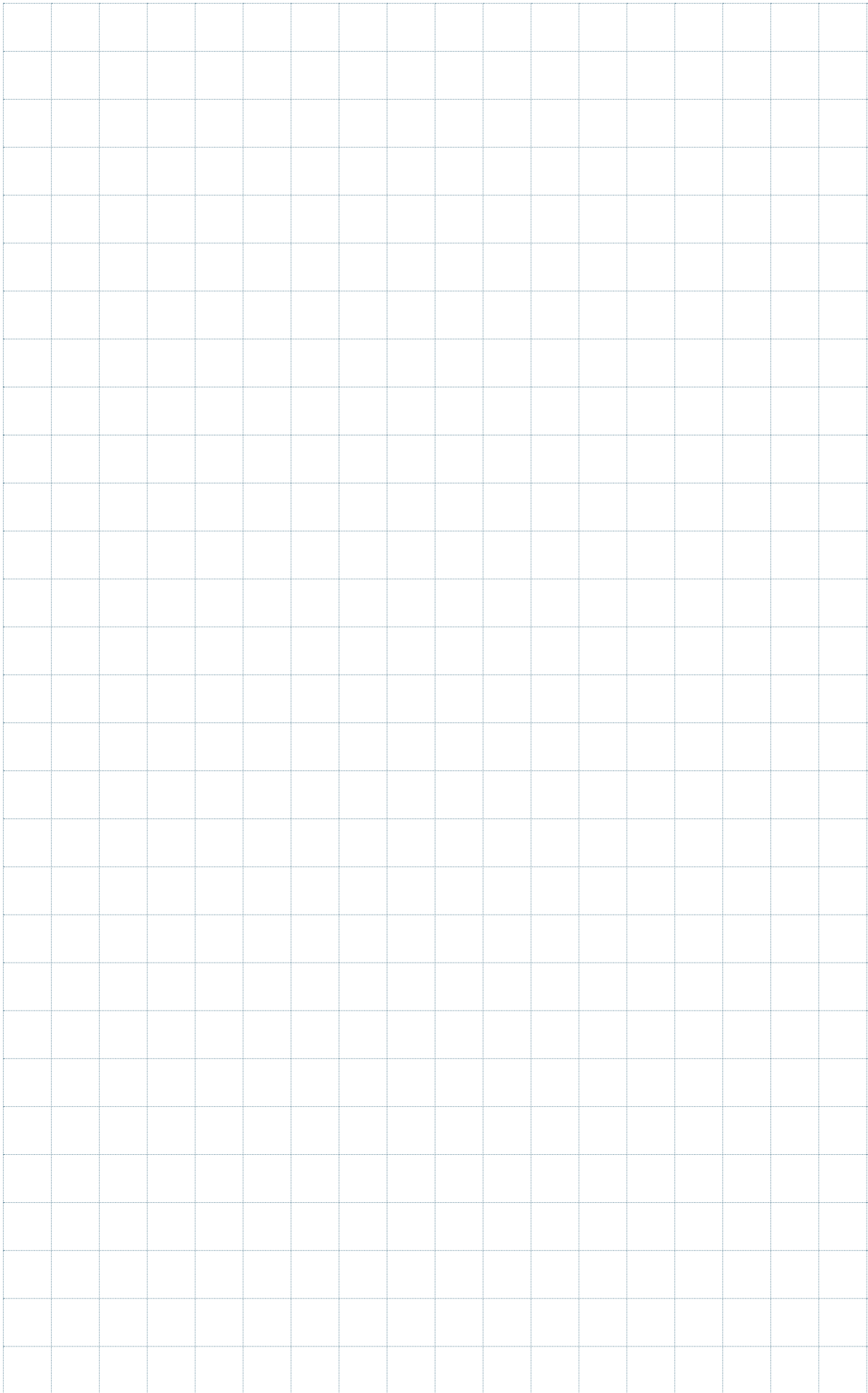


Figure B2: hyJOIST bracket types





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