Information contained within this manual is specific to the hyJOIST® range of LVL products and cannot be used with any other LVL products no matter how similar they may appear.
1.0 hyJOIST® OPTIONS RANGE

1.1 MORE OPTIONS FOR MORE ECONOMICAL FLOOR JOIST LAYOUTS

Select the economy section (HJ240 63, HJ300 63 & HJ360 63) of appropriate depth to accommodate the spans of the main area of the floor. Cater for any larger spans in the floor area using the wider flange options of corresponding depth.

Quality and performance

- Product quality – Engineered Wood Products Association of Australasia ‘Product Certified’ for peace of mind
- Technical support – experienced engineering support, simply call 0800 808 131
  – ‘on-the-ground’ specialist technical representatives, willing and able to help
- Responsible conservative design – ‘maintaining the standard for consistency of performance’
- ‘Off the shelf’ convenience – readily available, ex stock via a building merchant, simply cut to length and install
- Treated – Optional LOSP treatment to H3 (equivalent to H3.1) as defined in AS/NZS 1604.4 (refer to treatment technical note on www.chhwoodproducts.co.nz)

Design

Consider the ‘hyJOIST® SELECTION GUIDE’ on page 3, summarising key parameters involved in selection of the appropriate joist sections. Information contained in this publication applies for floor joists used in houses. For more information refer either to this publication or designIT® software as set out in the following table. Use of designIT will provide a wider range of options and allow more optimum design.

For specific design of hyJOIST members, refer to the Limit State Design Information in the Specific Design Guide available from www.chhwoodproducts.co.nz

The information contained in this manual relates specifically to hyJOIST LVL products manufactured by Carter Holt Harvey® Woodproducts and cannot be used with any other manufacturer’s LVL product no matter how similar they may appear.

Alternative LVL products can differ in a number of ways which may not be immediately obvious and substituting them for products 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.
TABLE 1: hyJOIST®

<table>
<thead>
<tr>
<th>Design information</th>
<th>Literature</th>
<th>designIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanning capabilities</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Bearing requirements</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Blocking for lateral support</td>
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<td>✓</td>
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<tr>
<td>Transfer of wind / earthquake forces through the floor depth</td>
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<td></td>
</tr>
<tr>
<td>Web holes – permitted locations related to size, shape and span</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Details for limited notching of flanges (at end supports only)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Hangers, brackets and fixing requirements for support of joists</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Framing for stair voids</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Cantilevers for balconies</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Joists supporting parallel load bearing walls</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Joists supporting perpendicular load bearing walls (including cantilevers)</td>
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<td></td>
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<tr>
<td>Continuous hyJOIST® blocking for support of load bearing walls</td>
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<td>✓</td>
</tr>
<tr>
<td>Joists supporting alternative floor mass &amp; floor live loads</td>
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</tr>
</tbody>
</table>

1.2 hyJOIST® SELECTION GUIDE

TABLE 2:

<table>
<thead>
<tr>
<th>Dimensions for Detailing</th>
<th>hyJOIST® Options Range</th>
<th>Span — Floor joists for Houses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>hyJOIST® Section Code</td>
<td>Weight of 5 metre length</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum Hole Size For Services 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Joist Spacing (mm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recommended Span Range (m)</td>
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<tr>
<td></td>
<td></td>
<td>Single Span</td>
</tr>
<tr>
<td></td>
<td></td>
<td>450</td>
</tr>
<tr>
<td>Overall Depth</td>
<td>Clear Distance Between Flanges</td>
<td>Flange Width (mm)</td>
</tr>
<tr>
<td>200</td>
<td>18</td>
<td>HJ240 63</td>
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<td></td>
<td>27</td>
<td>HJ240 90</td>
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<tr>
<td>300</td>
<td>39</td>
<td>HJ300 63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HJ300 90</td>
</tr>
<tr>
<td>360</td>
<td>39</td>
<td>HJ360 63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HJ360 90</td>
</tr>
<tr>
<td>400</td>
<td>39</td>
<td>HJ400 90</td>
</tr>
</tbody>
</table>

1. Used to determine the thickness of packing to pack web flush with flanges
2. Refer to page 9 / designIT® for permitted hole locations and limitations
3. Refer to page 10 / designIT for further design information.
I.3 BEARING SUPPORT

FOR JOISTS NOT TRANSFERRING LOAD FROM UPPER WALLS

**FIGURE 1**

Table 3:

<table>
<thead>
<tr>
<th>JOIST SPACING (mm)</th>
<th>450</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIGHT ROOF 45</td>
<td>45</td>
<td>65</td>
</tr>
<tr>
<td>HEAVY ROOF 65</td>
<td>65</td>
<td>902</td>
</tr>
</tbody>
</table>

1. Web stiffeners installed bearing may be reduced to 45 mm
2. Web stiffeners installed bearing may be reduced to 65 mm
3. For all cases bearing may be reduced to 30 mm if 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

For joists supporting load bearing walls at end supports, provide bearing as specified in the table below or alternatively install continuous hyJOIST® blocking/rimboard/boundary joist.

**TABLE 3:**

<table>
<thead>
<tr>
<th>LOAD TYPE</th>
<th>MINIMUM BEARING (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>65</td>
</tr>
</tbody>
</table>

For joists transferring upper storey wall and roof loads at supports

**FIGURE 2** 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 continuous hyJOIST® blocking/rimboard/boundary joist.

**FIGURE 3** 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.
Concentrated loads from jamb studs/posts
Use compression blocks to transfer loads through to supports as shown. Refer to Detail F18.

For lower storey of 2 storey construction
Continuous full depth hyJOIST® blocking should be installed to transfer compression loads from load bearing walls to the supports. In most cases continuous hyJOIST blocking will be adequate to support the roof, wall and floor loads. Refer to designIT for confirmation.

1.4 SUPPORT

TABLE 4: JOIST HAN GERS FOR hyJOIST®

<table>
<thead>
<tr>
<th>hyJOIST® Section Code</th>
<th>Manufacturer Or Distributor</th>
<th>Face Mount Hangers</th>
<th>Top Mount Hangers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Full Depth</td>
<td>Partial Depth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hanger Code</td>
<td>Minimum No Of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nails To Bearer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hanger Code</td>
<td>Minimum No Of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nails To Bearer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hanger Code</td>
</tr>
<tr>
<td>HJ200 45</td>
<td>Pryda</td>
<td>FB47/176</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Mitek</td>
<td>JH47190</td>
<td>8</td>
</tr>
<tr>
<td>HJ240 63</td>
<td>Pryda</td>
<td>LF235/65</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Mitek</td>
<td>IBHF24065</td>
<td>8</td>
</tr>
<tr>
<td>HJ240 90</td>
<td>Pryda</td>
<td>LF235/90</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Mitek</td>
<td>IBHF 24090</td>
<td>8</td>
</tr>
<tr>
<td>HJ300 63</td>
<td>Pryda</td>
<td>LF290/65</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Mitek</td>
<td>IBHF 30065</td>
<td>8</td>
</tr>
<tr>
<td>HJ300 90</td>
<td>Pryda</td>
<td>LF290/90</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Mitek</td>
<td>IBHF 30090</td>
<td>10</td>
</tr>
<tr>
<td>HJ360 63</td>
<td>Pryda</td>
<td>LF340/65</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Mitek</td>
<td>IBHF 36065</td>
<td>10</td>
</tr>
<tr>
<td>HJ360 90</td>
<td>Pryda</td>
<td>LF 350/90</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Mitek</td>
<td>IBHF 36090</td>
<td>10</td>
</tr>
<tr>
<td>HJ400 90</td>
<td>Pryda</td>
<td>LF 390/90</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Mitek</td>
<td>IBHF 40090</td>
<td>12</td>
</tr>
</tbody>
</table>

FIGURE 4

One or more compression blocks of similar combined cross sectional area to that of the supported jamb stud or post

Load bearing wall aligned under

Single nail to flange as shown

Jamb stud or post

FIGURE 4
SKEW ANGLE BRACKET FOR OBLIQUE JOISTS

1. Nailing specified is for brackets face fixed to hySPAN®, MSG8 or VSGB, J5 (or better) timber bearer or stringer.
2. Brackets to be installed strictly in accordance with bracket manufacturers’ recommendations. Note, nails for FB hangers are 35 x 3.15 flat head type; for all other hangers 40 x 3.75 flat head nails are specified.
3. Fix top mount hangers with 4, 35 x 3.75 flat head nails.

Storage
Prior to installation hyJOIST® should be stacked on level bearers, at least 150 mm clear of the ground and kept dry.

1.5 TYPICAL FLOOR LAYOUT
1.6 TRANSFER OF WIND AND EARTHQUAKE FORCES BETWEEN FLOORS

The design of houses includes quantification of lateral loads due to wind and earthquake. Racking forces determined for design of upper level bracing must be able to be transferred through the floor depth to the lower level. Racking forces in the direction of the joists are catered for by the considerable longitudinal shear capacity of the joists. For forces perpendicular to the joists, blocking and/or perimeter ‘rimboard’ and their associated fixings (installed to provide lateral restraint) may or may not be adequate. In particular, the fixing of the floor diaphragm to ‘rimboard’/blocking and in turn, fixing of ‘rimboard’/blocking to the supports must be adequate to resist the horizontal racking force used for design of the upper floor wall bracing system.

Blocking using hyJOIST® with the required fixing is a practical and easy to install solution.

FIGURE 9: Using plywood closures – at external walls

Nail spacing as required for the upper storey wall bracing

Structural plywood bracing panels as required for the upper storey walls

FIGURE 10: Using hyJOIST® blocking – external and internal walls

At external walls, ‘rimboard’ may be used in conjunction with hyJOIST® blocking.

Nail fix plate to blocking and blocking to support to match capacity of nailing required for the upper storey bracing

Tie-down strap or bolts as for The upper storey wall bracing and tie-down requirements

Nail fix plate to blocking and blocking to support to match capacity of nailing required for the upper storey bracing

Tie-down strap or bolts as for The upper storey wall bracing and tie-down requirements

1.7 WEB HOLES FOR hyJOIST®

Holes may be cut through the web of hyJOIST® provided they are located within the central part of the span as specified below. For hole sizes other than those included below refer to the web hole calculator in designIT®. For cases involving non-uniform loading or where the possibility of locating the hole closer to supports needs to be assessed, use the web hole option in the floor joist calculator in designIT.
**FIGURE 11:** Circular & Rectangular Holes

- 40 mm dia. hole allowed anywhere in web. Closest spacing 300 mm C/C
- Hole spacing not less than 300 mm or 2D (or 2W)
- Maximum 40 mm diameter hole in cantilever span

**TABLE 5:**

<table>
<thead>
<tr>
<th>hyJOIST® section code</th>
<th>Maximum hole diameter (mm)</th>
<th>Minimum distance from support ‘x’ (m)</th>
<th>Hole diameter (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ø80</td>
</tr>
<tr>
<td><strong>Circular holes – minimum distance ‘x’ from support – (m)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HJ200 45</td>
<td>118</td>
<td>0.34L</td>
<td>0.16L</td>
</tr>
<tr>
<td>HJ240 63</td>
<td>158</td>
<td>0.38L</td>
<td>0.12L</td>
</tr>
<tr>
<td>HJ240 90</td>
<td>158</td>
<td>0.38L</td>
<td>0.12L</td>
</tr>
<tr>
<td>HJ300 63</td>
<td>218</td>
<td>0.41L</td>
<td>0.10L</td>
</tr>
<tr>
<td>HJ300 90</td>
<td>218</td>
<td>0.41L</td>
<td>0.10L*</td>
</tr>
<tr>
<td>HJ360 63</td>
<td>278</td>
<td>0.42L</td>
<td>0.3 m*</td>
</tr>
<tr>
<td>HJ360 90</td>
<td>278</td>
<td>0.40L</td>
<td>0.3 m*</td>
</tr>
<tr>
<td>HJ400 90</td>
<td>318</td>
<td>0.40L</td>
<td>0.3 m*</td>
</tr>
</tbody>
</table>

* Minimum distance from any support is 0.3 metres.

Example: if actual span L= 4.0m then minimum distance 'X' from hole to support (see diagram) is 0.34 x 4.0 = 1.36m

**TABLE 6:**

<table>
<thead>
<tr>
<th>hyJOIST® section code</th>
<th>Height (mm)</th>
<th>Length (mm)</th>
<th>L</th>
<th>Actual Span ‘L’ in metres</th>
<th>X</th>
<th>Minimum distance from the side of the hole to any support – (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HJ200 45</td>
<td>118</td>
<td>250</td>
<td>L</td>
<td>≤ 3.8 4.0 4.2 4.4 4.5</td>
<td>X</td>
<td>0.34L 1.38 1.59 1.80 1.90</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>≤ 3.5</td>
<td></td>
<td>2.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<td></td>
<td>3.13</td>
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<td>HJ240 63</td>
<td>158</td>
<td>330</td>
<td>L</td>
<td>≤ 5.8 6.0 6.1</td>
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<td>4.13</td>
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<td></td>
<td></td>
<td>X</td>
<td>0.38L</td>
<td></td>
<td>5.13</td>
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<tr>
<td>HJ240 90</td>
<td>158</td>
<td>330</td>
<td>L</td>
<td>≤ 5.2 5.4 5.6 5.8 6.0 6.2 6.3</td>
<td></td>
<td>6.13</td>
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<td></td>
<td></td>
<td></td>
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<td>7.13</td>
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<td>400</td>
<td>L</td>
<td>≤ 6.4 6.6 6.8 7.0</td>
<td></td>
<td>8.13</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>0.40L 2.73 2.88 3.04</td>
<td></td>
<td>9.13</td>
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<tr>
<td>HJ300 90</td>
<td>218</td>
<td>400</td>
<td>L</td>
<td>≤ 5.4 5.6 5.8 6.0 6.2 6.4 6.6 6.8</td>
<td></td>
<td>10.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>0.42L 2.37 2.49 2.62 2.75 2.88 3.02 3.15</td>
<td></td>
<td>11.13</td>
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<tr>
<td>HJ360 63</td>
<td>278</td>
<td>500</td>
<td>L</td>
<td>≤ 7.2 7.4 7.6 7.7</td>
<td></td>
<td>12.13</td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
<td>0.40L 2.97 3.10 3.17</td>
<td></td>
<td>13.13</td>
</tr>
<tr>
<td>HJ360 90</td>
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<td>500</td>
<td>L</td>
<td>≤ 8.0</td>
<td></td>
<td>14.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>0.40L</td>
<td></td>
<td>15.13</td>
</tr>
</tbody>
</table>

Interpolate to obtain values of ‘X’ for spans intermediate between the values given

Notes:
1. Data applies for floor joists supporting uniform loads (and concentrated live load not exceeding 1.8 kN).
2. Hole locations closer to supports may be possible for some load and support conditions; refer to the ‘floor joist calculator’ in designIT software or contact Carter Holt Harvey.
3. Spacing between holes to be not less than 300 mm or twice the width (or twice the diameter) of the larger hole.
4. Not more than three holes with width or diameter greater than 80 mm in any span.
5. For cantilever spans holes greater than 40 mm diameter are not permitted.
6. Not more than one rectangular (or square) hole per span.
1.8 CANTILEVERS FOR BALCONIES

Balcony cantilevers, subject to external weather exposure can be provided using H3.2 preservative treated and protected outriggers as per Details F11 and F12. For weather proofed applications H3.1 treated hyJOIST® can be cantilevered to provide balcony support as per Detail F13.

Outriggers can be dry stress-graded timber or hySPAN® either nested against the hyJOIST web and bearing on the top of the bottom flange or placed adjacent to the hyJOIST bearing directly on the support. Diagrams illustrating these configurations are shown below.

TABLE 7:

<table>
<thead>
<tr>
<th>hyJOIST® section code</th>
<th>Joist spacing (mm)</th>
<th>Maximum balcony cantilever (m)</th>
<th>Outrigger options</th>
<th>Adjacent outrigger</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>450</td>
<td>1.0</td>
<td>Nested outrigger</td>
<td>Adjacent outrigger</td>
</tr>
<tr>
<td>HJ200 45</td>
<td>600</td>
<td>0.9</td>
<td>No Suitable Depth Option</td>
<td>150 x 45 hySPAN</td>
</tr>
<tr>
<td></td>
<td>450</td>
<td>1.3</td>
<td>2/150 x 45 hySPAN®</td>
<td>200 x 45 hySPAN</td>
</tr>
<tr>
<td>HJ240 63</td>
<td>600</td>
<td>1.2</td>
<td>2/150 x 45 hySPAN</td>
<td>200 x 45 hySPAN</td>
</tr>
<tr>
<td></td>
<td>450</td>
<td>1.4</td>
<td>2/150 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
<tr>
<td>HJ240 90</td>
<td>600</td>
<td>1.3</td>
<td>2/150 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
<tr>
<td></td>
<td>450</td>
<td>1.5</td>
<td>200 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>1.4</td>
<td>200 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
<tr>
<td></td>
<td>450</td>
<td>1.7</td>
<td>2/200 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>1.6</td>
<td>2/200 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
<tr>
<td></td>
<td>450</td>
<td>1.7</td>
<td>240 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>1.6</td>
<td>240 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
<tr>
<td></td>
<td>450</td>
<td>1.9</td>
<td>240 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>1.8</td>
<td>2/240 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
<tr>
<td></td>
<td>450</td>
<td>2.0</td>
<td>300 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>1.9</td>
<td>300 x 45 hySPAN</td>
<td>Not Recommended</td>
</tr>
</tbody>
</table>

1. Cut from larger hySPAN section with clearance between flanges

Some options for outriggers are included in the following table. These have all been determined for 2 kPa balcony floor load. For other floor loads and to consider other options refer to designIT®.

hySPAN outriggers are not recommended for use in weather exposed applications. MSG Pine may be treated to H3.2 level for weather exposed balconies.
### 1.9 Joists Supporting Parallel Load Bearing Walls

#### Table 8:

**Light roof & ceiling**

<table>
<thead>
<tr>
<th>hyJOIST® section code</th>
<th>Roof load width (m)</th>
<th>Maximum single span (m)</th>
<th>Maximum continuous span (m)</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>5.645</td>
<td>5.345</td>
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</table>

#### Table 9:

**Heavy roof & ceiling**

<table>
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<tr>
<th>hyJOIST® section code</th>
<th>Roof load width (m)</th>
<th>Maximum single span (m)</th>
<th>Maximum continuous span (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.8</td>
<td>2.4</td>
<td>3.6</td>
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<tr>
<td>HJ200 45</td>
<td>2.2</td>
<td>1.8</td>
<td>1.3</td>
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<tr>
<td>2/HJ200 45</td>
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<td>2.7</td>
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<tr>
<td>HJ400 90</td>
<td>4.565</td>
<td>3.765</td>
<td>2.765</td>
</tr>
</tbody>
</table>

Notes:
1. NS signifies the calculated span is less than 1.2 m.
2. Bearing for single span joists or the end supports of continuous joists, provide at least 30 mm bearing unless signified otherwise by a subscript value adjacent to the quoted span. - ##, signifies that web stiffeners are required together with a bearing of 90 mm.
2.0 hyJOIST® INSTALLATION

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 engineered 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 other 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 special requirements not included in this guide as ‘basic requirements’.

2.1 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.

2.2 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.

2.3 FIXING TO SUPPORTS

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

2.4 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 on page 5.

2.5 BLOCKING AND 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, ‘rimboard’ or 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 referred on page 4.
2.6 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 ‘rimboard’, boundary joists, metal strap/brace or plywood closures are acceptable.

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

2.7 INTERMEDIATE RESTRAINT (BETWEEN SUPPORTS)

For best performance, the top flange of hyJOIST should be held straight between supports – (no more than 1 mm 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.

Fixing of Flooring

Flooring may be nailed to joists and to blocking using either 2.8 mm diameter nails, hand driven or 2.5 mm diameter nails, machine driven. Alternatively, for sheet flooring self-drilling Type 17 screws may be used. Fastener lengths should not exceed the lengths given in Table 1. Nail or screw spacing should be at centres recommended for the particular flooring type.

Where nail centres are less than 50 mm 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 nailing.

### Table 7:

<table>
<thead>
<tr>
<th>Flooring Thickness</th>
<th>15-21 mm</th>
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<tbody>
<tr>
<td>Maximum Nail/Screw Lengths</td>
<td>50 mm</td>
<td>57 mm</td>
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2.8 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 12 mm (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 6 mm for installation of nails or screws at supports allowed

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 on page 9. Alternative locations may be specified in the design documentation for specific load and support cases.

FIGURE 20

FIGURE 21

FIGURE 22

FIGURE 23
2.9 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 F15.

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

![Diagram of cantilever joist installation](image)

2.10 TIE DOWN AND 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 and TD1 – TD5 show how bracing walls may be tied down to a hyJOIST floor system.
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 ‘rimboard’ or 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 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.

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.
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 balcony 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 beyond that specified in the basic requirements
- Specification of web holes and permitted locations (not within the scope of tables on page 9)

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 see Joist Hangers for hyJOIST on page 5 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 H3.1 level for protection against low level rot and decay and are ideal for use in weather protected balconies. For fully exposed balconies H3.2 treated 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 weather protected or internal balcony cantilevers Detail F13 may be used.

FIGURE 28

Trimming beam

FIGURE 29: Balcony cantilevers using outriggers

Blocking

Outrigger

Packing required for
Adjacent Outrigger only

Outrigger backspan

Outrigger fixed to joist as per detail f11 Adjacent Outrigger

(as illustrated above) detail f12 Nested Outrigger

Joist backspan not less than 2 times cantilever span

Joist backspan min 1.5 X cantilever span

Outrigger fixed to joist as per detail f11 Adjacent Outrigger (as illustrated above) detail f12 Nested Outrigger

FIGURE 30

Waterproof membrane or flashing over is recommended

Painting or staining is recommended

H3.2 Preservative treated outrigger

ADJACENT OUTRIGGER CONFIGURATION

NESTED OUTRIGGER CONFIGURATION
DETIAL F1: End restraint – blocking with hyJOIST®

Wall plate/flooring or temporary batten, nailed to hyJOIST joists. Nail through flooring or wall plate into blocking for permanent installation.

hyJOIST blocking nailed down to support using 75 x 3.15 FH nails

DETIAL F2: End restraint – using strap or bracing

Wall plate/flooring or temporary batten, nailed to hyJOIST

Joint braced with galvanised steel strap

Fix with 3/32 x 3.15 nails to joist and to supports

DETIAL F3: End restraint – using ply or hardboard bracing

Wall plate or batten

Two joist spacings minimum

7.0 mm structural plywood bracing fixed to wall plates or battens with 30 x 2.5 FH nails @ 150 cts.

DETIAL F4: Fixing hyJOIST® to steel beams – using face mount hangers

Steel beam

Fixing plates cut neatly between steel beam flanges and fix back to packers

DETIAL F5: Nailing down to supports

Min. 40 mm end distance

Required bearing length

Nail through flanges 75 x 3.15 nail

DETIAL F6: Installation of web stiffeners

3 mm gap

Support

Web stiffener installed in contact with bottom flange

Clench nail ply stiffeners to both sides of web using minimum 5 nails for 200 mm joist depth and 1 additional nail for every additional 100 mm depth

Nail length

Web stiffener/packer thickness

<table>
<thead>
<tr>
<th></th>
<th>45 mm flange</th>
<th>63 mm flange</th>
<th>90 mm flange</th>
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</thead>
<tbody>
<tr>
<td>Nail length</td>
<td>50 mm</td>
<td>75 mm</td>
<td>100 mm</td>
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<tr>
<td>Plywood of appropriate thickness is available as an accessory product</td>
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</tr>
</tbody>
</table>
**DETAIL F4A: Web stiffeners for double joists**

- Web stiffeners installed in contact with bottom flange
- Minimum web stiffener thickness is twice that given for detail F6

**DETAIL F7: Notching of flanges at end supports**

- Steel beam
- Minimum bearing
- Notch not to extend more than 5 mm beyond support
- Do not overcut

**DETAIL F8: Notching of webs for steel beam flange**

- Porion may be removed but not outside the line of support

**DETAIL F9: Tie-down to internal bracing wall**

- Timber packer piece
- Bracing wall
- M10 bolt and washer for 6.0 kN fixing
- Nominal nailing through web

**DETAIL F10: hyJOIST®/hyJOIST connection**

- 25 x 0.8 mm galv. steel strap as tie fixed to each member with minimum 3/30 x 2.8 mm FH nails
DETAIL F1: Adjacent outrigger

Outrigger installed in contact with support

45 or 63 mm flange width hyJOIST® only

Packing may comprise strips of plywood® sufficient to accommodate nailing

Minimum 5 nails at each end for 200 mm joist depth plus 2 additional nails for every 100 mm additional joist depth

Two rows of nails at 150 mm centres as shown. Use FH galv. nails, 50 x 2.8 for 45 mm thick flange and 65 x 2.8 for 65 mm flange width

DETAIL F12: Nested outrigger installation

Outrigger installed in contact with hyJOIST® support and timber block

Timber block of thickness to match hyJOIST flange thickness

Double outrigger nailing to match as shown for single outrigger

Minimum 5 nails at each end for 200 mm joist depth plus 2 additional nails for every 100 mm additional joist depth

Two rows of nails at 150 mm centres as shown. Use FH galv. nails, 50 x 2.8 for 45 mm thick flange and 65 x 2.8 for 65 mm flange width

DETAIL F13: hyJOIST® cantilever for for internal or weather proofed balcony applications

hyJOIST or solid blocking for all cantilevered joists

End trimmer

Cantilever span

For external use, hyJOIST floor joists must be protected from becoming wet by a fully waterproof deck and treated to h3.1 level

Use full depth blocking or compression blocks to transfer roof loads to supports
**DETAIL F14: Short cantilever supporting load bearing wall**

- Load bearing wall
- Intermittent blocking
- Splice joint ‘rimboard’ between joists to blocking or ply piece

Where specified
- Install type 1 reinforcement in accordance with detail F21
- Install type 2 reinforcement in accordance with detail F22

**DETAIL F15: Cantilever supporting load bearing wall**

- Load bearing wall
- Continuous trimming joint or ply framed closure attached to the ends of all joists
- ‘rimboard’ or boundary joist across ends of joists and between wall plates

Where specified
- Install type 1 reinforcement in accordance with detail F21
- Install type 2 reinforcement in accordance with detail F22

**DETAIL F16: Cantilevers supporting load bearing walls — installation of end trimmer**

- Continuous wall plate or batten above and below and fixed to each hyJOIST with 2 x 75 mm nails
- Plywood or hardboard joined over timber cleat and nailed with minimum 4 nails
- 7 mm structural plywood or hardboard bracing nailed to wall plates or battens with 30 x 2.5 FH nails @ 150 cts.

**DETAIL F17: End restraint – using ‘rimboard’ or boundary joist**

- Splice joint ‘rimboard’ between joists to blocking or ply piece
- ‘Rimboard’ may be minimum 25 mm F8 H3 treated structural ply cut to the same depth as joists
- hyJOIST must be installed plumb (max. 1 mm per 300 mm joist depth)

- *Nails should be of sufficient length to penetrate the flanges of joist at least 30 mm*
**DETAIL F18: Installation of compression blocks**

- Load bearing wall aligned under
- One or more compression blocks of similar combined cross sectional area to that of the supported jamb stud or post
- Compression block cut 1 mm longer than joist depth
- Single nail to flange as shown

**DETAIL F21: Cantilever supporting load bearing walls — Type 1 reinforcement**

- 15 mm F11 structural ply cut same depth as joist
- Ply stiffeners/packaging
- Nail reinforcement through stiffener, web and into outer stiffener (3 places). Minimum 5 nails, use 75 mm FH nails for 45 flange widths, 90 mm FH nails for other — clench as necessary
- Minimum 1.5 X Lc cantilever 'Lc'

* Plywood strips of suitable thickness available as accessory product

**DETAIL F22: Cantilever supporting load bearing walls — Type 2 reinforcement**

- 15 mm F11 structural ply both sides cut same depth as joist
- Nail reinforcement to stiffeners from both sides
  - minimum 5 nails per side using 75 x 3.15 FH nails
- Minimum 1.5 X Lc cantilever 'Lc'

* Plywood strips of suitable thickness available as accessory product
**DETAIL TD1: Tie-down for external bracing wall using Rimboard**

- Block up to first nog fixed to stud with 3/100 x 3.75 nails to accommodate double strap.
- 25 mm F8 plywood rimboard.
- hyJOIST® web stiffener each side of joist — fix as per detail F6.
- Sheet brace strap 300mm x 25mm x 0.9mm fixed with 6/30 x 3.15 nails to each end.
- 6 kN and 12 kN fixing details using rimboard.

**DETAIL TD2: Tie-down for external bracing walls**

- 6 kN and 12 kN fixing details — bracing wall parallel to joists.
- Block up to first nog fixed to stud with 3/100 x 3.75 nails to accommodate double strap.
- hyJOIST® web stiffener each side of joist — fix as per detail F6.
- Sheet brace strap 300mm x 25mm x 0.9mm fixed with 6/30 x 3.15 nails to each end.

**DETAIL TD3: Tie-down for external bracing walls**

- 6 kN and 12 kN fixing details — bracing wall parallel to joists.
- Block up to first nog fixed to stud with 3/100 x 3.75 nails to accommodate double strap.
- hyJOIST® or timber nog between joists.
- Sheet brace strap 300mm x 25mm x 0.9mm fixed with 6/30 x 3.15 nails to each end.
**DETAIL TD4: Tie-down for internal bracing walls**

- **12 kN fixing:**
  - additional sheet brace strap
- **Multigrip both sides (fully nailed):**
  - hySPAN® or timber blocking full depth
- **Sheet brace strap 300mm x 25mm x 0.9mm** fixed with 6/30x3.15 nails to each end

**DETAIL TD5: Bracing transfer through diaphragm floors**

- **Sheet flooring diaphragm**
- **Upper wall framing**
  - 60x2.8 nails at 150 cts
- **60x2.8 nails at 150 cts**
- **Rimboard — 25mm H3 CCA treated plywood — full depth of joist (minimum 2.5 joist spacings in length)**
- **Lower wall framing**
- **hyJOIST® floor joists**
  - hyJOIST or 2/70x45 nogs between each joist fix with 75x3.15 nails at 150 cts to top plate of lower wall
- **hyJOIST or 2/70x45 nogs between each joist**
- **60x2.8 FH nails at 150 cts**
- **60x2.8 FH nails at 150 cts**
- **Rimboard**
- **75x3.15 FH nails at 150 cts**
4.0 hyJOIST® RAFTERS

hyJOIST® may also become part of a very effective and economical roof system, particularly where low pitch roofs with ceiling directly attached to the underside are being designed. hyJOIST rafters allow the flexibility of having provision for the installation of ducting and electrical services through the web, whilst offering ample room to include insulation.

hyJOIST may also be used for pitched roofs up to 35 degrees where special attention is paid to connection and tie-down. It is important that the connection of rafters includes for the effects of wind loading as well as dead, live and snow loads where applicable.

Rafter tie-down using looped over strap is recommended whilst bracing requirements do not differ with the use of a hyJOIST roof system.

TYPICAL INSTALLATION FOR LOW PITCHED ROOFS

FIGURE 31

DETAIL R6: Restraint at supports — using blocking

DETAIL R10: Fixing and support using bevelled plate

Roof battens at maximum 1200 mm C/C for light roofs

Rafter tie down as per detail R13* with 4/35 x 3.15 FH nails per end

Ceiling either directly fixed or fixed via battens at 600 mm C/C

*References to tie-down and number of nails from designIT® output have been included in this specification relative to span tables on page 26

TyPICAL INST aLLa TION FOr LOW PITcCHED r OOFS

hyJOIST® RAFTERS
4.1 RAFTER SPAN TABLES

The following span tables have been prepared in accordance with AS 1684.1: 1999 and are based on the following design criteria:

- Rafter spacing (mm)
- Span (m)
- O/h (m)
- Roof mass does not exceed 40 kg/m², i.e. light roof and ceiling.
- Wind Zones up to Very High.
- Snow loads up to 0.5 kPa (Snow loads for 1.0 kPa may be designed using modification factors from Section 15 of NZS 3604:1999).
- Permanent load serviceability design limit: span/300 or 20 mm.

### TABLE 10:

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<thead>
<tr>
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<td>7.1</td>
</tr>
<tr>
<td>HJ360 63</td>
<td>8.5</td>
<td>2.8</td>
<td>7.8</td>
<td>2.6</td>
<td>6.4</td>
</tr>
<tr>
<td>HJ360 90</td>
<td>9.2</td>
<td>3.3</td>
<td>8.6</td>
<td>3.1</td>
<td>8.0</td>
</tr>
<tr>
<td>HJ400 90</td>
<td>9.8</td>
<td>3.6</td>
<td>9.2</td>
<td>3.4</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Note:
1. Limited by strength
2. Overhang should not exceed half the length of the backspan

designIT allows for the design and specification of hyJOIST® rafters for other applications including:

- Roof mass from 10 kg/m² to 90 kg/m²
- Low, medium and high wind zones
- Rafters where continuous restraint is not provided to the bottom flange
- Overhangs with horizontal soffits
- Face fixing to ridge beams and details for birdsmouthing over supports
- Alternate fixing details
5.0 COMPLIANCE WITH THE NEW ZEALAND BUILDING CODE (NZBC)

This guide provides technical information for the design and installation of hyJOIST® engineered I-Joists as floor joists and rafters in domestic and residential buildings. Further design guidance can also be obtained from the designIT NZ software available from futurebuild. This guide is intended to be used by designers or builders to select appropriate sizes of hyJOIST members and their connections in the framing of houses and similar buildings.

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 conforming to AS/NZS 2269.2004 Plywood - Structural. hyJOIST is Product Certified by the Engineered Wood Products Association of Australasia (EWPPA) as being manufactured in accordance with AS/NZS 4357 and AS/NZS 2269.1. The EWPPA is accredited for product certification by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Design

The design methodology used in the preparation of this guide complies with the requirements of the following design standards:

- AS/NZS 1170:2002/3 Structural Design Actions

The design properties and methodologies of hyJOIST used to calculate the span tables in this brochure were determined in agreement with NZS 3603:1993 Timber Structures Standard, an Acceptable Solution to NZBC Clause 1 Structure.

Guidance has been taken from AS 1684.1:1999, Residential timber-framed construction, Part 1: Design criteria, and reviewed to ensure agreement with NZS 3604:1999 Timber Framed Buildings, an Acceptable Solution to NZBC Clause 1 Structure. When selected and installed in accordance with the specifications, details and limitations in this guide, hyJOIST floor joists and rafters will comply with the requirements of the New Zealand Building Code.

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

For weather-protected applications noted in NZS 3602:2003 hyJOIST can be LOSP (solvent) treated to H3 in accordance with AS/NZS 1604.4:2004. This treatment provides the efficacy intended by both H1.2 and H3.1 in NZBC B2/AS1 and NZS 3640:2003

5.1 FOR MORE EFFICIENT FLOOR DESIGN USE

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5.2 DISCLAIMER

The information contained in this document is current as of December 2013 and is based on data available to CHH Woodproducts at the time of going to print. CHH Woodproducts 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 www.chhwwoodproducts.co.nz

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