## Contents

1. **INTRODUCTION**

2. **APPLICATION AND SCOPE**
   2.1 Application
   2.2 Scope
   2.3 Compliance
   2.4 Responsibility

3. **SYSTEM INDEX**
   3.1 Internal Fire Rated Walls
   3.2 External Fire Rated Walls
   3.3 RAB Board Fire Rated Systems
   3.4 Flooring/ceilings Fire Rated Systems

4. **HOW TO USE THIS MANUAL**
   4.1 Table Data
   4.2 Colour Legend
   4.3 James Hardie Fire and Acoustic system Description
   4.4 STC and Rw
   4.5 R-values
   4.6 Wall Width
   4.7 Wall Height

5. **DESIGN GUIDELINE**
   5.1 General
   5.2 Boundary Wall – Post Fire Stability
   5.3 Framing
   5.4 Timber
   5.5 Steel
   5.6 Structural Steel Members in Fire Rated Wall
   5.7 Insulation
   5.8 Flexible Underlay or Rigid Air Barrier
   5.9 Expansion and Control Joints
   5.10 Control Joints
   5.11 Cladding/Lining Layout and Fixings
   5.12 Coatings and Finishes

6. **NZBC CONSIDERATIONS**
   6.1 Structure
   6.2 Load Bearing of Walls
   6.3 Bracing
   6.4 Durability
   6.5 Fire Performance
   6.6 Fire Resistance
   6.7 Internal Linings Group Numbers
   6.8 Non-Combustible James Hardie Claddings
   6.9 Vertical Fire Spread
   6.10 Internal Moisture
   6.11 Thermal Performance
   6.12 Acoustic Performance
   6.13 Airborne Sound
   6.14 Impact Sound
   6.15 Tests and Opinions
   6.16 Product Substitution
   6.17 Compliance
   6.18 Thermal Fire Batten
   6.19 Referenced Documents

7. **INTERNAL WALLS**
   7.1 General
   7.2 Continuity and Isolation

8. **EXTERNAL WALLS**

9. **RAB BOARD**

10. **INTERNAL FLOORS/CEILINGS**

11. **CONSTRUCTION DETAILS**
   11.1 Framing
   11.2 RAB Board / Flexible Underlay
   11.3 Insulation
   11.4 James Hardie Cladding or Lining
   11.5 Cavity Construction
   11.6 GIB® Standard Plasterboard and GIB Fyreline® Lining
   11.7 Services Penetrations

12. **CONSTRUCTION DETAILS**
   12.1 James Hardie Fire Rated Boundary Wall And Soffits

13. **SAFE WORKING PRACTICE**

14. **PRODUCT INFORMATION AND ACCESSORIES**

15. **PRODUCT WARRANTY**

---

**WE VALUE YOUR FEEDBACK**

To continue with the development of our products and systems, we value your input. Please send any suggestions, including your name, contact details, and relevant sketches to:

**Ask James Hardie™**
Fax 0800 808 988
literaturefeedback@jameshardie.co.nz
1 Introduction

This manual provides information about James Hardie two way fire and acoustic systems using timber or steel frames in residential or non-residential construction, such as:

- Separating walls in multi unit residential buildings or
- External walls close to boundaries.

In terms of the New Zealand Building Code (NZBC) requirements, fire rating is referred to as FRR (Fire Resistance Rating) and is measured in minutes e.g. a FRR 30/30/30 means a fire rating for 30 minutes. Further explanation regarding this is provided in section 7.6 of this technical specification.

2 Application and scope

2.1 APPLICATION

The fire and acoustic rated walls described in this specification can be used to meet a wide range of performance requirements to suit most applications as indicated in this section.

For intertenancy partition walls, Villaboard® Lining is a suitable product for use in internal fire and acoustic rated walls. Villaboard Lining can also be used to achieve bracing where required. It can also provide significant bracing strength immediately after the installation.

For external walls, a range of James Hardie claddings 6mm or thicker are available which are suitable for use in fire and acoustically rated wall systems.

James Hardie fibre cement products achieve better sound-insulated walls that are slimmer than other traditional walling materials. These thinner walls have advantages in multiple residential, units, motels and other similar projects where maximum floor area utilisation is paramount.

All James Hardie products are resistant to fire and damage from moisture, cracking and rotting when installed and maintained as per James Hardie’s published literature current at the time of installation.

This manual is intended to assist designers in selecting a suitable James Hardie product and to choose a system which will meet their performance requirements. The fire rated system details have also been provided in this manual for the ease of material selection.

The following page describes the various James Hardie products that can be used in internal or external fire and acoustic rated walls.

The sections have been arranged to allow for quick familiarisation with James Hardie fire and acoustic systems. It is assumed that readers are familiar with the relevant James Hardie cladding and lining product literature. The information provided in this manual includes the specific use of James Hardie fibre cement products in a fire rated and acoustic systems.

SPECIFIER

If you are a designer / specifier ensure that you are familiar with the approved document for fire and safety, Clause C of the NZBC and check its requirements. Ensure that the information in this document is appropriate for the application you are planning and that you undertake specific design and detailing for areas which fall outside the scope of this manual.

INSTALLER

If you are an installer ensure that you follow the complete system requirements as mentioned in this literature to achieve the required performance levels. Follow the design, moisture management and associated details and material selection provided by the designer. The systems provided in this manual must be read and installed in conjunction with the project specifications. Any material specified in this manual when substituted may affect the system performance. All James Hardie products shall be installed as per the relevant product technical literature.

MAKE SURE YOUR INFORMATION IS UP TO DATE

When specifying or installing James Hardie products, ensure you have the current manual. If you’re not sure you do, or you need more information, visit www.jameshardie.co.nz or Ask James Hardie™ on 0800 808 868.

2.2 SCOPE

The fire and acoustic systems provided in this design manual are suitable for residential or non-residential applications. Refer to NZS 3604 to determine framing dimensions and maximum wall heights. Beyond the scope of NZS 3604, a specific engineering design must be carried out.

2.3 COMPLIANCE

NZBC CLAUSE C ‘PROTECTION FROM FIRE’

The fire resistance rating (FRR) of James Hardie fire rated systems has been verified through full scale testing and technical assessments. The systems published in the design manual are suitable to achieve passive fire protection and meet the requirements of NZBC Clause C ‘Protection From Fire’.

NZBC CLAUSE B2 ‘DURABILITY’

James Hardie products meet the serviceable life in excess of 50 years and meet the requirements of NZBC Clause B2 ‘Durability’. It must be ensured the products are installed and maintained in accordance to their published technical specifications.

NZBC CLAUSE G6 ‘AIRBORNE & IMPACT SOUND’

For the systems published in this design manual the STC and IIC ratings have established through testing or acoustic modelling. Designers/specifiers must ensure that the ratings published in this manual are suitable for the intended applications. In case higher ratings are required, ask James Hardie at 0800 808 868 for assistance.
2.4 RESPONSIBILITY

The designer must ensure that the information and details published in this manual are appropriate for the intended application and a specific design is performed for those systems that fall outside the scope of this manual. Ensure that the intent of your design meets the requirements of the NZBC.

All New Zealand Standards referenced in this document are current edition and must be complied with.

James Hardie conducts stringent quality checks to ensure that any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure that the product meets aesthetic requirements before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations after the installation of product.

THE FOLLOWING JAMES HARDIE PRODUCTS ARE CLASSIFIED AS ‘NON-COMBUSTIBLE’ MATERIALS AND ARE SUITABLE FOR USE IN FIRE RATED SYSTEMS SPECIFIED IN THIS DESIGN GUIDE.

Villaboard® Lining 6mm and 9mm
Internal lining fixed with butt or flush stopped joints. Refer to Villaboard Lining Installation Manual for information regarding fixing.

RAB® Board 6mm
Rigid Air Barrier suitable to achieve fire ratings regardless of the cladding used with it. Refer to James Hardie Rigid Air Barriers Installation Manual for information regarding fixing.

James Hardie Weatherboards 7.5mm
Weatherboard cladding with a range of finishes available. Refer to James Hardie Weatherboard Technical Specification for information regarding fixing.

Linea® Weatherboard 16mm
16mm thick pre-primed weatherboard where a 90 minute FRR can be achieved. Refer to Linea Weatherboard Technical Specification for information regarding fixing.

Linea® Oblique Weatherboard
16mm thick pre-primed weatherboard which can be installed horizontally or vertically. Refer to Linea Oblique Weatherboard Technical Specification for information regarding fixing.
Monotek® Sheet 7.5mm and 9mm

Titan® and ExoTec® Facade Panels 9mm
Expressed jointed panels, paint finished for external claddings on residential or commercial projects. Refer to Titan and ExoTec Facade Panel Rainscreen Technical Specification for information regarding fixing.

Stria Cladding®
14mm thick pre-primed cladding which can be installed horizontally or vertically. Refer to Stria Cladding Technical Specification for information regarding fixing.

Axon® Panel 9mm
Pre-primed cladding with subtle vertical lines. Refer to Axon Panel Technical Specification for information regarding fixing.

EasyLap™ Panel 9mm
Pre-primed cladding with subtle vertical lines. Refer to EasyLap Panel Technical Specification for information regarding fixing.

Monotek® Sheet 7.5mm and 9mm

Titan® and ExoTec® Facade Panels 9mm
Expressed jointed panels, paint finished for external claddings on residential or commercial projects. Refer to Titan and ExoTec Facade Panel Rainscreen Technical Specification for information regarding fixing.

Stria Cladding®
14mm thick pre-primed cladding which can be installed horizontally or vertically. Refer to Stria Cladding Technical Specification for information regarding fixing.
3 System index

The following table gives the key information regarding different fire rated and acoustic systems provided in this manual and indicates the page numbers where more descriptive information can be found. All the fire rated systems given in these tables are two way fire rated systems.

The information under the ‘Reference’ column refers to BRANZ report, assessment, or opinion which confirms the fire performance of a system.

### 3.1 INTERNAL FIRE RATED WALLS

<table>
<thead>
<tr>
<th>SYSTEM ARRANGEMENT</th>
<th>JAMES HARDIE SYSTEM NUMBER</th>
<th>STUD DEPTH (MM)</th>
<th>FRR</th>
<th>STC RANGE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERNAL 30 MINUTE TWO WAY FIRE RATED AND ACOUSTIC SYSTEM</td>
<td>JHITVV30</td>
<td>90</td>
<td>30/30/30</td>
<td>41 – 45</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>JHITGV30</td>
<td>90</td>
<td>30/30/30</td>
<td>39</td>
<td>18</td>
</tr>
<tr>
<td>INTERNAL 60 MINUTE TWO WAY FIRE RATED AND ACOUSTIC SYSTEM</td>
<td>JHITVV60</td>
<td>90</td>
<td>60/60/60</td>
<td>41 – 45</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>JHITVV60</td>
<td>90 x 2</td>
<td>60/60/60</td>
<td>58</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>JHITGV60</td>
<td>90</td>
<td>60/60/60</td>
<td>42 – 44</td>
<td>21</td>
</tr>
</tbody>
</table>
### 3.2 EXTERNAL FIRE RATED WALLS

**EXTERNAL 30 MINUTE TWO WAY FIRE RATED AND ACOUSTIC SYSTEM**

<table>
<thead>
<tr>
<th>SYSTEM ARRANGEMENT</th>
<th>JAMES HARDIE SYSTEM NUMBER</th>
<th>STUD DEPTH (MM) (MIN)</th>
<th>FRR</th>
<th>STC RANGE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>JHETGJ30</td>
<td>90</td>
<td>30/30/30</td>
<td>40 – 48</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>JHESGJ30</td>
<td>89</td>
<td>30/30/30</td>
<td>47 – 53</td>
<td>24</td>
</tr>
</tbody>
</table>

**EXTERNAL 60 MINUTE TWO WAY FIRE RATED AND ACOUSTIC SYSTEM**

<table>
<thead>
<tr>
<th>SYSTEM ARRANGEMENT</th>
<th>JAMES HARDIE SYSTEM NUMBER</th>
<th>STUD DEPTH (MM) (MIN)</th>
<th>FRR</th>
<th>STC RANGE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>JHETJJ60</td>
<td>90</td>
<td>60/60/60</td>
<td>43 – 47</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>JHETGJ60</td>
<td>90</td>
<td>60/60/60</td>
<td>44 – 47</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>JHESGJ60</td>
<td>89</td>
<td>60/60/60</td>
<td>50 – 54</td>
<td>27</td>
</tr>
</tbody>
</table>

**EXTERNAL 90 MINUTE TWO WAY FIRE RATED AND ACOUSTIC SYSTEM**

<table>
<thead>
<tr>
<th>SYSTEM ARRANGEMENT</th>
<th>JAMES HARDIE SYSTEM NUMBER</th>
<th>STUD DEPTH (MM) (MIN)</th>
<th>FRR</th>
<th>STC RANGE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>JHETGL90</td>
<td>90</td>
<td>90/90/90</td>
<td>49</td>
<td>28</td>
</tr>
</tbody>
</table>
### 3.3 RAB BOARD FIRE RATED SYSTEMS

<table>
<thead>
<tr>
<th>SYSTEM ARRANGEMENT</th>
<th>JAMES HARDIE SYSTEM NUMBER</th>
<th>STUD DEPTH (MM) (MIN)</th>
<th>FRR</th>
<th>STC RANGE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>JHETGR30c (CLD batten)</td>
<td>90</td>
<td>30/30/30</td>
<td>47</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>JHETGR60c (CLD batten)</td>
<td>90</td>
<td>60/60/60</td>
<td>47</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>JHETGR30a</td>
<td>90</td>
<td>30/30/30</td>
<td>47</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>JHETGR60a</td>
<td>90</td>
<td>60/60/60</td>
<td>47</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>JHETRR30</td>
<td>90</td>
<td>30/30/30</td>
<td>43</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>JHETRR60</td>
<td>90</td>
<td>60/60/60</td>
<td>43</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>JHETGR30b</td>
<td>90</td>
<td>30/30/30</td>
<td>47</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

### 3.4 FLOORING/CEILINGS FIRE RATED SYSTEMS

<table>
<thead>
<tr>
<th>SYSTEM ARRANGEMENT</th>
<th>JAMES HARDIE SYSTEM NUMBER</th>
<th>FLOOR JOIST DEPTH (MM)</th>
<th>FRR</th>
<th>STC/IIC</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>JHFTGS30</td>
<td>232</td>
<td>30/30/30</td>
<td>46/33</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>JHFTGS60</td>
<td>235</td>
<td>60/60/60</td>
<td>47/37</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>JHFTGS_{60} (cradle)</td>
<td>355</td>
<td>60/60/60</td>
<td>65/60</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>
4 How to use this manual

4.1 TABLE DATA
The following table explains how to read the information provided for each system:

<table>
<thead>
<tr>
<th>SYSTEM NUMBER</th>
<th>FRR SOUND ATTENUATION DATA</th>
<th>OTHER INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>WALL SECTION</td>
<td></td>
<td>OPTIONS</td>
</tr>
</tbody>
</table>

4.2 COLOUR LEGEND
Section drawings have been used in each table using the following colour legend.

- **FIRE RETARDANT FLEXIBLE UNDERLAY**
- **THERMAL FIRE BATTENS**
- **J** = ANY JAMES HARDIE CLADDING OR LINING PER SCOPE
- **V** = VILLABOARD® LINING
- **G** = GIB® Fyreline®
- **RAB® BOARD**
- Non James Hardie Exterior Cladding complying with C Clause

4.3 JAMES HARDIE FIRE AND ACOUSTIC SYSTEM DESCRIPTION
A comprehensive range of FRR timber framed and steel framed wall systems are included in this manual.

Each FRR system is identified by unique nomenclature preceded by the letters JH (e.g., JHETJ60) to identify it as one of the James Hardie fire resistance rated wall systems.

The explanation of system nomenclature used is as follows:

- After JH the first letter defines the application
  - I — Interior system only
  - E — Exterior system only
  - F — Floor system only
- After JH the second letter describes the framing material used with a subscript, “d” denoting double studs.
  - T — timber frame
  - S — steel frame
- After JH, the third and fourth letter describes the material used on each side respectively. A subscript “g” identifies the James Hardie product is fixed over plasterboard on both sides. J is used to indicate the use of a James Hardie product in a FRR system.

The following letters may be used to generate a unique number to fully describe a cladding or a lining product used in a FRR system:

- **J** — Any James Hardie cladding or lining material as per the scope of this manual
- **R** — RAB Board
- **X** — HardieFlex Sheet
- **M** — Monotec Sheeting
- **T** — Titan Façade Panel
- **A** — Axon Panel
- **L** — Linea Weatherboard
- **W** — James Hardie Weatherboards
- **V** — Villaboard Lining
- **G** — GIB® Plasterboard (G is generally used in James Hardie system to identify the use of a GIB® product).
- **S** — Secura Interior Flooring

The last two digits indicate the fire resistance rating in minutes.

Returning to the earlier example, JHETJ60 means this is a James Hardie external fire rated system that uses a standard timber frame with a James Hardie cladding on one face and a James Hardie lining on the other face and the fire rating achieved is up to 60 minutes.

4.4 STC AND Rw
Tested or modelled Rw and STC data is indicated in the shaded cells provided for each system. Refer to section 7.12 and 7.13 for the description of methods used to calculate the acoustic performance.

4.5 R-VALUES
R-values provided in this manual for external walls have been calculated considering the thermal conductivity of each material and their thickness used in the construction of a wall. The insulation specified in external fire rated systems is a minimum requirement to achieve the desired fire rating performance. For options that would only marginally increase the R-value (e.g., 1.5mm increased cladding sheet thickness) has been ignored and the lowest value is presented for simplicity.

The fire rated systems, where a fibreglass R2.2 insulation has been specified, can be replaced with a higher R-value fibreglass insulation material to achieve higher insulation (R-value) requirements.

4.6 WALL WIDTH
Wall thickness data has been presented for comparative purposes. This is a theoretical figure which excludes construction tolerances and finishes. The nominal wall width figure is based on the product thickness used on each side of the wall.

4.7 WALL HEIGHT
Using 90 x 45mm SG8 timber frame a maximum wall height up to 3m can be achieved.

For maximum wall height in relation to boundary fire rated walls, refer to Figures 1, 3, 4, 5 and 6.

For wall heights more than 3m contact James Hardie for further SED assistance.
5 Design guideline

5.1 GENERAL
To achieve the performance levels as described in each system, all materials as specified in the system must be used. The basic information regarding the materials to be used can be found in the individual system, section 8 for internal walls and section 9 for external walls. Information about James Hardie materials are outlined in various tables.

The following section outlines the minimum specifications of other related components.

5.2 BOUNDARY WALL – POST FIRE STABILITY
The fire rated walls built close to boundary are required to achieve post fire stability as per section 2.2.4 of B1/VM1 of the NZBC. James Hardie has developed a few design solutions for concrete slab and timber foundations.

The bottom plate of these walls can be fixed in accordance with Figures 1, 2, 3, 4, 5 and 6 of this design manual using Pryda Brace Anchor on either side of the stud. These fixings ensure that when a boundary wall is exposed to post fire face loads, it doesn’t collapse in any direction. Contact the project structural engineer for an alternate design to achieve post fire stability if the published solutions are not suitable for the project.

Note: Post fire stability for steel framing must be as per SED.

5.3 FRAMING
The frame sizes and spacing mentioned in this manual are a minimum requirement. Bigger framing sections required to suit a proprietary cladding system or to suit higher wind pressures, will not affect the FRR, provided that the other system requirements presented in this manual are adhered to.

Higher levels of timber treatments or steel coating to enhance their durability will not alter the fire or acoustic performance of the systems.
Sheet set-out must be determined by the designer including the location of all expansion and control joints to enable correct framing set-out (these must be in accordance with the relevant James Hardie product literature).

5.4 TIMBER
Timber framing must either be in accordance with NZS 3604 or in accordance with specific engineering design (SED) as per AS/NZ 1170 and NZS 3603 standards. The stud, nogs / dwangs and floor joist spacing, timber size must meet the following minimum requirements:

FOR INTERNAL WALLS:
• Minimum framing of 90 x 45mm shall be used.
• Maximum stud spacing 600mm.
• Maximum nogs / dwangs spacing of 800mm.
• Minimum framing depth as per fire and acoustic system selected or the structural requirements whichever is greater.
• All sheet edges must be supported by framing timber.
• Timber framing treatment to comply with the minimum requirements of NZS 3602.
• When framing at 140 x 45mm the maximum stud spacing 600mm.

FOR EXTERNAL WALLS:
• Minimum framing size as per figures 1, 3, 4, 5 or 6.
• Maximum stud spacing as per figures 1, 3, 4, 5 or 6.
• Maximum nogs / dwangs spacing of 800mm.
• Minimum framing depth as per fire and acoustic system selected or the structural requirements whichever is greater.
• All sheet edges must be supported by framing timber.
• Timber framing treatment to comply with the minimum requirements of NZS 3602.

FOR FLOORS:
• Minimum 45mm wide floor joists shall be used.
• Strutting of floor joists is required as per NZS 3604.
• Bottom plate fixing in timber floors must penetrate through floor into joists or solid blocking. Refer to Figures 5 and 6.

5.5 STEEL
Steel framing for fire rated walls must be in accordance with NASH standard for residential and low rise buildings and AS/NZ 1170 standards. The framing shall also meet the following requirements:
• Steel sections shall be galvanized/zinc coated and have a base metal thickness (BMT) 0.55mm minimum for non-load bearing walls and 0.75mm minimum for load bearing walls and 1.6mm maximum.
• The minimum size for steel stud framing to be used in external walls shall be minimum 89mm deep x 36mm wide.
• Maximum stud spacing 400mm c/c.
• Maximum nogs / dwangs spacing 800mm c/c.
• Steel frame must comply with the durability requirements of NZBC.
• For jointing of the flat sheet products, double studs securely fastened together must be provided where a higher framing width is required. All sheet edges must be supported by framing.

Steel sections thicker than those sound tested may adversely affect the predicted sound ratings of a system.

Emergency fire load capacities for steel framed walls require special calculation. Refer to section 6.2 for further information.

All steel framing must be used according to their manufacturer’s instructions. Steel framing properties vary considerably depending upon the grade of steel used. It is the designer’s responsibility to ensure the type of framing selected is fit for purpose and suitable to carry design loads.

Expressed or open jointed cladding must not be used over steel frame.

5.6 STRUCTURAL STEEL MEMBERS IN FIRE RATED WALL
When structural steel members are located inside the fire rated wall cavity such as columns, or beams in a floor/ceiling cavity, these structural members must be independently fire rated with e.g. Intumescent paints. The temperatures inside the cavities can rise above the critical temperature levels for structural
steel members resulting in premature buckling. Therefore by containing the structural steel members within a fire rated system, it cannot be automatically assumed that a structural steel member will achieve the structural rating of the fire rated system within which it is contained.

5.7 INSULATION

Fibreglass Insulation
Where R2.2 fibreglass insulation is specified in a system, any brand of R2.2 fibreglass insulation which weighs 14–18kg/m3 may be used. This insulation can be substituted with a higher R-value fibreglass insulation to achieve higher insulation requirements.

James Hardie Mineral Insulation
In a fire rated system where a mineral insulation is specified, only James Hardie Mineral Insulation must be used. James Hardie Mineral Insulation cannot be substituted with any other insulation material.

Also refer to clause H1 of the NZBC for further information on construction R-value requirements.

5.8 FLEXIBLE UNDERLAY OR RIGID AIR BARRIER

All external walls must have a flexible underlay or a rigid air barrier installed beneath the claddings.

In a FRR system, any flexible underlay that complies with Table 23 of E2/AS1 and has a Flammability Index not exceeding 5, when tested to AS 1530.2 may be used.

James Hardie RAB Board will provide superior thermal insulation, air tightness performance when compared with flexible underlays.

Installation of a flexible underlay or rigid air barrier must be in accordance with their manufacturer’s recommendations and this manual.

RAB Board can be used to achieve the published fire ratings in James Hardie systems where 6mm or thicker James Hardie cladding is specified.

5.9 EXPANSION AND CONTROL JOINTS

Expansion joints are generally required for long continuous walls/structures and need to be specified by the project engineer. All expansion joints must extend through the cladding and wall framing.

The control joints provided in certain types of cladding or lining products are a necessity to maintain the system’s integrity and must be formed as per the product’s technical literature.

Some common construction details can be found in section 13 of this manual.

5.10 CONTROL JOINTS

Horizontal control joints in claddings shall be provided at all floor joist levels as per the relevant James Hardie product technical specification.

Vertical control joints must be installed as per the James Hardie product technical literature. It is not necessary for all claddings to have vertical control joints e.g. Linea Weatherboard and James Hardie Weatherboards do not require vertical control joints.

Villaboard Lining control joints must be provided as recommended in the Villaboard Lining technical literature.

5.11 CLADDING/LINING LAYOUT AND FIXINGS

The product layout and its installation must be in accordance with the relevant James Hardie product literature for the cladding / lining selected.

The cladding/lining fixings must be as per the information below. Refer to relevant James Hardie product technical literature for further installation details:

- Villaboard Lining fixed at 150mm centres maximum as per Villaboard Lining Installation Manual. When Villaboard Lining is installed over plasterboard, the fixing must be increased in length by the thickness of the plasterboard.
- RAB Board fixed at 150mm centres maximum as per James Hardie Rigid Air Barriers Installation Manual.
- HardieFlex Sheet fixed at 150mm centres maximum. Refer to HardieFlex Sheet Technical Specification for further information.
- Monotek Sheet fixing not exceeding 150mm centres. Refer to Monotek Sheet Technical Specification for further information.
- Linea Weatherboard face fixed at each stud. Refer to Linea Weatherboard Technical Specification.
- Linea Oblique Weatherboard fixed at each stud. Refer to Linea Oblique Weatherboard technical specification.
- Titan and ExoTec Facade Panel fixed at 150mm centres maximum. Refer to Titan and ExoTec Facade Panel Rainscreen Technical Specification (Timber Cavity Battens).
- When installing Titan Facade Panel, Stria Cladding, EasyLap Panel or Axon Panel over CLD Structural Cavity Battens, RAB Board must be used to achieve fire ratings.
- James Hardie Weatherboards fixed at each stud. Refer to James Hardie Weatherboards Technical Specification.
- Axon Panel fixed at 150mm centres maximum. Refer to Axon Panel Technical Specification.
- GIB Fyreline® fixed as per table below and within this design guide.

Fixing claddings / linings to steel framing requires a steel screw which should be selected considering the thickness of cladding, steel frame and thermal fire batten. The minimum penetration in steel frame must be 15mm.

All FRR systems must be mechanically fixed. All bracing systems must be fixed in accordance with the James Hardie Bracing Design Manual for the selected bracing system.

James Hardie cladding or lining products can be used to achieve fire rating and structural bracing simultaneously.
**GIB FYRELINE® FIXING REQUIREMENTS**

- 300mm centre around the sheet perimeter and intermediate studs
- Fixings to be 12mm from bound sheet edges and 18mm from sheet ends

**TIMBER FRAMING**

<table>
<thead>
<tr>
<th>Thickness</th>
<th>GIB Fyreline®</th>
<th>Screws/Nails</th>
</tr>
</thead>
<tbody>
<tr>
<td>10mm</td>
<td>41mm x 6g GIB® Grabber® High Thread Drywall Screws or 40 x 2.8mm GIB® nails</td>
<td></td>
</tr>
<tr>
<td>13mm</td>
<td>41mm x 6g GIB® Grabber® High Thread Drywall Screws or 40 x 2.8mm GIB® nails</td>
<td></td>
</tr>
<tr>
<td>16mm</td>
<td>51mm x 7g GIB® Grabber® High Thread Drywall Screws</td>
<td></td>
</tr>
</tbody>
</table>

**STEEL FRAMING**

<table>
<thead>
<tr>
<th>Layer</th>
<th>Screws/Nails</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner layer</td>
<td>25mm x 6g GIB® Grabber® Drywall Self Tapping Screws</td>
</tr>
<tr>
<td>Outer layer 10mm GIB Fyreline®</td>
<td>32mm x 6g GIB® Grabber® Drywall Self Tapping Screws</td>
</tr>
<tr>
<td>Outer layer 13mm GIB Fyreline®</td>
<td>41mm x 6g GIB® Grabber® Drywall Self Tapping Screws</td>
</tr>
</tbody>
</table>

**5.12 COATINGS AND FINISHES**

All James Hardie cladding systems require protective coatings to meet the NZBC requirements. Refer to relevant James Hardie technical literature for the product selected. All claddings must be maintained in accordance with product literature. Also refer to coating manufacturer’s recommendations.

For FRR systems with surface finishes over 1mm thick, designers must ensure that the finishes comply with the requirements of Section 5.8 clause C/AS2 to C/AS7 of the NZBC.

James Hardie claddings have been tested and assessed as ‘Non-Combustible’ materials and meet the requirements of clause C3.7 of the NZBC.

**6 NZBC considerations**

The following performance issues have been considered when designing James Hardie Fire and Acoustic systems. Only a brief outline of the key areas in the NZBC that need to be considered when selecting fire and acoustic systems are provided in this document. It is the designers’ responsibility to familiarise themselves with the requirements of the NZBC and select the correct system for the project. Designers need to be particularly familiar with the Approved Documents for the NZBC Fire Safety Clause C to determine fire safety requirements to be followed for their project.

**6.1 STRUCTURE**

General structural requirements for framing have been covered under the framing section of this manual.

**6.2 LOAD BEARING OF WALLS**

Refer to NZS 3604 for framing size and wall height for load bearing and non-load bearing walls. Beyond these limits a specific engineering design is required.

The information about structural loading capacity achieved during a fire test is available to engineers using AS/NZS 1170 design standards, Ask James Hardie on 0800 808 868 for further information.

The load bearing of the steel framed walls are either based on actual test data or assessments that restrict the temperature rise of steel stud sections. To make accurate predictions the information about load bearing capacity of a steel stud at ambient temperatures and applied load during a fire test is required.

The fire rating of a load bearing steel frame wall can be calculated by referring to a non load bearing system information as per the following equation. You can also refer to BRANZ ‘Design of Light Framed Walls for Fire Resistance’ bulletin no.138 for further information.

$$FRR (LB) = FRR (NLB) \times (1 – \frac{\text{Applied Load KN/stud}}{\text{Capacity KN/stud}}) \times FRR (NLB).$$

**WHERE:**

- Capacity — is the normal design load bearing capacity of steel stud at ambient temperatures.
- Applied load — is load at the time of fire.
- FRR (NLB) — is the FRR of the initial system in minutes selected.
- FRR (LB) — is the calculated FRR of the load bearing system.

**6.3 BRACING**

The bracing systems specified in James Hardie Bracing Design Manual can easily be combined with the fire and acoustic systems by adhering to the details outlined for the relevant bracing and fire and acoustic systems.

Bracing cannot be achieved when James Hardie claddings/pre-cladding are fixed with screws or when steel framing is used.

**6.4 DURABILITY**

When fire rated systems are combined with bracing systems then the durability of the components used in the system must meet a 50 years durability criteria of Clause B2 of the NZBC.

** Exposure conditions and nail selection prescribed by NZS 3604**

<table>
<thead>
<tr>
<th>NAIL MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone D</td>
</tr>
<tr>
<td>Grade 316 Stainless</td>
</tr>
</tbody>
</table>
In addition to James Hardie specifications, particular attention must be given to adhere with project design advice and the manufacturers instructions to achieve satisfactory durability of performance materials.

6.5 FIRE PERFORMANCE
To determine the fire performance required from various walls and floor/ceiling elements of a building, the designer needs to consider the Approved Documents — ‘Protection from Fire’ Clause C of the NZBC. A fire engineer may be required to evaluate the fire safety requirements for a building depending upon its type/scope and the user group etc.

6.6 FIRE RESISTANCE
Working through the Approved Documents will determine the fire resistance rating required for walls that separates the fire cells. These ratings are expressed as Fire Resistance Rating (FRR) of a wall in minutes. Most fire rated systems included in this publication round the values back to the nearest 15 minutes. The fire engineers may occasionally need to use the actual value in some applications. If this information is required, Ask James Hardie on 0800 808 868.

In the event of a fire, the fire walls provide the occupants with sufficient time to escape to safety, prevent spread of fire to neighbouring property, and allow fire extinguishing operations to be completed by ensuring the wall maintains sufficient Stability, Integrity and Insulation for that period.

If the project requires a wall to achieve a FRR of 60/60/60 (i.e. Stability/Integrity/Insulation) the wall will have the following characteristics:

- The first 60 figure describes the wall’s structural stability requirement for 60 minutes. Within this period the wall must support the structure and other fire rated elements within the same or other fire cells. A dash here indicates the wall is not a structural wall (this is typical for non-load bearing systems such as partition walls).

- The second 60 figure describes the wall’s integrity requirement for 60 minutes. During this period the hot gases or flames can not pass through the wall to either side. After this period a failure has occurred as the wall system under test develops cracks or openings through which hot gases and smoke can pass.

- The third 60 figure describes the wall’s insulation requirement for 60 minutes. After this period a failure has occurred in the wall system under test, when:
  a) the average temperature of the unexposed surface of the test specimen increases by more than 140°C above the initial temperature, or
  b) the temperature at any point on the unexposed surface increases by more than 180°C above the initial surface temperature. A dash here would indicate that no insulation rating as temperatures are higher than outlined early in the test. Such a system is allowed in external FRR walls that are sufficiently spaced from boundaries.

The James Hardie Fire and Acoustic systems allow a wide range of framing methods and architectural systems to achieve FRR from 30/30/30 to 90/90/90. When specific fire safety design is required for a specialist application, fire engineers may Ask James Hardie on 0800 808 868 for further information.

6.7 INTERNAL LININGS GROUP NUMBERS
The internal lining materials are required to be tested as per ISO 9705 or ISO 5660 in order to identify their ‘Group Number.’

All James Hardie internal linings such as Villaboard Lining and HardieGroove Lining have been tested/assessed by BRANZ and they have a ‘Group Number 1-S’. Note that this classification only applies to James Hardie fibre cement lining products without paint or wet finish. Contact the surface finishes supplier for Group Number information about their product.

Our prefinished linings such as HardieGlaze Lining, Invibe panel and Inraw panel have also been tested/assessed and they have a ‘Group Number 1-S’. This means that James Hardie lining products are suitable for use as internal linings in exitways and all occupied spaces in schools, hospitals, detention centres, offices, hotels, motels and apartments type buildings etc. ‘Group Number 1-S’ is the highest performance expectation under ‘Part 4, Control of Internal Fire and Smoke Spread’ clause C/AS2 to C/AS7 of the NZBC. It means a James Hardie product can be specified for use in any risk group application.

6.8 NON-COMBUSTIBLE JAMES HARDIE CLADDINGS
James Hardie cladding products i.e. Linea Weatherboard, Linea Oblique Weatherboard, James Hardie Weatherboard, Stria Cladding, Titan Façade Panel, Axon Panel, ExoTec Facade Panel, Monotek Sheet, HardieFlex Sheet and its rigid air barrier products have been tested and assessed by BRANZ for their ‘Peak Heat Release Rates’ and ‘Total Heat Release Rates’ and are classified as ‘Non-Combustible’ materials.

James Hardie fibre cement products are suitable for use in residential/commercial building applications where non-combustible materials are required to control the vertical fire spread through external walls. The peak heat release rate and total heat release rate of James Hardie claddings have been tested and these rates fall well under those specified in Section 5.8.1 (a) of C/AS2-7 and meet the requirements to control the external fire spread.

6.9 VERTICAL FIRE SPREAD
According to E2/AS1 wall claddings are required to be installed either direct fixed to the framing or over the cavity battens depending on the risk score. The fire ratings published in this document are not affected whether the James Hardie cladding is direct fixed or fixed over a drained cavity.

When using the cavity construction method in mixed use buildings with different tenancies one above the other e.g. apartments, offices, retail etc, the external cladding systems must not allow vertical fire spread through the cavity. The cavity behind the claddings is blocked off by running a horizontal batten at the floor level i.e. at the boundary of two fire cells and a ‘Z’
flashing is installed. Inter-storey cladding junction details have been provided in this literature to stop vertical fire spread. Refer to Figure 6.

6.10 INTERNAL MOISTURE

The FRR system published in this literature sets a minimum requirement of R-value for bulk insulation to be used to achieve the fire ratings published in this literature.

The E3 — ‘Internal Moisture’ and H1 — ‘Energy Efficiency’ clauses of the NZBC require the external walls of most buildings to have minimum R-values as per the NZS 4218 to prevent condensation and control the energy losses.

6.11 THERMAL PERFORMANCE

The R-values provided for different systems has been calculated for the complete wall construction using ‘Verification Method’ NZS 4214 and James Hardie Mineral Insulation actual test data. The calculation is based on studs at 400mm centres maximum and nogs at 800mm centres maximum.

James Hardie Mineral Insulation has been tested at BRANZ to verify its physical properties and the tests indicate the following thermal resistance value.

James Hardie Mineral Insulation has been tested at BRANZ to verify its physical properties and the tests indicate the following thermal resistance value.

The density of this product is @ 60kg/m3.

6.12 ACOUSTIC PERFORMANCE

‘Airborne and Impact Sound - G6’ an Approved Document of NZBC requires that "buildings shall be provided with adequate noise control in common walls, floors and other elements between occupancies, habitable spaces and other occupancies or common spaces". The performance criteria requires that the sound transmission class (STC) of walls be no less than 55 and the Impact Insulation Class (IIC) for floors be no less than 55.

The NZBC performance criteria set a minimum requirement which may not be adequate for certain types of multi unit dwelling. Similarly many external walls may need better sound attenuation according to occupants and Resource Management Act requirements. James Hardie products can be used to achieve high sound attenuation ratings and values are presented in this manual for a range of fire rated and acoustic systems. This will help the designers to make an informed decision on the most convenient way to improve noise control for a wide range of internal and external wall applications.

If attention is paid in eliminating structural bridging at location of services, flanking paths and quality of workmanship, performance laboratory results may be achieved on site. There are a number of details in section 13 of this manual to assist designers.

Designers can be assured of getting better onsite results if they specify systems that have higher initial ratings and are simple to construct. Appliances, TVs and speakers should not be mounted on or near inter tenancy walls to avoid transmission of sound by vibration into the structure.

6.13 AIRBORNE SOUND

The New Zealand Standards authority published AS/NZS 1276.1 (ISO 717-1) for the calculation of Rw and Rw, tr (weighted sound reduction indices) values for airborne sound attenuation. These values are derived by testing and calculation in a similar way as the STC values are calculated and are an international update of this older sound attenuation rating system.

Generally, but not always, Rw ratings are slightly more difficult to achieve and are more conservative and give a lower value than the STC rating for a given construction. This is because they consider a broader spectrum of noise with emphasis on the more difficult to manage lower frequencies. The Rw value can also be used as a reference for attenuating some forms of external noise. Rw value testing can also be expanded to cover a different band of external noise sources and is then denoted by the additional subscript tr. Depending on the ISO document this can be written as Rw+Ctr, Rtr,w and Rw, tr.

This manual has both Rw and STC values for internal and external systems. External noise control in an application generally falls under the Resource Management Act and little published guidance on how to determine effective sound attenuation for external walls has been available. The acoustic designer must consider all sound flanking paths for effective external noise control in a project.

6.14 IMPACT SOUND

An impact sound performance criterion as per the NZBC is applicable to intertenancy floor systems. James Hardie products such as Secura™ Interior Flooring have been commonly used in floors by acoustic engineers to improve its impact sound performance which is measured in IIC. The sound attenuation performance of ceilings is measured in STC. The IIC and STC for common floor / ceiling systems have been given in the system details provided in this manual.

6.15 TESTS AND OPINIONS

GENERAL

James Hardie continuously develops and introduces new systems and reserves the right to improve those presented in this manual.

FIRE

James Hardie Fire and Acoustic systems have been tested at BRANZ or have been developed using the test data from various fire tests conducted and by the opinion of qualified fire engineers.

The reference number of tests or opinion/assessments have been provided in Tables 4.1, 4.2 and 4.3.

SOUND

Where required for compliance with clause G6 of the NZBC (STC > 55) James Hardie Fire and Acoustic systems have been tested at the Acoustic Testing Service, University of Auckland, or have been conservatively derived by technical opinion from acoustic consultant Marshall Day Acoustics. Data values have been either tested or derived from models created from the test data by Marshall Day and Associates and where modelled the data has an expected accuracy of ± 3 points.
6.16 PRODUCT SUBSTITUTION

The fire and acoustic performance, durability and maintenance requirements of alternative proprietary products cannot be assured by James Hardie. Many apparently identical products were tested and rejected before selection of materials for use in the systems in this manual. Where flexibility is possible it has been reflected in the appropriate system. When a product specified in a system as per this manual is substituted, the performance of the system will be compromised. Therefore the materials specified in the system must not be substituted.

6.17 COMPLIANCE

If the systems are constructed as presented in this manual without substitution or alteration then James Hardie has in the form of this manual presented a producer statement to confirm the performance of systems to the tested standards. James Hardie cannot provide opinions for actual site performance or for systems that deviate from this manual. James Hardie recommends that the specifications materials and systems presented in this manual be strictly adhered to, to avoid building consent and compliance difficulty.

6.18 THERMAL FIRE BATTEN

Fire battens are used on all FRR steel stud systems and must be used between James Hardie cladding and steel framing face. For steel framing in interior/exterior applications the NZBC also requires additional external insulation to achieve adequate thermal resistance. These insulated battens are assembled on site by cutting a 100mm wide strip from 9mm thick Monotek Sheet and adhering a 10mm thick XPS (Extruded Polystyrene) on the face.

All fire battens are fixed horizontally and vertically to all steel faces. All battens must be neatly cut and tightly fitted covering all steel faces. All Thermal Fire Battens must be fitted with the polystyrene to the outside face. The batten is tacked to the steel framing as shown in the following detail.

6.19 REFERENCED DOCUMENTS

Documents referenced in this manual are current edition and must be complied with.

NZBC APPROVED DOCUMENTS

STANDARDS
AS/NZS 1276.1 (ISO 717-1), Airborne sound insulation
NZS-AS 1530.2 Test for flammability of materials
AS/NZS 1530.3, Simultaneous determination of ignitability, flame propagation, heat release and smoke release
AS/NZS 3837, Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter
AS/NZS 4200.1, Pliable building membranes and underlay. Part 1, Materials
AS/NZS 4600, Cold formed steel structures
NZS 3602, Timber and Wood Based Products for use in Building
NZS 3603, Timber Structures Standard
NZS 3604, Timber-framed Buildings
NZS 3404, Steel Structural Standard
NZS 1170, Structural Design Actions Standard
NZS 4214, Methods of Determining the Total Thermal Resistances of parts of Buildings
7 Internal walls

7.1 GENERAL
All interior walls using Villaboard Lining are impact resistant, moisture resistant and achieve high levels of noise control in a minimal space. With Villaboard Lining FRR systems design flexibility with a variety of finishes is maintained while the FRR is substantially achieved by the complete wall.

Inter-tenancy walls present challenges to both designers and builders. Sufficient consideration to following issues must be given by all involved in the project.

All dimensions shown in tables are in millimetres.

7.2 CONTINUITY AND ISOLATION
To achieve the required fire protection and sound attenuation on site, it requires informed design by the engineer/designer as he/she deals with the challenges of attaining adequate structural support and bracing while satisfying space utilisation requirements and the separation required for sound control. The engineer must consider the noise transmission issues when dealing with wall junctions/joints and penetrations. An innocuous tie to gain structural stability can significantly reduce a system’s sound attenuation capability.

The designer must also ensure the fundamental rules of continuity and isolation for adequate fire and acoustic performance are adhered to. The builder also needs to adhere to seemingly insignificant details to be assured of performances approaching those achieved in a laboratory.

James Hardie have provided various solutions for achieving structural support, continuity of fire protection and maintaining sound isolation simultaneously, which are detailed in section 13 of this manual.
### Fire Resistance Rating

<table>
<thead>
<tr>
<th>JHITVV30</th>
<th>Fire Resistance Rating</th>
<th>STC</th>
<th>Lining options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30/30/30</td>
<td>6mm = 41</td>
<td>9mm = 45</td>
</tr>
</tbody>
</table>

**Fire and Acoustic Design Manual August 2017 New Zealand**

**Fire Resistance Rating STC Lining options**

- 30/30/30 6mm = 41
- 9mm = 45

Villaboard® Lining both sides

---

### TWO WAY INTERNAL 30 MINUTE – TIMBER FRAMED WALL

**Framing**

- Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.
- Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.
- Timber framing treatment to be in accordance with NZBC Acceptable Solution B2/AS1.

**WALL HEIGHTS**

- This fire rated system has been tested with a stud height of 3m maximum.

**Lining**

- Villaboard® Lining installed as specified below.

**Fixing/Joining**

- 150mm centre around the sheet perimeter and intermediate studs.
- Fixings to be 12mm from sheet edges and corners 50mm horizontally and 75mm vertically from sheet ends.
- Fix with 40 x 2.8mm HardieFlex nails or Villadrive or HardieDrive wood screws.

**Insulation**

- James Hardie Mineral Insulation. Density - 60kg/m³. 90mm thick.

---

For further information refer to the clauses in the Fire and Acoustic Design Manual.
TWO WAY INTERNAL 30 MINUTE – TIMBER FRAMED WALL

FRAMING
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.
Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.
Timber framing treatment to be in accordance with NZBC Acceptable Solution B2/AS1.

WALL HEIGHTS
This fire rated system has been tested with a stud height of 3m maximum.

JH LINING
Villaboard® Lining 6mm or thicker installed as specified below.

FIXING/JOINTING
James Hardie Linings fixed into the entire framing using fixings at 150mm centres maximum.
Fix with HardieFlex nails 40 x 2.8mm or Villadrive or HardieDrive wood screws.

LINING
10mm GIB Fyreline® installed as specified below.

FIXING/JOINTING
• 300mm centre around the sheet perimeter and intermediate studs.
• Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.
Fix with 41mm x 6g GIB® Grabber High Thread Drywall Screws or 40 x 2.8mm GIB® nails.

INSULATION
R2.2 or higher fibreglass insulation.
Density - 14-18kg/m³.

For further information refer to clauses within the Fire and Acoustic Design Manual.
<table>
<thead>
<tr>
<th>JHITVV60</th>
<th>Fire Resistance Rating</th>
<th>STC</th>
<th>Lining options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60/60/60</td>
<td>6mm = 41</td>
<td>Villaboard® Lining both sides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9mm = 45</td>
<td></td>
</tr>
</tbody>
</table>

**Fire and Acoustic Design Manual August 2017 New Zealand**

**Fire Resistance Rating STC Lining options**

- 60/60/60 6mm = 41
- 9mm = 45

**FRAMING**
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.

Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.

Timber framing treatment to be in accordance with NZBC Acceptable Solution B2/AS1.

**WALL HEIGHTS**
This fire rated system has been tested with a stud height of 3m maximum.

**LINING**
Villaboard® Lining installed as specified below.

**FIXING/JOINTING**
- 150mm centre around the sheet perimeter and intermediate studs.
- Fixings to be 12mm from sheet edges and corners 50mm horizontally and 75mm vertically from sheet ends.

Fix with 40 x 2.8mm HardieFlex nails or Villadrive or HardieDrive wood screws.

**INSULATION**
James Hardie Mineral Insulation. Density - 60kg/m³. 90mm thick.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
TWO WAY INTERNAL 60 MINUTE – TIMBER FRAMED WALL

FRAMING
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.
Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.
Timber framing treatment to be in accordance with NZBC Acceptable Solution B2/AS1.

WALL HEIGHTS
This fire rated system has been tested with a stud height of 3m maximum.

LINING
Villaboard® Lining 9mm installed as specified below.

FIXING/JOINTING
James Hardie Linings fixed into the entire framing using fixings at 150mm centres maximum.
Fix with 40 x 2.8mm HardieFlex nails or Villadrive or HardieDrive wood screws.

INSULATION
R2.2 or higher fibreglass insulation
Density - 14-18kg/m³.
James Hardie Mineral Insulation. Density - 60kg/m³. 90mm thick.

STRUCTURAL STABILITY
As per SED or details published by James Hardie.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
**Fire Resistance Rating**

<table>
<thead>
<tr>
<th>JHITGV60</th>
<th>60/60/60</th>
</tr>
</thead>
<tbody>
<tr>
<td>STC</td>
<td>6mm = 42</td>
</tr>
<tr>
<td></td>
<td>9mm = 44</td>
</tr>
<tr>
<td>Lining options</td>
<td>Villaboard® Lining with 13mm GIB Fyreline®</td>
</tr>
</tbody>
</table>

**TWO WAY INTERNAL 60 MINUTE – TIMBER FRAMED WALL**

**FRAMING**
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.

Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.

Timber framing treatment to be in accordance with NZBC Acceptable Solution B2/AS1.

**WALL HEIGHTS**
This fire rated system has been tested with a stud height of 3m maximum.

**JH LINING**
Villaboard® Lining 6mm or thicker installed as specified below.

**FIXING/JOINTING**
James Hardie Linings fixed into the entire framing using fixings at 150mm centres maximum.

Fix with 40 x 2.8mm HardieFlex nails or Villadrive or HardieDrive wood screws.

**LINING**
13mm GIB Fyreline® installed as specified below.

**FIXING/JOINTING**
- 300mm centre around the sheet perimeter and intermediate studs.
- Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.

Fix with 41mm x 6g GIB® Grabber High Thread.

Drywall Screws or 40 x 2.8mm GIB® nails.

**INSULATION**
James Hardie Mineral Insulation.
Density - 60kg/m³.
90mm thick.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
8 External walls

GENERAL
The external walls are required to be fire rated depending upon the situation when the wall is close to a boundary or a neighbouring property in order to comply with NZBC clause C3. The walls included in this section are two way fire rated load bearing walls as per NZS 3604. Special attention must be paid to junctions and penetrations in external walls. The external claddings may be required to be fixed over a cavity for certain designs and the cavity must not open into the roof space or sub floor space.

The systems presented in the following sections are primarily based on the correct selection of materials.

When using Linea Weatherboards in a fire rated situation the weatherboard must always be face fixed.

All dimensions shown in tables are in millimetres.
Fire and Acoustic Design Manual August 2017 New Zealand

<table>
<thead>
<tr>
<th>JHETGJ30</th>
<th>Fire Resistance Rating</th>
<th>STC</th>
<th>Cladding options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30/30/30</td>
<td>40 – 48</td>
<td>HardieFlex™ Sheet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Monotek® Sheet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Linea® Weatherboard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Linea® Oblique Weatherboard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>James Hardie® Weatherboards</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Axon® Panel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stria® Cladding</td>
</tr>
<tr>
<td>Lining option</td>
<td></td>
<td></td>
<td>10mm GIB Fyreline®</td>
</tr>
</tbody>
</table>

TWO WAY EXTERNAL/INTERNAL 30 MINUTE – TIMBER FRAMED WALL

FRAMING
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.

Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

WALL HEIGHTS
This fire rated system has been tested with a stud height of 3m maximum. The fire rated walls built close to boundary are also required to achieve post fire stability in either direction in accordance with the NZBC verification method B1/VM1, paragraph 2.2.4.

Refer to Figure 1, 3, 4, 5 and 6 of the Fire and Acoustic Design Manual for post fire stability design.

CLADDING
Any James Hardie direct fixed cladding 6mm or thicker.
Any James Hardie cladding 6mm or thicker fixed over timber cavity battens.

Fixing/Joining
James Hardie Sheet claddings fixed to all framing at 150mm centres.
Linea Weatherboards to be face fixed into each stud.
Refer to technical specification for further information on type of fixings applicable. Also refer to Figures 8 and 9.

FLEXIBLE UNDERLAY
Any flexible underlay that complies with Table 23 of E2/AS1 and has a flammability index not exceeding 5 can be used.

LINING
10mm GIB Fyreline® installed as specified below.

Fixing/Joining
• 300mm centre around the sheet perimeter and intermediate studs.
• Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.
Fix with 41mm x 6g GIB® Grabber High Thread Drywall Screws or 40 x 2.8mm GIB® nails.

INSULATION
R2.2 or higher fibreglass insulation.
Density - 14-18kg/m³.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
FRAMING
Steel framing to be in accordance with NASH standard for residential and low rise building and AS/NZS 1170 standards.

Steel sections shall be galvanised/zinc coated and have a base metal thickness 0.75mm minimum for load bearing walls and 1.6mm maximum.

Minimum stud size shall be 89mm deep x 36mm wide at 400mm maximum centres with nogs/dwangs at 800mm maximum centres.

Steel framing must comply with the durability requirements of the NZBC.

WALL HEIGHTS
This fire rated system has been tested with a stud height of 3m maximum. The fire rated walls built close to boundary are also required to achieve post fire stability as per SED in either direction in accordance with NZBC verification method B1/VM1, paragraph 2.2.4.

CLADDING
Any James Hardie direct fixed cladding 6mm or thicker.

Any James Hardie cladding 6mm or thicker fixed over timber cavity battens.

FIXING/JOINTING
James Hardie Sheet claddings fixed to all framing at 150mm centres maximum.

James Hardie Weatherboards/Linea Weatherboards to be face fixed into each stud.

Refer to technical specification for further information on type of fixings applicable.

FLEXIBLE UNDERLAY
Any flexible underlay that complies with Table 23 of E2/AS1 and has a flammability index not exceeding 5 can be used.

LINING
2 x 10mm GIB Fyreline® installed as specified below.

• inner layer - fixings 600mm centres to each stud.
• outer layer - 300mm centres to each stud.
• Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.
• Vertical joints must be staggered.

Fix with 41mm x 6g GIB® Grabber High Thread Drywall Screws or 40 x 2.8mm GIB® nails.

INSULATION
James Hardie Mineral Insulation. Density - 60kg/m². 90mm thick.
Fire and Acoustic Design Manual August 2017 New Zealand

### JHETJJ60

<table>
<thead>
<tr>
<th>Fire Resistance Rating</th>
<th>STC</th>
<th>Lining/Cladding options</th>
</tr>
</thead>
<tbody>
<tr>
<td>60/60/60</td>
<td></td>
<td>Villaboard® Lining one side and JH cladding other or HardieFlex™ Sheet both sides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monotek® Sheet both sides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Linea® Weatherboard both sides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Linea® Oblique Weatherboard both sides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>James Hardie® Weatherboards both sides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Axon® Panel both sides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stria® Cladding both sides</td>
</tr>
</tbody>
</table>

### TWO WAY EXTERNAL 60 MINUTE – TIMBER FRAMED WALL

#### FRAMING
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.

Minimum framing 90 x 45mm at 600mm maximum centres with nog/s/ dwangs at 800mm maximum centres.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

#### WALL HEIGHTS
This fire rated system has been tested with a stud height of 3m maximum.

The fire rated walls built close to boundary are also required to achieve post fire stability in either direction in accordance with the NZBC verification method B1/VM1, paragraph 2.2.4.

Refer to Figure 1, 3, 4, 5 and 6 of the Fire and Acoustic Design Manual for post fire stability design.

#### CLADDING
Any James Hardie direct fixed cladding 6mm or thicker.

Any James Hardie cladding 6mm or thicker fixed over timber cavity battens.

#### FIXING/JOINTING
James Hardie Sheet claddings fixed to all framing at 150mm centres maximum.

James Hardie Weatherboards/Linea Weatherboards to be face fixed into each stud.

Refer to technical specification for further information on type of fixings applicable. Also refer to Figures 8 and 9.

#### FLEXIBLE UNDERLAY
Any flexible underlay that complies with Table 23 of E2/AS1 and has a flammability index not exceeding 5 can be used.

Not required when 6mm RAB Board system.

#### LINING
Villaboard® Lining installed as specified below.

#### FIXING/JOINTING
- 150mm centre around the sheet perimeter and intermediate studs.
- Fixings to be 12mm from sheet edges and corners 50mm horizontally and 75mm vertically from sheet ends.

Fix with 40 x 2.8mm HardieFlex nails or Villadrive or HardieDrive wood screws.

#### INSULATION
James Hardie Mineral Insulation.
Density - 60kg/m³.
90mm thick.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
JHETGJ60 | Fire Resistance Rating | STC | Cladding options
--- | --- | --- | ---
60/60/60 | 44 – 47 | HardieFlex™ Sheet
Monotek® Sheet
Linea® Weatherboard
Linea® Oblique Weatherboard
James Hardie® Weatherboards
Axon® Panel
Stria® Cladding

**Lining option**
13mm GIB Fyreline®

---

**TWO WAY EXTERNAL/INTERNAL 60 MINUTE – TIMBER FRAMED WALL**

**FRAMING**
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.
Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.
Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

**WALL HEIGHTS**
This fire rated system has been tested with a stud height of 3m maximum.
The fire rated walls built close to boundary are also required to achieve post fire stability in either direction in accordance with the NZBC verification method B1/VM1, paragraph 2.2.4.
Refer to Figure 1, 3, 4, 5 and 6 of the Fire and Acoustic Design Manual for post fire stability design.

**CLADDING**
Any James Hardie direct fixed cladding 6mm or thicker.
Any James Hardie cladding 6mm or thicker fixed over timber cavity battens.

**FIXING/JOINTING**
James Hardie Sheet claddings fixed to all framing at 150mm centres maximum.
James Hardie Weatherboards/Linea Weatherboards to be face fixed into each stud.
Refer to technical specification for further information on type of fixings applicable. Also refer to Figures 8 and 9.

**FLEXIBLE UNDERLAY**
Any flexible underlay that complies with Table 23 of E2/AS1 and has a flammability index not exceeding 5 can be used.

**LINING**
13mm GIB Fyreline® installed as specified below.

**FIXING/JOINTING**
- 300mm centre around the sheet perimeter and intermediate studs.
- Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.
Fix with 41mm x 6g GIB® Grabber High Thread Drywall Screws or 40 x 2.8mm GIB® nails.

**INSULATION**
James Hardie Mineral Insulation.
Density - 60kg/m².
90mm thick.

---

For further information refer to the clauses in the Fire and Acoustic Design Manual.
FRAMING
Steel framing to be in accordance with NASH standard for residential and low rise building and AS/NZS 1170 standards.
Steel sections shall be galvanised/zinc coated and have a base metal thickness 0.75mm minimum for load bearing walls and 1.6mm maximum.
Minimum stud size shall be 89mm deep x 36mm wide at 400mm maximum centres with nog/s dwang at 800mm maximum centres.
Steel framing must comply with the durability requirements of the NZBC.

WALL HEIGHTS
This fire rated system has been tested with a stud height of 3m maximum. The fire rated walls built close to boundary are also required to achieve post fire stability in either direction as per SED in accordance with NZBC verification method B1/VM1, paragraph 2.2.4.

CLADDING
Any James Hardie direct fixed cladding 6mm or thicker.
Any James Hardie cladding 6mm or thicker fixed over timber cavity battens.

FIXING/JOINTING
James Hardie claddings fixed to all framing at 150mm centres maximum.
James Hardie Weatherboards/Linea Weatherboards to be face fixed into each stud.
Refer to technical specification for further information on type of fixings applicable.

FLEXIBLE UNDERLAY
Any flexible underlay that complies with Table 23 of E2/AS1 and has a flammability index not exceeding 5 can be used.

LINING
2 x 13mm GIB Fyreline® installed as specified below.

FIXING/JOINTING
- Inner layer - fixings 600mm centres to each stud.
- Outer layer - fixings 300mm centres to each stud.
- Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.
- Vertical joints must be staggered.
Fix with 41mm x 6g GIB® Grabber High Thread Drywall Screws or 40 x 2.8mm GIB® nails.

INSULATION
James Hardie Mineral Insulation.
Density - 60kg/m³.
90mm thick.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
**FRAMING**
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.

Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

**WALL HEIGHTS**
This fire rated system has been tested with a stud height of 3m maximum.

The fire rated walls built close to boundary are also required to achieve post fire stability in either direction in accordance with the NZBC verification method B1/VM1, paragraph 2.2.4.

Refer to Figure 1, 3, 4, 5 and 6 of the Fire and Acoustic Design Manual for post fire stability design.

**CLADDING**
Linea Weatherboard direct fixed.
Linea Weatherboard fixed over timber cavity battens.

**FIXING/JOINTING**
Linea Weatherboards to be face fixed into each stud as per technical specification. Also refer to Figure 9.

**PRE-CLADDING**
6mm RAB Board.

**FIXING/JOINTING**
RAB Board fixed to all framing with fixings at 150mm centres maximum.

Joints taped as per James Hardie Rigid Air Barriers Installation Manual.

**LINING**
16mm GIB Fyreline® installed as specified below.

**FIXING/JOINTING**
- 300mm centre around the sheet perimeter and intermediate studs.
- Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.
  Fix with 41mm x 6g GIB® Grabber High Thread Drywall Screws or 40 x 2.8mm GIB® nails.

**INSULATION**
James Hardie Mineral Insulation.
Density - 60kg/m³.
90mm thick.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
9 RAB Board

GENERAL
Where a RAB Board is used in lieu of a flexible underlay then the fire rating can be achieved without relying on the cladding product. RAB Board is suitable to achieve a fire rating up to 60 minutes as per fire rated system described below. When RAB Board is used for fire rating, a ‘non-combustible’ cladding material e.g. Monotek Sheet, Linea Weatherboard, Linea Oblique Weatherboard, Stria Cladding, Axon Panel, Titan Facade Panel etc can be used over RAB Board. These claddings can either be direct fixed or fixed onto a cavity batten over RAB Board. The cavity must not open into the roof or sub floor spaces. Special attention must be paid to junctions and penetrations through external walls.

When RAB Board is used in conjunction with Linea Weatherboard cladding, a 90 minute fire rating can be achieved. Refer to JHETGL 90 system for further details.

James Hardie cladding system eg Axon Panel, EasyLap Panel, Titan Façade Panel installed to CLD Structural Cavity Batten in conjunction with RAB Board, are suitable for use in fire rated systems.
Always fix the cladding as per their manufacturers’ recommendations.
FRAMING
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.

Minimum framing 90 x 45mm at 600mm maximum centres with nogs/ dwangs at 800mm maximum centres.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

WALL HEIGHTS
This fire rated system has been tested with a stud height of 3m maximum. The fire rated walls built close to boundary are also required to achieve post fire stability in either direction in accordance with the NZBC verification method B1/VM1, paragraph 2.2.4. Refer to Figure 1, 3, 4, 5 and 6 of the Fire and Acoustic Design Manual for post fire stability design.

CLADDING
Axon Panel, EasyLap Panel, Titan Façade Panel fixed to CLD Structural Cavity Batten fixed as per their technical specification.

PRE-CLADDING
6mm RAB Board.

FIXING/JOINTING
RAB Board fixed to all framing with fixings at 150mm centres maximum.

Joints taped as per James Hardie Rigid Air Barriers Installation Manual.

INSULATION
R2.2 or higher fibreglass insulation. Density - 14-18kg/m³.

Lining
10mm GIB Fyreline® installed as specified below.

LINING
10mm GIB Fyreline® installed as specified below.

FIXING/JOINTING
- 300mm centre around the sheet perimeter and intermediate studs.
- Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.

Fix with 41mm x 6g GIB® Grabber High Thread Drywall Screws or 40 x 2.8mm GIB® nails.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
FRAMING
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.

Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

WALL HEIGHTS
This fire rated system has been tested with a stud height of 3m maximum. The fire rated walls built close to boundary are also required to achieve post fire stability in either direction in accordance with the NZBC verification method B1/VM1, paragraph 2.2.4. Refer to Figure 1, 3, 4, 5 and 6 of the Fire and Acoustic Design Manual for post fire stability design.

CLADDING
Axon Panel, EasyLap Panel, Titan Façade Panel fixed to CLD Structural Cavity Batten fixed as per their technical specification.

PRE-CLADDING
6mm RAB Board.

FIXING/JOINTING
RAB Board fixed to all framing with fixings at 150mm centres maximum. Joints taped as per James Hardie Rigid Air Barriers Installation Manual.

LINING
13mm GIB Fyreline® installed as specified below.

INSULATION
James Hardie Mineral Insulation.
Density - 60kg/m³.
90mm thick.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
FRAMING
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.

Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

WALL HEIGHTS
This fire rated system has been tested with a stud height of 3m maximum. The fire rated walls built close to boundary are also required to achieve post fire stability in either direction in accordance with the NZBC verification method B1/VM1, paragraph 2.2.4. Refer to Figure 1, 3, 4, 5 and 6 of the Fire and Acoustic Design Manual for post fire stability design.

CLADDING
Non-combustible cladding as per clause 5.8.1 of C/AS of the NZBC fixed as per their technical specification either on timber cavity batten or direct fixed.

PRE-CLADDING
6mm RAB Board.

FIXING/JOINTING
RAB Board fixed to all framing with fixings at 150mm centres maximum. Joints taped as per James Hardie Rigid Air Barriers Installation Manual.

LINING
10mm GIB Fyreline® installed as specified below.

INSULATION
R2.2 or higher fibreglass insulation. Density - 14-18kg/m³.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
FRAMING
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.

Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

WALL HEIGHTS
This fire rated system has been tested with a stud height of 3m maximum.
The fire rated walls built close to boundary are also required to achieve post fire stability in either direction in accordance with the NZBC verification method B1/VM1, paragraph 2.2.4. Refer to Figure 1, 3, 4, 5 and 6 of the Fire and Acoustic Design Manual for post fire stability design.

CLADDING
Non-combustible cladding as per clause 5.8.1 of C/AS of the NZBC fixed as per their technical specification either on timber cavity batten or direct fixed.

PRE-CLADDING
6mm RAB Board.

FIXING/JOINTING
RAB Board fixed to all framing with fixings at 150mm centres maximum.
Joints taped as per James Hardie Rigid Air Barriers Installation Manual.

LINING
13mm GIB Fyreline® installed as specified below.

FIXING/JOINTING
- 300mm centre around the sheet perimeter and intermediate studs.
- Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.
Fix with 41mm x 6g GIB® Grabber High Thread Drywall Screws or 40 x 2.8mm GIB® nails.

INSULATION
James Hardie Mineral Insulation.
Density - 60kg/m³.
90mm thick.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
<table>
<thead>
<tr>
<th><strong>JHETRR30</strong></th>
<th>Fire Resistance Rating</th>
<th>STC</th>
<th>Cladding options</th>
</tr>
</thead>
<tbody>
<tr>
<td>30/30/30</td>
<td>43</td>
<td></td>
<td>A non-combustible cladding as per C clause over RAB® Board</td>
</tr>
</tbody>
</table>

**FRAMING**
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.
Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.
Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

**WALL HEIGHTS**
This fire rated system has been tested with a stud height of 3m maximum. The fire rated walls built close to boundary are also required to achieve post fire stability in either direction in accordance with the NZBC verification method B1/VM1, paragraph 2.2.4. Refer to Figure 1, 3, 4, 5 and 6 of the Fire and Acoustic Design Manual for post fire stability design.

**CLADDING**
Non-combustible cladding as per clause 5.8.1 of C/AS of the NZBC fixed as per their technical specification either on timber cavity batten or direct fixed.

**PRE-CLADDING**
6mm RAB® Board.

**FIXING/JOINTING**
RAB® Board fixed to all framing with fixings at 150mm centres maximum.
Joints taped as per James Hardie Rigid Air Barriers Installation Manual.

**INSULATION**
James Hardie Mineral Insulation.
Density - 60kg/m³.
90mm thick.

---

For further information refer to the clauses in the Fire and Acoustic Design Manual.
**FRAMING**
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.

Minimum framing 90 x 45mm at 600mm maximum centres with nog/dwangs at 800mm maximum centres.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

**WALL HEIGHTS**
This fire rated system has been tested with a stud height of 3m maximum.

The fire rated walls built close to boundary are also required to achieve post fire stability in either direction in accordance with the NZBC verification method B1/VM1, paragraph 2.2.4. Refer to Figure 1, 3, 4, 5 and 6 of the Fire and Acoustic Design Manual for post fire stability design.

**CLADDING**
Non-combustible cladding as per clause 5.8.1 of C/AS of the NZBC fixed as per their technical specification either on timber cavity batten or direct fixed.

**PRE-CLADDING**
6mm RAB Board.

**FIXING/JOINTING**
RAB Board fixed to all framing with fixings at 150mm centres maximum.

Joints taped as per James Hardie Rigid Air Barriers Installation Manual.

**INSULATION**
James Hardie Mineral Insulation.
Density - 60kg/m³.
90mm thick.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
FRAMING
Timber framing to be in accordance with NZS 3604 or in accordance with specific engineering design complying with AS/NZS 1170 and NZS 3603 standards.

Minimum framing 90 x 45mm at 600mm maximum centres with nogs/dwangs at 800mm maximum centres.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

WALL HEIGHTS
This fire rated system has been tested with a stud height of 3m maximum. The fire rated walls built close to boundary are also required to achieve post fire stability in either direction in accordance with the NZBC verification method B1/VM1, paragraph 2.2.4. Refer to Figure 1, 3, 4, 5 and 6 of the Fire and Acoustic Design Manual for post fire stability design.

CLADDING
Brick veneer cladding fixed as per their technical specification.

PRE-CLADDING
6mm RAB Board.

FIXING/JOINTING
RAB Board fixed to all framing with fixings at 150mm centres maximum.

Joints taped as per James Hardie Rigid Air Barriers Installation Manual.

LINING
10mm GIB Fyreline® installed as specified below.

FIXING/JOINTING
- 300mm centre around the sheet perimeter and intermediate studs.
- Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.

Fix with 41mm x 6g GIB® Grabber High Thread Drywall Screws or 40 x 2.8mm GIB® nails.

INSULATION
R2.2 or higher fibreglass insulation. Density - 14-18kg/m³.
10 Internal floors/ceilings

Secura Interior Flooring used as flooring over the floor joists is suitable to achieve fire and acoustic rated floors. The floor joists must comply with NZS 3604 span tables or the specific engineering design. Refer to Secura Interior Flooring Installation Manual for installing Secura Interior Flooring.

Floor coverings have a significant contribution in enhancing the IIC rating of floor/ceiling system e.g. a floor having carpet covering will provide a lot better IIC rating when compared to ceramic tiles.

The IIC ratings for the following systems have been calculated without any floor covering over the Secura Interior Flooring.

The products specified in these systems must be installed in accordance with their manufacturer’s specifications.
### JHFTGS30

<table>
<thead>
<tr>
<th>Fire Resistance Rating</th>
<th>STC / IIC</th>
<th>Floor/Lining option</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>46/33</td>
<td>Secura™ Interior Flooring with 13mm GIB Fyreline®</td>
</tr>
</tbody>
</table>

**TWO WAY 60 MINUTE – TIMBER FRAMED FLOOR**

**FRAMING**

Floor joists to be in accordance with NZS 3604 or alternatively, solid timber joist, Hyspan® and Hyjoist® series joists can also be used in accordance with a specific engineering design meeting the requirements of AS/NZS 1170.

Minimum joist framing 200 x 50mm at 450mm maximum centres with solid strutting at 1800mm maximum centres.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

*Note: Posi-Strut® floor joists are not suitable for this system.*

**FLOORING**

Secura Interior Flooring 19mm.

**FIXING/JOINTING**

Secura Interior Flooring fixed as per installation manual.

Edges other than tongue and groove must be supported over floor joists.

**LINING**

13mm GIB Fyreline® installed as specified below.

**FIXING/JOINTING**

- 200mm centre around the sheet perimeter and intermediate joists.
- Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.

Fix with 25mm x 6g GIB® Grabber® Drywall Self Tapping Screws.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
<table>
<thead>
<tr>
<th>JHFTGS60</th>
<th>Fire Resistance Rating</th>
<th>STC / IIC</th>
<th>Floor/Lining option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60</td>
<td>47/37</td>
<td>Secura™ Interior Flooring with 16mm GIB Fyreline®</td>
</tr>
</tbody>
</table>

**TWO WAY 60 MINUTE – TIMBER FRAMED FLOOR**

**FRAMING**
Floor joists to be in accordance with NZS 3604 or alternatively, solid timber joist, Hyspan® and Hyjoist® series joists can also be used in accordance with a specific engineering design meeting the requirements of AS/NZS 1170.

Minimum joist framing 200 x 50mm at 450mm maximum centres with solid strutting at 1800mm maximum centres.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

*Note: Posi-Strut® floor joists are not suitable for this system.*

**FLOORING**
Secura Interior Flooring 19mm.

**FIXING/JOINTING**
Secura Interior Flooring fixed as per installation manual. Edges other than tongue and groove must be supported over floor joists.

**LINING**
16mm GIB Fyreline® installed as specified below.

**FIXING/JOINTING**
- 200mm centre around the sheet perimeter and intermediate joists.
- Fixings to be 12mm from bound sheet edges and 18mm from sheet ends.

Fix with 25mm x 6g GIB® Grabber® Drywall Self Tapping Screws.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
Secura™ Interior Flooring with 2 x 13mm GIB Fyreline®
Additional layer of Secura™ Interior Flooring to James Hardie Acoustic Floor Channel and James Hardie Acoustic Cradle

TWO WAY 60 MINUTE – TIMBER FRAMED FLOOR

**FRAMING**
Floor joists to be in accordance with NZS 3604 or alternatively, solid timber joist, Hyspan® and Hyjoist® series joints can also be used in accordance with a specific engineering design meeting the requirements of AS/NZS 1170.

Floor joist depth to be 200mm minimum provide at 450mm c/c maximum spacing.

Solid blocking for floor/ceiling to wall junctions to be in accordance with NZS 3604 or as per floor joist manufacturer.

Nogs/framing is required at the perimeter of fire rated ceiling to facilitate GIB Fyreline® fixing.

Timber framing treatment to be in accordance with the NZBC Acceptable Solution B2/AS1.

Note: Posi-Strut® floor joists are not suitable for this system.

**FLOOR**
Secura Interior Flooring 2700 x 600 x 19mm.

**FIXING/JOINTING**
Secura Interior Flooring fixed as per its installation manual.Flooring edges other than tongue and groove must be supported over floor joists.

**INSULATION**
Acoustic insulation between timber joists. Minimum 9.6kg/m3.

**FLOATING FLOOR**
Secura Interior Flooring 2700 x 600 x 19mm fixed to James Hardie Acoustic Floor Channel spacing at 450mm maximum centres. Flooring edges other than tongue and groove must be supported over floor channel.

Floating Secura Flooring to butt into external/internal walls allowing a gap of 5-8mm. Fill the gap with flexible acoustic sealant.

**RUBBER CRADLE**
James Hardie Acoustic Rubber Cradle spaced at 450mm maximum centres along the batten.

**INSULATION**
Acoustic insulation between acoustic floor channel. Minimum 9.6kg/m3.

**CEILING LINING**
2 x 13mm GIB Fyreline® installed at right angles as specified below to the underside of GIB Quiet Clip® and GIB® Rondo® Metal Ceiling Battens.

**FIXING**
- Secura Interior Flooring to be fixed with self tapping steel screws at 200mm centre around the sheet perimeter and intermediate joists/battens.
- Floating Fixings to be 12mm from sheet ends and 25mm from t&g sheet joints.

**INNER LAYER**
- 13mm GIB Fyreline® fixed with 25mm x 6g GIB® Grabber® Drywall Self Tapping Screws.

**OUTER LAYER**
- Fixed with 41mm x 6g screws
- Fyreline® Fixings to be 12mm from board sheet edges and 18mm from sheet end.
- Refer to GIB Fire & Noise system manual for further information.

For further information refer to the clauses in the Fire and Acoustic Design Manual.
11 Construction details

Study the James Hardie fixing manual for the cladding or lining system to be used. Obtain the FRR or acoustic system specification required on your project. This should provide you with a specification number which clearly indicates the FRR performance required to be achieved. Additionally, the cladding or lining thickness required to obtain the desired sound attenuation should also be clearly specified. The specification corresponding to the number, FRR and framing specified can be quickly located using the system index in section 4 of this manual. Study section 8 and 9 to ensure the basic requirements for the system specified. Those basic requirements together with the following details will give you sufficient information to ensure the system you construct will provide the desired fire and acoustic performance.

Additional construction details (eg. Intertenancy T junctions etc) are available for download at www.jameshardie.co.nz

11.1 FRAMING

The framing must be erected as per the requirements of this specification. If any alterations are made to the timber frame set-out, ensure that the designer is informed. Set-out joints and control joints are planned as per the relevant James Hardie technical specification.

- Timber framing must either be fixed as per NZS 3604 or SED specifications.
- Check erected frame for straightness. To achieve the desired aesthetic results it must be in accordance with NZS 3604.
- Minimum timber stud size required is 90 x 45mm.

Note: Accuracy of nogs / dwangs spacing at 800mm is important to ensure the tight fit of the insulation.

11.2 RAB BOARD / FLEXIBLE UNDERLAY

All external James Hardie claddings must have RAB Board or flexible underlay installed beneath it. Refer to project specifications and this manual for more details. Installation of flexible underlay or RAB Board must be as per the manufacturer's recommendations and this manual.

11.3 INSULATION

FIBREGLASS INSULATION

Fit the specified insulation tightly in all framing cavities against the flexible underlay. Always ensure that the flexible underlay is not pushed out of the framing plane as it will tend to block off the cavity drainage where the cladding is fixed over cavity battens.

JAMES HARDIE MINERAL INSULATION

If you are not familiar with James Hardie Mineral Insulation then you must read section 14.1 on safe working practices, storage and handling of this product.

The pre-cut sizes are 50mm bigger in length and width than the cavity size to ensure a tight friction fit in the cavity.

If the cavity to be insulated is smaller than the size of insulation supplied, the insulation may be cut to fit to size. Ensure that insulation is at least 50mm bigger in each direction than the size of frame cavity to be filled so that a tight friction fit is achieved.

11.4 JAMES HARDIE CLADDING OR LINING

Use any standard jointing details as described in the appropriate James Hardie technical specifications. Note that expressed joints cannot exceed a maximum of 10mm in width vertically or horizontally.

The expressed jointing system followed doesn't affect the fire ratings in timber frame construction but this jointing option must not be used with steel frame construction.

11.5 CAVITY CONSTRUCTION

The fire ratings are not affected when the James Hardie cladding or any other non-combustible cladding is fixed using a timber cavity batten (18-25mm) construction method. Follow the cavity construction specification developed for each cladding materials supplied by James Hardie or their manufacturer.

The fire rated performance of James Hardie claddings fixed over a timber cavity batten (18-25mm) has been assessed by BRANZ (Reference FSR562).

A horizontal separation within the cavity must be provided at the floor levels where there are two separate tenancies one above the other. Refer to Figure 7.

Titan Facade Panel, Stria Cladding, EasyLap Panel and Axon Panel when fixed to CLD Structural Cavity Batten must be installed over RAB Board to achieve the fire rating. Refer to RAB Board fire rated systems.

11.6 GIB® STANDARD PLASTERBOARD AND GIB FYRELINE® LINING

GIB® Standard plasterboard and GIB Fyreline® linings where specified in the system must be installed as per Winstone Wallboards technical literature. Also refer to Clause 5.11.

11.7 SERVICES PENETRATIONS

Due to the complexities involved with fire performance of various materials and assemblies, it is suggested to explore all options that may help in avoiding the penetrations through fire rated walls.

A penetration through a fire rated wall must be carefully detailed and constructed in accordance with the information fire sleeve/collar supplier. A penetration must at least be 100mm from the sheet/panel edges.

Any gaps around penetrations or joints etc. must be sealed with tested intumescent sealers.

The pipe up to 20mm diameter can run vertically along side a stud within the wall framing. Insulation must be tightly fitted around these pipes. Ask James Hardie at 0800 808 868 for further assistance in this matter.

Refer to proprietary fire sealant or accessories suppliers for further information about the correct use of their product.
12 Construction details

Table 1

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1: Boundary Wall Bottom Plate Fixing – Concrete Foundation</td>
<td>43</td>
</tr>
<tr>
<td>Figure 2: Boundary Wall Bottom Plate Fixing – Concrete Foundation</td>
<td>44</td>
</tr>
<tr>
<td>Figure 3: Boundary Wall Bottom Plate Fixing – Blockwall Foundation</td>
<td>45</td>
</tr>
<tr>
<td>Figure 4: Boundary Wall Bottom Plate Fixing – Blockwall Foundation</td>
<td>46</td>
</tr>
<tr>
<td>Figure 5: Boundary Wall Bottom Plate – Timber Foundation Parallel</td>
<td>47</td>
</tr>
<tr>
<td>Figure 6: Boundary Wall Bottom Plate – Timber Foundation Right Angle</td>
<td>48</td>
</tr>
<tr>
<td>Figure 7: Intermenancy Vertical Fire Separation</td>
<td>49</td>
</tr>
<tr>
<td>Figure 8: Lining/Cladding Fixing and Layout to Boundary Wall</td>
<td>50</td>
</tr>
<tr>
<td>Figure 9: Weatherboard Fixing and Layout to Boundary Wall</td>
<td>51</td>
</tr>
<tr>
<td>Figure 10: Concrete Slab to Intermenancy Wall Junction</td>
<td>52</td>
</tr>
<tr>
<td>Figure 11: Timber Floor to Floor Intermenancy Wall Junction</td>
<td>53</td>
</tr>
<tr>
<td>Figure 12: Split Level Floor to Intermenancy Wall Junction</td>
<td>54</td>
</tr>
<tr>
<td>Figure 13: Floor to Deck junction</td>
<td>55</td>
</tr>
<tr>
<td>Figure 14: Sub Floor FRR Partition Wall</td>
<td>56</td>
</tr>
<tr>
<td>Figure 15: Intermenancy Wall to External Wall Junction with Cavity</td>
<td>57</td>
</tr>
<tr>
<td>Figure 16: Intermenancy Wall to External Wall Junction without Cavity</td>
<td>57</td>
</tr>
<tr>
<td>Figure 17: Intermenancy Timber Wall to Concrete</td>
<td>58</td>
</tr>
<tr>
<td>Figure 18: Linea Weatherboard Intermenancy Wing Wall Junction</td>
<td>59</td>
</tr>
<tr>
<td>Figure 19: Intermenancy Wall to Roof Junction</td>
<td>60</td>
</tr>
<tr>
<td>Figure 20: Parapet Wall to Roof Junction</td>
<td>61</td>
</tr>
</tbody>
</table>

12.1 JAMES HARDIE FIRE RATED BOUNDARY WALL AND SOFFITS CONSTRUCTION

Figure 1 will provide FRR Soffits which should be used in conjunction with James Hardie FRR exterior systems. The FRR soffit system has been assessed by BRANZ under FAR2597.
Figure 1: Boundary Wall Bottom Plate Fixing - Concrete Foundation

Concrete slab on ground foundation design as per NZS 3604 or as per SED
Minimum concrete depth 200mm.
Minimum 20MPa concrete.

<table>
<thead>
<tr>
<th>Wall Height Max (mm)</th>
<th>2400</th>
<th>3000</th>
<th>3700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stud / Bottom Plate (mm)</td>
<td>90 x 45</td>
<td>140 x 45</td>
<td>140 x 45</td>
</tr>
<tr>
<td>Stud Spacing Max (mm)</td>
<td>400</td>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td>Nog Spacing (mm)</td>
<td>800</td>
<td>800</td>
<td>800</td>
</tr>
<tr>
<td>Hold Down brackets</td>
<td>Pryda Brace Anchor both side of stud</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:
1. Ground clearances as per E2/AS1 and the product technical specification / installation manual
2. Fixings for JH cladding refer Figure 8 or Figure 9 and the product technical specification / installation manual
Figure 3: Boundary Wall Bottom Plate Fixing – Blockwall Foundation

Wall height as per table below

<table>
<thead>
<tr>
<th>Wall Height Max (mm)</th>
<th>3000</th>
<th>3700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stud / Bottom Plate (mm)</td>
<td>140 x 45</td>
<td>140 x 45</td>
</tr>
<tr>
<td>Stud Spacing (mm)</td>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td>Nog Spacing (mm)</td>
<td>800</td>
<td>800</td>
</tr>
<tr>
<td>Hold Down brackets</td>
<td>Pryda Brace Anchor both side of stud</td>
<td></td>
</tr>
</tbody>
</table>

Note:
1. Ground clearances as per E2/AS1 and the product technical specification / installation manual
2. Fixings for JH cladding refer Figure 8 or Figure 9 and the product technical specification / installation manual

Concrete poured flush with outer edge of blockwall.

70mm edge distance

35mm long Type 17 12 gauge hot dipped galvanised screws

Ramset AnkaScrew M12x150

140 x 45mm framing

Concrete slab as per NZS3604 or SED. Minimum 20MPa

Villaboard® Lining fixed as per clause 5.11 of James Hardie Fire and Acoustic Design Manual or GIB Fyreline® fixed as per clause 5.11 of Fire and Acoustic Design Manual

James Hardie Soffit minimum 6mm thick

Select insulation as per James Hardie fire rated system

Selected James Hardie 6mm or thicker cladding or RAB® Board as per James Hardie fire rated system

GIB Fyreline® to extend to underside of roof fixed to blocking between the rafters OR use solid timber blocking to close the cavity between the top plate and underside of roof.

Select insulation as per James Hardie fire rated system. Insulation must extend to underside of roof.

Axent™ Fascia or Timber fascia

Foundation as per NZS3604 or SED

Line of truss bottom chord

Insulation

Ceiling

Fire and Acoustic Design Manual August 2017 New Zealand
Figure 4: Boundary Wall Bottom Plate Fixing – Blockwall Foundation

1. Concrete blockwall design as per SED by structural engineer to achieve bending moment and shear force introduced by the timber frame wall under a face load of 0.5kPa along with any other load.
2. Ground clearances as per E2/AS1 and the product technical specification / installation manual
3. Fixings for JH cladding refer Figure 8 or Figure 9 and the product technical specification / installation manual

<table>
<thead>
<tr>
<th>Wall Height Max (mm)</th>
<th>3000</th>
<th>3700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stud / Bottom Plate (mm)</td>
<td>140 x 45</td>
<td>140 x 45</td>
</tr>
<tr>
<td>Stud Spacing Max (mm)</td>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td>Nog Spacing (mm)</td>
<td>800</td>
<td>800</td>
</tr>
<tr>
<td>Hold Down brackets</td>
<td>Pryda Brace Anchor both side of stud</td>
<td></td>
</tr>
</tbody>
</table>

For Higher stud heights, please refer to James Hardie
Figure 5: Boundary Wall Bottom Plate - Timber Foundation Parallel

- GIB Fyrelite® to extend to underside of roof fixed to blocking between the rafters OR use solid timber blocking to close the cavity between the top plate and underside of roof.
- Select insulation as per James Hardie fire rated system. Insulation must extend to underside of roof.
- Axent™ Fascia or Timber fascia
- James Hardie Soffit minimum 6mm thick
- Select Insulation as per James Hardie fire rated system
- Selected James Hardie 6mm or thicker cladding or RAB® Board as per James Hardie fire rated system
- 35mm long Type 17 12 gauge hot dipped galvanised screws
- Pryda® Brace Anchor to both sides of stud
- M12 x 150mm coach screw
- 400x25x1mm ms strap to each joist fixed with six 30x3.15 flat head nails

Note:
1. Ground clearances as per E2/AS1 and the product technical specification / installation manual
2. Fixings for JH cladding refer Figure 8 or Figure 9 and the product technical specification / installation manual

<table>
<thead>
<tr>
<th>Floor joist parallel to the wall</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stud / Bottom plate size (mm)</td>
<td>140 x 45</td>
</tr>
<tr>
<td>Stud Spacing (mm)</td>
<td>600 Maximum</td>
</tr>
<tr>
<td>Nog Spacing (mm)</td>
<td>800 Maximum</td>
</tr>
<tr>
<td>Hold Down Brackets</td>
<td>Pryda Brace Anchor both side of stud</td>
</tr>
<tr>
<td>Wall Height (mm)</td>
<td>2700 Maximum</td>
</tr>
<tr>
<td>Joist (mm)</td>
<td>190 Minimum</td>
</tr>
</tbody>
</table>
Figure 6: Boundary Wall Bottom Plate - Timber Foundation Right Angle

- GIB Fyreliner® to extend to underside of roof fixed to blocking between the rafters OR use solid timber blocking to close the cavity between the top plate and underside of roof.
- Select insulation as per James Hardie fire rated system. Insulation must extend to underside of roof.
- Axent™ Fascia or Timber fascia

### Floor Joists at Right Angles to the Wall

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stud / Bottom plate size (mm)</td>
<td>140 x 45</td>
</tr>
<tr>
<td>Stud Spacing (mm)</td>
<td>600 Maximum</td>
</tr>
<tr>
<td>Nog Spacing (mm)</td>
<td>800 Maximum</td>
</tr>
<tr>
<td>Hold Down Brackets</td>
<td>Pryda Brace Anchor both side of stud</td>
</tr>
<tr>
<td>Wall Height (mm)</td>
<td>2700 Maximum</td>
</tr>
<tr>
<td>Joist (mm)</td>
<td>190 Minimum</td>
</tr>
</tbody>
</table>

For higher stud heights, please contact James Hardie

---

1. Ground clearances as per E2/AS1 and the product technical specification / installation manual
2. Fixings for JH cladding refer Figure 8 or Figure 9 and the product technical specification / installation manual
Figure 7: Intertenancy Vertical Fire Separation

Detail:
- Cavity batten
- Selected James Hardie 6mm or thicker cladding
- Coating system
- Flexible underlayment over flashing

Post fire structural stability as per Figure 5 and 6

- James Hardie uPVC vent strip
- Purpose made metal flashing 15° min slope. Refer E2/AS1 for flashing durability
- Continuous timber cavity batten to block top of cavity
- Flexible underlayment to min lap
- VitraBoard® Lining fixed as per clause 5.11 of James Hardie Fire and Acoustic Design Manual or GIB Pumice® fixed as per clause 5.11 of Fire and Acoustic Design Manual
- Cavity batten
Figure 8: Lining/Cladding Fixing and Layout to Boundary Wall

Cladding Fixing Notes:

Direct Fix
- **RAF® Board**: Fix at 150mm centres with 40 x 2.8mm HardieFlex™ nails to all framing.
- **HardieFlex™ Sheet**: Fix at 150mm centres with 40 x 2.8mm HardieFlex™ nails to all framing.
- **Axon® Panel**: Fix at 150mm centres with 40 x 2.8mm HardieFlex™ nails to all studs.
- **When using a rigid air barrier like HomeRAF® Pre-Cladding or RAFA® Board, 50 x 2.8mm HardieFlex™ nails must be used**.

Cavity Fix
- **HardieFlex™ Sheet**: Fix at 150mm centres with 60 x 3.15mm HardieFlex™ nails to all framing.
- **Monotek® Sheet**: Fix at 150mm centres with 60 x 3.15mm HardieFlex™ nails to all framing.
- **Axon® Panel**: To timber cavity battens fix with 60 x 3.15mm HardieFlex™ nails at 150mm centres to all studs.
- **Titan® and EvoTek® Facade Panel**: To timber cavity battens fix with 60 x 3.15mm HardieFlex™ nails or 10g x 65mm screws respectively at 150mm centres to all framing.
- **When using a rigid air barrier like HomeRAF® Pre-Cladding or RAFA® Board, 75 x 3.15mm HardieFlex™ nails must be used**.
- **When Axon® Panel, EasyLap® Panel and Titan Facade Panel fixed to CLD Structural Cavity Battens, RAFA® Board must be installed to achieve the fire rating**.

**Concrete or timber floor**

**Wall Height**
- This fire tested system has been tested with a stud height of 3m maximum.
- For boundary wall / post fire stability, refer to Figures 1 to 6

**Stud spacing**
- Maximum stud spacing 600mm.
- Maximum nogs spacing 800mm
- For boundary wall / post fire stability, refer to Figures 1 to 6
Figure 9: Weatherboard Fixing and Layout to Boundary Wall

Direct Fix

Linea® Weatherboard:
- Face fix with 60 x 3.15mm jolt head nails through lap into studs.
- When using a rigid air barrier like HomeRAB® Pre-Cladding or RAB® Board, 75 x 3.15mm jolt head nail must be used. Pre-drill top board.

James Hardie Weatherboards
- Face fix with 50 x 2.8mm HardieFlex™ nails through lap to each stud.
- When using a rigid air barrier like HomeRAB® Pre-Cladding or RAB® Board, 60 x 3.15mm HardieFlex™ nail must be used.

Cavity Fix

Linea® Weatherboard:
- Face fix with 75 x 3.15mm jolt head nails through lap into studs. Pre-drill top board.
- When using a rigid air barrier like HomeRAB® Pre-Cladding or RAB® Board, 90 x 4mm jolt head nail must be used. Pre-drill top board.

James Hardie Weatherboard:
- Face fix with 75 x 3.15mm HardieFlex™ nails through lap to each stud.

Stria® Cladding / Linea® Oblique Weatherboard:
- 65 x 2.87mm D head or 65 x 2.87mm RoundDrive ring shank nails to each stud.
- When using a rigid air barrier like HomeRAB® Pre-Cladding or RAB® Board, 75 x 3.06 D Head or 75 x 3.15mm RoundDrive ring shank nails must be used
- When Stria® Cladding feed to CLD Structural Cavity Batten, RAB® Board must be installed to achieve the fire rating.

Concrete or timber floor
Bottom plate fixed as per NZS 3604.
- For boundary wall / bottom plate / stud fixing, refer to Figures 1 to 6

Wall Height
- This fire rated system has been tested with a stud height of 3m maximum.
- For boundary wall / post fire stability, refer to Figures 1 to 6

Stud spacing
- Maximum stud spacing 600mm.
- Maximum nogs spacing 800mm
- For boundary wall / post fire stability, refer to Figure 1 to 6
Figure 10: Concrete Slab to Timber Intertenancy Wall Junction

Notes:
1. Intertenancy walls must be full height to the underside of the slab.
2. Fire rating as per SED.
3. Concrete slab as per SED.
4. GB® Quiet Tle® must be installed every 3rd stud (1.8m) along the length of wall to top plate.
5. Bottom plate to floor joist fixed as per NZS 3604 or SED

STCN IC
1. STC=85
2. IIC=60

Note: STCN IC values are based on 100mm thick concrete.
Figure 11: Timber Floor to Floor Interenancy Wall Junction

Notes:
For joint framing at 90° to Interenancy wall, solid blocking must use used between joints under.

GIB® Quiet Tie® must be installed every 3rd stud (1.8m) along the length of wall to bottom plate and top plate.

Bottom plate to floor joist fixed as per NZS 3604 or SED

Key Elevation

<table>
<thead>
<tr>
<th></th>
<th>Unit 3</th>
<th>Unit 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Unit 1</th>
<th>Unit 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 12: Split Level Floor to Intertenancy Wall Junction

Notes:

GBR Quiet Tie® must be installed every 3rd stud (1.8m) along the length of wall to bottom plate and top plate.

Bottom plate to floor joist fixed as per NZS 3604 or SED
Figure 13: Floor to Deck Junction

Note:
1) Deck structure as per NZS3604 or SED.
Figure 14: Sub Floor FRR Partition Wall

Flooring

Post fire structural stability as per figure 5 and 6

Flashing to suit junction between materials

Floor Joists

Bearer

Fire retardant flexible underlay

Selected James Hardie 6mm or thicker cladding

Selected James Hardie 6mm or thicker cladding

James Hardie Mineral Insulation as per system requirement

Nog

DPC

Concrete nib wall between piles

Minimum ground clearance as per NZS 3604

Framing to comply with NZS 3604 or to Engineers design. Timber treatment as per NZS 3602
Figure 15: Intertenancy Wall to External Wall Junction with Cavity

Figure 16: Intertenancy Wall to External Wall Junction without Cavity
Figure 17: Intertenancy Timber Wall to Concrete

- Masonry or concrete wall
- R2.2 Fiberglass insulation
- 9mm Villaboard® Lining
- Studs fixing as per SED
- Continuous DPC
- Engineer specified clearance and connection to stud / lining and concrete wall
- Acoustic sealant
- James Hardie Mineral Insulation
- 9mm Villaboard® Lining
Figure 18: Linea Weatherboard Intertenancy Wing Wall Junction

Note: For other James Hardie Cladding options on the wing wall, refer to its product literature.
Figure 19: Intertenancy Wall to Roof Junction

- Solid blocking between roof battens
- 6mm RAB® Board
- R2.2 Fibreglass insulation
- 6mm RAB® Board
- James Hardie Mineral Insulation
- Acoustic sealant
- 9mm Villaboard® Lining
- James Hardie Mineral Insulation
- Roof trusses
- 9mm Villaboard® Lining
- R2.2 Fibreglass Insulation
Safe working practice

STAY HEALTHY WHEN WORKING WITH BUILDING PRODUCTS CONTAINING CRYSTALLINE SILICA

CRYSTALLINE SILICA
What is it? Why and when is it a health hazard?

CRYSTALLINE SILICA IS
• Commonly known as sand or quartz
• Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

WHY IS CRYSTALLINE SILICA A HEALTH HAZARD?
• Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust
• Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks.
• The most hazardous dust is the dust you cannot see!

WHEN IS CRYSTALLINE SILICA A HEALTH HAZARD?
• It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica.
• Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board).

FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS AND INSTALLATION INSTRUCTIONS WHEN WORKING WITH JAMES HARDIE PRODUCTS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

AVOID BREATHING IN CRYSTALLINE SILICA DUST!

SAFE WORKING PRACTICES
• NEVER use a power saw indoors or in a poorly ventilated area
• NEVER dry sweep
• ALWAYS use M Class extractor unit as a minimum and always hose down with water/wet wipe for clean up
• NEVER use grinders
• ALWAYS use a circular sawblade specifically designed to minimise dust creation when cutting fibre cement – preferably a sawblade that carries the HardieBlade™ logo or one with at least equivalent performance.
• ALWAYS follow tool manufacturers’ safety recommendations
• ALWAYS expose only the minimum required depth of blade for the thickness of fibre cement to be cut
• ALWAYS wear an approved properly-fitted, approved dust mask (P1 or P2) or respirator

Use one of the following methods based on the required cutting rate:
BEST
• HardieKnife™
• Hand guillotine
• Fibreshear

BETTER
• Dust reducing circular saw equipped with HardieBlade™ Saw Blade and M Class extractor unit.

GOOD
• Dust reducing circular saw with HardieBlade™ Saw Blade

WORKING OUTDOORS
👍 Make sure you work in a well ventilated area
👍 Position cutting station so wind will blow dust away from yourself and others in the working area
👍 Cut products with either a HardieKnife or fibre cement shears or, when not feasible, use a HardieBlade™ Saw Blade (or equivalent) and a dust-reducing circular saw attached to a M Class extractor unit
👍 When sawing, sanding, rebating, drilling or machining fibre cement products, always:
  - Wear your P1 or P2 mask (correctly fitted in accordance with manufacturers’ instructions) and when others are close by, ask them to do the same
  - If you are not clean shaven, then use a powered air respirator with a loose fitting head top.
  - Wear safety glasses
  - Wear hearing protection
  - When others are close by, ask them to do the same.

WORKING INDOORS
👍 Never cut using a circular saw indoors
👍 Position cutting station in a well ventilated area
👍 Cut ONLY using a HardieKnife, hand guillotine or fibreshears (manual, electric or pneumatic)
👍 Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class extractor unit

IF CONCERN STILL EXISTS ABOUT EXPOSURE LEVELS OR YOU DO NOT COMPLY WITH THE ABOVE PRACTICES, YOU SHOULD ALWAYS CONSULT A QUALIFIED INDUSTRIAL HYGIENIST.
WORKING INSTRUCTIONS

- Refer to Recommended Safe Working Practices before starting any cutting or machining of product.

HARDIEBLADE™ SAW BLADE
The HardieBlade™ Saw Blade used with a dust-reducing saw is ideal for fast, clean cutting of James Hardie fibre cement products. A dust-reducing saw uses a dust deflector or a dust collector connected to a vacuum system. When sawing, clamp a straight-edge to the sheet as a guide and run the saw base plate along the straight edge when making the cut.

HOLE-FORMING
For smooth clean cut circular holes:
- Mark the centre of the hole on the sheet.
- Pre-drill a ‘pilot’ hole.
- Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill.

For irregular holes:
- Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face.
- Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported.

STORAGE & DELIVERY

KEEPING PRODUCTS AND PEOPLE SAFE
OFF LOADING
- James Hardie products should be off-loaded carefully by hand or by forklift.
- James Hardie products should not be rolled or dumped off a truck during the delivery to the jobsite.

STORAGE
James Hardie products should be stored:
- in their original packaging
- under cover where possible or otherwise protected with a waterproof covering to keep products dry
- off the ground – either on a pallet or adequately supported on timber or other spacers
- flat so as to minimise bending

James Hardie products must not be stored:
- directly on the ground
- in the open air exposed to the elements

JAMES HARDIE IS NOT RESPONSIBLE FOR DAMAGE DUE TO IMPROPER STORAGE AND HANDLING.
## 14 Product information and accessories

### Table 2

<table>
<thead>
<tr>
<th>Accessories/tools supplied by James Hardie</th>
<th>Description</th>
<th>Quantity/size (approx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>James Hardie Mineral Insulation</td>
<td>600 x 800 x 90 mm – 2.4m² per bale</td>
<td>Code: 304904</td>
</tr>
<tr>
<td>James Hardie Acoustic Floor Channel</td>
<td>40 x 42 x 1800mm</td>
<td>Code: 305922</td>
</tr>
<tr>
<td>James Hardie Acoustic Cradle</td>
<td>Code: 305920</td>
<td></td>
</tr>
<tr>
<td>James Hardie Flooring Shims</td>
<td>Code: 305925</td>
<td></td>
</tr>
</tbody>
</table>

Claddings or linings as per the relevant James Hardie product literature
### Table 3

**Accessories/tools not supplied by James Hardie**

James Hardie recommends the following products for use in conjunction with James Hardie products. James Hardie does not supply these products and does not provide a warranty for their use. Please contact component manufacturer for information on their warranties and further information on their products.

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible underlay</td>
<td>Must comply with E2/AS1 requirements.</td>
</tr>
<tr>
<td>HardieFlex™ Nail</td>
<td>Galvanised or stainless steel.</td>
</tr>
<tr>
<td>Flexible tape</td>
<td>A flexible self-adhesive tape used in preparation of a window. e.g. Marshall Innovations, Tyvek®, Flexwrap™, etc.</td>
</tr>
<tr>
<td>Finishing Nailer</td>
<td>Gas or pneumatic finishing nailer for fixing</td>
</tr>
<tr>
<td>PEF Rod</td>
<td>Used to form an air seal between the window liner and window opening frame.</td>
</tr>
<tr>
<td>Inseal Strip 3109</td>
<td>Used for sealing around window jambs.</td>
</tr>
<tr>
<td>Head Flashing</td>
<td>compliant with E2 Material must comply with E2/AS1 requirements.</td>
</tr>
<tr>
<td>Sealant</td>
<td>Fire retardant / acoustic sealant to seal the joints. Refer to sealant manufacturer’s recommendations before applying. e.g. GIB Soundseal®, Bostik Acoustic Sealant, Holdfast Gorilla Firestop MS Sealant, FirePro Centabuild M755 Acoustic Sealant.</td>
</tr>
<tr>
<td>Thermal Fire Battens</td>
<td>The battens are made by cutting a 100mm wide strip from 9mm thick Monotek Sheet and adhering a 10mm thick XPS (Extruded Polystyrene) to the strip.</td>
</tr>
<tr>
<td>GIB Fyreline®</td>
<td></td>
</tr>
<tr>
<td>GIB® Standard Plasterboard</td>
<td></td>
</tr>
<tr>
<td>GIB Quiet Tie®</td>
<td></td>
</tr>
<tr>
<td>GIB Quiet Clip®</td>
<td></td>
</tr>
<tr>
<td>FRR Penetrations</td>
<td></td>
</tr>
</tbody>
</table>

Marshall Innovations, Tyvek®, Flexwrap™ are trademarks registered to their owners.
August 2017

For full product specific warranties, please refer to the relevant product technical specification or installation manual. They are also available for download at www.jameshardie.co.nz or simply Ask James Hardie on 0800 808 868.