



futurebuild^{ML}

ecoply[®]

BATTEN & CRADLE[™] FLOORING SYSTEM

SPECIFICATION &
INSTALLATION GUIDE

NOVEMBER 2022

www.battenandcradle.co.nz

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1.0 INTRODUCTION

Carter Holt Harvey Plywood Ltd together with Carter Holt Harvey LVL Ltd, trading as Futurebuild® LVL, and B&C Systems International Limited (licensed manufacturers and suppliers of Batten & Cradle™ Flooring Systems) have developed a lightweight floor system that is suitable for use as an inter-tenancy floor. The system, Batten & Cradle™ Flooring System, is suitable for use on solid timber, LVL or hyJOIST® floor joists with a structural 19 mm Ecoply® F11/F8 Flooring combined with QB Quiet Batten™, acoustic cradles and flooring products including 20 mm Strandfloor® Tongue & Groove (Strandfloor®), 20 mm Kopine® Tongue & Groove I2 (Kopine), or 19 mm Secura™ Interior Flooring (Secura).

New Zealand Building Code (NZBC) Clause G6 'Airborne and Impact sound' stipulates that the Sound Transmission Class (STC) and the Impact Insulation Class (IIC) for intertenancy floors shall not be less than 55.

The Batten & Cradle™ Flooring System has been tested and verified to meet or exceed STC 65/IIC 55 and is suitable for use with passive fire systems including GIB® Fire Rated Systems. The acoustic performance exceeds the minimum requirements of Clause G6 of the NZBC (refer section 6 below). The acoustic performance of the system has been independently tested at Auckland University and reviewed by Marshall Day Acoustics.

2.0 SCOPE

This literature has been developed to provide an acoustic and fire solution for inter-tenancy applications and/or where a higher level of acoustic performance is preferred. The solutions contained in this literature are available for common flooring solutions including

Figure 1: Typical Batten & Cradle™ Flooring System



Kopine, Strandfloor® and Secura floating flooring with a structural plywood flooring fixed to floor joists (refer to figure 1).

This acoustic system can be applied for use in applications including most domestic and commercial buildings including residential apartments and offices where live loading does not exceed 4.0 kPa and/or 2.7 kN. Where live loading exceeds these parameters Specific Engineering Design (SED) is required.

3.0 HEALTH & SAFETY

The Batten & Cradle™ Flooring System, must be assembled in accordance with project design documentation and the NZBC. Installation of all products, including health and safety requirements, shall be in accordance with NZBC, manufacturer's literature and Safety Data Sheets (SDS) as appropriate.

4.0 HANDLING & STORAGE

Wood-based products require care in storage and handling prior to installation relevant product and/or manufacturer's literature should be consulted for specific requirements. Minimum storage requirements are:

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

5.0 DESIGN RESPONSIBILITY

Design responsibility lies with the building owner and the professionals that they engage. The specifier for the project must ensure that the details in the specification for their individual projects are appropriate for the intended application. This includes the design and specification of structural, acoustic and fire systems associated with the Batten & Cradle™ Flooring System.

Acoustic performance for each installation is site specific and the level of acoustic performance achieved will require the customer's own acoustic engineer's assessment of all factors affecting acoustic performance. The customer's own acoustic engineer must set the level of acoustic performance to be expected.

6.0 ACOUSTIC PERFORMANCE

Acoustic testing of the Batten & Cradle™ Flooring System included in this literature has been completed at Auckland University and reviewed by Marshall Day Acoustics. Table 1. provides specific information in relation to the systems tested as well as the associated STC and IIC ratings based on testing.

Table 1: Acoustic Floor Performance

Floating Floor Panel	Batten & Cradle Info	Insulation Between Battens	Fixed Floor Panel	Joists	Insulation Between Joists	Ceiling Hangers	Ceiling Panel	STC	IIC
20mm Strandfloor® Tongue & Groove	40 x 42mm QB Quiet Batten™ @ 400mm ctrs, acoustic cradles spaced at 450mm ctrs	50mm insulation blanket (density 11kg/m³)	19mm Ecoply® F11/F8 Flooring	hyJOIST® @ 400mm	75mm insulation blanket (density 11kg/m³)	GIB Quiet Clip® @ 800mm ctrs with GIB Rondo® 35mm ceiling battens @ 600mm ctrs	2 layers 13mm GIB Braceline®/ Noiseline® plasterboard	65	55
20mm Kopine® Tongue & Groove I2	40 x 42mm QB Quiet Batten™ @ 400mm ctrs, acoustic cradles spaced at 450mm ctrs	50mm insulation blanket (density 11kg/m³)	19mm Ecoply® F11/F8 Flooring	hyJOIST® @ 400mm	75mm insulation blanket (density 11kg/m³)	GIB Quiet Clip® @ 800mm ctrs with GIB Rondo® 35mm ceiling battens @ 600mm ctrs	2 layers 13mm GIB Braceline®/ Noiseline® plasterboard	66	57
19mm Secura™ Interior Flooring	40 x 42mm QB Quiet Batten™ @ 450mm ctrs, acoustic cradles spaced at 450mm ctrs	50mm insulation blanket (density 11kg/m³)	19mm Ecoply® F11/F8 Flooring	hyJOIST® @ 400mm	75mm insulation blanket (density 11kg/m³)	GIB Quiet Clip® @ 800mm ctrs with GIB Rondo® 35mm ceiling battens @ 600mm ctrs	2 layers 13mm GIB Fyreline® plasterboard	65	57

Adding acoustic floor coverings may improve the IIC achieved by the floor system. For more information contact your acoustic engineer for specific advice.

7.0 DESIGN CONSIDERATIONS

7.1 General

The structural design and detailing of a floor system including the addition of a Batten and Cradle™ acoustic solution shall take into consideration the additional depth of the floor in the specification of stud size and height as well as taking into account the additional floor mass over and above the notional floor loads typically applied.

The floating floor will typically add an additional 80 mm height to the floor and 13 mm to the ceiling depth with the inclusion of two layers of ceiling lining. Table 2, subject to the material used for flooring details the additional floor dead load that needs to be added to the total floor dead load.

Table 2: Additional Dead Load for Batten & Cradle™ Flooring System¹

Product	Strandfloor®	Kopine®	Secura™
	Mass (kg/m ²)		
Flooring	13.6	14.2	24.5
Acoustic cradles	0.9	0.9	0.8
QB Quiet Batten™	2.3	2.3	2.1
Insulation	0.6	0.6	0.6
Ceiling² (13 mm GIB Noiseline®/Braceline®)	12.5	12.5	12.5
Total	30	30	40

Notes:

1. Does not include any allowance for additional floor coverings.
2. Additional ceiling layer not catered for in notional floor weight.

7.2 Diaphragm Floors

19 mm Ecoply® F1 I/F8 Flooring is a structural product and can be designed as a diaphragm floor in accordance with NZS 3603, Timber Structures. 19 mm Ecoply F1 I/F8 tongue and groove flooring has been tested for use as an NZS 3604, Timber Framed Buildings, diaphragm without the addition of blocking as

required by NZS 3604 Clause 7.2.3.3. For further information please consult CHH Plywood Technical Note "Diaphragm floors".

7.3 Partition Walls

Light weight non-load bearing timber and light gauge steel partition walls may be constructed directly on the floating floor. All partition walls must be confirmed as appropriate by the designer.

8.0 COMPONENTS

The Batten & Cradle™ Flooring System includes the following components:

- Structural floor joists designed to suit the required service criteria, residential, office floor, etc. and will typically be hyJOIST®, solid Futurebuild® LVL sections or sawn timber, SG8 or SG10 sections.

Note: Joist must be a minimum of 240mm deep.

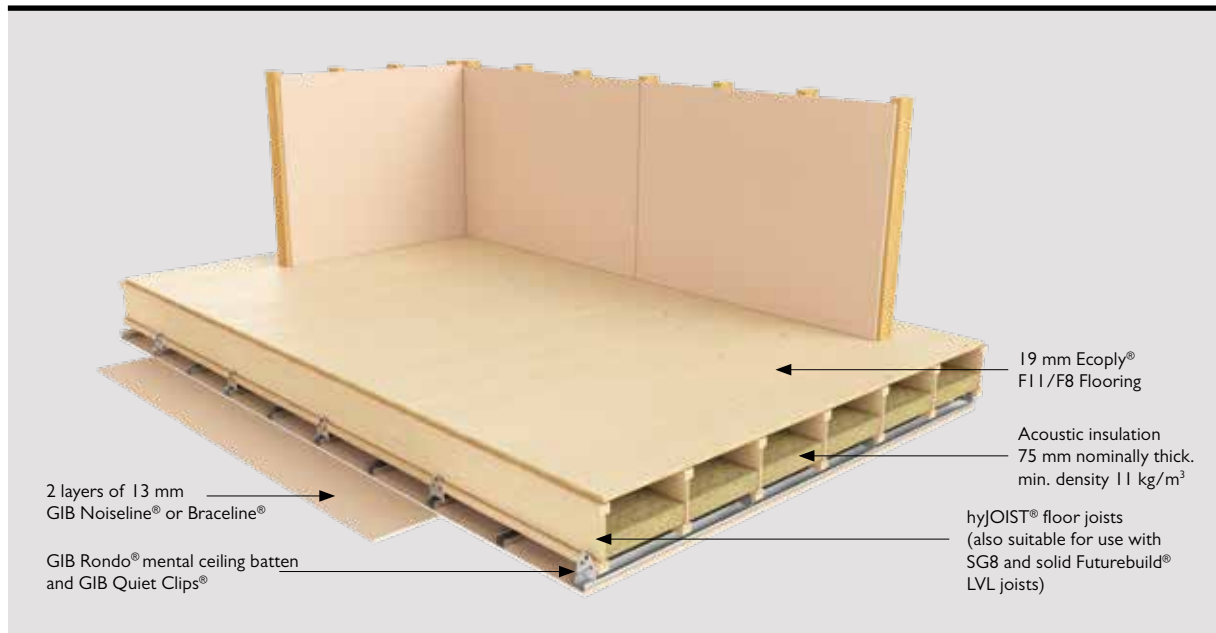
- 19 mm Ecoply® F1 I/F8 Flooring
- 40 x 42 QB Quiet Batten™
- Acoustic Insulation
 - 75 mm nominal thickness with density $\geq 11 \text{ kg/m}^3$.
 - 50 mm nominal thickness with density $\geq 11 \text{ kg/m}^3$.

- Acoustic cradles
- One of the following flooring products:
 - 20 mm Strandfloor® Tongue & Groove,
 - 20 mm Kopine® Tongue & Groove I2; or
 - 19 mm Secura™ Interior Flooring.
- Two layers of 13 mm GIB Noiseline® or Braceline®.
 - Note: Two layers of 13 mm GIB Fyrelene® may be used for the ceiling lining for Secura systems.
- Rondo® ceiling battens and GIB Quiet Clips® for installation of ceiling.

All products are readily available from reputable merchants.

9.0 FLOOR JOIST & 19 mm ECOPLY® FLOORING INSTALLATION

Figure 2: 19 mm Ecoply® F1 I/F8 Flooring Installation



This Batten & Cradle™ Flooring System is installed using conventional floor construction methodologies where products are installed in accordance with the requirements of this literature, NZS 3604, and manufacturer's specific literature as appropriate.

The floor uses sawn timber, LVL or hyJOIST® floor joists overlaid by 19 mm Ecoply® F1 I/F8 structural flooring prior to the installation of acoustic cradles, QB Quiet Batten™ and one of either 20 mm Strandfloor® Tongue & Groove, 20 mm Kopine® Tongue & Groove I2, or 19 mm Secura™ Interior Flooring as the floor topping.

19 mm Ecoply® F1 I/F8 structural flooring installation over joists:

- Floor joists to be installed in accordance with manufacturer's literature or NZS 3604 as appropriate.
 - Consideration of the floating floor mass and ceiling should be taken into account in the design of the floor joists.
 - Floor joist spacing shall be either 400 mm or 600 mm with use of Batten & Cradle™ Flooring System (refer figure 3).

- Install 19 mm Ecoply FI I/F8 structural flooring in accordance with Ecoply Flooring Specification and Installation Guide, noting:
 - Glue screwing/nailing of flooring is advantageous in limiting squeak and noise in floors.
 - Flooring to be installed with face grain running across the joists.

Once installation of the Ecoply® structural flooring has been completed, the construction above the floor should be carried out as per traditional framing practice. Once the internal walls have been completed, including the installation of internal linings, the installation of the acoustic battens and floor can begin.

Figure 3: Joist spacing



10.0 FLOATING FLOOR/SECOND LAYER INSTALLATION

- Position the acoustic cradles on the floor starting from one edge of the room. The cradles allow the placement of QB Quiet Battens™.
- Acoustic cradles must be placed at 450 mm centres maximum (refer figure 4) along the length of the batten, and batten rows must not exceed 400 mm centres, refer figure 5 (Note: battens can be placed at 450 mm spacings.
- when Secura™ flooring is used). Minimum requirements are 7 cradles/m² of the floor area (refer figure 6).
- The acoustic cradles and QB Quiet Battens™ should be leveled prior to the installation of flooring. Any leveling should take into account proposed deformation and construction tolerances.

Figure 4: Acoustic cradles Spacing Along the Length of the Batten

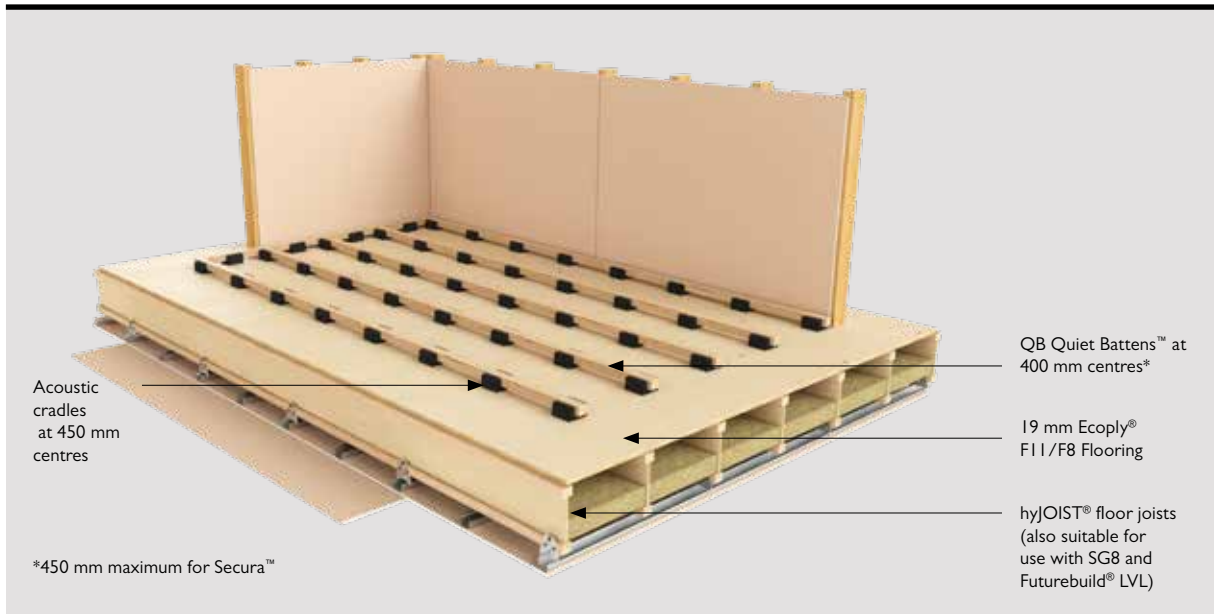


Figure 5: QB Quiet Batten™ Spacing



Notes:

- Battens may be installed either running parallel to the joists or perpendicular.
- Cradles should be installed such that they are level and do not rock or lie at an angle. Use packers or similar to overcome low areas or cambers.
- Cradles and support battens should be set out such that the centre of the batten is approximately 60 mm from the perimeter walls.

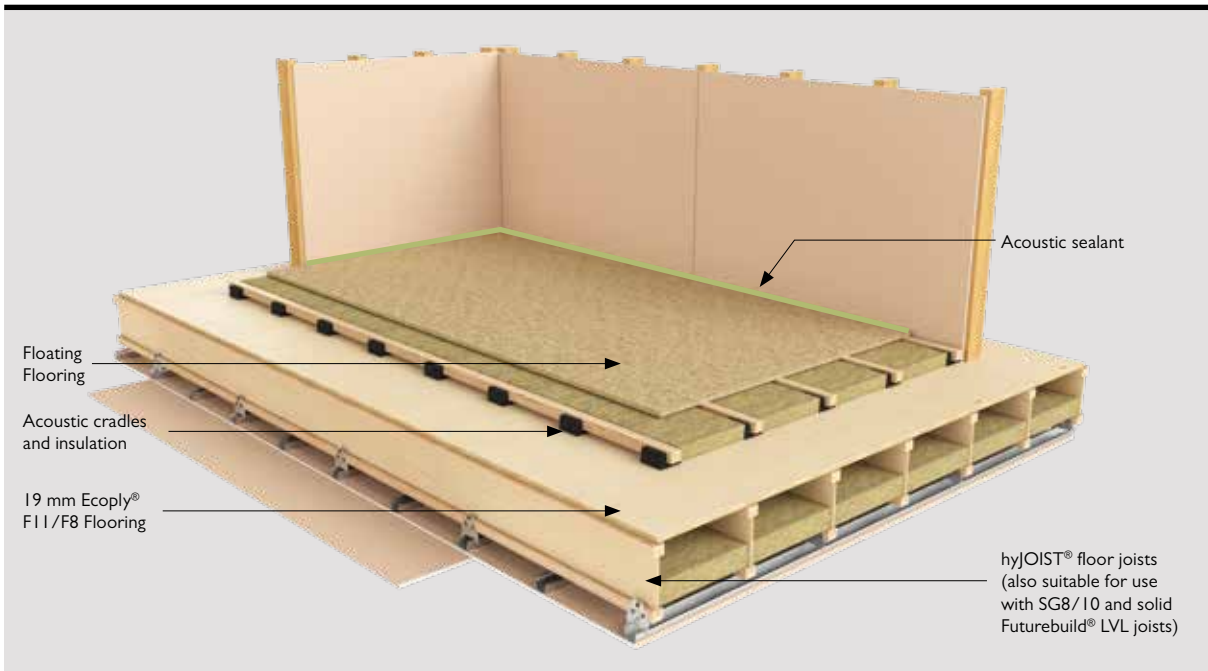
Figure 6: Typical Batten and Cradle™ Set Up

- d. Place the QB Quiet Batten™ structural battens into the Acoustic cradle, noting orientation of the laminates (refer Figure 7). The maximum spacing between the battens must not exceed 400 mm centres (refer figure 5) or 450 mm for Secura™. The battens can run in either direction of the room i.e. independent of the floor joists or EcoPLY® Flooring layout.
- e. Acoustic insulation 50 mm thick (density 11 kg/m³ minimum) must be placed in between the battens to create a damping effect (refer figure 8).

Figure 7: QB Quiet Batten™ Orientation**Figure 8: Insulation Requirements**

- f. Lay 20 mm Strandfloor® Tongue & Groove, 20 mm Kopine® Tongue & Groove I2, or 19 mm Secura™ Interior Flooring across the battens and fix in accordance with manufacturers literature.
- Note: Gluing of 'floating' flooring to the QB Quiet Battens is not mandatory.
 - Floating flooring installation details can be sourced from the following literature:
 1. Secura™ Interior Flooring, Installation Manual February 2013.
 2. Kopine® flooring systems, Installation Guide and Technical Specifications.
 3. Strandfloor® Technical Manual.
- f. Maintain a 5-8 mm gap between the floating flooring and the wall lining around the perimeter.
- g. The gap is filled with a PEF rod and sealed with acoustic sealant (refer figure 9).

Figure 9: Floating Floor/Second Flooring Layer Installation



11.0 WET AREAS

Wet areas are a necessity in residential and commercial applications and can easily be incorporated into Batten and Cradle™ systems. It is recommended that treated flooring be applied to all wet areas including the additional installation of an impervious moisture layer.

When using rigid floor coverings like tiles, sound building practice and good design should take into account the inclusion of a suitable tile and slate underlay, including a water-proof membrane, and shall be installed over the treated floor topping prior to installation of rigid floor coverings.

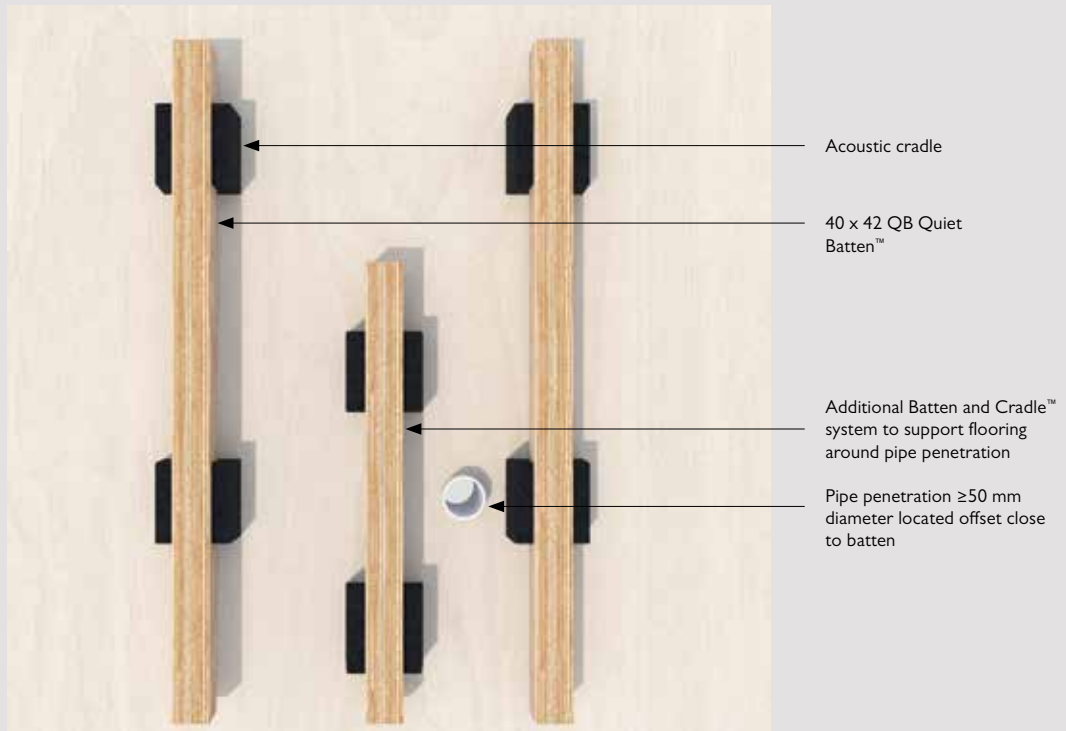
Carter Holt Harvey Plywood Ltd recommend the use of H3.2 treated plywood below all wet areas.

12.0 FLOOR PENETRATIONS

Where floor penetrations are required for services all penetrations shall be sealed with acoustic sealant and the application of acoustic pipe sleeves for penetrations through joists as required. All penetrations should be installed through neatly cut holes, typically 10 mm oversize.

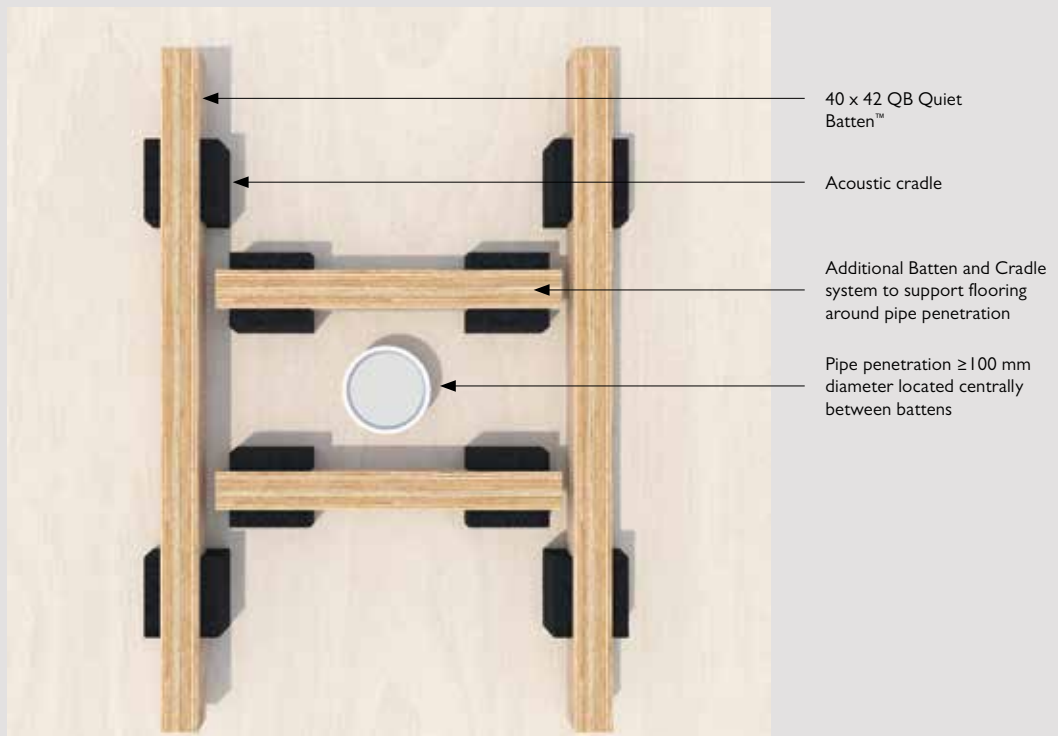
Reinforcement of floating floor flooring may be required where penetrations are greater than 50 mm in diameter. Figures 10, 11 and 12 detail reinforcement requirements for floating flooring.

Figure 10: Floating Floor Flooring Reinforcement Around Penetrations Close to Battens



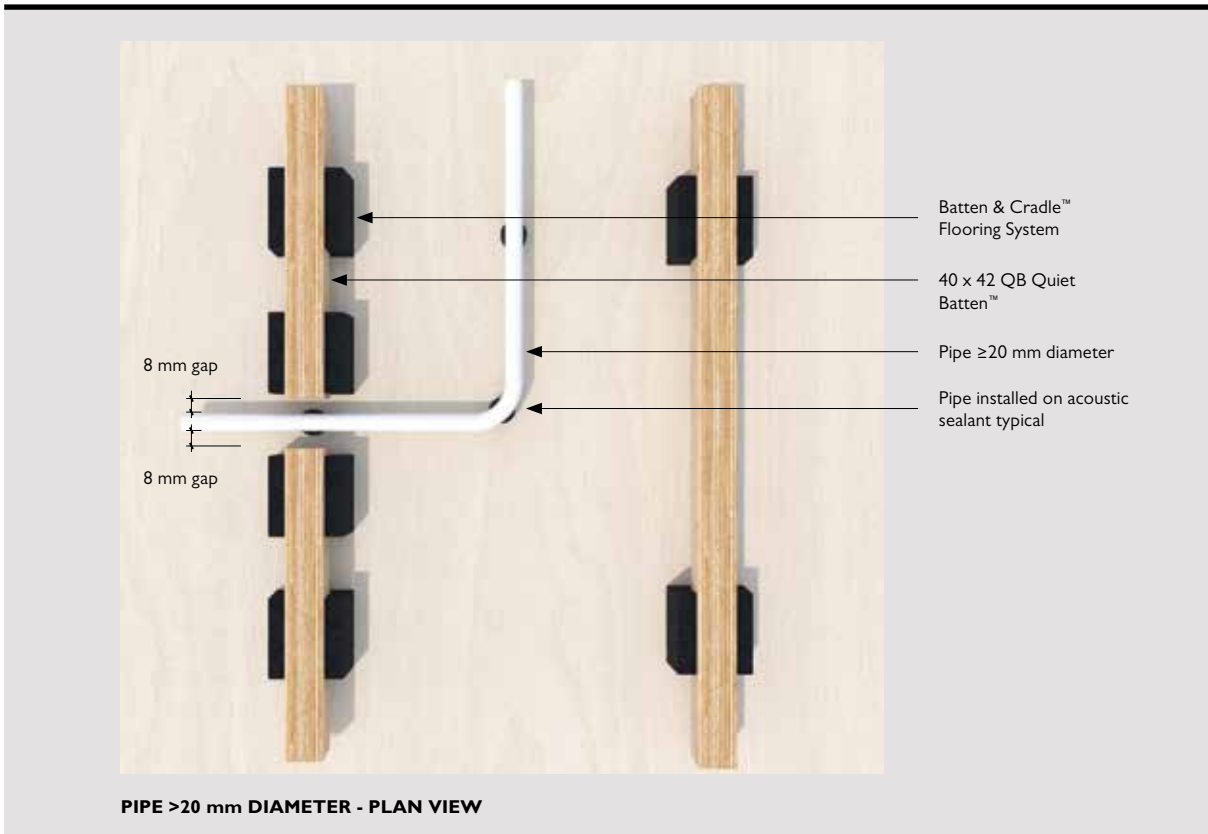
PIPE PENETRATION > 50 mm DIAMETER LOCATED OFFSET NEAR BATTEN - PLAN VIEW

Figure 11: Floating Floor Flooring Reinforcement Around Penetrations Centralised Between Battens



PIPE PENETRATION > 100 mm DIAMETER LOCATED CENTRALLY - PLAN VIEW

Figure 12: Floating Floor Flooring Reinforcement Around Penetrations Passing Through Battens



13.0 CEILING PENETRATIONS

Penetrations through a fire rated system, if they are not correctly specified, installed and tested, can allow spread of fire and smoke from one fire cell to another.

For all penetrations in ceilings remedial action is required, please confer with the 'GIB® Fire Rated systems' specification before specifying any penetrations through a fire rated ceiling. Also check with the proprietary seals manufacturer/supplier for the installation details of their products and test data.

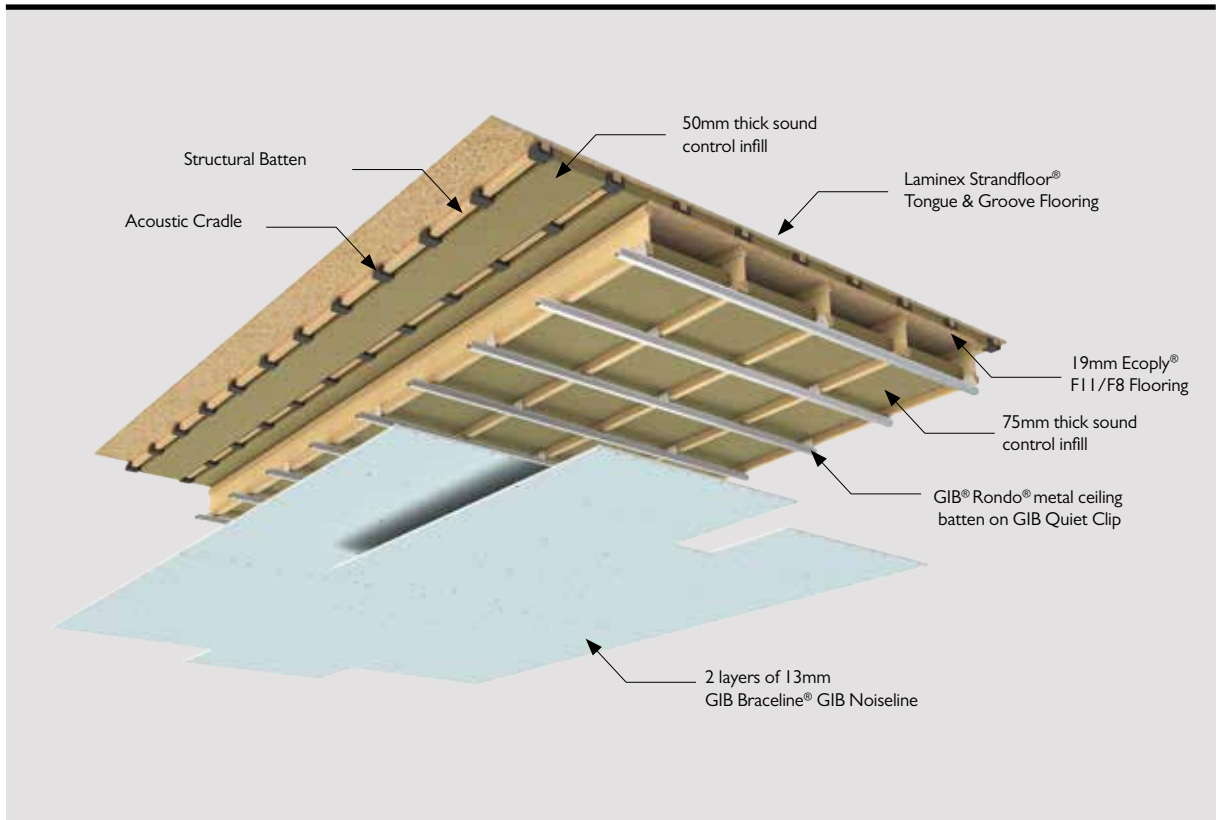
14.0 GIB NOISELINE®/BRACELINE® CEILING INSTALLATION

The Batten & Cradle™ Flooring System included in this literature have been tested using GIB Quiet Clips® for connection to joists and two layers of 13 mm NoiseLine®/Braceline®* for the ceiling lining.

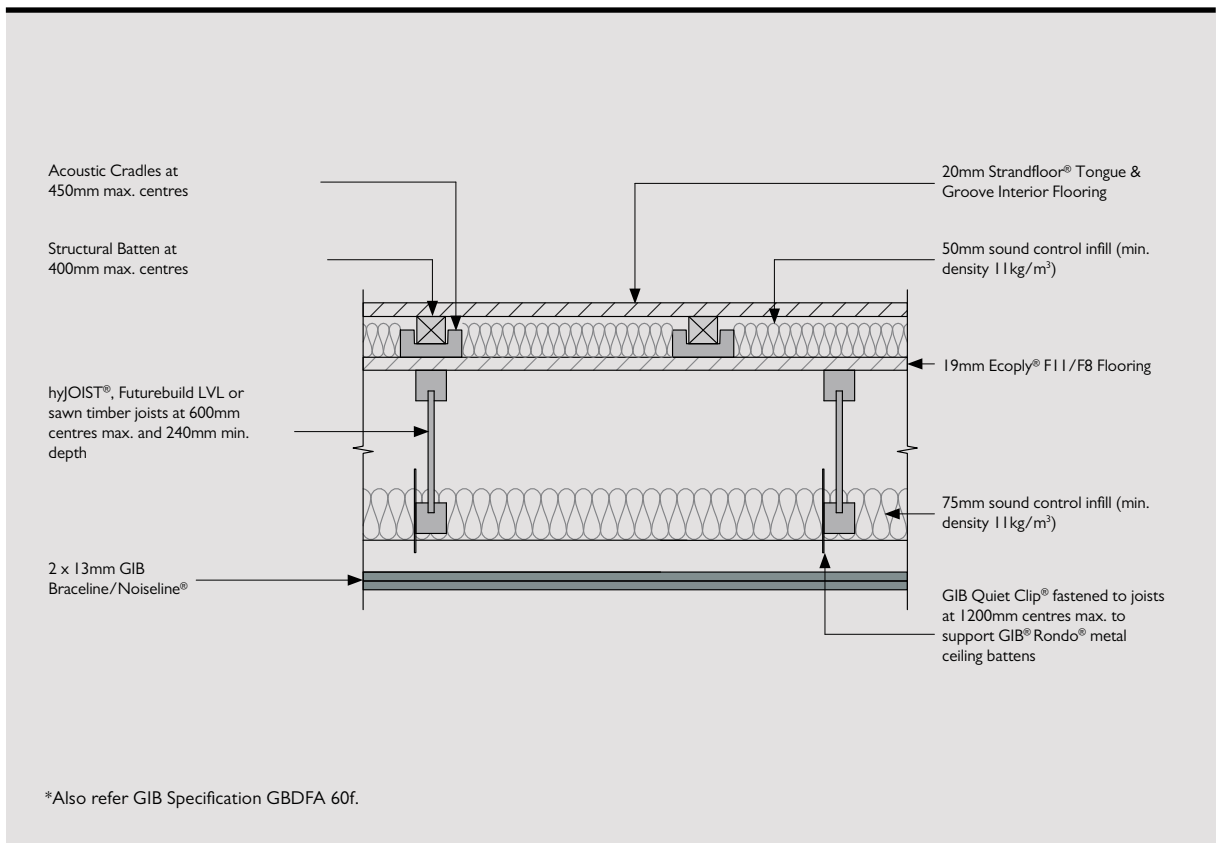
Installation shall be completed in accordance with GIB® system specification number GBDFA 60f, GBDFA 60g, and GBDFA 60h for Strandfloor®, Kopine® and Secura™ flooring respectively.

*Note: Fyreline® may be used with James Hardie Secura™.

Figure 13: GIB® Noise Control Installation – with Strandfloor® Floating Flooring*

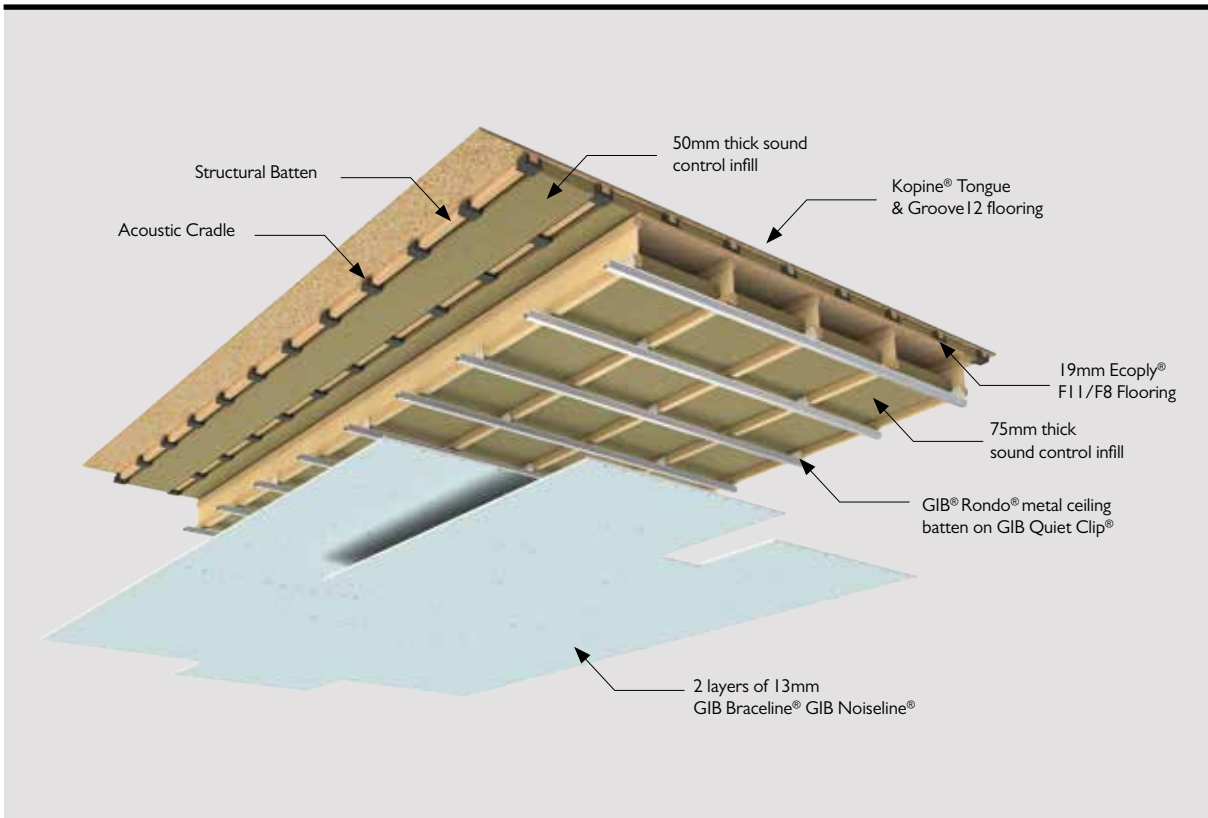


Construction Detail



*Also refer GIB Specification GBDFA 60f.

Figure 14: GIB® Noise Control Installation – with Kopine® Floating Flooring*



Construction Detail

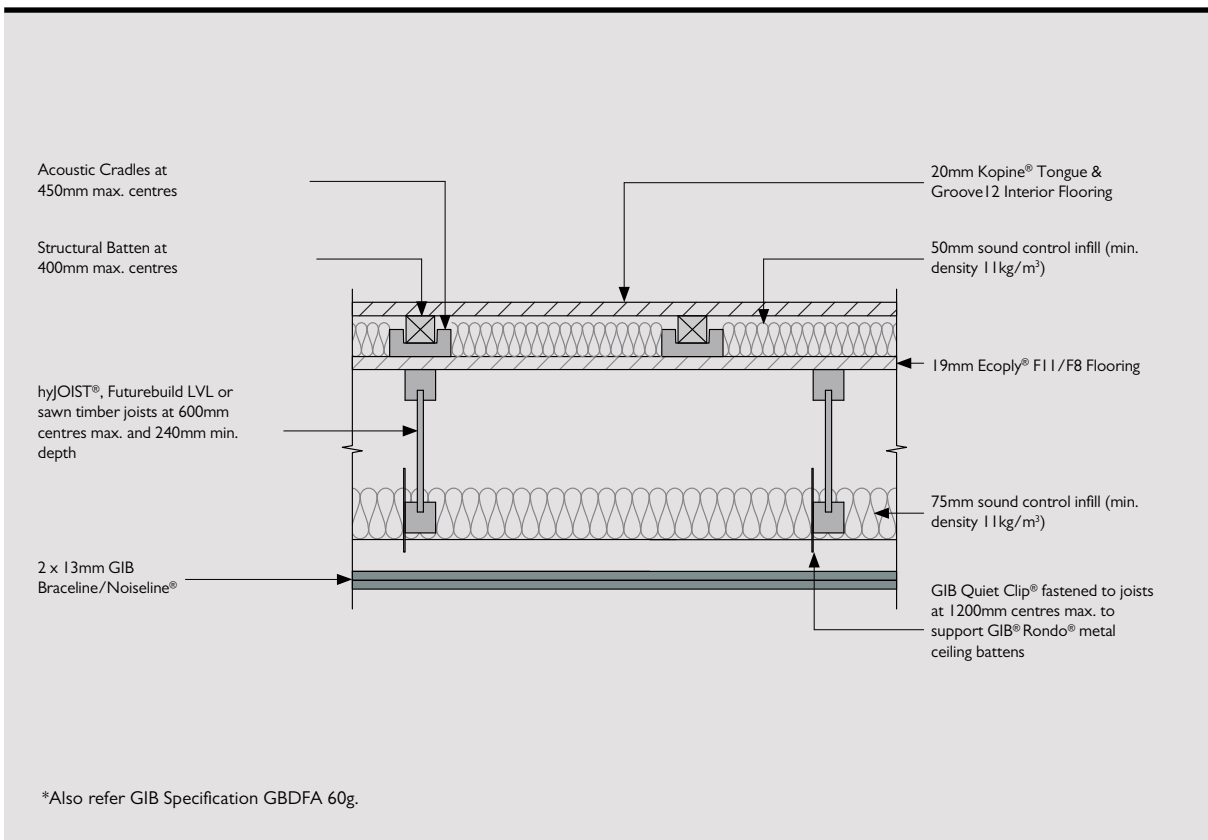
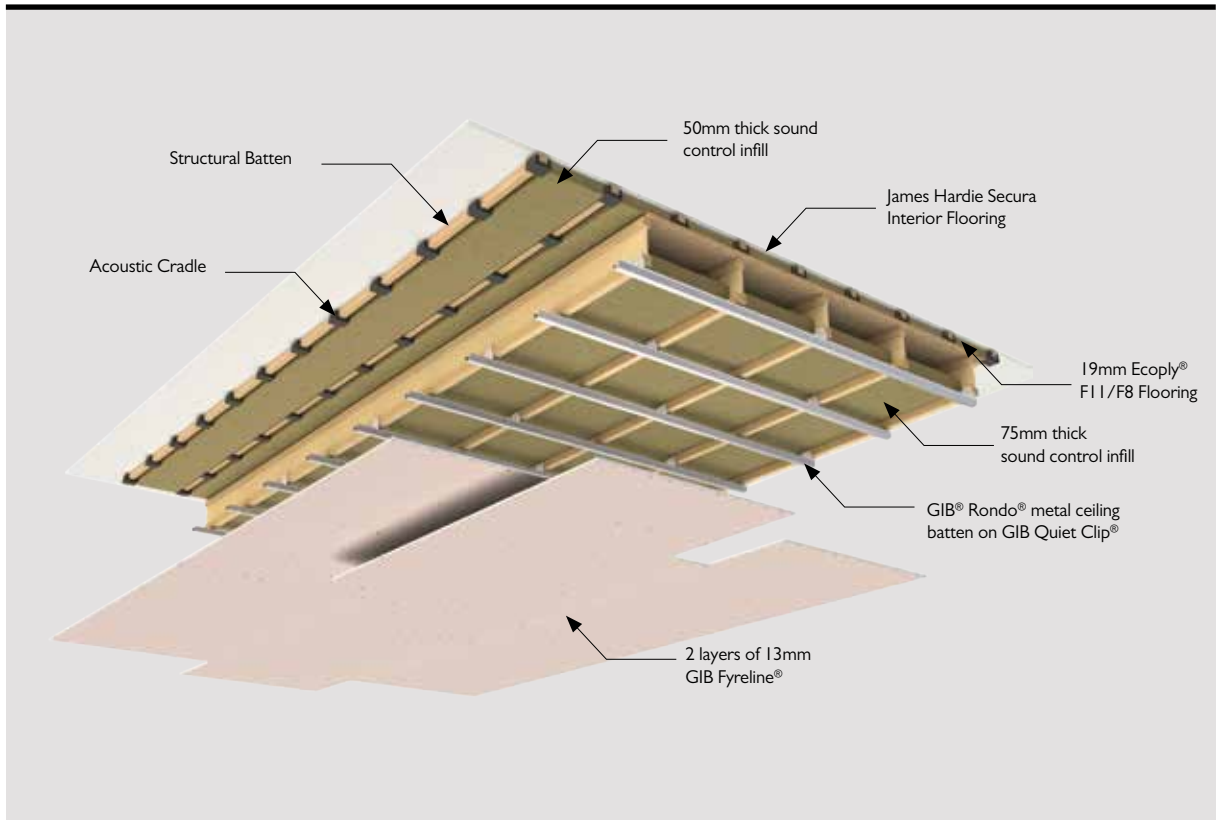
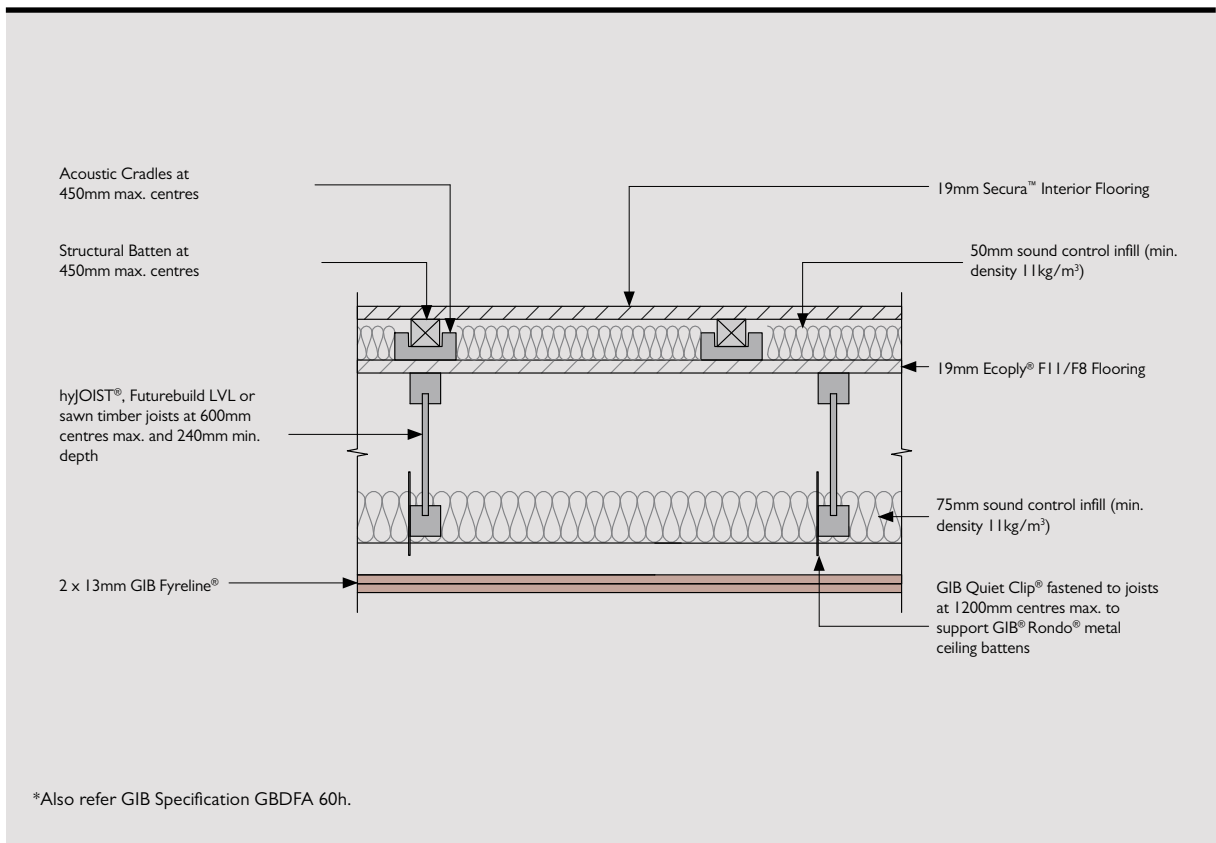


Figure 15: GIB® Noise Control Installation – with Secura™ Floating Flooring*



Construction Detail



*Also refer GIB Specification GBDFA 60h.

15.0 REFERENCES & SOURCES OF INFORMATION

- New Zealand Building Code (NZBC)
- ECOPLY® SPECIFICATION & INSTALLATION GUIDE, SEPTEMBER 2015
- CHH Plywood technical notes - downloadable from www.ecoply.co.nz
- Futurebuild® LVL Durability Statement downloadable from www.futurebuild.co.nz
- designIT® for houses software package – downloadable from www.chsoftware.co.nz
- NZS 3603:1993 “Timber Structures Standard”
- NZS 3604:2011 “Timber Framed Buildings”
- AS/NZS 1170:2011 “Structural design actions”
- AS/NZS 2269:2012 “Plywood Structural”
- Secura™ Interior Flooring, Installation Manual February 2013
- Kopine® flooring systems, Installation Guide and Technical Specifications
- Laminex™ Strandfloor® Technical Manual - refer to Laminex.co.nz for current edition
- GIB® Noise Control Systems, Specification and installation manual, CB15113, September 2017
- Batten and Cradle™ flooring systems, Specifiers Guide Version 4, April 2017
- Laboratory measurement of airborne and impact insulation of an acoustic flooring system. Test ID: T1962-1
- Laboratory measurement of airborne and impact insulation of an acoustic flooring system. Test ID: T1962-2
- Laboratory measurement of airborne and impact insulation of an acoustic flooring system. Test ID: T1962-4

16.0 LIMITATIONS

The information contained in this document is current as at November 2022 and is based on data available to Carter Holt Harvey Plywood Ltd, Carter Holt Harvey LVL Ltd (CHH) and B&C Systems International Limited (Batten & Cradle™ Flooring System) at the time of going to print. All images are intended to provide a general impression only and should not be relied upon as an accurate example of products installed in accordance with this document or NZBC compliance documents. CHH and B&C reserves the right to change the information contained in this document without prior notice.

It is your responsibility to ensure that you have the most up to date information available, including at the time of applying for a building consent. You can call toll free on visit www.battenandcradle.co.nz to obtain current information.

CHH and Batten and Cradle have used all reasonable endeavours to ensure the accuracy and reliability of the information contained in this document. However, to the maximum extent permitted by law, CHH and Batten and Cradle assume no responsibility or liability for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.

17.0 TRADEMARKS

Futurebuild® LVL and hyJOIST® are all trademarks of Carter Holt Harvey LVL Limited.

Ecoply® is a trademark of Carter Holt Harvey Plywood Limited.

Strandfloor®, GIB®, GIB Braceline®, GIB Noiseline®, GIB Rondo®, GIB Quiet Clips®, GIB Fyrelime® are trademarks of Fletcher Building Holdings Limited.

Secura™ is a trademark of James Hardie Technology Limited.

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Kopine® is a trademark of Kopine Ltd.

QB Quiet Batten™ is a trademark of B&C Systems International Limited and Carter Holt Harvey LVL Limited.



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