



# INTEGRA<sup>®</sup>

## LIGHTWEIGHT CONCRETE FLOORING SYSTEM

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**TECHNICAL MANUAL**

# General System Description

The INTEGRA Lightweight Concrete Flooring System is a proprietary high-performance flooring system that can provide both structural performance and vertical fire separation and prevent undue noise transmission in a building.

The panel includes two discrete layers of steel mesh for reinforcement, and the panels are screw fixed into the joists to ensure the performance of the System.

The INTEGRA Lightweight Concrete Flooring System is suitable for use in low, medium and high-density housing.

This system provides a quality floor solution with the feel of a concrete floor at a significantly reduced cost.

## Terminology

Find below explanations of some of the acronyms that are used throughout this document. For further information, refer to the Building Code Handbook for additional definitions. This can be found at the following link.

<https://www.building.govt.nz/building-codecompliance/building-code-and-handbooks/building-code-handbook/>

**AS** – Acceptable Solution or Australia Standard

**FRR** – Fire Resistance Rating

**FSTC** – Field Sound Transmission Class

**NZBC** – New Zealand Building Code

**NZS** – New Zealand Standard

**STC** – Sound Transmission Class represents a single number system for quantifying the transmission loss through a building element. STC is based upon typical speech and domestic noises and thus is most applicable to these areas. STC of a building element is measured in approved testing laboratories under ideal conditions.

**FSTC** – The ‘field’ or in situ measurement of Sound Transmission Class. Building tolerances and flanking noise have an effect on the performance of a partition when it is actually installed, which results in FSTC values lower than the laboratory-derived STC values, typically 5 dB less.

**Rw** – Sound Reduction Index is a number used to rate the effectiveness of a soundproofing system or material

**IIC** – Impact Insulation Class measures a floor assembly’s ability to absorb impact sound

**FIIC** – The ‘field’ or in situ measurement of Impact Insulation Class. Building tolerances and flanking noise have an effect on the performance of a partition when it is actually installed, which results in FIIC values lower than the laboratory-derived IIC values, typically 5 dB less.

**PPE** – Personal Protective Equipment

**SG** – Stress Grade

**VM** – Verification Method

**AS1530.4-2005** – Methods for fire tests on building materials, components and structures, Part 4: Fire-resistance tests of elements of construction

**Sound Insulation** – When sound hits a surface, some of the sound energy travels through the material. ‘Sound insulation’ refers to the ability of a material to stop sound travelling through it.

**Impact Sound** – Sound produced by an object directly impacting a building structure, such as footfall noise or chairs scrapping on a floor.

**Flanking Paths/Transmission** – The transmission of sound energy through paths adjacent to the building element is being considered. For example, sound may be transmitted around a wall by travelling up into the ceiling space and then down into the adjacent room.

**Structure-Borne Transmission** – The transmission of sound from one space to another through the structure of a building.

## Specification Reference Labelling

The specification label reference allows a quick reference to a system. For example

### **INTA120a**

**IN** = 75mm INTEGRA Panel

**TJ** = Timber Support Structure

**CJ** = Composite Support Structure

**SJ** = Steel Support Structure

**FC** = Floor Ceiling

**FSC** = Floor Suspended Ceiling

**A** = Acoustic

**120** = Fire Resistance Rating

**a/b/c/d/e** = System Options

## Product Substitution

The INTEGRA Lightweight Concrete Flooring System is a proprietary system that has been carefully designed for New Zealand conditions and independently tested and assessed to ensure that it meets the performance criteria outlined in the NZBC. Using only Resene Construction Systems' proprietary products where specified is imperative. This will ensure that fire safety and structural and sound performance are achieved on-site.

## Components not supplied

### **GIB® Systems**

A GIB® System is only required when using the INTEGRA Lightweight Concrete Flooring System as part of a fire separation system.

The INTEGRA Lightweight Concrete Flooring System described in this document is partly based on test data from Winstone Wallboards Ltd. Resene Construction Systems has received authorisation and approval to utilise this data to achieve enhanced solutions for the INTEGRA Lightweight Concrete Flooring System. This means that the system must always incorporate the Winstone Wallboards Ltd products that are specified in the Technical Manual. Resene Construction Systems accepts no liability if system components are not used per the instructions in this publication.

## What is the scope of use for the INTEGRA Lightweight Concrete Flooring System?

INTEGRA Lightweight Concrete Flooring System can be used:

- As a replacement for conventional particleboard or plywood sheet flooring on a suspended timber or steel support structure with floor joists at 600 centres, maximum
- Where a Fire Resistance Rating up to 120/120/120 is required
- Where up to a 3 kPa uniformly distributed live load is required
- Where a concentrated live load up to 3.7 kN is required (20 mm diameter foot – see Table 3.1 in AS/NZS 1170.1)
- Where a concentrated live load up to 7.5 kN is required (100 mm x100 mm square foot – see Table 3.1 in AS/NZS 1170.1)
- For buildings that have been designed and constructed in accordance with NZS 3604 Section 7
- When seeking compliance with the NZBC

The designer should consider the various systems depending on the required acoustic and fire performance. The designer should factor in the following:

- Size of the floor
- Control Joint set out
- Potential building movement, earthquake zones
- Any lateral loads
- Floor loads
- The timber framing needs to be designed for the individual project
- Fire Ratings, if needed
- Acoustic Ratings, if needed

## Compliance with the NZBC

### **B1 – Structure**

The design and specification for timber framing must be in accordance with the performance requirements of NZBC B1. Acceptable Solution B1/AS1 nominates NZS 3604:2011, so timber floor framing designed in accordance with NZS3604:2011 complies with NZBC B1 and is the best choice to use when using the INTEGRA Lightweight Concrete Flooring System. Where the timber framing falls outside the scope and the requirements of NZS3604:2011, we recommend that a structural engineer is engaged to ensure that NZBC B1 compliance is achieved.

The INTEGRA Lightweight Concrete floor panels can carry permanent and imposed actions (dead and live loads) but otherwise perform NO STRUCTURAL FUNCTION and cannot form part of a diaphragm floor.

In relation to the design of the timber floor framing, the framing must be designed in accordance with either B1/AS1 3.0 Timber (NZS 3604) or B1/VM1 6.0 Timber (NZS 3603).

The INTEGRA Lightweight Concrete Flooring System can be used with either a loadbearing or non-loadbearing wall.

During construction, provisions should be made for areas with increased foot traffic to prevent wear and tear if the INTEGRA panels are wet.

Provision should also be made if the INTEGRA Panel is being stored on the floor joists during the construction phase to ensure that the floor can take the load of the panels.

## B2 – Durability

NZBC clause B2.3.1 requires that a floor continue to satisfy the performance requirements of the NZBC for a period not less than 50 years. Under normal conditions of internal use, the INTEGRA Lightweight Concrete Flooring System will achieve a service life in excess of 50 years and thus satisfy the requirements of NZBC B2.

## C1-C6 – Protection from Fire

The INTEGRA Lightweight Concrete Flooring System can provide passive fire protection per NZBC C1-C6 – Protection from Fire requirements. The INTEGRA Lightweight Concrete Flooring System has been peer reviewed and meets the provisions of NZBC C1-C6 when kept within the scope as outlined in Section 6 – Scope of use for the INTEGRA Lightweight Concrete Flooring System.

The INTEGRA Lightweight Concrete Flooring System has been designed to be used in conjunction with GIB® Fire Rated Floor/Ceiling Systems, where the INTEGRA system replaced the particle board or plywood sheet flooring material that is used in the GIB® system.

*The fire-resistance rating of the INTEGRA system has been established through a Technical Opinion from BRANZ. The non-combustibility of the INTEGRA system (i.e., the lightweight concrete panels) has been established through a report from CSIRO. These fire reports are available on request.*

## Fire Cells and Fire Resistance Ratings

1. The fire engineer for the project will determine where the fire cells are in the building and what fire resistance ratings (FRRs) are required.
2. In most cases, the INTEGRA Lightweight Concrete Flooring System will be part of the common floor of a fire cell between adjacent tenancies and will require an FRR.
3. The INTEGRA Lightweight Concrete Flooring System has been assessed in accordance with AS 1530.4: 2005 and achieves up to a 120/120/120-minute FRR, depending on which GIB® Fire Rated Floor/Ceiling system is utilised.
4. The elements of the FRR required will depend on the specific scenario in the building in question. For example, the INTEGRA LWC Flooring System will not require an insulation rating if fire sprinklers are present.
5. Specific requirements are contained within the Acceptable Solutions C/AS1 (Risk Group SH) and C/AS2 (all other Risk Groups)

## Control of Internal Fire and Smoke Spread

1. Where the INTEGRA LWC flooring system is required to have an FRR, any service penetration through the floor is required to be fire-stopped. Specialist advice will be required from the fire engineer in this case.

2. In situations (Risk Group other than SH) where floor coverings are used, the floor covering shall be either non-combustible or, when tested, have a critical radiant flux of not less than that specified in Table 4.5 of C/AS2 or comply with Appendix of C/VM2.

## NZBC F2 – Hazardous Building Materials

Under normal conditions of internal use, the INTEGRA Lightweight Concrete Flooring System does not constitute a health hazard and meets the provisions of the NZBC Clause F2.

## NZBC G6 – Airborne and Impact Sound

The INTEGRA Lightweight Concrete Flooring System provides airborne noise control ratings that exceed the minimum requirements of NZBC Clause G6 – Airborne and Impact Sound. The INTEGRA Lightweight Concrete Flooring System has been peer reviewed and meets the provisions of NZBC G6 when kept within the scope as outlined in Section 6 – Scope of use for the INTEGRA Lightweight Concrete Flooring System.

The STC ratings have been established through full-scale sound testing at the University of Auckland and an opinion by Acoustic Engineering Solutions. These reports/opinions are available on our website.

## Exposure to weather during construction

The INTEGRA Lightweight Concrete Flooring System can be exposed to the elements for up to 3 months before the building is closed in. Should the floor be exposed to the weather for a longer period, then we recommend applying Resene Aquapel over the entire surface of the INTEGRA Lightweight Concrete Panels to protect it further.

## Materials

### Fasteners

INTEGRA Lightweight Concrete Flooring System Screws must be used; these are available in the following sizes

### Timber Floor Joists

- 14gx100mm Galvanised Screws – Used to secure the INTEGRA Panel to the Floor Joists
- 14gx125mm Galvanised Screws – Used to secure the INTEGRA Panel to the Floor Joists
- 14gx150mm Galvanised Screws – Used to secure the INTEGRA Panel to the Floor Joists and the bottom plate to the joists on non-bracing walls

### Steel Floor Joists

- 14gx100mm Galvanised Self-Tapping Screws – Used to secure the INTEGRA Panel to the Floor Joists

### INTEGRA Floor Panel

- Compressive strength: 4 MPa
- Modulus of Elasticity, E: 1800 MPa

- Thermal Conductivity: 0.1496 W/mK (Average 23°) (m2K/W)
- Thermal Resistivity, R: 0.501 m2K/W
- Substrate Thickness: 75 mm
- Density: 550 kg/m3
- Weight: 44.55 kg/m2
- 1800 mm long, 600 mm wide
- Non-Combustible (AS1530.1-1994)

### PSL AAC Adhesive

- Supplied in 20kg bags
- Used for bonding AAC together and patching panel

### Anti-Corrosion Coating

- Use to prime any exposed steel that may be exposed when the INTEGRA panel is cut to length or width
- Zinc-rich protective Coating such as Wurth Zinc Spray Light Perfect

## System Variations

Where fire or acoustic performance is not required, the following variations are permitted

- The use of Steel frames in accordance with the (NASH Handbook Best Practice for Design and Construction of Residential and Low Rise Steel Framing).
- Utilising LVL members
- Utilising proprietary joists systems.

## Framing set out

The INTEGRA Lightweight Concrete Flooring System must be supported on either a light timber framed structure or a light steel framed structure. The light timber-framed structure may comprise timber joists, ply webbed joists, trussed joists, laminated timber joists, timber and steel beams or any combination of the above.

It is recommended that the floor framing system have a joist set out of either 360, 450 or 600mm (whole-number multiples of the 1800 mm INTEGRA panel length) to ensure minimal wastage onsite. The joists, bearers and any other support framing should be sized according to the project engineer/architect.

The floor framing system should be designed for the appropriate live load plus the in-service mass of the panels. For framing designed to NZS3604 "Timber Framed Buildings" compensation needs to be made for the extra weight of the INTEGRA LWC flooring panels. Framing sizes should be selected from the appropriate table for a live load of the Design Live Load plus 0.5 kPa for the Floor Panel. For example, for normal domestic loading, the floor joists should be chosen from the 2.0kPa live load tables (1.5kPa + 0.5 kPa). Alternatively, a tabular summary of joist spacing, spans and sizes is provided in Table 1, which accounts explicitly for the increased self-weight of INTEGRA LWC floor panels compared to conventional sheet flooring products.

## Floor Loading

The INTEGRA Lightweight Concrete Flooring System has been designed to support a concentrated live load of 2.7kN applied over a 0.1m x 0.1m area.

Concentrated loads from load-bearing walls or point loads shall be supported by additional framing, such as joists or blocking. The bearing stress in the panels shall be limited to 1.0MPa.

## Panel Layout

Floor joists have been sized according to maximum spans for the following spacing: 360mm, 450mm, and 600mm. INTEGRA Lightweight Concrete Flooring Panels should be laid as full panels wherever possible. The panels shall be laid in a stretcher bond pattern. INTEGRA Floor Panels can be readily cut to size to suit floor layout requirements and openings. Concentrated loads (e.g. Supporting a load-bearing wall must have additional blocking or be situated over a double joist).

We recommend not using panel lengths less than 225mm wide where the panels need to be cut down.

## Bracing Walls

Where a bracing wall occurs on top of the INTEGRA Lightweight Concrete Flooring System, it shall have either supporting blocking or a joist directly underneath. A GIB® HandiBrac™ can be fastened through the bottom plate into the supporting floor joist/blocking. For bracing walls parallel with the floor joists, the bracing wall shall either be over a joist or supported by solid blocking. Blocking shall have a minimum width of 45mm.

The INTEGRA Lightweight Concrete Flooring System is not considered to provide a horizontal diaphragm bracing system.

Coach screw for fixing bracket to be sized to achieve minimum embedment into joist/blocking as required by GIB® specification.

## Penetrations

Penetrations on a floor are generally required for foul water pipework, air conditioning, and electrical services.

Provided the penetrations are isolated, penetrations up to 80mm in diameter may be made in INTEGRA Lightweight Concrete Flooring Panels without reducing the structural performance of the floor system. Larger penetrations or groups of penetrations should be supported by additional blocking.

Penetrations should be finished using a collar or appropriate sealant. Where the penetration is part of a fire-rated system, an appropriate fire collar and sealant should be installed according to the fire engineer's specifications.

## Lateral Load Transfer

INTEGRA Lightweight Concrete Flooring Panels are fixed to the floor joists using 14-gauge, 100mm long screws at a maximum of 300mm centres along all joists. A minimum edge distance of 50mm is recommended from the short edge to the first screw, although screwing in on an angle is permitted. If the panel overhangs a floor joist on the short edges, it must be cut back so that it is flush and supported on this edge.

The INTEGRA Lightweight Concrete Flooring System is not considered to provide a horizontal diagram bracing system.

## Wet Areas

Where INTEGRA Lightweight Concrete Flooring Panels are being used in a Wet Area, an appropriate waterproof membrane must be installed in accordance with the manufacturer's specifications. Please check that adhesion to the panels will not be compromised by having a dusty surface. A masonry sealer may be required before any membranes are installed.

## Acoustic Performance

The New Zealand Building Code requires an acoustic barrier between two tenancies to have an STC rating of at least 55. For a material to have an STC rating of 55, each frequency band between 125Hz and 4000Hz must have a 'deficiency' of no more than 8, and the sum of all deficiencies must be no more than 32. For more information regarding the acoustic values of the INTEGRA Flooring System, refer to the report from Acoustic Engineering Services.

The placement of insulation in the floor/ceiling cavity will enhance the acoustic performance of the INTEGRA Lightweight Concrete Flooring System.

A carpet with underlay generally provides the best absorption of sound.

It should be noted that the INTEGRA Lightweight Concrete Flooring System is generally **NOT** suitable for an intertenancy floor. This is due to the difficulty in achieving a suitable STC/IIC rating when hard flooring finishes such as tiles are used.

Further increases in acoustic performance can be obtained using resilient mounts, channels or cradle systems. For further information on acoustic systems, please contact GIB® Acoustic Systems or an Acoustic Engineer.

## Construction Joints

Construction control joints should divide the INTEGRA Lightweight Concrete Flooring System.

Construction joint locations should be as follows:

- At changes in panel and joist direction
- Over support walls or beams
- At 6.0 m maximum spacing

## Floor Protection

Once the INTEGRA Lightweight Concrete Flooring System has been laid, we recommend that the INTEGRA Lightweight Concrete Flooring Panels be protected before the finished floor coverings and preparation are completed. Thin plywood, or RAM board, can be laid on top of the flooring where high traffic is expected during construction (i.e., hallways and entrances). This will protect and minimise surface damage to the INTEGRA Lightweight Concrete Flooring Panels.

## Floor Coverings

Where the floor covering specification calls for 'thin section' flooring such as vinyl and carpet tiles or other floor coverings with low surface defect tolerances, the floor will require the application of a floor levelling/surface preparation compound before installation. Carpet with underlay can generally be installed as per a standard concrete floor preparation guideline.

### Carpets

Installation of a smooth carpet edge before laying the carpet requires using specifically selected nails (Annular Grooved) and an adhesive. Use an appropriate primer with all adhesives.

### Tiles

As per manufacturer's guidelines. Apply tiles to screed or adhesive as per a concrete floor. Screed floors to maintain fall and/or levelling. Refer to Tile Adhesive manufacturer for Primer suitable for AAC (porous materials) to promote adhesion.

### Timber Floors

All timber floors require a vapour barrier to be installed after the flooring has been installed. We also recommend using a Floor Levelling Compound to ensure the floor is flat. Anchor battens at the required centres using anchors suitable for AAC Floating Timber Floor - Underlay/backing is installed as usual for a concrete slab.

### Vinyl (Linoleum)

Floor levelling is generally required: Installed as per manufacturer's requirements. Always consult your floor covering specialist for advice.

## Recommend Floor Levelling Screeds and Vapour Barriers

The recommended floor levelling compound is Bostik UI-200. The recommended vapour barrier is the Bostik Moisture Seal Epoxy Water Vapour Barrier. For a full specification, please contact your local Bostik Representative.

# Installation Guidelines for over joists

## General

Check that the sub-floor/joists are straight and true

## STEP 1

### Setting out

Measure 600mm from the perimeter/boundary joist at both ends of the floor. Mark this with a chalk line and continue this process across the floor. Trim the edge of several panels. These panels will be used to start the flooring system installation.

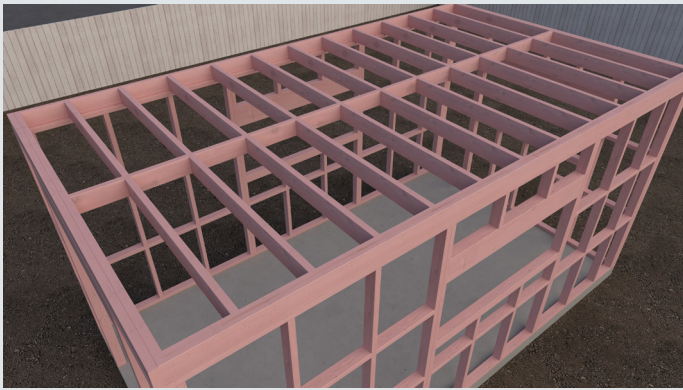


Image 1 - Typical framing layout



Image 2 - The tongue should be removed before installing the panels to the boundary joists

## STEP 2

### Installing the first panel

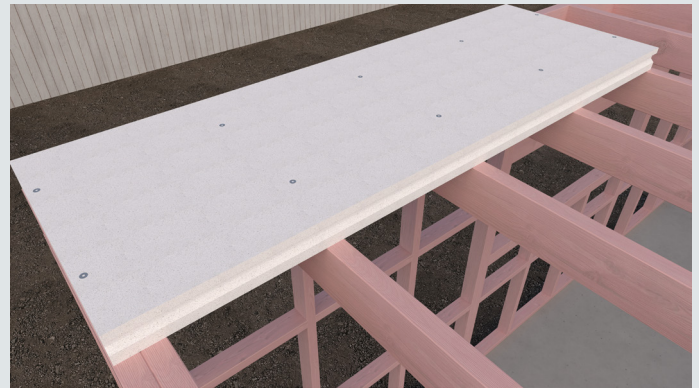


Image 3 - Start installing from the corner

Starting from one corner of the floor structure, lay the first INTEGRA Floor Panel parallel to that boundary joist. Make sure that both of the narrower ends of the INTEGRA Floor Panel are supported on joists/blocking. Ensure that the flat edge of the INTEGRA Panel is on the boundary joist edge. Once the panels are positioned in the correct location, screw-fix them so they are secure.

INTEGRA Lightweight Concrete Flooring Panels are fixed to the floor joists using 14-gauge, 100mm long screws at a maximum of 300mm centres along all joists.

## STEP 3

### Joining panels

Ensure all narrow ends of the INTEGRA Floor Panels also have Resene Construction Systems AAC Adhesive applied to them before butting in the adjoining panel.



Image 4 - AAC Adhesive should be used on the long and short edges of the INTEGRA panel

## STEP 4

### Finishing the first row

Around all boundary joists, the fixing centres must be at a maximum of 300mm. Where two INTEGRA Floor Panels meet on a floor joist/blocking, screws can be fixed by screwing in on an angle from both sides. At least two intermediate joists must support all full sheets of INTEGRA Floor Panels.



Image 5 – The ends of adjacent panels should finish over solid timber

## STEP 5

### Installing the second row of the panel

Before installing any of the second row of panels, apply Resene Construction Systems AAC Adhesive. The easiest way to do this is to apply Resene Construction Systems AAC Adhesive into the panel groove using a Broad-knife before installing the panel. Take care not to overpack the groove, and then carefully install the INTEGRA Floor Panel into the tongue of the first row of INTEGRA Floor Panels in stretcher bond. Gently tape the panels with a hammer and block of wood to ensure the tongue of the panels fits neatly into the groove.

The second row of INTEGRA Floor Panels must be installed in a stretcher bond pattern. The INTEGRA Floor Panels must be cut to allow this to happen. Make sure that all narrow panel ends are supported on joists.

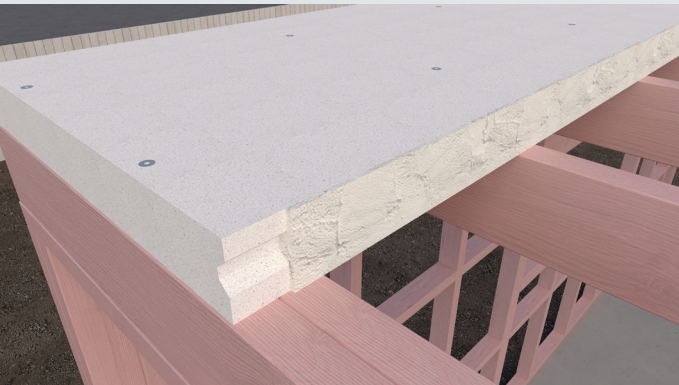


Image 6 – The rebate in the panel can be filled with AAC adhesive before the next panel is fitted into place

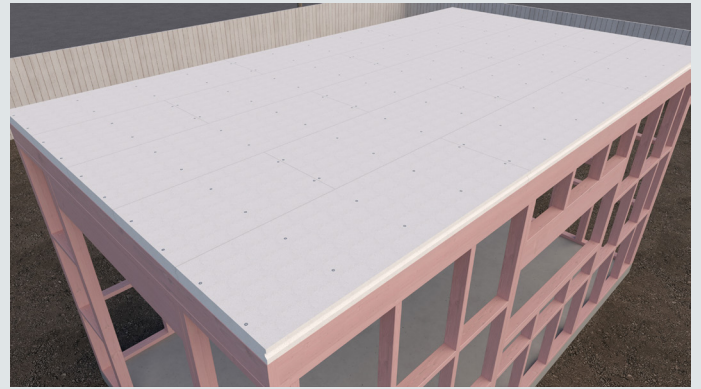


Image 7 – Remainder of the floor fastened in place

## STEP 6

### Screw Fixing the panel

Screw fix the panel a minimum of 150mm from either side of the panel following along the joist. Two screws are required in each panel at each joist.



Image 8 – Skew fix the panel where the screws are located near the edge of the panels

Screws in the end edge of the panel may be skewed to achieve the 50mm end distance requirement. Larger screws (125mm) may be required in this area where skewing screws at a sharp angle. The screws must be wound into the panel until the head is 2mm – 3mm below the panel surface.



Image 9 – Fix each panel 150mm from the long edges along the joists

Panels must be supported on a minimum of two joists. Screws into joists are driven without drilling of panels, and excessive adhesive should be removed immediately. Screw holes are filled with Resene Construction Systems AAC Adhesive, and any chips on panel edges should be filled with Resene Construction Systems AAC Adhesive.

## **STEP 7**

### **Completing the floor**

Continue across the entire floor, making sure to maintain a stretcher bond pattern. Try and keep all panel joints tidy by scraping off any Resene Construction Systems AAC Adhesive so that the joints are flush. Once the INTEGRA panels have been installed, go around all the exposed edges of INTEGRA Floor Panels and prime all the exposed steel using an anti-corrosion coating.

## **STEP 8**

### **Securing the bottom plate**

The panel around the boundary joists must be fastened at 300mm centres.

All Bottom Plates should be screwed down using 150mm x14G INTEGRA fasteners at 300mm centres.

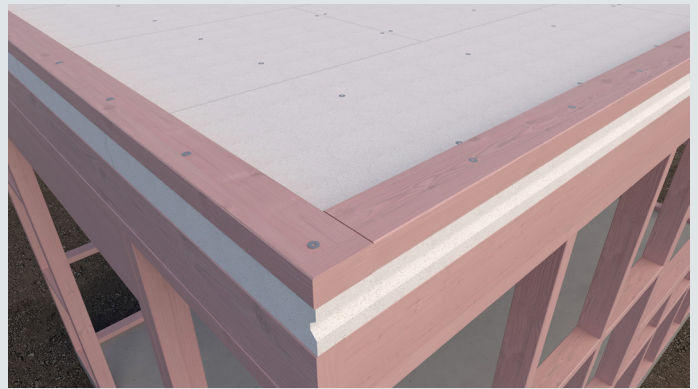


Image 10 – Fasten the bottom plate around the perimeter using a 150mm INTEGRA Screw at 300mm centres

## **STEP 9**

### **Cleaning Up**

Ensure that any AAC Adhesive droppings on lower levels are cleaned up on the same day. If it is left to dry, it can be difficult to remove.

Any joints in the panels may need to be flushed out with additional AAC Adhesive. Ensure that the floor is left tidy for subsequent trades.

## Timber Joist Sizes (corresponding to Tables 7.1 and 14.8 in NZS3604:2011)

Table 1 below provides a summary of timber floor joist sizes and spans for three recommended joist spacings of 360 mm, 450 mm and 600 mm. Each of these recommended joist spacings is a whole number multiple for the INTEGRA panel length of 1800 mm to minimise on-site cutting time

and material wastage. The spans and spacings have explicitly been calculated to account for the self-weight of the INTEGRA LWC floor panel and correspond to the 1.0 kPa, 2.0 kPa (Table 7.1) and 3.0 kPa (Table 14.8) tables in NZS 3604:2011.

Live Load (kPa)	Span (m)	360mm Joist Spacing	450mm Joist Spacing	600mm Joist Spacing
1.5	1.2	90 × 35	90 × 35	90 × 35
	1.5	90 × 45	140 × 35	140 × 35
	1.8	140 × 35	140 × 35	140 × 35
	2.1	140 × 35	140 × 35	140 × 45
	2.4	140 × 45	190 × 45	190 × 45
	2.7	190 × 45	190 × 45	190 × 45
	3	190 × 45	190 × 45	240 × 45
	3.3	190 × 45	240 × 45	240 × 45
	3.6	240 × 45	240 × 45	240 × 45
	3.9	240 × 45	240 × 45	290 × 45
	4.2	240 × 45	290 × 45	290 × 45
	4.5	290 × 45	290 × 45	
	4.8	290 × 45		
2.0	1.2	90 × 35	90 × 35	90 × 45
	1.5	140 × 35	140 × 35	140 × 35
	1.8	140 × 35	140 × 35	140 × 35
	2.1	140 × 35	140 × 45	190 × 45
	2.4	190 × 45	190 × 45	190 × 45
	2.7	190 × 45	190 × 45	240 × 45
	3	190 × 45	240 × 45	240 × 45
	3.3	240 × 45	240 × 45	240 × 45
	3.6	240 × 45	240 × 45	290 × 45
	3.9	240 × 45	290 × 45	290 × 45
	4.2	290 × 45	290 × 45	
	4.5	290 × 45		
	4.8	290 × 45		

3.0	1.2	90 × 35	90 × 45	140 × 35
	1.5	140 × 35	140 × 35	140 × 35
	1.8	140 × 35	140 × 35	190 × 45
	2.1	140 × 45	190 × 45	190 × 45
	2.4	190 × 45	190 × 45	190 × 45
	2.7	190 × 45	240 × 45	240 × 45
	3	240 × 45	240 × 45	240 × 45
	3.3	240 × 45	240 × 45	290 × 45
	3.6	240 × 45	290 × 45	290 × 45
	3.9	290 × 45	290 × 45	
	4.2	290 × 45		
	4.5			
	4.8			

## Serviceability Limit criteria using Timber Joists

Serviceability Criteria	Timber Joist Centres			
	360mm	400mm	450mm	600mm
Span/600	0.60mm	0.67mm	0.75mm	1.00mm
Span/500	0.72mm	0.80mm	0.90mm	1.20mm
Span/400	0.90mm	1.00mm	1.13mm	1.50mm
Span/300	1.20mm	1.50mm	1.50mm	2.00mm
Span/250	1.44mm	1.60mm	1.80mm	2.40mm

# System Specification

Name	FRR	Linings	Structure
INTJFC15	15/15/15	1 layer of 13mm GIB® Standard	Timber Joist
INTJFC30	30/30/30	1 layer of 13mm Fyreline®	Timber Joist
INTJFC45	45/45/45	1 layer of 13mm Fyreline®	Timber Joist
INTJFC60	60/60/60	1 layer of 16mm Fyreline®	Timber Joist
INTJFC90	90/90/90	2 layers of 16mm Fyreline®	Timber Joist
INTJFC120	120/120/120	2 layers of 19mm Fyreline®	Timber Joist
INCJFC30	30/30/30	1 layer of 13mm Fyreline®	Composite Joist
INCJFC45	45/45/45	1 layer of 13mm Fyreline®	Composite Joist
INCJFC60	60/60/60	1 layer of 16mm Fyreline®	Composite Joist
INSJFC30	30/30/30	1 layer of 13mm Fyreline®	Steel Joist
INSJFC60	60/60/60	1 layer of 16mm Fyreline®	Steel Joist
INTJFSC30	30/30/30	1 layer of 13mm Fyreline Suspended Ceiling®	Timber Joist
INTJFSC60a	60/60/60	2 layers of 13mm Fyreline Suspended Ceiling®	Timber Joist
INTJFSC60b	60/60/60	1 layer of 16mm Fyreline Suspended Ceiling®	Timber Joist
INTJFSC90	90/90/90	1 layer of 13mm Fyreline and 1 layer of 16mm Fyreline Suspended Ceiling®	Timber Joist

## INTJFC15 - Timber Frame 15 minute

### INTEGRA Lightweight Concrete Flooring System with 1 layer of 13mm GIB® Standard Plasterboard

#### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

#### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

#### Framing for Floor

- Framing as per NZS3604, strength and serviceability and spaced at a maximum of 600 centres

#### Flooring

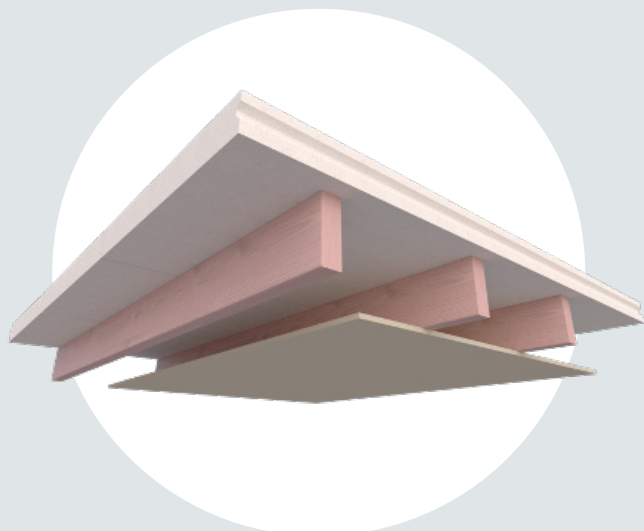
- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

#### Ceiling Linings

- 1 layer of 13mm GIB® Standard Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or nogs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

#### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017



## INTJFC30 - Timber Frame 30 minute

### INTEGRA Lightweight Concrete Flooring System with 1 layer of 13mm Fyrelite® Plasterboard

#### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

#### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

#### Framing for Floor

- Framing as per NZS3604, strength and serviceability and spaced at a maximum of 600 centres

#### Flooring

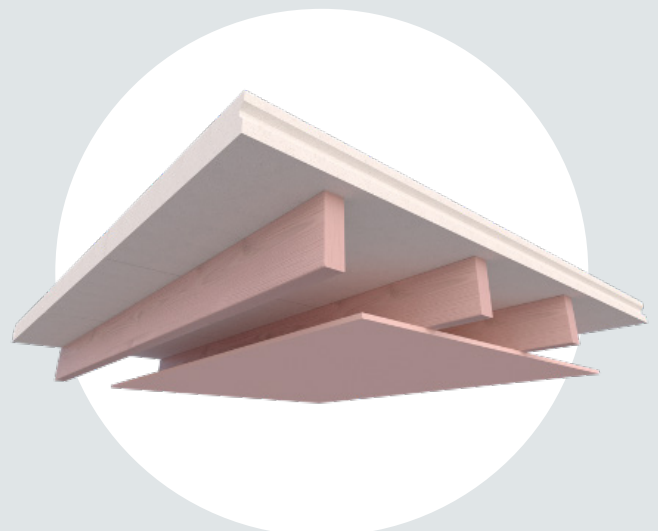
- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

#### Ceiling Linings

- 1 layer of 13mm Fyrelite® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or nogs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

#### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017



## INTJFC45 - Timber Frame 45 minute

### INTEGRA Lightweight Concrete Flooring System with 1 layer of 13mm Fyreline® Plasterboard

#### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

#### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

#### Framing for Floor

- Framing as per NZS3604, strength and serviceability and spaced at a maximum of 600 centres

#### Flooring

- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

#### Ceiling Linings

- 1 layer of 13mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or nogs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

#### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017
- 

## INTJFC60 - Timber Frame 60 minute

### INTEGRA Lightweight Concrete Flooring System with 1 layer of 16mm Fyreline® Plasterboard

#### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

#### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

#### Framing for Floor

- Framing as per NZS3604, strength and serviceability and spaced at a maximum of 600 centres

#### Flooring

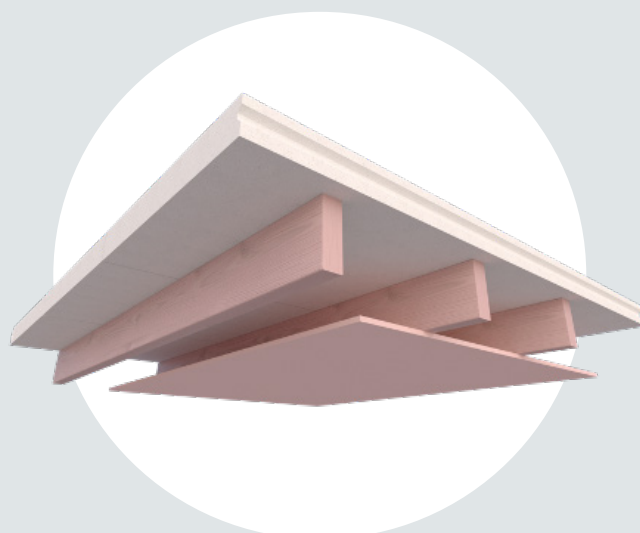
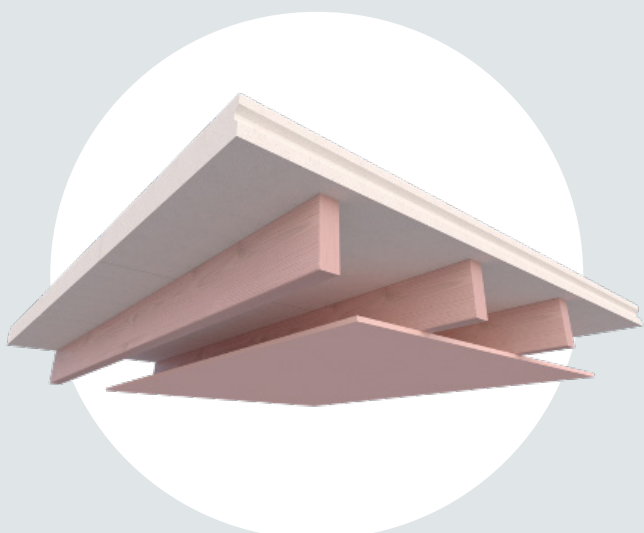
- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

#### Ceiling Linings

- 1 layer of 16mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or nogs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

#### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017



## INTJFC90 - Timber Frame 90 minute

### INTEGRA Lightweight Concrete Flooring System with 2 layer of 16mm Fyreline® Plasterboard

#### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

#### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

#### Framing for Floor

- Framing as per NZS3604, strength and serviceability and spaced at a maximum of 600 centres

#### Flooring

- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

#### Ceiling Linings

- 2 layers of 16mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or noggs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

#### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017

## INTJFC120 - Timber Frame 120 minute

### INTEGRA Lightweight Concrete Flooring System with 2 layers of 19mm Fyreline® Plasterboard

#### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

#### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

#### Framing for Floor

- Framing as per NZS3604, strength and serviceability and spaced at a maximum of 600 centres

#### Flooring

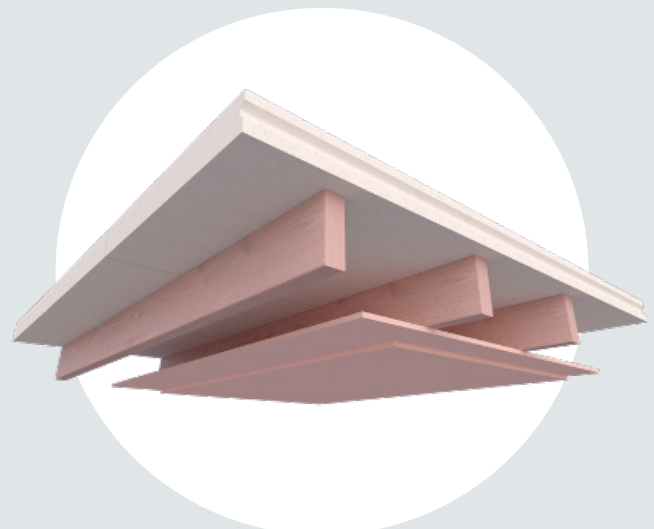
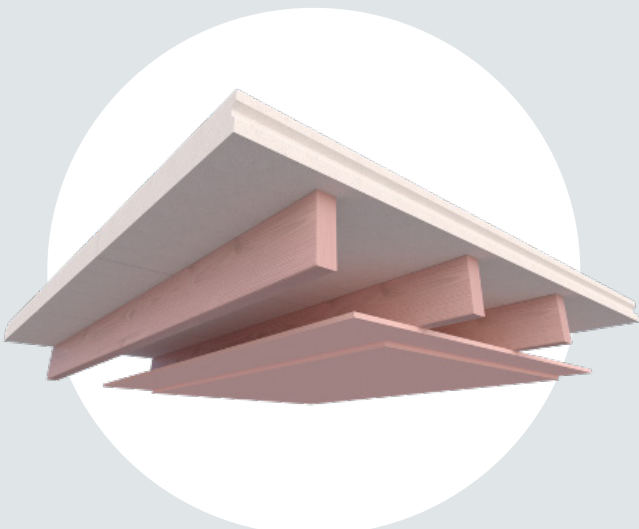
- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

#### Ceiling Linings

- 2 layers of 19mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or noggs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

#### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017



## INCJFC30 - Composite Frame

### 30 minute

#### INTEGRA Lightweight Concrete Flooring System with 1 layer of 13mm Fyreline® Plasterboard

##### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

##### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

##### Framing for Floor

- Hyspan®/Hybeam®/Posi Strut® or other engineered joists may be used as an alternative. Joists must be covered be SED (specific engineering design) for strength and serviceability and spaced at a maximum of 600 centres
- Requirements for nogs/dwangs are the same as for NZS 3604 floor framing above.
- Consult the joist manufacturer about construction of the solid blocking contained in floor/ceiling to wall junctions.

##### Flooring

- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

##### Ceiling Linings

- 1 layer of 13mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or nogs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

##### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017

## INCJFC45 - Composite Frame

### 45 minute

#### INTEGRA Lightweight Concrete Flooring System with 1 layer of 13mm Fyreline® Plasterboard

##### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

##### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

##### Framing for Floor

- Hyspan®/Hybeam®/Posi Strut® or other engineered joists may be used as an alternative. Joists must be covered be SED (specific engineering design) for strength and serviceability and spaced at a maximum of 600 centres
- Requirements for nogs/dwangs are the same as for NZS 3604 floor framing above.
- Consult the joist manufacturer about construction of the solid blocking contained in floor/ceiling to wall junctions.

##### Flooring

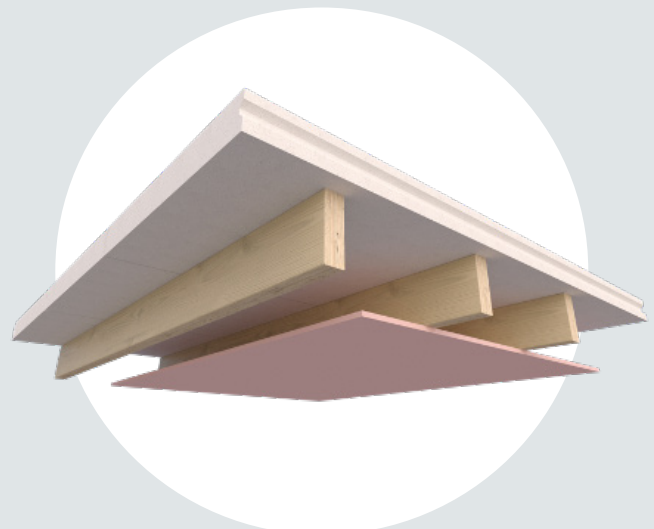
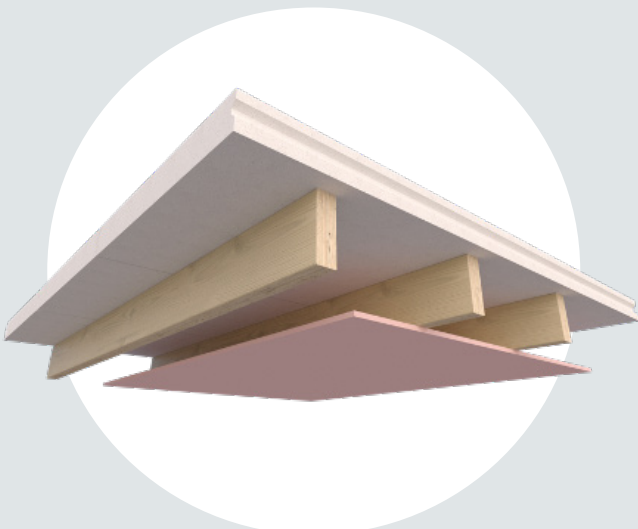
- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

##### Ceiling Linings

- 1 layer of 13mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or nogs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

##### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017



## INCJFC60 - Composite Frame

### 60 minute

#### INTEGRA Lightweight Concrete Flooring System with 1 layer of 16mm Fyreline® Plasterboard

##### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

##### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

##### Framing for Floor

- Hyspan®/Hybeam®/Posi Strut® or other engineered joists may be used as an alternative. Joists must be covered be SED (specific engineering design) for strength and serviceability and spaced at a maximum of 600 centres
- Requirements for nogs/dwangs are the same as for NZS 3604 floor framing above.
- Consult the joist manufacturer about construction of the solid blocking contained in floor/ceiling to wall junctions.

##### Flooring

- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

##### Ceiling Linings

- 1 layer of 16mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or nogs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

##### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017

## INSJFC30 - Steel Frame

### 30 minute

#### INTEGRA Lightweight Concrete Flooring System with 1 layer of 13mm Fyreline® Plasterboard

##### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

##### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

##### Framing for Floor

- Framing dimensions and height as determined by E2/AS4 (NASH Handbook Best Practice for Design and Construction of Residential and Low Rise Steel Framing)s

##### Flooring

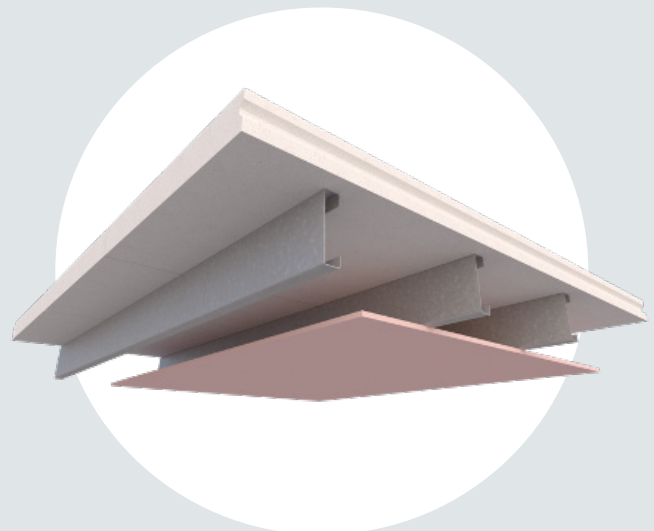
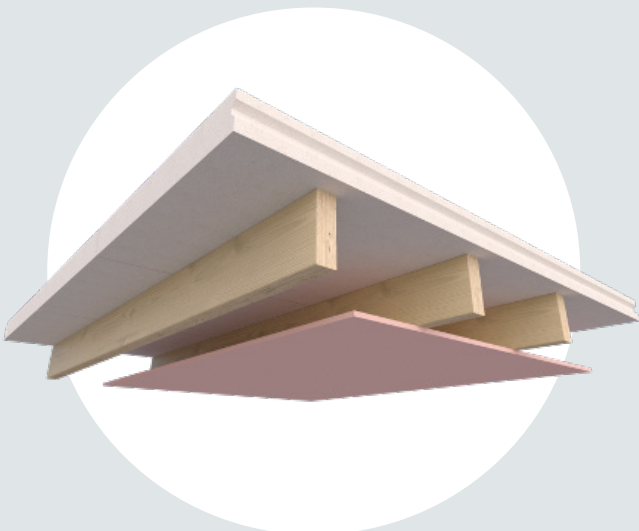
- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

##### Ceiling Linings

- 1 layer of 13mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or nogs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

##### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017



## INSJFC60 - Steel Frame

### 60 minute

#### INTEGRA Lightweight Concrete Flooring System with 1 layer of 16mm Fyreline® Plasterboard

##### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

##### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

##### Framing for Floor

- Framing dimensions and height as determined by E2/AS4 (NASH Handbook Best Practice for Design and Construction of Residential and Low Rise Steel Framing)

##### Flooring

- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

##### Ceiling Linings

- 1 layer of 16mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or noggs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

##### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017

## INTJFSC30 - Timber Frame

### 30 minute

#### INTEGRA Lightweight Concrete Flooring System with 1 layer of 13mm Fyreline® Plasterboard

##### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

##### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

##### Framing for Floor

- Framing as per NZS3604, strength and serviceability and spaced at a maximum of 600 centres

##### Flooring

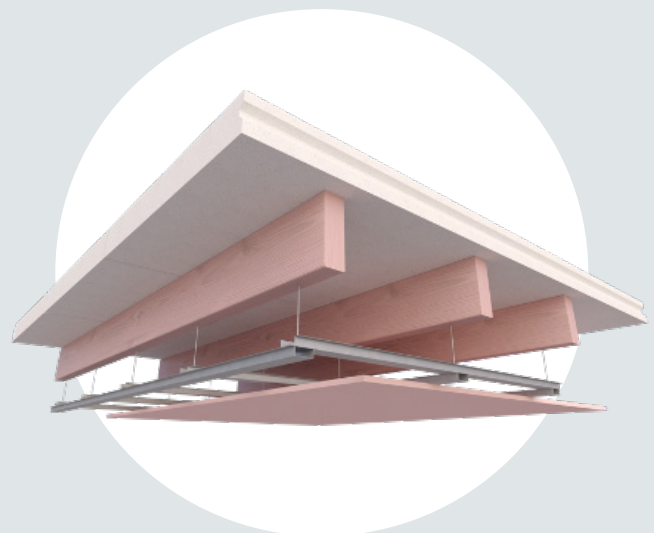
- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

##### Ceiling Linings

- 1 layer of 13mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or noggs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

##### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017



## INTJFSC60a - Timber Frame 60 minute

### INTEGRA Lightweight Concrete Flooring System with 2 layers of 13mm Fyreline® Plasterboard

#### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

#### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

#### Framing for Floor

- Framing as per NZS3604, strength and serviceability and spaced at a maximum of 600 centres

#### Flooring

- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

#### Ceiling Linings

- 2 layers of 13mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or noggs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

#### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017

## INTJFSC60b - Timber Frame 60 minute

### INTEGRA Lightweight Concrete Flooring System with 1 layer of 16mm Fyreline® Plasterboard

#### Framing to comply with

- NZBC B1 – Structure
- NZBC B2 – Durability

#### Flooring to comply with

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

#### Framing for Floor

- Framing as per NZS3604, strength and serviceability and spaced at a maximum of 600 centres

#### Flooring

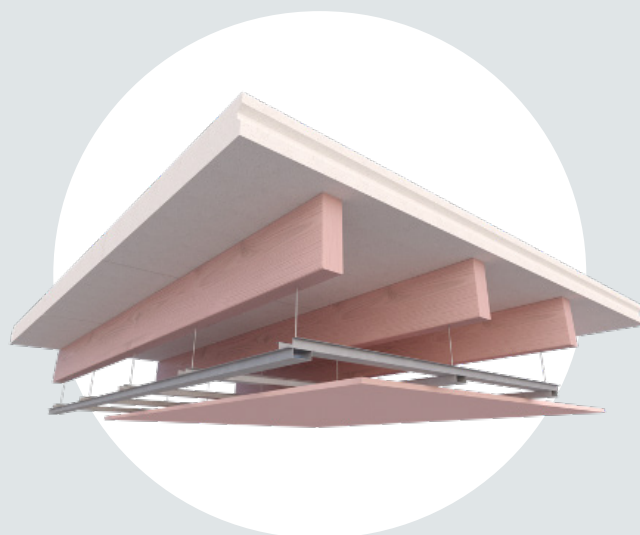
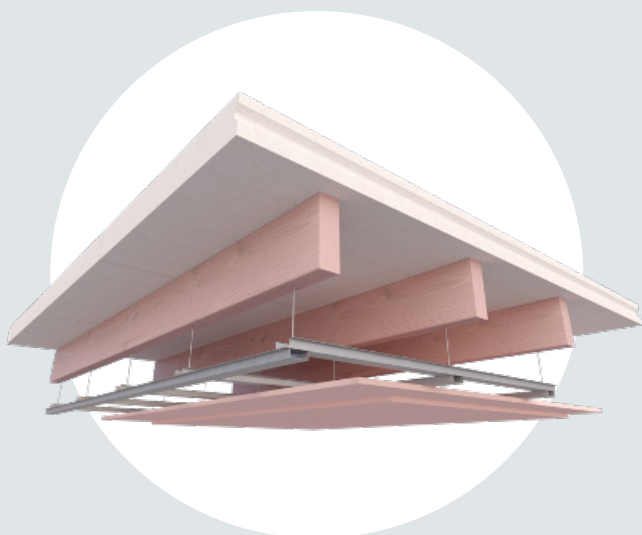
- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

#### Ceiling Linings

- 1 layers of 16mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or noggs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

#### Jointing

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017



# INTJFSC90 - Timber Frame

## 90 minute

### **INTEGRA Lightweight Concrete Flooring System with 1 layer of 16mm Fyreline® Plasterboard and 1 layer of 13mm Fyreline® Plasterboard**

#### **Framing to comply with**

- NZBC B1 – Structure
- NZBC B2 – Durability

#### **Flooring to comply with**

- NZBC Clause B1 Structure
- NZBC Clause B2 Durability
- NZBC Clause C1-C6 – Protection from Fire
- NZBC Clause F2 Hazardous Building Materials
- NZBC Clause G6 Airborne and Impact Sound

#### **Framing for Floor**

- Framing as per NZS3604, strength and serviceability and spaced at a maximum of 600 centres

#### **Flooring**

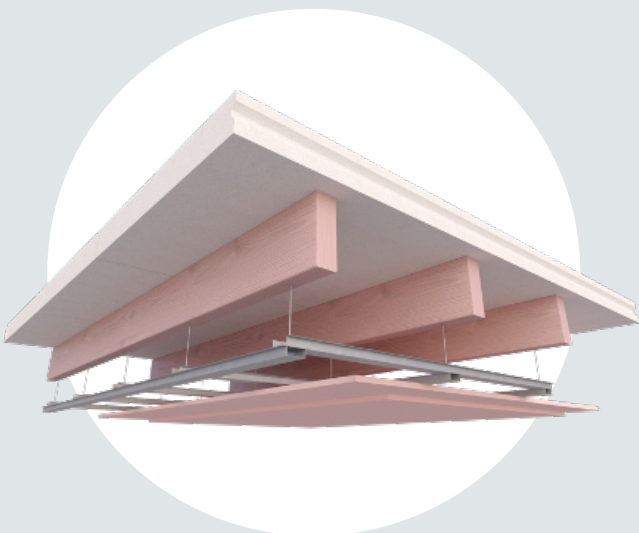
- 75mm INTEGRA Flooring
- Fastened with 100mmx14g Galvanised Screws
- Fastened at 300 centres along joist and around the perimeter

#### **Ceiling Linings**

- 1 layer of 16mm Fyreline® Plasterboard and 1 layer of 13mm Fyreline® Plasterboard shall be fixed at right angles to the underside of the floor joists.
- All joints must occur on joists, solid strutting or noggs.
- Sheets shall be touch-fitted
- Fastened as per plasterboard manufacturer specifications

#### **Jointing**

- Jointing and finishing of plasterboard is to be as per the manufacturer's instructions to meet requirements of AS/NZS 2589:2017









For all other information  
see our website or call  
one of our team to assist.