



# Reverberation Control Systems

Design and Installation Manual for  
GIB Quietline® and GIB-Tone® Quiet™ tiles

CBI 5311

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## NATIONAL SUPPORT

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## GIB® HELPLINE

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**Cover:** GIB Quietline® installed on the ceiling of the Dentsu Aegis Network - NZ fitout designed by Jose Gutierrez Ltd.

**This Page:** GIB Quietline® used in the library of Rangitapu Girls' School designed by McIldowie Partners.

# GIB® Reverberation Control Systems combine an innovative, efficient method to improve the quality of sound within a space with the great look of GIB Quietline® and GIB-Tone® Quiet™ ceiling tiles.

## LOOKS GOOD, SOUNDS BETTER

GIB® Reverberation Control Systems specifically addresses spaces with hard reflective surfaces, by absorbing and dispersing sound. By reducing the reverberation of sound, a space becomes more comfortable.

Designed in New Zealand, manufactured in New Zealand and tested in New Zealand. Kiwi spaces have a unique aesthetic with open rooms that meld with the outdoors embracing the natural environment.

## GIB QUIETLINE®

13mm GIB Quietline® plasterboard is manufactured using 13mm GIB Ultraline®, which includes a fibre reinforced core and high quality Pearlcoat™ coated paper surface. Each sheet is perforated producing unique patterns, before having the acoustic GIB® QuietFabric™ laminated on the back.

GIB Quietline® is jointed and painted in a similar manner to other GIB® plasterboards (see page 12).

## GIB-TONE® QUIET™ CEILING TILE

10mm GIB-Tone® Quiet™ ceiling tiles are based on the hard wearing pre-finished GIB-Tone® Ready™ ceiling tile. Each ceiling tile has a white painted surface, finished with a technologically advanced VOC free UV-cured coating system. Each ceiling tile is perforated to produce unique patterns, before having the acoustic GIB® QuietFabric™ laminated on the back.

## IMPROVE SOUND IN EVERY SPACE

GIB Quietline® and GIB-Tone® Quiet™ ceiling tiles are ideal for controlling sound reverberation in large open areas with hard surfaces such as:

- Offices
- Cafés
- Schools
- Multi-media rooms
- Function spaces
- Shops

## WHAT IS NEW?

GIB® Reverberation Control Systems literature supersedes GIB® Acoustic Systems – May 2014.

The available patterns of GIB Quietline® and GIB-Tone® Quiet™ tiles have been consolidated to simplify specification and improve supply and delivery to site.

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## Scope of Use

The GIB® Reverberation Control Systems offer is aimed at improving the internal acoustic environment of spaces within buildings where people commonly gather. Spaces include school classrooms, lecture rooms, meeting rooms, cafés, restaurants, areas within hospitals, and other places of assembly such art galleries and airport terminals.

GIB® Reverberation Control Systems can be designed into new buildings or used to improve the acoustic environment of existing premises.

## New Zealand Building Code Compliance

GIB® Reverberation Control Systems are interior lining solutions which reduce sound reverberation within an open interior space. As such GIB® Reverberation Control Systems does not aim to achieve specific performance requirements of the New Zealand Building Code (NZBC). However, the following Clauses are relevant.

### **NZBC CLAUSE B2 – DURABILITY**

GIB® Reverberation Control Systems exceed a 5 year minimum durability as required by NZBC Clause B2.3.1. Under normal conditions of dry internal use, GIB® plasterboard has an expected service life in excess of 50 years.

### **NZBC CLAUSE C – PROTECTION FROM FIRE**

The contribution of GIB® Reverberation Control Systems has not been tested as part of fire rated wall or floor/ceiling construction. Where a Fire Resistance Rating (FRR) is required GIB Quietline® is installed in addition to the required FRR system. A wide range of fire rated specifications can be found in the 'GIB® Fire Rated Systems' as well as 'GIB® Noise Control Systems' literature.

### **SURFACE FINISH PROPERTIES**

GIB Quietline® and GIB-Tone® Quiet™, including the backing material, have been tested in accordance with 'ISO 5660 Reaction to Fire Tests – Heat release, smoke production and mass loss rate Parts 1 and 2' and achieve a Group 1-S Classification.

### **NZBC CLAUSE F2 - HAZARDOUS BUILDING MATERIALS**

GIB® plasterboard does not constitute a health hazard and meets the requirements of NZBC Clause F2. Dust resulting from sanding compounds may be a respiratory irritant and the use of a suitable facemask is recommended. Employ careful lifting techniques. Lifting machines are recommended for ceiling sheets.

### **AS/NZS 2107:2000**

GIB Quietline® offers noise reduction by absorbing sound waves that otherwise 'bounce off' hard surfaces and can be used for the design of new buildings as well as for the remediation of existing interiors where reverberation issues detract from customer experience. For further design guidance, reference is made to guidance in Australian/ New Zealand Standard AS/NZS 2107:2000 'Acoustics – Recommended design sound levels and reverberation times for building interiors'.

## Beware of substitution

The performance of GIB® Systems is very sensitive to design detailing and construction practices. GIB® Systems have been developed specifically for New Zealand conditions and independently tested or assessed to verify the performance level. Use only GIB® branded components where specified and closely follow the specified design details, so you can be confident that the required performance is achieved on site. Winstone Wallboards Ltd accepts no liability if GIB® Systems are not used in accordance with instructions contained in this publication.

For further information please call our GIB® Helpline on 0800 100 442.

## Use Only the Current Specification

This publication may be superseded by a new publication at any time. Winstone Wallboards Ltd accepts no liability for reliance upon publications that have been superseded. Before using this publication check whether this is the current publication; simply call the GIB® Helpline on 0800 100 442 or visit [gib.co.nz](http://gib.co.nz).

## Definitions

**STC** – Sound Transmission Class. A measure of the sound transmission between adjacent spaces. This is a single number rating, measured at one third octave frequencies between 125 and 4000 Hz. The higher the STC value the greater the reduction in sound transmission between adjacent spaces.

**Rw** – Weighted sound reduction index. Another measure of sound transmission between adjacent spaces. The Rw index is also a single number rating and is determined from transmission loss data between 100 and 3150 Hz.

**IIC** – Impact Insulation Class. A measure of direct or structure borne sound transmission or vibration between adjacent spaces. The IIC is a single number rating determined from sound transmission loss data between 100 and 3150 Hz. The higher the IIC rating, the lower the amount of impact sound transmitted between adjacent spaces.

**NRC** – Noise Reduction Coefficient. This is a measure of a material's ability to absorb sound. The NRC is an average of the material's sound absorption coefficient at 250, 500, 1000 and 2000 Hz. An NRC of 0.50 means that 50% of sound hitting the material's surface is absorbed.

**CAC** – Ceiling Attenuation Class. Walls often finish at ceiling height, this can result in leakage of sound through the ceiling space into an adjacent room. A measure of a ceiling space systems' ability to resist the leakage of sound is the Ceiling Attenuation Class (CAC). A CAC rating is similar to an STC rating. To achieve full benefit from a noise control wall between adjacent spaces, the CAC of the ceiling system should be similar to the STC of the separating wall system.

## GIB Quietline® storage and handling

### STORAGE AND LIMITATIONS

Stack GIB Quietline® flat and protected from the weather (see Figure 1).

GIB Quietline® linings in use must not be exposed to liquid water or be installed in situations where extended exposures to humidity above 90% RH can reasonably be expected.

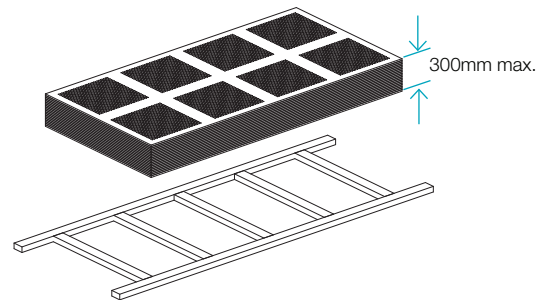
GIB Quietline® must not be exposed to temperatures in excess of 52° C for prolonged periods.

See the GIB® Site Guide for further detail.

### HANDLING

GIB Quietline® must be handled as a finishing material. Carry GIB Quietline® sheets with care and on edge. Fully support GIB Quietline® sheets when positioning and fixing to framing. The use of mechanical lifting machines is recommended for ceilings.

FIGURE 1: STACKING OF BOARDS



## GIB-Tone® Quiet™ Tiles storage and handling

### STORAGE AND HANDLING

GIB-Tone® Quiet™ suspended ceiling tiles must be delivered to the site immediately prior to installation to reduce the risk of damage.

They must be stored in flat stacks (clear of the floor) with care taken to avoid sagging or damage to ends, edges and surfaces.

Tiles must be kept dry at all times and fully protected from the weather and direct sunlight.

### LIMITATIONS

GIB-Tone® Quiet™ suspended ceiling tiles are unsuitable for use in areas subject to continuously damp or humid conditions.

## Reverberation Control

In an enclosed space, sound can continue to reflect for a period of time after the sound source has stopped. This continuation due to reflection is known as reverberation and the period of time reflection continues after the sound source has stopped is known as the reverberation time.

Reverberation time is one of the primary acoustic measures of a space. If the reverberation time is long then the space is often considered to be 'live' acoustically. If a space has a short reverberation time then it is considered to be 'dead'. Speech is best undertaken in a 'dead' space, whereas music is often enhanced in a 'live' space.

The reverberation time is affected by the size of the space and the amount of reflective and absorptive surfaces within that space. Large spaces often have long reverberation times. The reverberation time of a space can be altered by adding more absorptive or reflective surfaces.

The location and quantity of absorbent material, as well as the NRC properties required to design or alter the reverberation time of a space requires specific input by an acoustic professional.

Table 1 shows the GIB Quietline® and GIB-Tone® Quiet™ Ceiling Tiles Noise Reduction Coefficient (NRC) for options ranging from 10 to 20% perforation. The table also shows that, for an un-insulated cavity, a larger plenum/cavity is better and for an insulated cavity the depth of plenum/cavity is not significant on NRC performance.

Detailed third octave sound absorption data is available at [gib.co.nz/reverberation-control-systems](http://gib.co.nz/reverberation-control-systems).

## Specification of GIB Quietline® and GIB-Tone® Quiet™

GIB Quietline® and GIB-Tone® Quiet™ are available in a range of perforation patterns (pages 8 – 9). Each pattern has been developed with a percentage of the face of the GIB® plasterboard perforated, ranging from 10 – 20%.

Each pattern available in GIB Quietline® and GIB-Tone® Quiet™ has been tested so that it can be used with different cavities behind it (50mm – 400mm) and used with or without insulation.

As can be seen in Table 1, GIB Quietline® and GIB-Tone® Quiet™ allow for a required NRC to be achieved through the specification of:

- The cavity above the ceiling or in the wall.
- The pattern (reflected in the percentage of perforation).
- The inclusion or not of insulation.

This means that there are multiple considerations which would provide the same acoustic result. In Table 1, it can be seen that there are multiple configurations that would provide an NRC of 0.65.

### Example

A specification decision may be driven by the physical ceiling space available. If a 100mm cavity above the ceiling was available, and an NRC of 0.65 required, products with a 20% or 10% perforation could be selected.

Alternatively if the ceiling space is not restrictive, then the product selection could be based on the pattern or NRC required.

### PLENUM/CAVITY INSULATION

Suitable plenum/wall cavity insulation materials include fibreglass, mineral, polyester or wool fibre bulk insulation with a minimal nominal thickness of 75mm (40mm thickness for 50 to 75 mm cavities) and a density in the range of 14 to 16 kg/m<sup>3</sup>.

TABLE 1. GIB® REVERBERATION CONTROL SYSTEMS – NOISE REDUCTION COEFFICIENTS FOR CEILING AND WALLS

Perforation	Noise Reduction Coefficient							
	400mm Plenum (Cavity)		200mm Plenum (Cavity)		100mm Plenum (Cavity)		50mm Plenum (Cavity)	
	Without Insulation	With Insulation	Without Insulation	With Insulation	Without Insulation	With Insulation	Without Insulation	With Insulation
20%	0.65	0.80	0.70	0.80	0.65	0.85	0.50	0.80
15%	0.60	0.70	0.60	0.75	0.60	0.75	0.50	0.75
10%	0.55	0.65	0.60	0.65	0.55	0.65	0.50	0.65

## GIB Quietline® and GIB-Tone® Quiet™ product range

GIB Quietline® and GIB-Tone® Quiet™ ceiling tiles can be chosen based on their pattern and also by their acoustic performance. Through consideration of the pattern, the ceiling void and the inclusion (or not) of insulation, different NRC values can be achieved.

Note: GIB Quietline® and GIB-Tone® Quiet™ have a lead time. For further information on lead times and availability, please contact the GIB® Helpline on 0800 100 442 or ask a Winstone Wallboards representative.

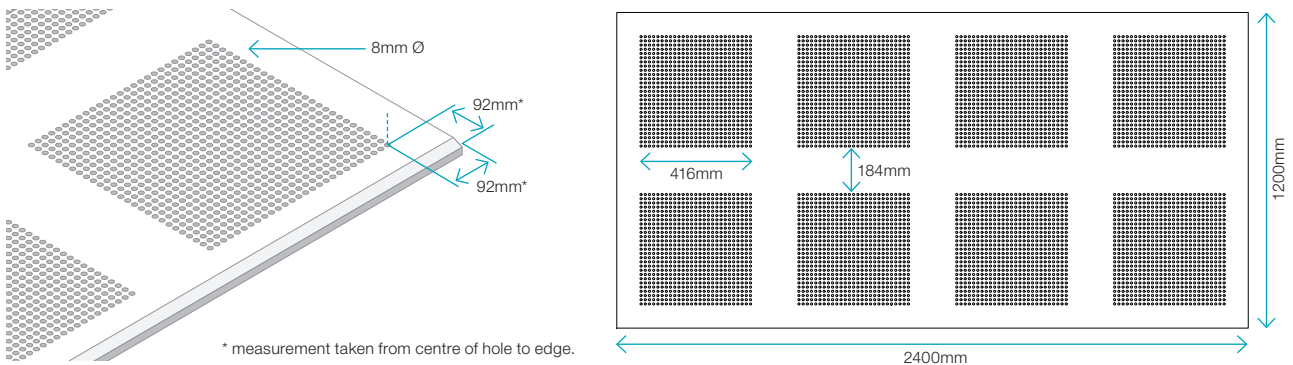
TABLE 2. SIZES AND WEIGHTS OF GIB® PLASTERBOARDS INCLUDED IN THE GIB® REVERBRATION CONTROL SYSTEMS

Name	Dimensions	Edge*	Surface finish properties	Backing fabric	Weight (nominal)
13mm GIB Quietline®	2400 x 1200mm (+/- 2mm)	TE/TE (square cut ends)	Pearlcoat™ coated paper.	GIB® QuietFabric™	8.3kg/m2 (10% perforation) to 7.4 kg/m2 (20% perforation)
10mm GIB-Tone® Quiet™ Tile	1195 x 595mm nominal (+/- 2mm)	SE/SE	White UV-cured pre-painted surface.	GIB® QuietFabric™	6.0kg/m2 (10%) to 5.3kg/m2 (20%)

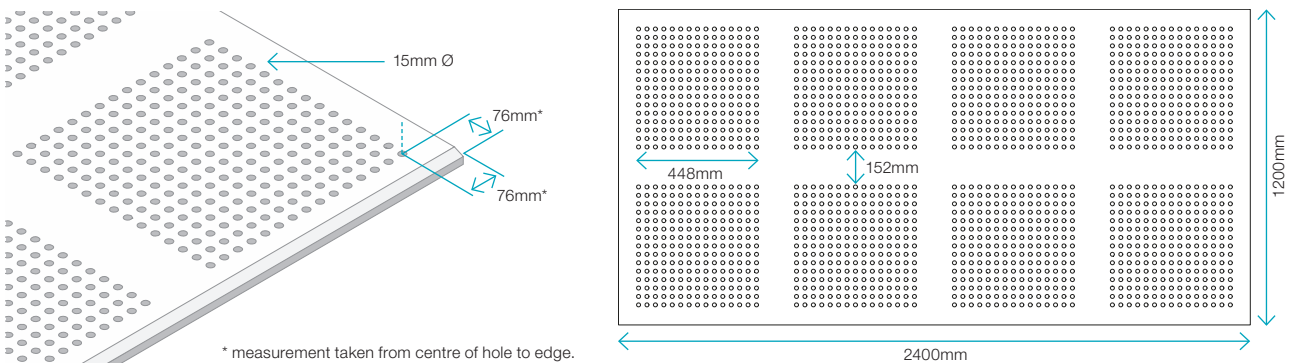
\* TE = Tapered edge. SE = Square Edge

## GIB Quietline® circle panel range

### 15501 - GIB QUIETLINE® CIRCLE 8MM Ø 8 PANEL - 10% PERFORATION

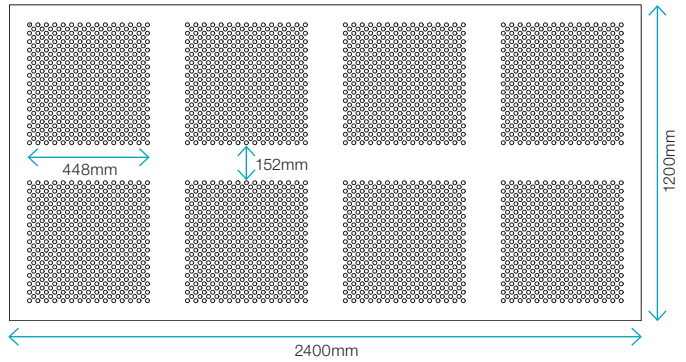
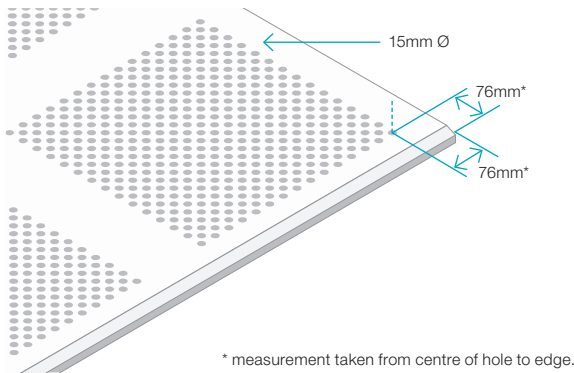


### 15397 - GIB QUIETLINE® CIRCLE 15MM Ø 8 PANEL - 10% PERFORATION



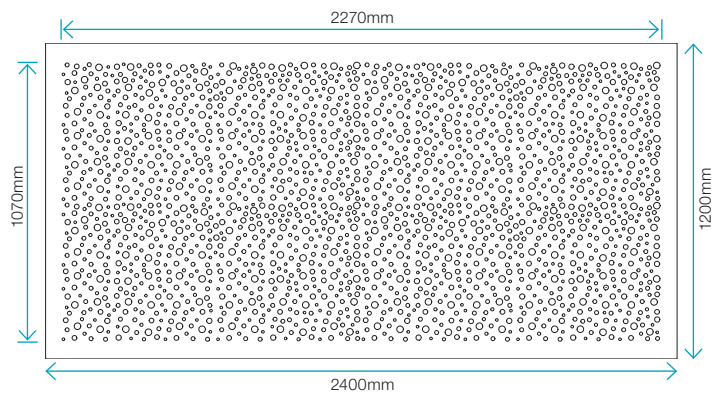
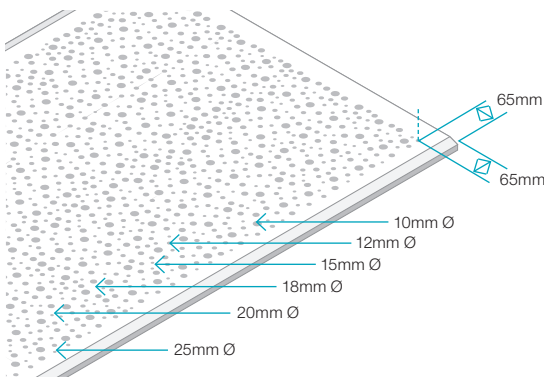


**15502 - GIB QUIETLINE® CIRCLE 15MM Ø 8 PANEL - 20% PERFORATION**



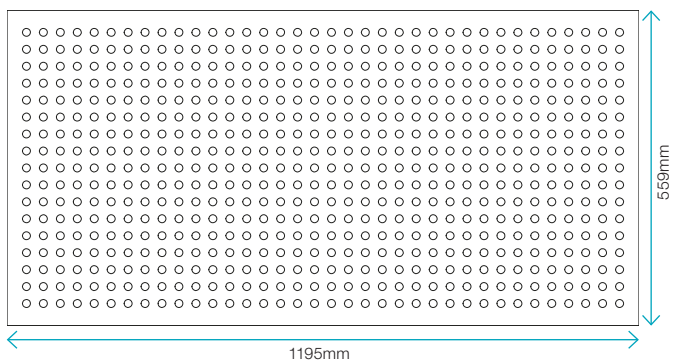
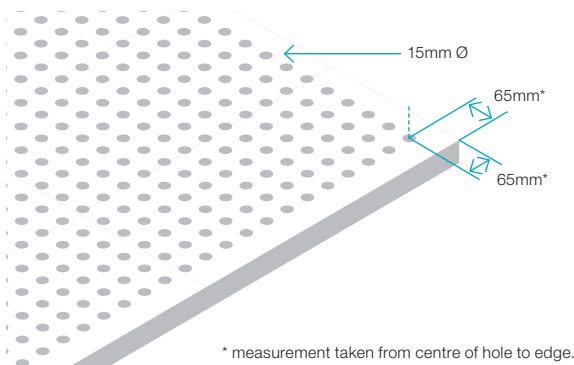
GIB Quietline® random panel

**15503 - GIB QUIETLINE® RANDOM 1 PANEL - 15% PERFORATION**



GIB-Tone® Quiet™ ceiling tile

**15506 - GIB-TONE® QUIET™ TILE CIRCLE - 15% PERFORATION**



## Installation – Ceilings

A number of factors should be considered prior to and during the installation of GIB Quietline®. These factors include:

1. Plan layout carefully before commencing installation of sheets.
2. Take measurements from the centre of the room to ensure a uniform border and pattern distribution.
3. Fix battens at a maximum of 600mm centres. Where possible, ensure that the battens line up with the clear spaces between perforations. If battens cannot be aligned with clear spaces, ensure fasteners are placed centrally between and no closer than 8mm to the edge of perforations.
4. Ensure a batten is placed centrally at the location of sheet end joints. It is recommended that this batten is located and permanently fixed to framing during the sheet installation process.
5. Carefully install sheets perpendicular to framing members and ensure the perforations of adjacent sheets align.
6. Use a minimum of 25mm x 6g GIB® Grabber® Self Tapping Drywall screws into steel battens or 32mm x 6g GIB® Grabber® screws into timber battens at a maximum of 200mm centres along the battens and at sheet ends or butt joints. Adhesive is not to be used.
7. Place fasteners no closer than 12mm from sheet ends or edges.
8. Install control joints at a maximum spacing of 12m and at junctions of hallways and large rooms. It is recommended that perimeter relief is provided by incorporating a negative detail or wall-only fixed trim at the wall-to-ceiling junction.
9. To limit sag in GIB Quietline® ceilings, ensure that longterm uniform distributed loads such as fixtures and fittings or insulation do not exceed 2kg/m<sup>2</sup> unless independently supported.

Please note: Insulation not shown in Figures 3–5 for clarity.

FIGURE 2: FASTENER SPACING

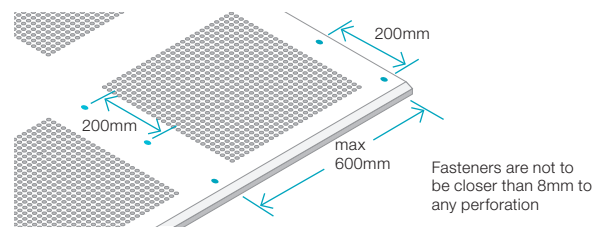


FIGURE 3: NEGATIVE DETAIL PERIMETER RELIEF

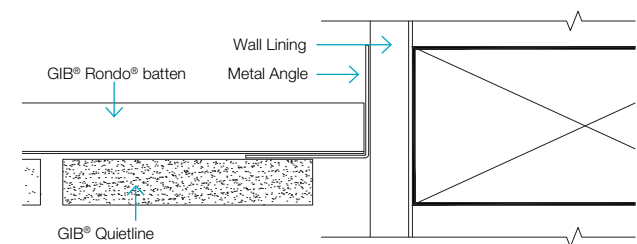


FIGURE 4: CONTROL JOINT - GIB® RONDO® P35

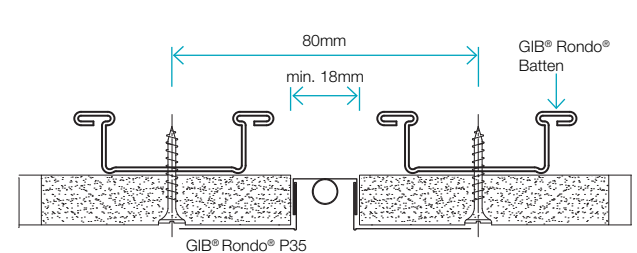
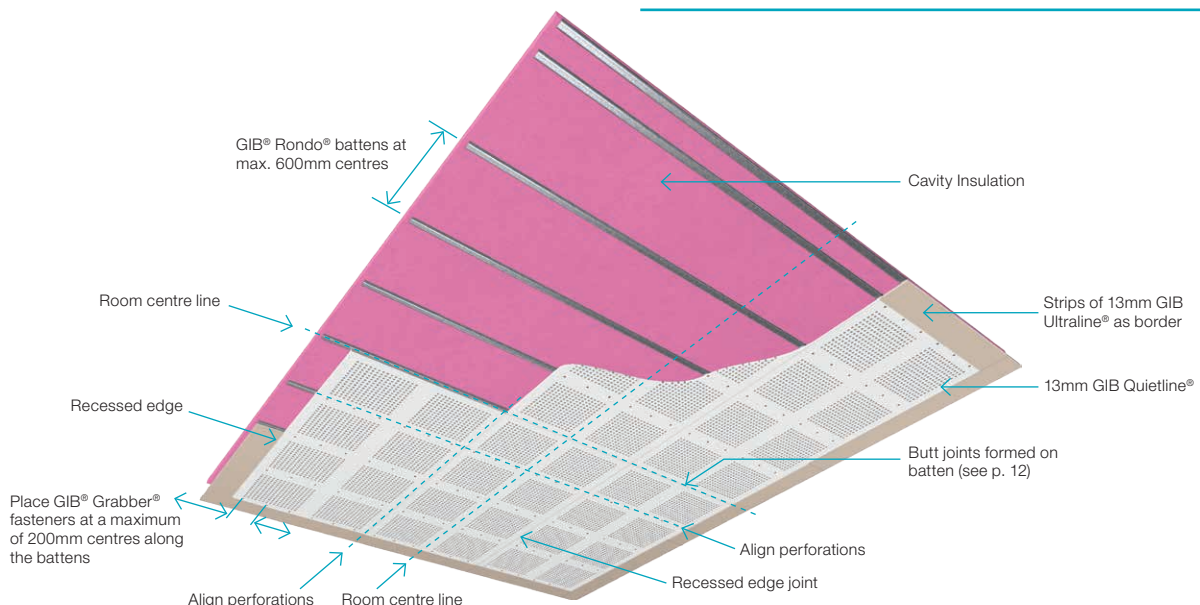
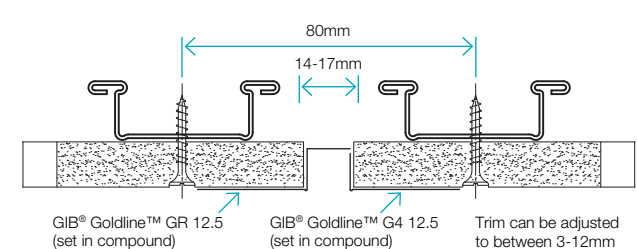


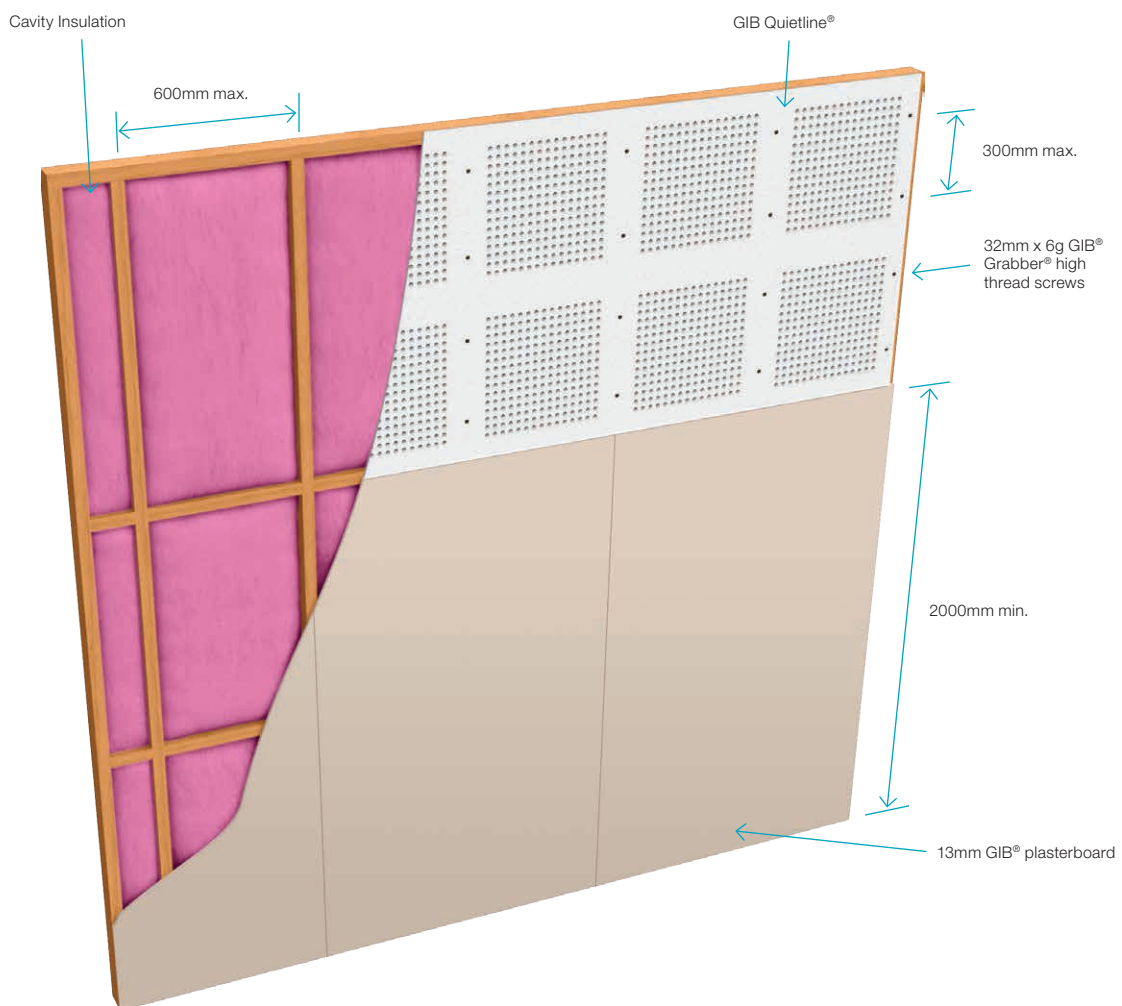
FIGURE 5: CONTROL JOINT - GIB® GOLDLINE™ PLATINUM TRIM



## Installation – Walls

A number of factors should be considered prior to and during installation of GIB Quietline® on walls. These factors include:

- Plan sheet layout before commencing installation.
- Ensure that GIB Quietline® is placed not less than 2m above floor level.
- Check wall framing tolerances with 1.8m straight edge.
- Check timber moisture content at time of installation is less than 18%.
- Use a minimum of 25 mm x 6g GIB® Grabber® self tapping drywall screws into steel framing or 32mm x 6g GIB® Grabber® high thread drywall screws into timber framing.
- Fasteners to be spaced at 300mm centres. Adhesive fixing is not permitted.
- GIB Quietline® sheets are preferably fixed horizontally but vertical fixing is permitted.
- Ensure bulk insulation does not protrude beyond the framing.
- End/butt joints are to be formed on framing.



## Finishing

Take care at all stages of finishing to ensure that perforations are not filled with jointing compound or paint. A low tack, thin masking tape can be used to mask perforations during the stopping process to minimise the accidental filling of holes. If masking tape is used, it is recommended that this is applied to the sheets on the floor (before fixing into position). Immediately remove any joint compound or paint which is accidentally placed in perforations.

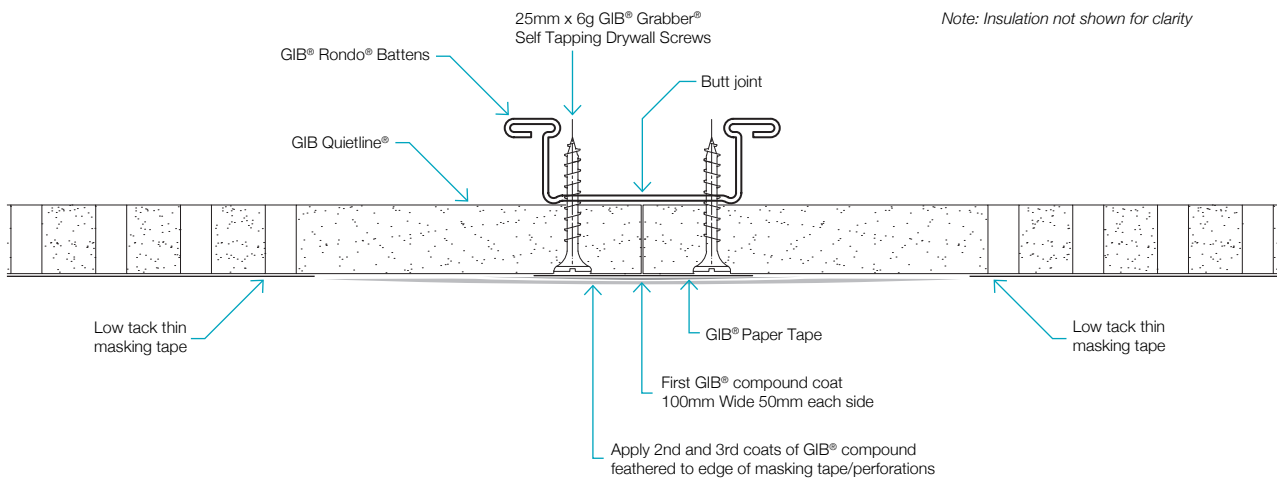
Use GIB® Joint tape in all joints and bed with a GIB® setting compound such as GIB Tradeset® 90, followed by two coats of a GIB® easy-sand air drying compound such as

GIB Trade Finish® Lite. Apply the first coat with a 100mm broad knife, smoothing the edges. Leave a gap between the base compound and the edge of the joint to ensure the final coat of air drying compound can be sanded to a feathered edge. The second and third coats are applied with a small broad knife or trowel and extend to the masking tape. Sand ridges after the joints have dried.

Apply paint system with a fine nap roller and ensure that perforation holes are not filled and the backing fabric is not clogged. Apply paint system to manufacturers instructions to ensure the best quality finish.

**Note: Paint must not be spray applied.**

FIGURE 6: FINISHING OF GIB QUIETLINE®



## GIB-Tone® Quiet™ ceiling tiles

GIB-Tone® Quiet™ must be installed in accordance with the suspended grid manufacturer's recommendations and comply with AS/NZS 2785. Winstone Wallboards recommends that the ceiling tile installers ensure that their hands are clean, or that gloves are worn to minimise marks on the ceiling tiles during installation.

## GIB Quietline® on GIB® Noise Control and GIB® Fire Rated Systems

In some situations GIB Quietline® might be required to be installed over a fire/noise control ceiling systems or adjacent to a fire/noise control wall system. Consider the following when installing GIB Quietline® in these situations:

- Install and finish fire/noise control system as per the specification in the GIB® Fire Rated Systems literature or the GIB® Noise Control Systems literature.
- Use a minimum plenum/cavity depth of 50 mm.
- Framing or framing supports for GIB Quietline® must be securely attached through the fire/noise control lining into the underlying framing.





Winstone Wallboards is committed to protecting the environment. Environmental matters are integrated into all business activities:

- Our operations strive to exceed all environmental regulatory requirements at all times.
- Protection of the environment is a day to day responsibility that we all must accept.
- We allocate appropriate management time and resources to address relevant environmental issues and continuously improve our activities in that area.
- We will achieve our standards of performance through positive action, employee involvement and constant communication with our neighbours, local authorities and customers.

Minimise on-site waste when designing and/or installing GIB® Systems. For larger projects give consideration to our cut-to-length service to reduce waste. GIB® plasterboard off-cuts, if separated from other waste building materials, can be readily recycled.

For larger projects waste can be diverted to compost manufacturers who grind up the GIB® plasterboard and use it in compost. For smaller projects, the GIB® plasterboard can be ground up and spread around the building site.

For more information on Winstone Wallboards sustainability commitments visit [gib.co.nz](http://gib.co.nz).

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### **TRADEMARKS**

The names GIB®, GIB Fyreline®, GIB Ultraline®, GIB Braceline®, GIB Barrierline®, GIB Toughline®, GIB Noiseline®, GIB Aqualine®, GIB Quietline® and GIB-Tone® Quiet™ tiles, GIB Nail®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, GIB HandiBrac®, GIB EzyBrace®, the colour blue for GIB Braceline®, the colour pink for GIB Fyreline®, the colour green for GIB Aqualine®, the colour mauve for GIB Toughline® and the shield device are registered trademarks of Fletcher Building Holdings Limited.



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