

# Sound Design Guide



# Building a Home with QuietZone™

Defined as sound that is loud, harsh or confused, 'noise' is rarely welcome in the home. Sometimes when a particular noise is continuous and inescapable it can even result in physical discomfort or mental distress. Anyone who has ever been disturbed by the banging of pots in the kitchen, slamming doors or a loud television or stereo in the next room would appreciate the quiet calm of a QuietZone™ home.

The best way to treat noise in the domestic situation is to ensure that proper building practices are followed at the design stage and during construction of the home. This involves ensuring the correct acoustic systems are installed and noise levels are compatible with the use of each space.

Ideally sound insulation requirements for a residential building should focus on internal sound transmission. Any wall or floor/ceiling system that separates a living area (like a kitchen or dining room) from a rest area (such as a bedroom) should be designed and constructed to provide a sufficient level of insulation against airborne and structureborne transfer of noise.

## Introducing QuietZone™

*Designed to suit the needs of the modern home occupant, QuietZone™ utilises the latest noise insulation technology to reduce noise in selected areas of the home, extension or renovation.*

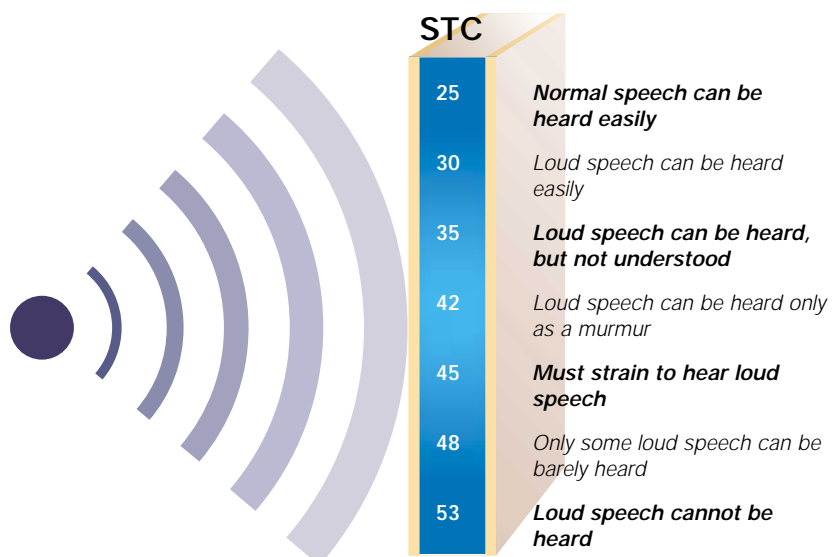
### Airborne Noise and Sound Transmission Class (STC)

Airborne noise is defined as noise from sources such as voices, televisions and musical instruments that is generated in one room and passes through a partition into the room on the other side.

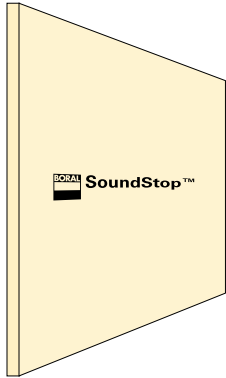
Developed in order to compare the isolating performance of building systems the Sound Transmission Class (or STC) is measured on a positive rising scale. The higher the STC the better the sound isolation of a wall or ceiling against airborne noise.

STC ratings are obtained from tests carried out in certified laboratories under controlled conditions.

A reduction in the acoustic performance of an actual building system may occur if attention is not given to preventing flanking paths (noise passing through other parts of the structure) or incorrect installation procedures. Refer to the section titled 'Guide to Constructing QuietZone™ Systems 'Controlling Flanking Noise' in this brochure.



# QuietZone™ Products



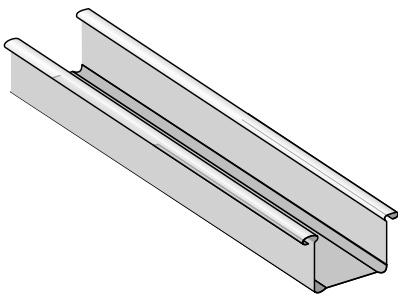
**Boral SoundStop™ Plasterboard**  
 10mm SoundStop™ - 1200mm and 1350mm wide x 3600mm, 4800mm lengths with recessed longitudinal edges. Spans - 600mm max. on wall framing and 450mm max. on ceiling framing.



**QuietPipe™**  
 combines Insulation Solutions' **Sonobatts™** 25mm thick Type 5 Blanket with **Nylabar™** 3mm with surface weight of 4.5kg/m<sup>3</sup> - Rolls of 5 metres x 1200mm cut to length 1350mm x 530mm to suit a 100mm pipe.



**Insulation Solutions' NoiseStop™ board**  
 13mm NoiseStop™ board - 914mm width x 1200mm lengths.



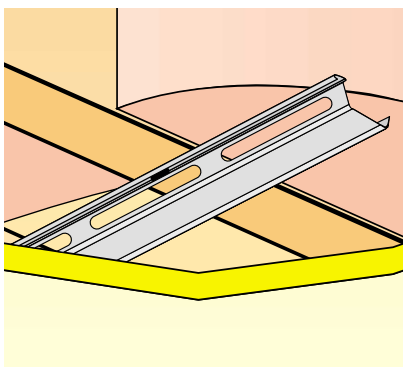
**Rondo Furring Channel**  
 Part No. 129 - 28mm Furring Channel - 3000mm, 3600mm, 4800mm, 6000mm lengths.



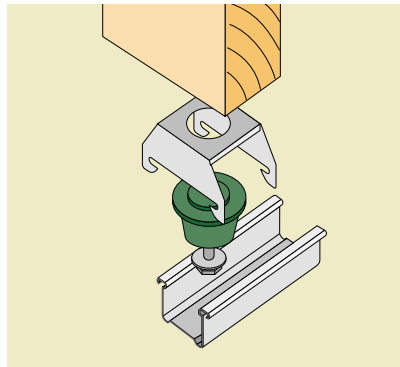
**Boral Plasterboard Jointing and Finishing Compounds**  
 One of Boral Plasterboard's Jointing and Finishing systems.



**Noise Control Batts™**  
 75mm Noise Control Batts™ - 430mm wide x 1160mm lengths, 600mm widths x 1200, 2700mm lengths.



**Rondo Resilient Channel**  
 Part No. 581 - Resilient Channel - 3658mm lengths.



**Boral Acoustic Ceiling Mount**  
 Comprises Furring Channel Clip and Rubber Element.



**Pink Batts™**  
 R 3.0 Pink Batts™ - 430, 580mm widths x 1160mm length.

# Guide to Constructing QuietZone™ Systems

Successful design and construction of the QuietZone™ systems is the easiest way to effectively reduce unwanted noise from specific areas of the home.

When determining the layout of the home or extension, it is important to be aware of the location of potentially noisy rooms. Proximity of living and entertainment areas, pipes, service ducts, toilet cisterns and domestic appliances will determine the areas that require QuietZone™ systems and how 'quiet' the room should be.

## Quiet Walls

A standard internal timber frame and plasterboard wall has an STC of 34 and normal speech can be heard easily. By selecting the 'Quietest' QuietZone™ Wall System, the Sound Transmission Class is increased dramatically to STC53 so that loud speech cannot be heard.

## Quiet Floor/Ceilings

To maximise the acoustic performance of a QuietZone™ Wall System treatment, the ceiling to the 'quiet' room should also be considered. Within a double-storey home, noise caused by footfall on hard flooring may be transferred from the upper floor to the rooms below.

A standard bare timber floor on timber joists, lined with plasterboard downstairs has an IIC rating of 30, meaning people walking upstairs are clearly audible and the noise generated is intrusive. This noise problem can be overcome

simply and inexpensively with the QuietZone™ Floor/Ceiling System. The 'Quieter' Floor/Ceiling System has an IIC of 68 with carpet and underlay, reducing the impact noise from heavy walking on the floor above to a low thump. There's even a QuietZone™ solution for plumbing installed in the upper floor cavity.

## Attention to detail

Building a QuietZone™ system requires a little more care and attention to detail than the standard project. Each component in a QuietZone™ system must be securely fixed, necessary services strategically placed and all plasterboard perimeter edges and necessary openings adequately sealed.

## Controlling 'Flanking Noise'

It is important when constructing a QuietZone™ room to seal all possible paths to prevent 'flanking noise' passing through poor joints between walls and floor, ceiling

spaces, floor spaces, ductwork and other walls. Combining QuietZone™ wall, floor/ceiling and plumbing systems, will control flanking noise travelling from one room to another and thoroughly sealing all joints and perimeter edges around openings with an approved acoustic sealant will prevent any noise leakage.

## Fixtures & fittings

Particular attention should also be paid to type and installation of fixtures and fittings. For example; solid core doors specifically designed for noise control and surface mounted lights on ceilings. Power points should be staggered on opposite sides of QuietZone™ walls and when installing cornice a continuous ribbon of flexible acoustic sealant should be applied at the wall/ceiling junction before installing the cornice to ensure an airtight seal.

# Architectural Specification

## Scope

The contractor shall supply all materials, labour and equipment required to satisfactorily complete the installation and jointing of all Boral Plasterboard, Insulation Solutions and Rondo products as specified to meet the individual project requirements.

## Qualifications

All materials unless otherwise indicated shall be manufactured by Boral Plasterboard, Insulation Solutions or Rondo Building Services. They should be installed in accordance with the printed instructions as detailed in the technical brochures of Boral Plasterboard and Insulation Solutions.

## Delivery, storage and protection

All materials used in the construction of the QuietZone™ systems shall be delivered in their original unopened packaging. The materials should be stored in an enclosed shelter providing protection from inclement weather and onsite damage. Damaged materials should be removed from the construction site.

## Framing or substrate

All framing shall conform to structural standards specified by the relevant building authorities and/or Australian Standard. The framing shall be prepared in accordance with the requirements of Australian Standard AS/NZS 2589.1:1997 – "Gypsum linings in residential and light commercial construction – application and finishing" and Boral Plasterboard's Systems Information Sheet 14 – 'Installing SoundStop™ into QuietZone™ Systems'.

## Installation

All plasterboard and insulation materials shall be installed in accordance with the requirements of Australian Standard AS/NZS 2589.1:1997 – "Gypsum linings in

residential and light commercial construction – application and finishing" and Boral Plasterboard's Systems Information Sheet 14 – 'Installing SoundStop™ into QuietZone™ Systems'.

## Materials

### Plasterboard

10mm Boral SoundStop™ Plasterboard. Widths as specified for the system selected, lengths as required.

### Rondo Furring Channel

Part No. 129 – 28mm Furring Channel.  
Lengths as required.

### Rondo Resilient Channel

Part No. 581 – Resilient Channel.

### Boral Acoustic Ceiling Mount

Comprises Furring Channel Clip and Rubber Element.

### Plasterboard Joint treatment

Any of the approved Boral Plasterboard jointing systems comprising perforated 50mm wide paper tape and tape bedding compound.

(Refer to Boral Plasterboard Installation Reference Manual, Fixing to Timber & Masonry - Booklet 2.)

### Finishing Compound

Any of the approved Boral Plasterboard joint finishing systems comprising a finishing compound.  
(Refer to Boral Plasterboard Installation Reference Manual, Products & Their Uses - Booklet 1.)

### Perimeter caulking

Boral Plasterboard Cornice Adhesive or an approved flexible acoustic sealant.

### Insulation Solutions' NoiseStop™ board

13mm NoiseStop™ board.

### Noise Control Batts™

75mm Noise Control Batts™  
Widths as specified for the system selected, lengths as required.

### Pink Batts™

R 3.0 Pink Batts™  
Widths as specified for the system selected, lengths as required.

### QuietPipe™

combines Insulation Solutions' 25mm thick Sonobatts™ Type 5 Blanket with 3mm Nylabar - surface weight of 4.5kg/m<sup>3</sup>.

Widths as specified for the system selected, lengths as required.

## Structureborne Noise and Impact Insulation Class (IIC)

Structureborne or impact noise is produced when a building element is directly or indirectly impacted or vibrated and some of the energy passes through the building structure and is re-radiated as noise to adjacent rooms.



The most common sources of structureborne noise are;

- ◆ Heavy footsteps on the floor/ceiling above (in two-storey homes)
- ◆ Movement of furniture - chair legs scraping on bare (uncarpeted) floors overhead
- ◆ Vibration from high volume television or stereo in upstairs rooms
- ◆ Vibration and noise from dishwashers, washing machines, clothes dryers and waste pipes

Footsteps will transfer structureborne noise through floors regardless of the covering. However bare floors such as tiled or polished timber floors are especially prone to structureborne noise transfer (also known as impact noise). The impact insulation of floors is rated using the Impact Insulation Class (IIC). The larger the IIC value, the better the impact insulation.

## QuietZone™ Systems

The QuietZone™ systems have been specifically developed for use in residential and other buildings where high levels of sound insulation are required and takes into consideration all possible internal sources of unwanted noise.

There are nine QuietZone™ systems; three wall and three ceiling systems and three plumbing systems. In addition, the QuietZone™ systems can be combined to produce varying levels of comfort within the home, tailored to meet the needs of the occupants. With the choice of Quiet, Quieter or Quietest, there's a system to suit the smallest budget and the broadest of design considerations.

QuietZone™ combines the products of two of Australia's leading building materials manufacturers: Boral Plasterboard and Insulation Solutions.

### Boral SoundStop™ Plasterboard

Developed particularly for acoustically sensitive applications Boral SoundStop™ Plasterboard has excellent sound insulating properties due to a specially modified high-density gypsum core. Designed to enable simple and cost effective construction, SoundStop™ plasterboard is conventionally applied to ceilings and walls in single or double layers depending on the level of acoustic insulation required - Quiet, Quieter or Quietest.

### Insulation Solutions

The superior performance of Insulation Solutions' NoiseStop™ board, Noise Control Batts™ and QuietPipe™ are integral to QuietZone™, ensuring the wall, floor/ceiling and pipe systems insulate against different levels of noise from a variety of sources.

# Quiet Walls

**Quiet Walls** reduce the level of sound entering the room from other areas of the home to the extent that loud speech can be heard but not understood (STC 42).

**Quiet Walls** are constructed using a single sheet of Boral SoundStop™ Plasterboard fixed either side of the wall and the wall cavity filled with Insulation Solutions' 75mm Noise Control Batts™.

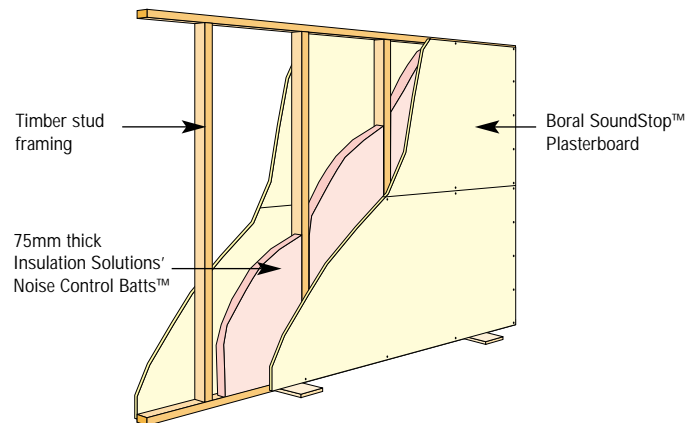
**Quieter Walls** insulate the room from noise so that loud speech uttered outside is heard in the room as only a murmur (STC 48).

**Quieter Walls** use Insulation Solutions' NoiseStop™ board fixed to one side of the wall with a single sheet of Boral SoundStop™ Plasterboard fixed to both sides and the wall cavity filled with Insulation Solutions' 75mm Noise Control Batts™.

**Quietest Walls** ensure that noise such as loud speech cannot be heard at all (STC 53).

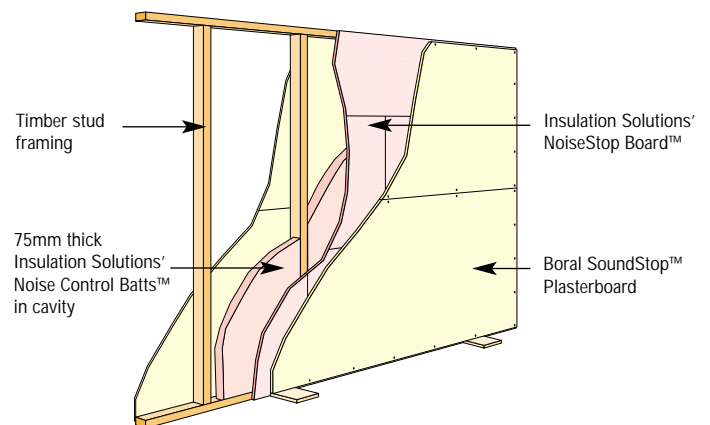
**Quietest Walls** consist of two sheets of Boral SoundStop™ Plasterboard fixed to each side of the staggered stud wall with the wall cavity filled with Insulation Solutions' 75mm Noise Control Batts™.

## Quiet Walls



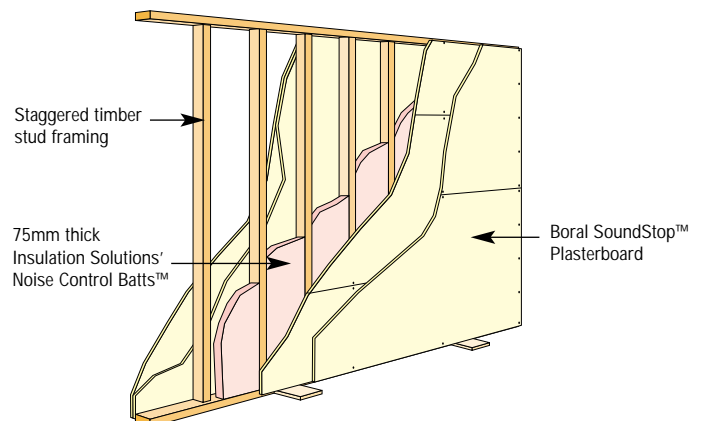
|             |   |
|-------------|---|
| STC         | 42  |
| Performance | Loud speech can be heard but not understood |

## Quieter Walls



|                |   |
|----------------|---|
| STC            | 48  |
| Performance    | Loud speech can be heard as a murmur  |
| Ceiling System | R3.0 Pink Batts plus 2x10mm Unispan in a room where noise will be generated |

## Quietest Walls



|                |   |
|----------------|---|
| STC            | 53  |
| Performance    | Loud speech cannot be heard   |
| Ceiling System | R3.0 Pink Batts plus 2x10mm Unispan. Plasterboard on Boral Acoustic Ceiling Mount in a room where noise will be generated |

# Quiet Floor/Ceilings

With the **Quiet Floor/Ceiling** loud speech may be heard but not understood and footsteps overhead (in a double storey home) are softened to a low thump (STC 50 / IIC 62 - with carpet & underlay).

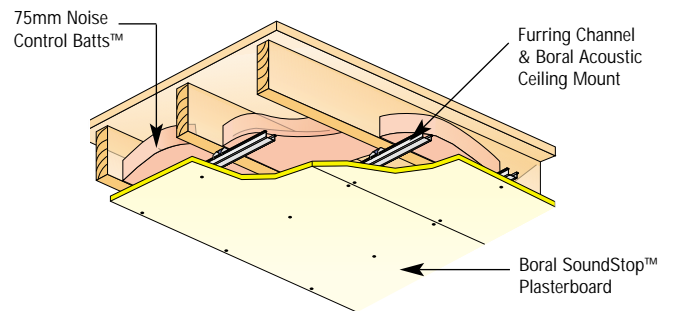
**Quiet Floors/Ceilings** are constructed from a single sheet of Boral SoundStop™ Plasterboard fixed to floor/ceiling joists using Rondo Furring Channel and the Boral Acoustic Ceiling Mount with Insulation Solutions' 75mm Noise Control Batts™ filling the floor/ceiling cavity.

**Quieter Floors/Ceilings** is the quieter alternative. Loud speech can hardly be heard from within and heavy walking on the floor above is audible as a low thump (STC 54 / IIC 68).

**Quieter Floors/Ceilings** consist of two sheets of Boral SoundStop™ Plasterboard fixed to floor/ceiling joists with Rondo Furring Channel, the Boral Acoustic Ceiling Mount and Insulation Solutions' 75mm Noise Control Batts™ filling the floor/ceiling cavity.

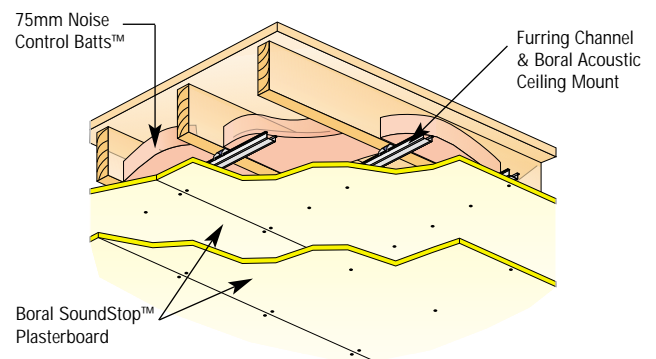
**Quietest Floors/Ceilings** keep noise out so that loud speech cannot be heard at all and the heavy footfall of a walker overhead is softened to a very low thump. (STC 59 / IIC 74 - with carpet & underlay). The quietest solution - **Quietest Floors/Ceilings** are constructed with two sheets of Boral SoundStop™ Plasterboard fixed to floor/ceiling joists, with Rondo Furring Channel, the Boral Acoustic Ceiling Mount, two additional layers of SoundStop™ fixed to the underside of flooring and Insulation Solutions' 75mm Noise Control Batts™ in the floor/ceiling cavity.

## Quiet Floors/Ceilings



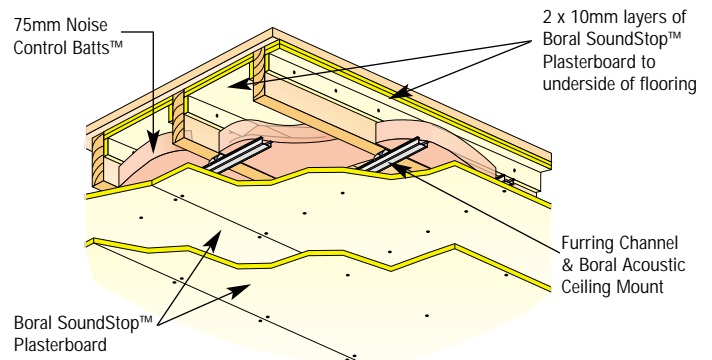
|             | With Carpet & Underlay                      | Bare Timber or Ceramic Floor Tiles          |
|-------------|---|---|
| <b>IIC</b>  | <b>62</b>                                   | <b>44</b>                                   |
| Performance | Walking heard as a low frequency thump      | People walking around are clearly audible   |
| <b>STC</b>  | <b>50</b>                                   | <b>50</b>                                   |
| Performance | Loud speech can be heard but not understood | Loud speech can be heard but not understood |

## Quieter Floors/Ceilings



|             | With Carpet & Underlay                       | Bare Timber or Ceramic Floor Tiles           |
|-------------|--|--|
| <b>IIC</b>  | <b>68</b>                                    | <b>49</b>                                    |
| Performance | Heavy walking heard as a low frequency thump | People walking around audible and noticeable |
| <b>STC</b>  | <b>54</b>                                    | <b>54</b>                                    |
| Performance | Very hard to hear loud speech                | Very hard to hear loud speech                |

## Quietest Floors/Ceilings



|             | With Carpet & Underlay                       | Bare Timber or Ceramic Floor Tiles           |
|-------------|--|--|
| <b>IIC</b>  | <b>74</b>                                    | <b>54</b>                                    |
| Performance | Heavy walking heard as a low frequency thump | People walking around audible but acceptable |
| <b>STC</b>  | <b>59</b>                                    | <b>59</b>                                    |
| Performance | Loud speech cannot be heard                  | Loud speech cannot be heard                  |



# Quiet Plumbing

Insulation Solutions' have developed an effective solution to noise generated in waste pipes and plumbing associated with household appliances. Noise from pipes located in walls and upper floors won't intrude into the rest of the home if the pipes are installed using the QuietPipe™ system in the Quiet or Quieter Plumbing systems.

QuietPipe™ combines Nylabar™ Loaded Vinyl Sheet with Insulation Solutions' 25mm thick Sonobatt™ Type 5 Blanket as acoustic pipe lagging capable of providing up to 18dB(A) noise reduction.

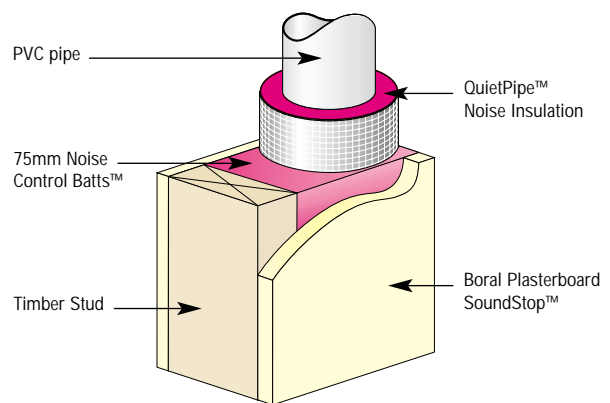
**Quiet Plumbing – Walls** will ensure noise is not transmitted to adjacent rooms by surrounding PVC Waste Pipes with the Insulation Solutions' QuietPipe™ system (Nylabar™ with 25mm thick Sonobatt™ Type 5 Blanket), Noise Control Batts™ and Boral SoundStop™ Plasterboard (STC 35).

**Quiet Plumbing – Floors** will provide an effective barrier against sound transmission to adjacent rooms from pipes located in the upper floors of a home. This is achieved by lagging the pipes with the QuietPipe™ system, one layer of 10mm Boral SoundStop™ Plasterboard on the floor/ceiling (with Boral Acoustic Ceiling Mount and Furring Channel) and 75mm Noise Control Batts™ in the floor/ceiling cavity (STC 35-40).

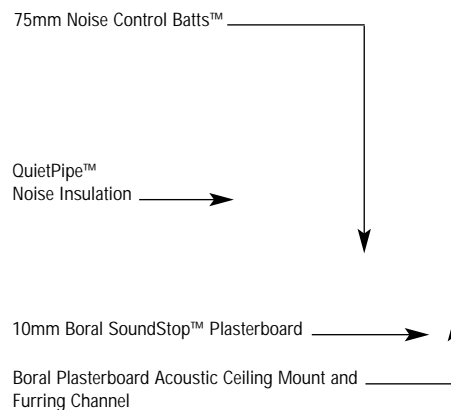
**Quieter Plumbing – Floors** will diminish noise emitted from waste pipes in the upper floor space so that the rooms below are free of audible disturbance while complying with the Building Code of Australia (BCA) minimum requirement of STC 45.

Quieter Plumbing combines Insulation Solutions' QuietPipe™ system (Nylabar™ with 25mm thick Sonobatt™ Type 5 Blanket) with two layers of 10mm Boral SoundStop™ Plasterboard on the floor/ceiling (with Boral Acoustic Ceiling Mount and Furring Channel) and 75mm Noise Control Batts™ in the floor/ceiling cavity.

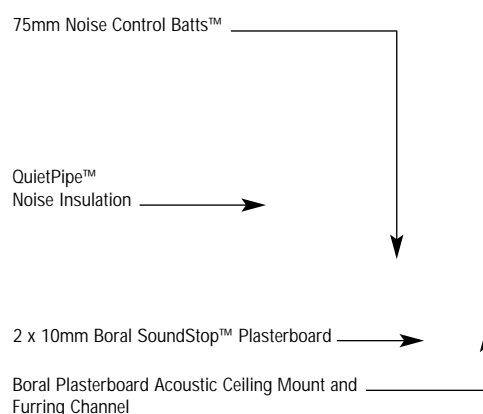
## Quiet Plumbing - Walls



## Quiet Plumbing - Floors



## Quieter Plumbing - Floors



# Quiet Walls & Ceilings... Quiet Floors...Quiet Plumbing...

## Guarantee

Products manufactured and supplied by Boral Australian Gypsum Limited (BAGL) A.C.N. 004 231 976 trading as **Boral Plasterboard** are guaranteed to be of consistent quality and free from any defects.

Boral Plasterboard products must be installed using the components and accessories specified and in accordance with the instructions detailed in Boral Plasterboard's technical literature.

Boral Plasterboard products are manufactured to suit the requirements of the building industry in Australia.

Boral Plasterboard may limit its liability under this guarantee to, at its option, the replacement or payment of the cost of replacing or supplying equivalent or payment of the cost of supplying equivalent or the repair or payment of the cost of repairing products found to be defective.

**Insulation Solutions** reserves the right to change product specifications without prior notification.

Information in this publication and otherwise supplied to users as to the subject product is based on our general experience and is given in good faith, but because of the many particular factors which are outside our knowledge and control and affect the use of the products, no warranty is given or is to be implied with respect to either such information or the product itself, in particular the suitability of the product for any particular purpose. The purchaser should independently determine the suitability of the product for the intended application.

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Nylabar™ is a trademark of NYLEX.

SoundStop™ is a trademark of Boral Australian Gypsum A.C.N. 004 231 976 trading as Boral Plasterboard.

**For further technical information please call:**

QuietZone™ – 1300 657 465

