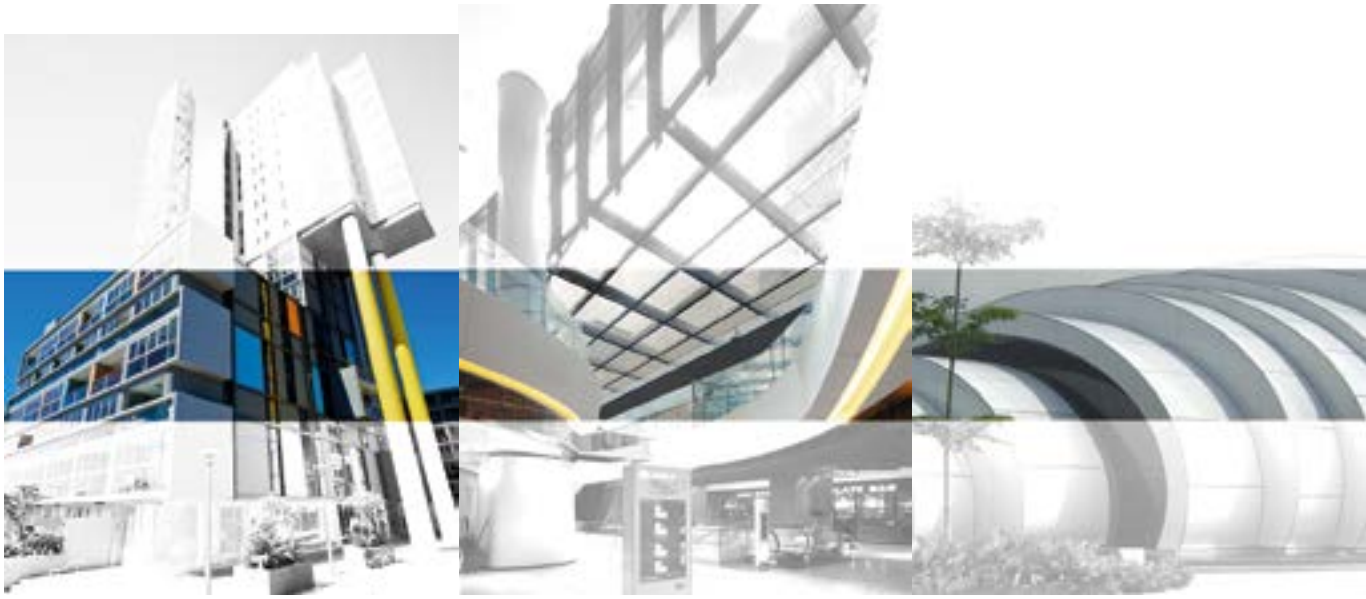


WALLS

STEEL STUD >
MAXIFRAME® >
QUIET STUD® >
MASONRY WALL >

RONDO®

RONDO STEEL STUD DRYWALL FRAMING SYSTEM

SUMMARY

The Rondo Steel Stud Drywall Framing System provides a durable, practical and lightweight structure for internal plasterboard walls and for specific external wall systems. The availability of various sizes, complimentary components such as noggin tracks, curved tracks and special cleats ensure Rondo Stud and Track wall systems are available to suit almost all situations.

SUITABLE FOR:

- Non-load bearing partition walls
- Load Bearing Walls by design
- Steel Stud Ceiling Systems
- Window and Door Jambs
- Non-Fire Rated Systems
- Fire Rated Systems
- Acoustic Wall Systems by design
- External Wall systems by design
- Light Weight Floor Joists
- Bulkheads

SPECIAL FEATURES

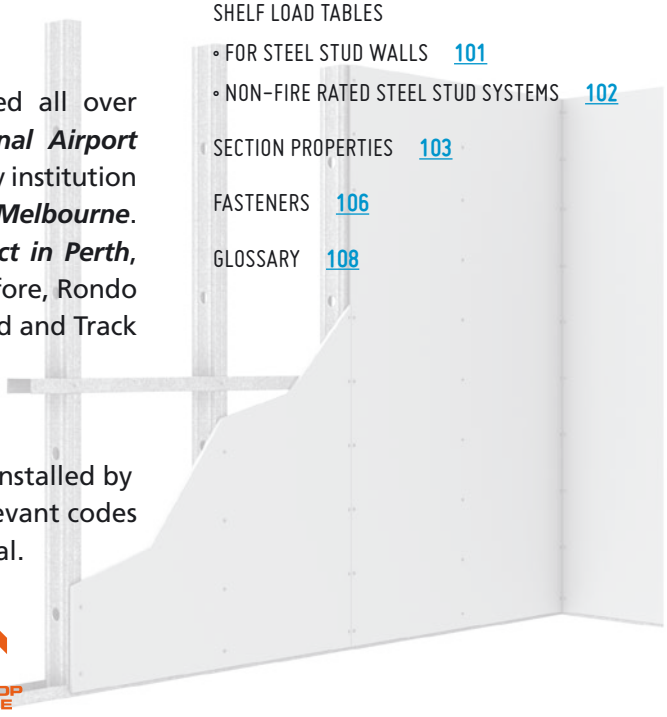
- Available in custom lengths
- Majority of Stud and Track is hemmed for safety and increased strength
- Bell mouthed service holes to mitigate damages to services
- Flexible Track available for curved walls
- Manufactured with a minimum coating of Z275
- Profiles widths range from 51 to 150mm, and gauges from 0.50 to 1.15BMT.
- MAXIframe External Wall Framing System made from 1.2BMT G500 steel
- Includes unique QUIET STUD® profile for better acoustic performance

IN PRACTICE

Rondo's Stud and Track Systems have been used all over the world, including in the ***Mumbai International Airport development in India*** and Australia's largest tertiary institution and award-winning project, ***RMIT University in Melbourne***. For the high-profile ***Fiona Stanley Hospital project in Perth***, its design required special length products – therefore, Rondo produced large quantities of the non-standard Stud and Track sizes to ensure the project could progress rapidly.

IMPORTANT NOTE:
Rondo recommends its products and systems are installed by a qualified tradesperson and according to the relevant codes and standards outlined on page 256 of this manual.

CONTENTS:



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RONDO STEEL STUD & TRACK SECTIONS

LIPPED WALL STUDS

401	51mm x 0.50bmt Stud with Hem
112	64mm x 0.50bmt Stud with Hem
403	76mm x 0.55bmt Stud with Hem
251	92mm x 0.55bmt Stud with Hem
489	51mm x 0.75bmt Stud
491	64mm x 0.75bmt Stud
493	76mm x 0.75bmt Stud
495	92mm x 0.75bmt Stud
511	150mm x 0.75bmt Stud
661	64mm x 1.15bmt Stud
671	76mm x 1.15bmt Stud
681	92mm x 1.15bmt Stud
691	150mm x 1.15bmt Stud

QUIET STUD

RQST	92mm x 0.55bmt

FLEXIBLE TRACK

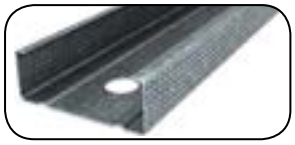
103	51mm Flexible Track
104	64mm Flexible Track
105	76mm Flexible Track
106	92mm Flexible Track
107	64mm Deflection Head Flexible Track
108	76mm Deflection Head Flexible Track
109	92mm Deflection Head Flexible Track
110	150mm Deflection Head Flexible Track

WALL TRACKS

400	51mm x 28mm x 0.50bmt with hem
111	64mm x 28mm x 0.50bmt with hem
402	76mm x 28mm x 0.50bmt with hem
250	92mm x 28mm x 0.50bmt with hem
490	51mm x 28mm x 0.70bmt with hem
492	64mm x 28mm x 0.70bmt with hem
494	76mm x 28mm x 0.70bmt with hem
496	92mm x 28mm x 0.70bmt with hem
660	64mm x 32mm x 1.15bmt Track
670	76mm x 32mm x 1.15bmt Track
680	92mm x 32mm x 1.15bmt Track

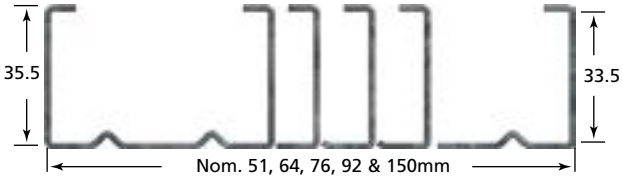
LIPPED WALL STUDS — FIRE TESTED

401/112/403/251/489/491/ 493/495//511

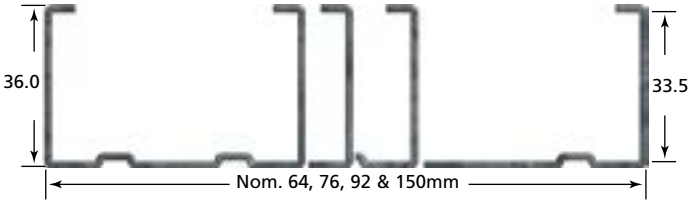


661/671/681/691

0.50/0.55 BMT



0.75 BMT



1.15 BMT

QUIET STUD

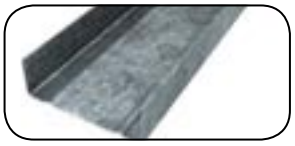
RQST

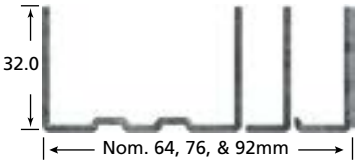
FLEXIBLE TRACK

103/104/105/106/ 107/108/109/110

WALL TRACKS

0.50/0.70 BMT





1.15 BMT

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DEFLECTION HEAD TRACKS

480	64mm x 50mm x 0.50bmt Deflection Head Track
482	76mm x 50mm x 0.50bmt Deflection Head Track
483	92mm x 50mm x 0.50bmt Deflection Head Track
488	51mm x 50mm x 0.70bmt Deflection Head Track
497	64mm x 50mm x 0.70bmt Deflection Head Track
498	76mm x 50mm x 0.70bmt Deflection Head Track
499	92mm x 50mm x 0.70bmt Deflection Head Track
510	150mm x 50mm x 0.75bmt Deflection Head Track
663	64mm x 50mm x 1.15bmt Deflection Head Track
673	76mm x 50mm x 1.15bmt Deflection Head Track
683	92mm x 50mm x 1.15bmt Deflection Head Track
690	150mm x 50mm x 1.15bmt Deflection Head Track

SLOTTED DEFLECTION HEAD TRACK

S499	92mm x 0.70 bmt Slotted Deflection Head Track
S510	150mm x 0.75 bmt Slotted Deflection Head Track
S683	92mm x 1.15 bmt Slotted Deflection Head Track
S690	150mm x 1.15 bmt Slotted Deflection Head Track

NOGGING TRACKS

501	Continuous Nogging Bracket
503	51mm x 0.70bmt Nogging Track
504	64mm x 0.70bmt Nogging Track
505	76mm x 0.70bmt Nogging Track
506	92mm x 0.70bmt Nogging Track
507	150mm x 0.75bmt Nogging Track

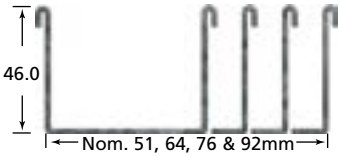
CLIPS

126	Staggered Stud Clip (Acoustic)
704	Partition mounting cip

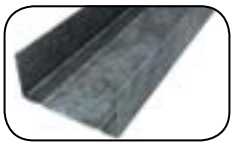
CONTROL JOINT

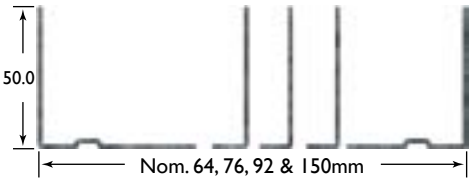
P35	Flexible Control Joint

DEFLECTION HEAD TRACKS



0.50/0.70 BMT



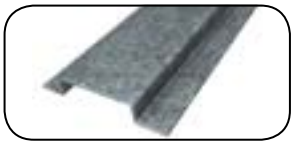


0.75/1.15 BMT

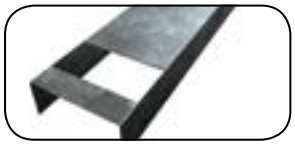
SLOTTED DEFLECTION HEAD TRACK

MAXITRACK

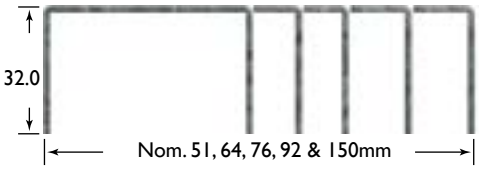
NOGGING TRACKS



NOGGING BRACKET



NOGGING TRACK



CLIPS

126

704

CONTROL JOINT

P35

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INSTALLATION INFORMATION: WALLS

Tracks

Track sections provide a friction fit for the studs, which not only holds the studs in position until the lining board is fitted, but also provides a slip joint to allow for movement in the structure. For this reason do not screw the lining board to the track sections unless specifically stated.

Track sections 0.50bmt and 0.70bmt have hemmed flanges with nominal heights of 29mm and 46mm for standard and deflection head track respectively. 1.15 bmt track sections are not hemmed and have nominal flange heights of 32 and 50mm.

In general, where walls are lined both sides, standard tracks are used unless the project engineer has indicated that deflection heads are required; for example, under a concrete slab or where the wall height is 4800mm or greater. For stud framing unlined or only lined one side, see notes accompanying Nogging Tables within this document.

There is no requirement to isolate the track sections from slabs, unless specifically stated.

Track sections are nominally 3000mm long and should be fixed at not more than 600mm centres. Fixings should be placed within 100mm from either end of the track sections.*

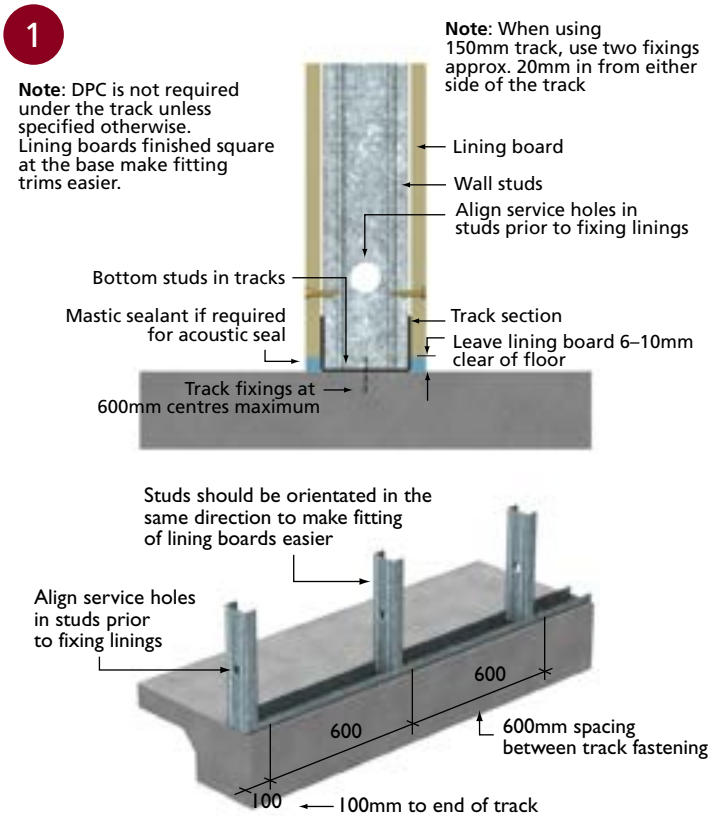
FRICTION JOINTS

Friction fit and deflection heads require special detailing to achieve their design capacity (*refer to Figure 2 for specific details).*

The maximum wall height tables have been checked assuming a friction joint between the stud and track*.

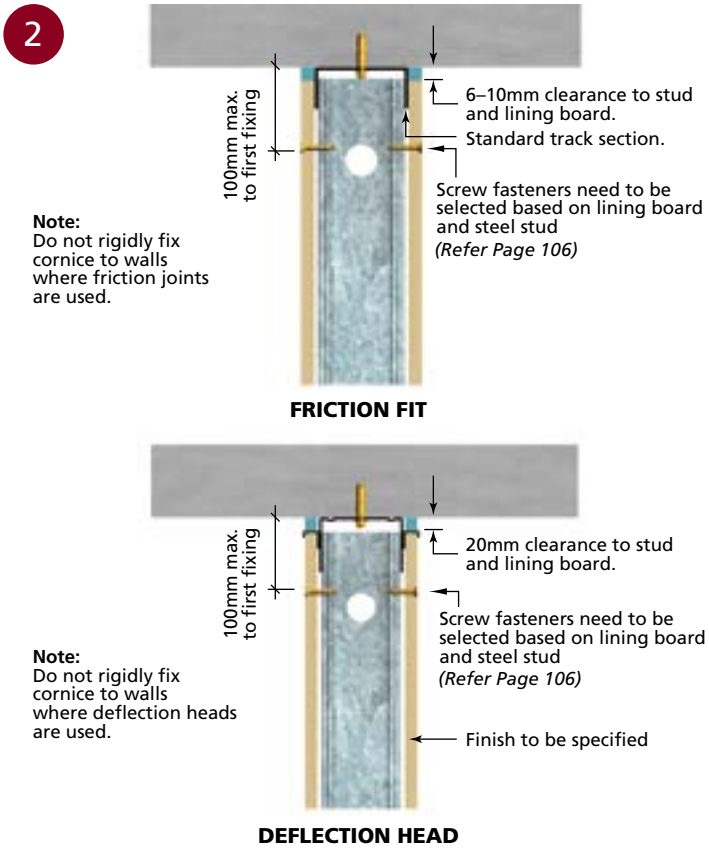
* In some seismic areas these connection details may not be valid. Please check with your nearest Rondo Office prior to commencing installation.

1



TRACK FIXING DETAILS

2



FRICTION FIT/DEFLECTION HEAD

Slotted Deflection Head Track (MAXItrack®)

The MAXItrack® is slotted along the flanges to provide a positive connection between the stud and the track as shown in Fig 3 by the use of 2 #10 screws, one each side, to greatly increase the connection capacity of the stud to head track connection.

By using MAXItrack®, it is no longer necessary to install Nogging track 100mm below the head track. Currently, MAXItrack® is available in 92 & 150 mm sizes.

FIXING TO CONCRETE:

The standard clearance between the top of the stud and the slab soffit is 20mm, which accommodates up to 15mm incremental slab deflection, with tolerance.

FIXING TO STEELWORK:

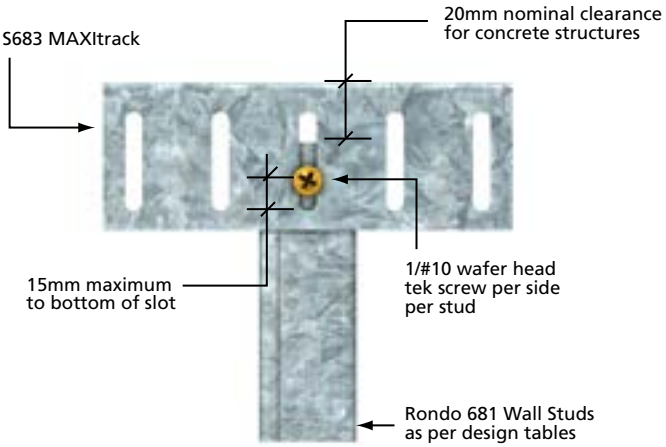
Where the steelwork carries roof or floor loads a deflection head will be required. Where the steelwork is in place only as a lateral support to the stud framing a deflection head is not required.

For roof uplift the MAXItrack® can be installed with an initial stud clearance of 5mm which will give an allowance of up to 15mm for uplift.

NOTE:

The allowance for structural movement should always be confirmed by the project engineer prior to commencing sitework.

3



TYPICAL MAXITRACK CONNECTION DETAIL

INSTALLATION INFORMATION: WALLS (continued)

Wall Studs

The Rondo 0.50, 0.55 and 0.75bmt wall studs have standard 25mm bell-mouthed service holes. Being bell-mouthed with no protruding sharp edges eliminates the need for fitting grommets for electrical cabling.

Punched round holes are processed at designated centres along the 1.15bmt studs.

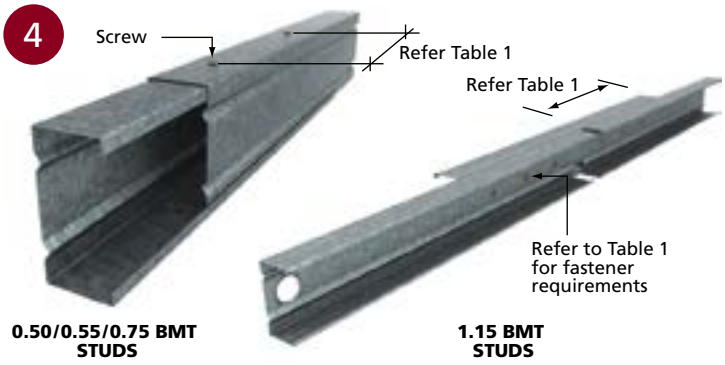
Mountain knurling along the flanges of the studs are designed to provide the screw point with a positive location during fitting of the lining board.

In situations where the stud length is shorter than that required, the 0.50, 0.55 and 0.75bmt studs may be spliced to extend the overall stud length. Studs of 1.15bmt or greater may be spliced back to back. *Refer to Table 1 for splicing details.*

Boxing Studs of 0.50, 0.55 and 0.75bmt and fixing Studs of 1.15bmt back to back provides greater rigidity at window and door openings and also at points where extra load carrying capacity is required – such as shelf loads.

The maximum wall height and ceiling span tables have been formulated in accordance with the requirements of the Building Code of Australia (BCA) Specification C1.8 "Structural Tests for Lightweight Construction".

4



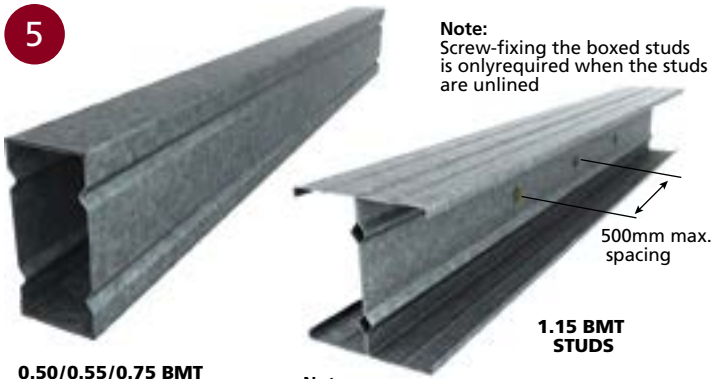
■ SPLICED STUDS

TABLE 1: FIXING GUIDE FOR SPLICED STUDS

STUD GAUGE (BMT)	WALL HEIGHT (m)	SPLICE LOCATION (%)	SPLICE LENGTH (mm)	NO. OF FASTENERS
0.50/0.55	0 – 4	10	330	2
		25	690	3
	4 – 6	10	740	3
		25	1540	4
0.75	0 – 4	10	250	2
		25	520	2
	4 – 6	10	560	2
		25	1160	3
1.15	0 – 4	10	300	3
		25	300	3
	4 – 6	10	450	3
		25	540	4

NOTES:
1. *Splices to be alternated top and bottom along wall.*
2. *Splicing of studs shall not be undertaken for load bearing (axial) walls*
3. *Do not splice studs between 25% – 75% of the wall height*
4. *All fasteners shall be #8 tek screws, or equivalent.*
5. *Walls may be lined both sides or one side.*
6. *Maximum stud spacing 600mm centres.*

5



■ BOXED/BACK-TO-BACK STUDS

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Wall Studs: Typical Applications

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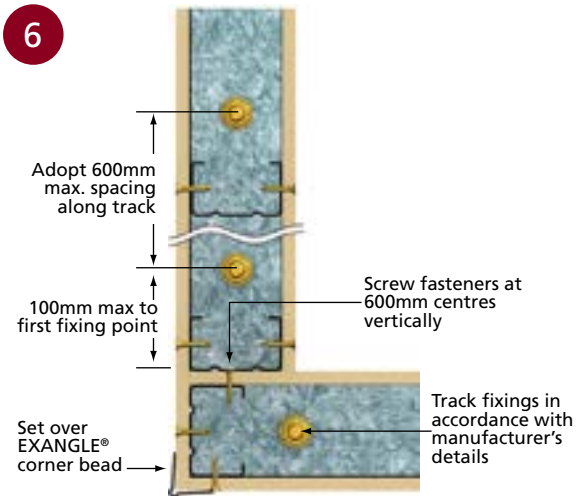
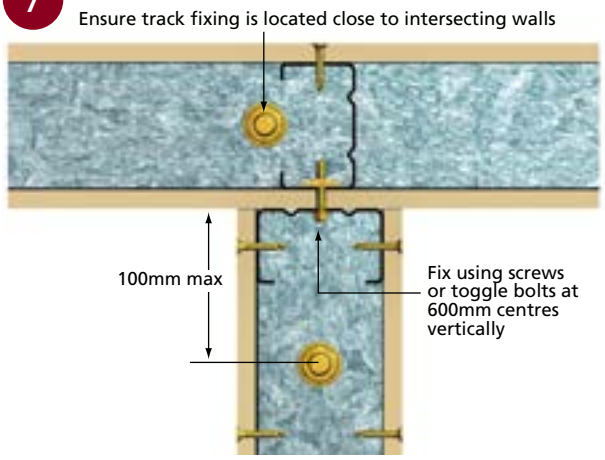


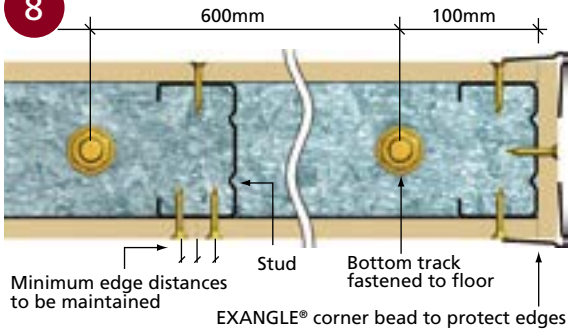
CORNER – SINGLE LAYER APPLICATION

7



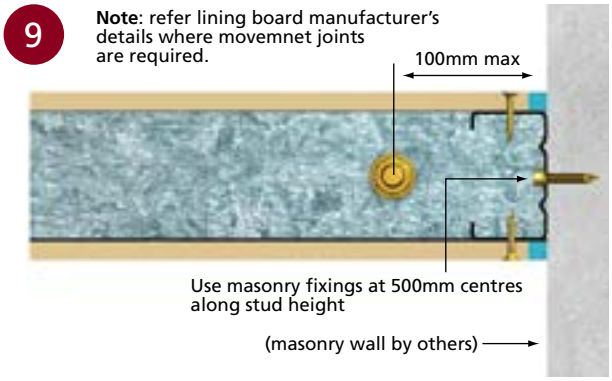
INTERSECTION – SINGLE LAYER APPLICATION

8



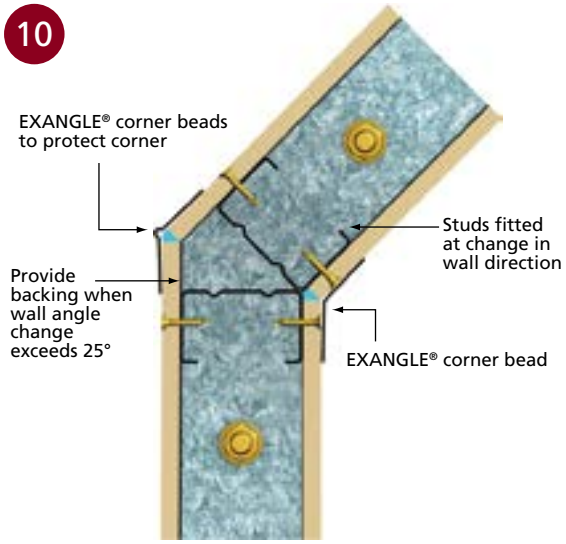
WALL END

9



INTERSECTION – MASONRY

10



ANGLED WALL

NOTE:
Fixing and finishing of lining boards to be in accordance with manufacturer's recommendations.

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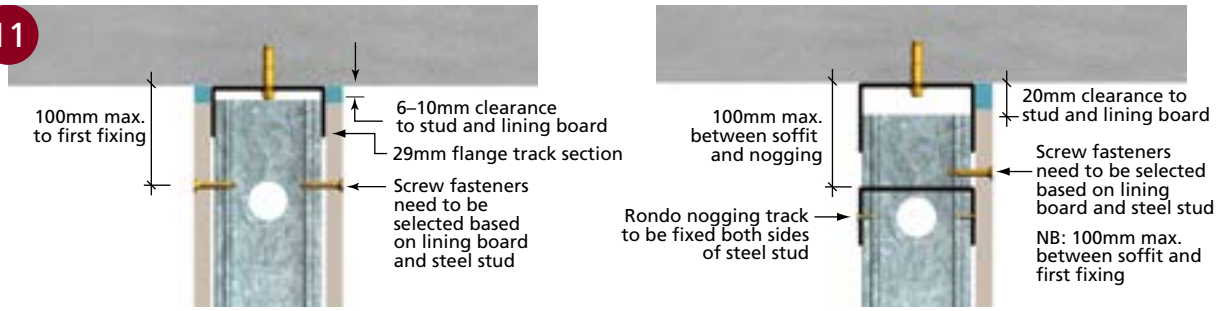
INSTALLATION INFORMATION: WALLS (continued)

Wall to Ceiling Junctions

NOTE:

- Wall and ceiling intersection details require specific checking under seismic loads. These details should be checked with your nearest Rondo branch prior to installation.
- Drill point screws are not recommended for sections less than 0.75bmt.

11



■ **A: CONCRETE SLAB – STUD WALL LINED BOTH SIDES B: CONCRETE SLAB (DEFLECTION HEAD) – STUD WALL LINED ONE SIDE ONLY**

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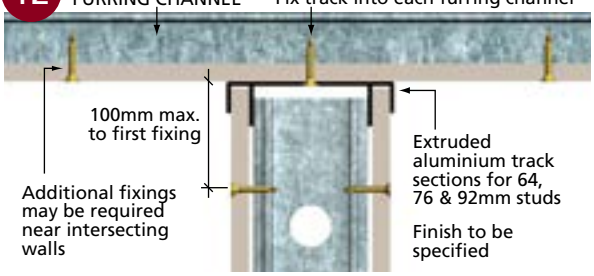
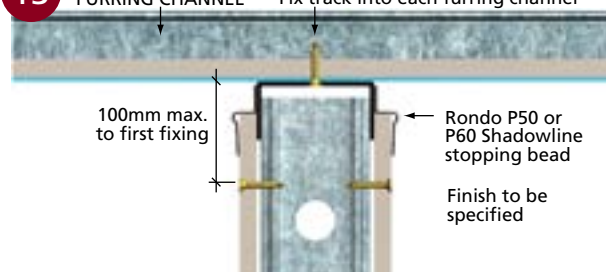


■ **KEY-LOCK® CEILING**

13



■ **KEY-LOCK® CEILING**

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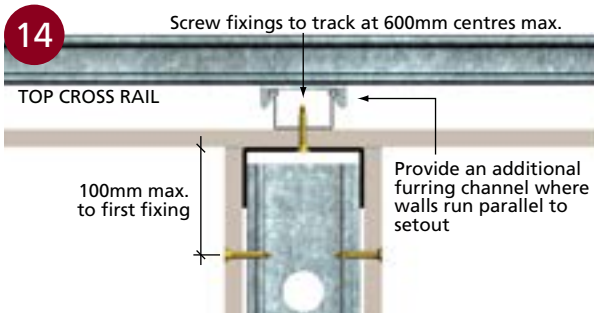

■ **KEY-LOCK® CEILING**

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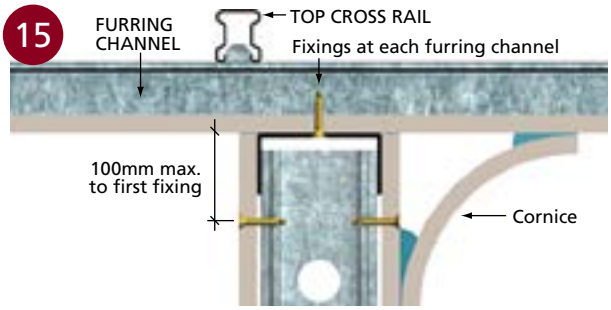

■ **KEY-LOCK® CEILING**

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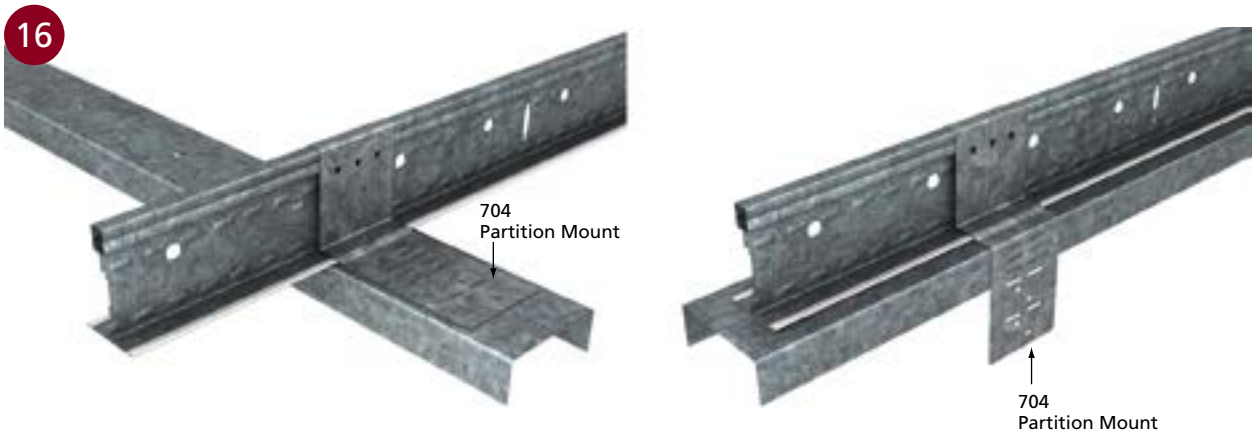

■ **PARTITION MOUNTING DETAILS – DUO® EXPOSED CEILING GRID**

Noggings: Steel

Noggings are designed to provide support to the wall studs and prevent twisting of the studs when fitting the lining boards. Noggings should be screwed, or crimped to both flanges of the studs.

Rondo produces a continuous Nogging track *(see Figure 17),* which can be fitted to the stud framing in one length, or individual Noggings may be cut from the track. Nogging track is produced in 0.70bmt to suit all stud framed wall installations, with the exception of 150mm stud framing which is 0.75bmt.

Noggings of 0.70bmt have been checked and approved for use with 1.15bmt studs.

Where services are to be fitted and a recessed Nogging is required this may be cut from stud or track.

Heavy fixtures may be fitted to the wall framing by fabricating custom Nogging.

The minimum number of Noggings required may be determined from Table 2, however it should be noted that in some instances a more economical design may be achieved using more Noggings. Table 2 is applicable for internal partitioning subjected to 0.25kPa service load.

Additional wall Noggings may be required in walls subject to elevated pressures.

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CONTINUOUS NOGGING TRACK

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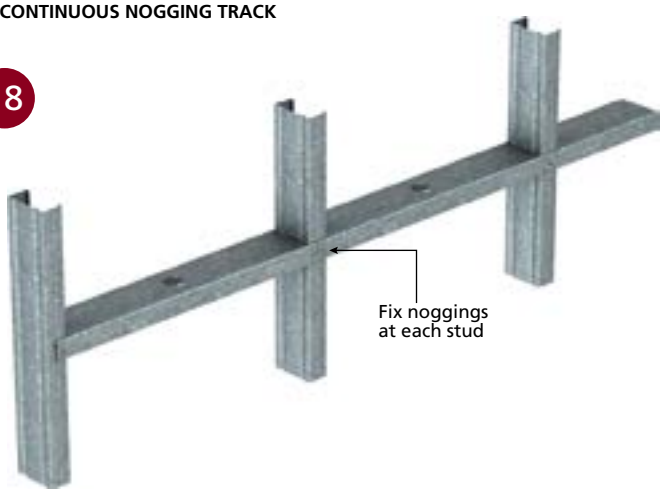

NOGGING DETAILS

TABLE 2: MINIMUM NUMBER OF NOGGINGS

WALL HEIGHT (m)	LINING CONDITION	NUMBER OF NOGGINGS
0 – 4.4	Both sides	0
4.4 – 8.8		1
0 – 3	Lined one side	1
3 – 6		2
6 – 8		3
8+		4

NOTE: Walls connected to the underside of a concrete slab must be installed with deflection head track and an additional row of Noggings 100mm down if unlined, or lined one side only. This does not apply if using Rondo Slotted Deflection Head Track (MAXItrack), see page 83.

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INSTALLATION INFORMATION: WALLS (continued)

Noggings: Timber

Timber or plywood Noggings are often installed in a steel stud wall to provide support for a variety of additional fittings, such as heavy cupboards, hand rails, flat screen television units etc. Rondo offers a choice of methods to install these Noggings.

Noggings can be fixed between the stud webs and notched out at one end to fit *(see Figure 19 a & b)*. Either screw fixed through the web of the stud (a), or with the addition of a 35 x 35 x 0.70 Rondo steel angle, and similarly, fixed to the stud web if additional support required (b).

Rondo 501 Continuous Nogging Bracket can also be used, which removes the need to notch timber Noggings around the stud flange or sourcing already notched out and cut to size Noggings.

The Nogging bracket is supplied in 2400mm lengths to accommodate a variety of Nogging widths and can be cut to size on site. To install, the bracket is screw fixed to the face of the stud and then screw fix the Nogging to the bracket *(see Figures 20 a & b)*.

As both the Nogging bracket and continuous Nogging track are 0.75bmt thick, it is unlikely that there will be "show-through" problems when the wall is sheeted.

The Nogging bracket is sized to suit the use of 17mm plywood, therefore ensuring a flush finish with the face of the stud. Plywood Noggings can be simply cut on site to suit size requirements.

It should be noted that plywood thickness tolerances can vary depending on the manufacturer. And is important to remember that CCA treated timber should not be used with Rondo steel stud systems.

Reference should be made to a Rondo representative if unsure of the appropriate Nogging to use due to the weight of the fixtures to be supported.

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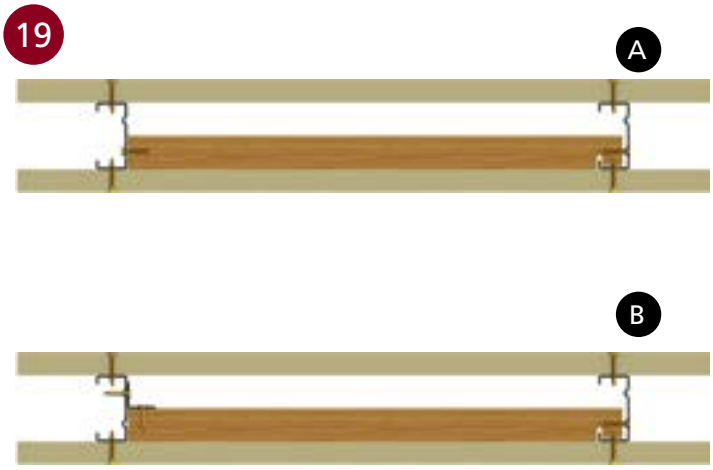

■ TIMBER NOGGINGS NOTCHED TO FIT BETWEEN STUD WEBS

20

■ TIMBER NOGGINGS FITTED USING RONDO CONTINUOUS NOGGING BRACKET

Unless specifically checked, framing should not exceed 600mm centres, and in higher wind loads this should be reduced according to the lining board manufacturers specified data.

Sheets may be installed horizontally or vertically with joints in the lining boards being staggered between sides of the framing.

Internal and external corners may be set using a perforated metal corner bead fixed to the linings at not more than 500mm centres. *(Refer to the Finishing Section in this manual for details.)*

Plasterboard may be fixed to studs using 'bugle' head self drilling needle point screws. Cement based sheeting can be fixed using self drilling self embedding head type screws. *(Refer to fastener details on pages 106–107)*.

The lining boards should be fitted to the framing using adjustable automatic clutch and depth control screw guns. Minimum edge distance to fasteners of 10 to 16mm must be maintained.

CONTROL JOINTS

Control joints are required in long continuous runs of walling, or where there are articulated or construction joints in the primary structure. Control joints should be spaced at not more than 12m centres in continuous plasterboard walls, and 9m in cement based lining material.

Fit the Rondo P35 Control Joint as per Figure 23.

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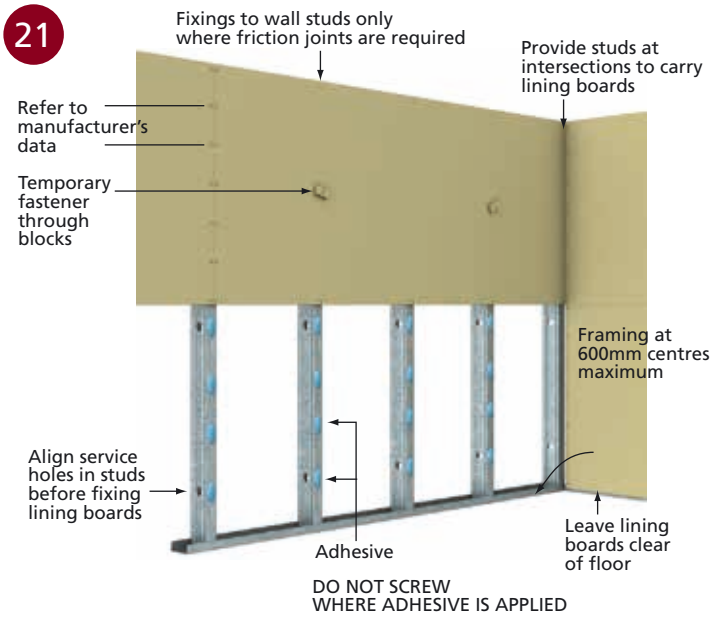
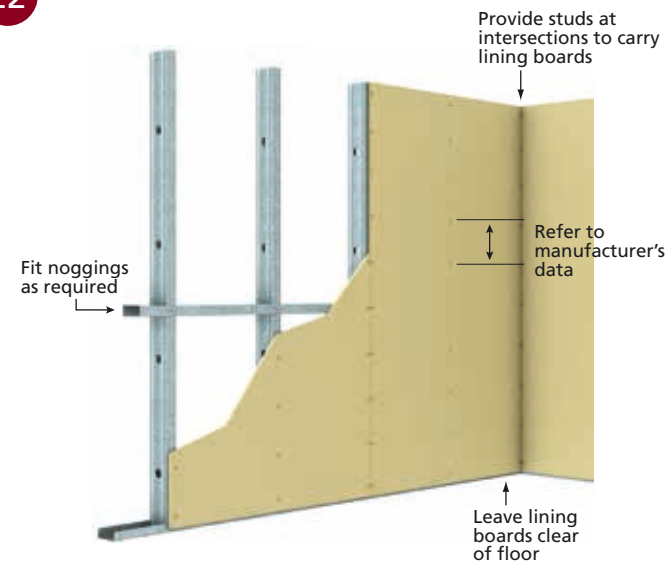


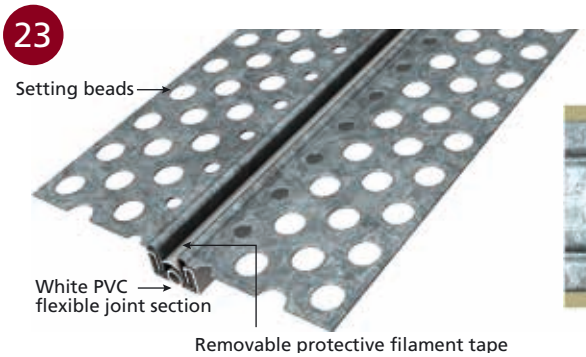
HORIZONTAL APPLICATION

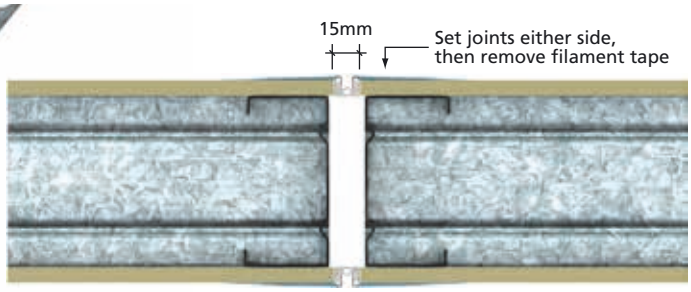
22



VERTICAL APPLICATION

23





CONTROL JOINTS

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INSTALLATION INFORMATION: WALLS (continued)

Staggered Stud System

Staggered Steel Stud Wall Framing Systems are designed to provide effective resistance to sound transmission and acoustic impact when lining boards are attached in various configurations.

Typically, staggered stud walls are constructed using Rondo 64mm x 0.75bmt studs staggered at 300mm centres inside Rondo 92mm x 0.70bmt track. However, please refer to Table 3 for maximum wall heights of other sections.

Studs are held in place using Rondo 126 stud/track holding clips at top and bottom.

For ease of installation, place holding clips at the top and bottom of each stud then slide the studs and clips onto the tracks *(see Figure 24).*

Alternate staggered stud installation methods are shown in Figures 25 & 26.

NOTE:
An alternative acoustic solution to staggered stud wall systems is the Rondo QUIET STUD®. In some cases, the Rondo QUIET STUD® system will achieve similar results to staggered stud wall systems yet is generally much easier to install and will achieve greater wall heights. (Refer to page 99.)

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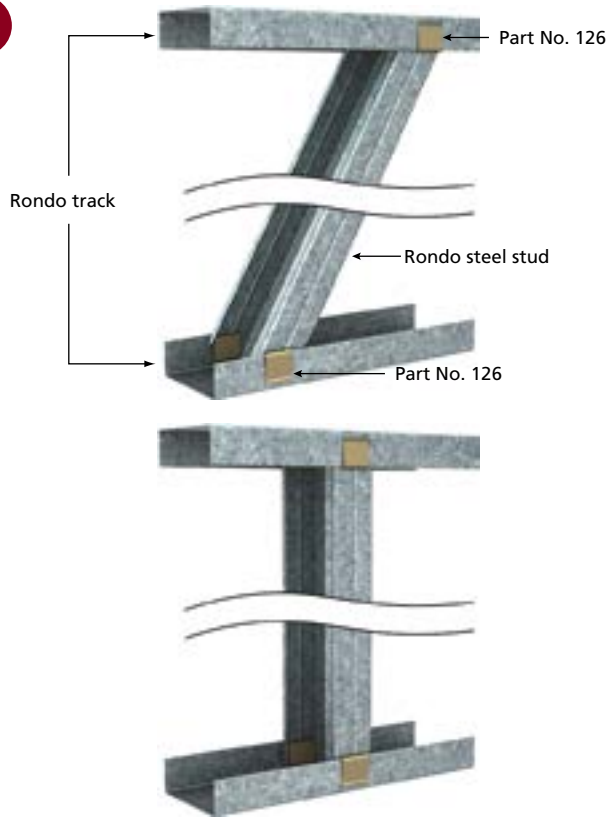
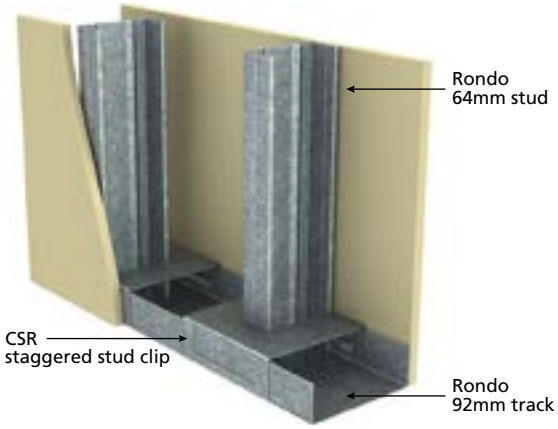


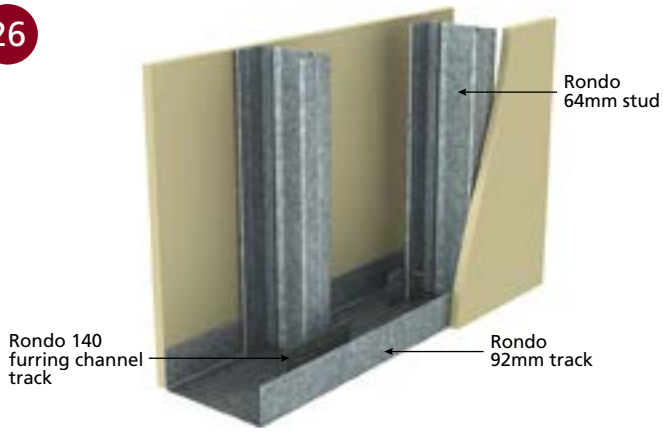
■ INSTALLATION OF STUDS

25



■ CSR GYPROCK STAGGERED STUD METHOD

26



■ BORAL PLASTERBOARD STAGGERED STUD METHOD

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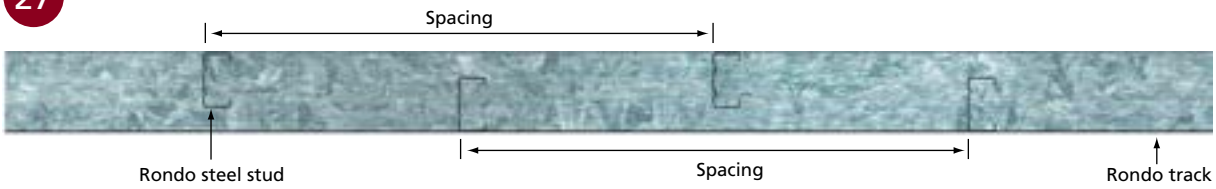

STAGGERED STUD SPACING

TABLE 3: MAXIMUM STAGGERED STUD WALL HEIGHTS – SPAN/240

STUD WIDTH	**51mm**		**64mm**			**76mm**			**92mm**			**150mm**	
BMT	**0.50**	**0.75**	**0.50**	**0.75**	**1.15**	**0.55**	**0.75**	**1.15**	**0.55**	**0.75**	**1.15**	**0.75**	**1.15**
PLASTERBOARD LININGS (mm)	**SINGLE STUDS @ 600mm CENTRES**												
1x10mm	2320	2600	2375	2830	3510	2610	3000	3600	2740	3190	3750	3660	4150
1x13mm	2320	2600	2375	2830	3510	2610	3000	3600	2740	3190	3750	3660	4150
1x16mm	2320	2600	2375	2830	3510	2610	3000	3600	2740	3190	3750	3660	4150
PLASTERBOARD LININGS (mm)	**SINGLE STUDS @ 450mm CENTRES**												
1x10mm	2520	2860	2590	3190	3870	2800	3320	4000	2990	3480	4120	3970	4550
1x13mm	2520	2860	2650	3270	3930	2840	3380	4080	3030	3530	4190	4000	4600
1x16mm	2520	2860	2700	3350	3950	2920	3450	4170	3060	3590	4260	4040	4640
PLASTERBOARD LININGS (mm)	**SINGLE STUDS @ 400mm CENTRES**												
1x10mm	2630	2970	2690	3310	4020	2900	3440	4150	3100	3610	4270	4090	4710
1x13mm	2630	2970	2740	3390	4090	2950	3500	4230	3140	3660	4340	4130	4760
1x16mm	2630	2970	2800	3480	4100	3000	3570	4330	3180	3710	4420	4170	4800
PLASTERBOARD LININGS (mm)	**SINGLE STUDS @ 300mm CENTRES**												
1X10MM	2890	3270	2930	3610	4430	3180	3740	4560	3390	3910	4680	4420	5130
1X13MM	2890	3270	2990	3700	4490	3230	3810	4660	3430	3970	4760	4460	5180
1X16MM	2890	3270	3060	3790	4510	3280	3890	4760	3480	4040	4840	4500	5230

NOTES: 1. Deflection Limit is span/240 to a maximum of 30mm at 0.25 kPa, in accordance with the BCA Specification C1.8 – 2005.

2. Maximum wall heights refer to the structural wall heights only. Maximum wall heights may be reduced from those in the table for fire rated walls, refer to your plasterboard manufacturer for this information.

3. The tabulated heights are not for axial loads but do include self weight and lateral pressures.

4. Shelf loading is not permitted on the tabulated wall heights.

5. Loadings: a. Pultimate = 0.375 kPa
b. Pservice = 0.25 kPa

6. These walls are not for external applications.

7. All loading in accordance with AS1170:2002.

8. Walls analysed in accordance with AS4600:2005.

9. No Noggings are used in staggered stud walls.

10. BMT = Base Metal Thickness.

11. Where single studs are shown in the above table spaced @600mm centres, this means staggering the studs @ every 300mm centres. For single studs shown spaced @400mm centres, this means staggering the studs @ every 200mm centres, etc.

12. If proposing to use 126 clips for a staggered stud wall, refer to Rondo Technical Services for advice on maximum wall heights.

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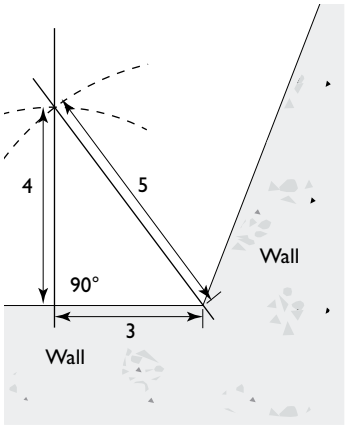
INSTALLATION GUIDE: WALLS

STEP ONE
Set out the track locations in accordance with the floor plans. Ensure internal walls are perpendicular to the external walls, by using the 3 4 5 triangle method.

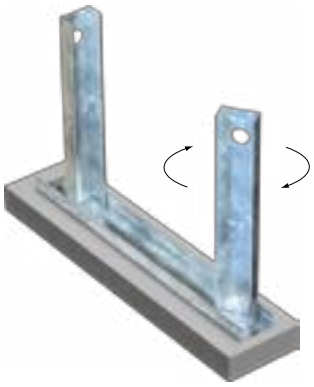


STEP TWO
Secure the top and bottom tracks in position using appropriate fasteners, at not more than 600mm centres. The first fastener should be no more than 100mm from the start or finish of each track or any opening. Deflection head tracks should be used for walls 4.8m and higher.

STEP THREE
Cut the studs to length - for friction fit this is 6mm shorter than the wall height and for deflection heads this is 20mm shorter than the wall height.

STEP FOUR (A)
(Where Noggings are specified)
Refer to Nogging tables for number of Noggings required. If Noggings are required, use Rondo Nogging track with pre-punched holes at nominated centres. Nogging track should be installed with flanges facing the floor.
Fit studs into the pre-punched holes and into both the top and bottom tracks with the service holes starting from the bottom. Then, with a twisting action, rotate the studs into position. Ideally, the studs should be orientated in the same direction to make fitting the lining board easier. Nogging track section should then be lifted to required height and fixed to each steel stud.

STEP FOUR (B)
(Where Noggings are not required)
Fit the stud into both the top and bottom tracks with the service holes starting from the bottom, then with a twisting action rotate the stud into position. Ideally, the studs should be orientated in the same direction to make fitting the lining board easier.



STEP FIVE
Fit the lining board to one side of the wall first. The lining board should be fitted such that the board is screwed to the open side of the stud first. This will prevent any misalignment of the board along the wall.

STEP SIX
Allow the services to be run in the wall cavity.

STEP SEVEN
Line the second side of the wall, using the same method as the first, except that the joints in the lining board should be staggered. This is achieved by starting with a half sheet.

STEP EIGHT
Fit the EXANGLE® corner beads and set the wall joints.

INSTALLATION DETAILS: WALLS

Rondo Web Cleats

There are occasions when it is necessary to allow for higher than standard lateral wall pressures, including both in external wall framing situations and some internal wall systems in high-rise buildings.
In such situations Rondo or the Project Engineer may specify the use of special heavy duty cleats (brackets) to transfer loads at the stud/ track connection to meet the higher load requirement.
Rondo produces two special cleats, 201 and 203, which are both manufactured from 3.0mm G2 steel with a Z275 coating. These cleats are part of the Rondo MAXI-frame® External Wall Framing System but are suitable for use with standard heavy duty stud/track connections.

A: 201 92mm x 3.0mm BASE BRACKET

Connection A shows an installation with 1.15bmt 92 mm Stud and Track using 2 x #10 hex head tek screws per cleat to the stud and a 10mm expanding anchor securing the cleat through the Track into the concrete structure. If installing onto structural steel, a M10 Grade 4.6 Bolt and washer is recommended *(see Figure 28)*.

B: 203 92mm x 3.0mm SLOTTED HEAD BRACKET

Connection B shows an illustration with 1.15bmt 92mm Stud and Deflection Head Track using 2 x #10 hex head tek screws per cleat to the Stud and a 10mm expanding anchor securing the cleat through the Track into the concrete structure *(see Figure 29)*.

NOTE: If securing into structural steel, a slotted head cleat may not be necessary, check with the Project Engineer on the deflection aspects of the structural steel and consult your Rondo Representative.

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CONNECTION METHOD A

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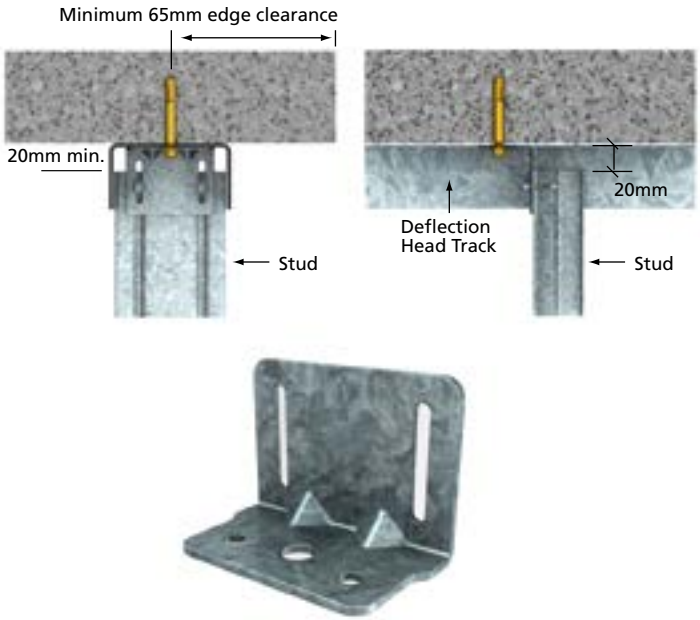

CONNECTION METHOD B

TO TOP PAGE

INSTALLATION DETAILS: WALLS (continued)

Curved Walls

When constructing curved walls, stud centres should be reduced to suit the lining board manufacturer's recommendations *(see Table 4).*

Rondo Flexible Tracks at top and bottom should be curved to match the specified radius and fastened to the structure through the holes provided in the web. Each fixing should be as near as possible to the stud point.

Studs must be fixed both sides through the holes provided in both flanges *(refer to Figure 30).*

Care should be taken when tracks span between purlins and in some instances, strengthening may be required.

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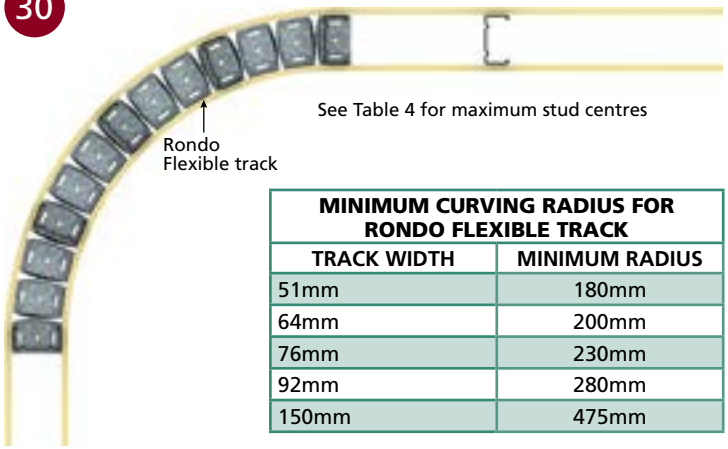


MINIMUM CURVING RADIUS FOR RONDO FLEXIBLE TRACK	
TRACK WIDTH	**MINIMUM RADIUS**
51mm	180mm
64mm	200mm
76mm	230mm
92mm	280mm
150mm	475mm

FRAMING PREPARATION FOR CURVED WALLS

TABLE 4: STUD CENTRES FOR CURVED WALLS

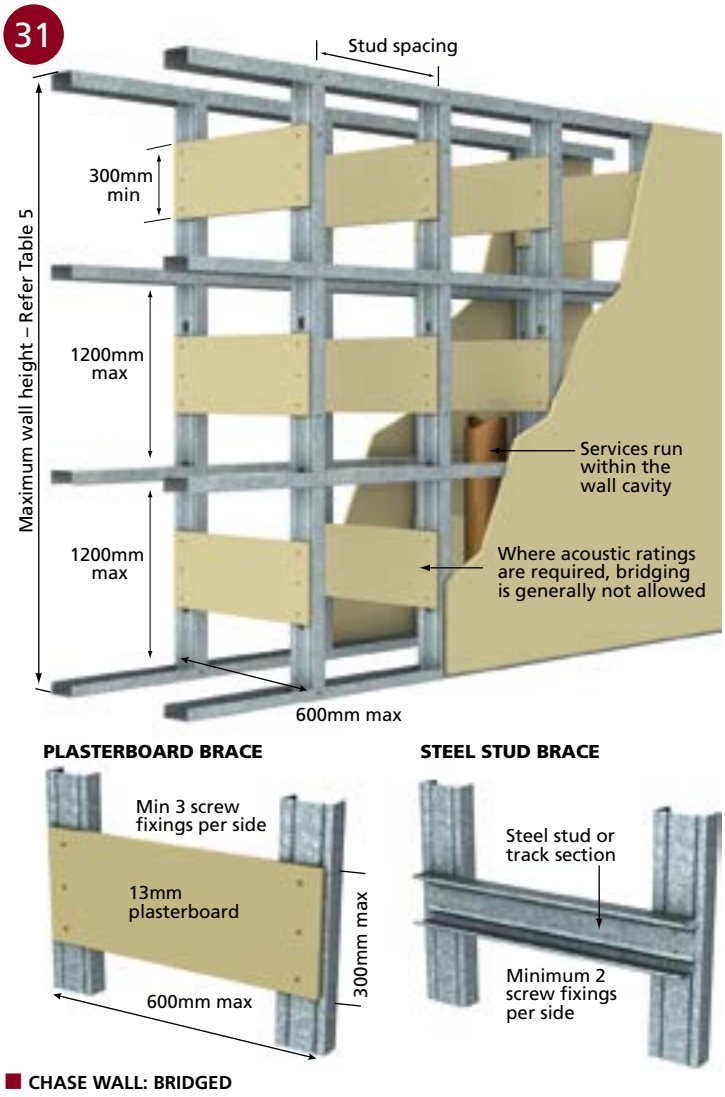
LINING BOARD THICKNESS (mm)	**RADIUS** (mm)						
	900–1000	**1000–1500**	**1500–2000**	**2000–2500**	**2500–3000**	**3000–4000**	**4000+**
	MAXIMUM STUD CENTRES (mm)						
6.0 – 6.5	150	200	250	300	350	450	550
10	150	200	250	300	350	400	500
13	–	150	200	250	300	400	500
16	–	–	–	–	–	250	350

Bridged Chase Walls

Chase walls are required where it is necessary to accommodate large bore pipes, air conditioning ducts or similar services.

The walls are constructed using two parallel runs of stud and track, which can then be cross braced at regular intervals.

The cross bracing may be either plasterboard, stud or track section *(refer to Figure 31 for details).*



■ CHASE WALL: BRIDGED

TABLE 5: LIMITING HEIGHT: BRIDGED CHASE WALLS

STUD WIDTH (mm)	GAUGE (mm)	SPACING (mm)	MAXIMUM WALL HEIGHT		NO. OF NOGGINGS
			H/240	H/360	
64	0.50	600	3390	2960	2
		450	3730	3260	2
		400	3870	3380	2
76	0.55	600	4210	3790	2
		450	4645	4145	2
		400	4820	4290	2
92	0.55	600	4655	4230	2
		450	5120	4665	2
		400	5270	4840	2

NOTES: 1. Bridging to be installed in accordance with Figure 31.
2. Linings assumed to 1 x 13mm plasterboard minimum.
3. Noggings to be equally spaced over wall height.
4. Deflection limited to either H / 240 or H / 360 at 0.25kPa, in accordance with the BCA Specification C1.8.
5. Strength (ultimate) checked at 0.375kPa static pressure.

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INSTALLATION DETAILS: WALLS (continued)

Acoustic Chase Walls

Where chase walls are constructed for acoustic purposes no cross bracing between the walls is permitted. These walls use in-plane Noggings for rigidity, and the wall heights are significantly lower.

The maximum wall heights may be determined from the wall heights given in Tables 6 & 7 (refer walls lined one side only).

The number of Noggings required may be determined from the table shown below.

This type of wall construction is also known as 'discontinuous construction' *(see Figure 32)*.

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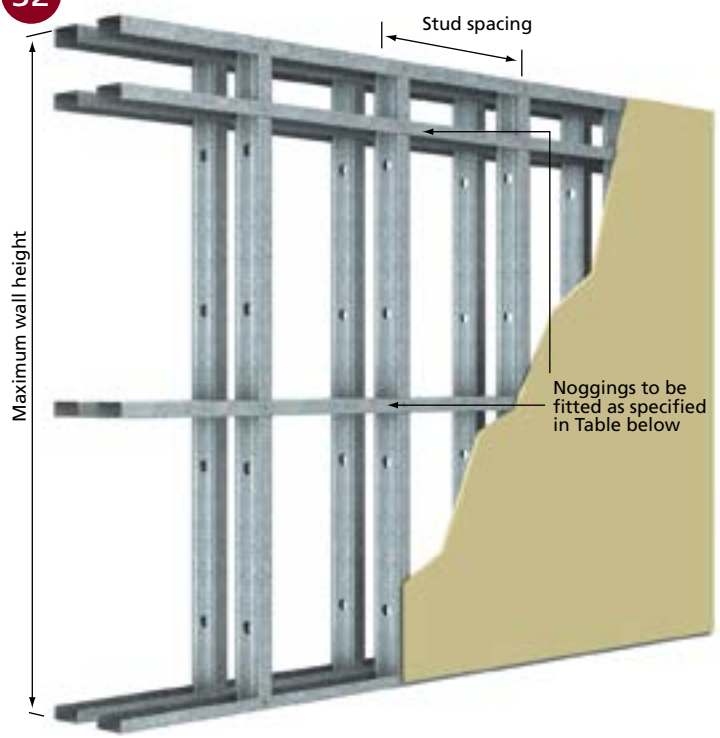

CHASE WALL: UNBRIDGED ACOUSTIC WALL

Minimum Number of Noggings: Acoustic Chase Wall

WALL HEIGHT (m)	LINING CONDITION	NO.OF NOGGINGS
0 – 3	Lined one side	1
3 – 6		2
6 – 8		3
8+		4

NOTE: Walls connected to the underside of a concrete slab must be installed with deflection head track and an additional row of Noggings 100mm down if unlined, or lined one side only.

Window & Door Framing

Window and door framing require special detailing to prevent long term serviceability problems. This detailing is in the form of additional fixings and framing members which carry the extra loadings in these areas.

Typically, track sections can be cut and fabricated to frame window and door openings. For internal partitioning, the standard details as shown in Figure 33 would be acceptable for window openings up to 1500mm and standard door openings. Configurations outside of these limits, and external wall framing, should be checked prior to commencement of work.

Studs adjacent to window and door openings should be boxed and screw fastened to the wall tracks and should be taken through to the structural soffit.

Allow approximately 100mm each end of the track to facilitate a suitable connection. Studs, cut to length, should be fitted above and below the window openings and above the door openings.

The stud spacing of the short studs should match the standard wall stud spacing.

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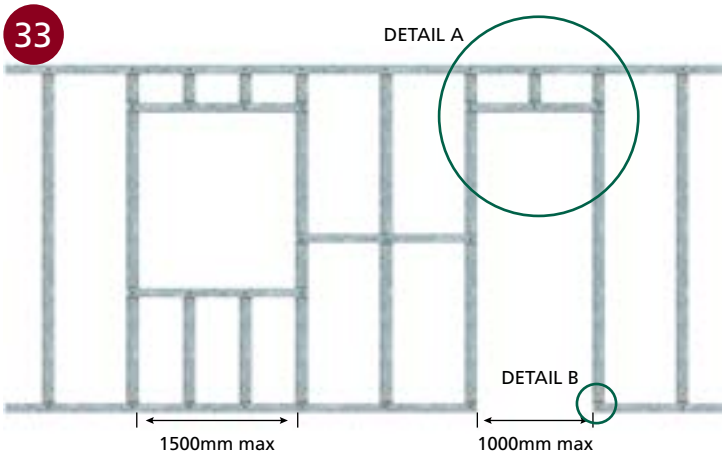
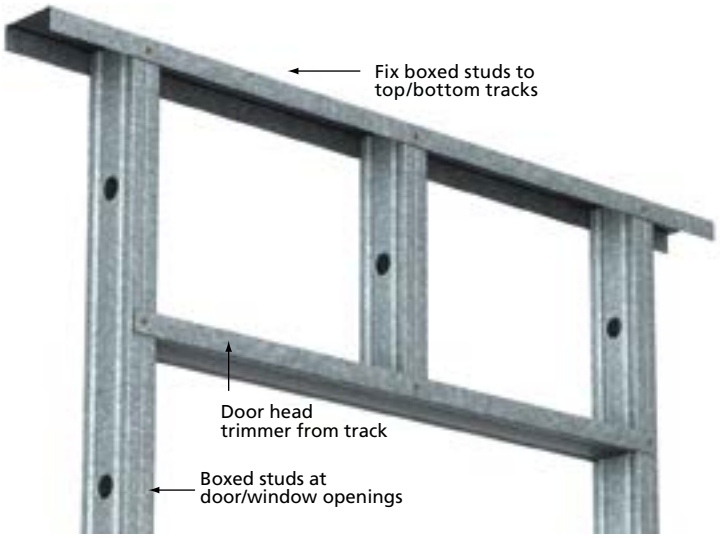
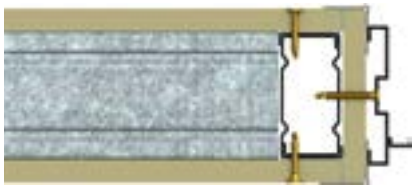


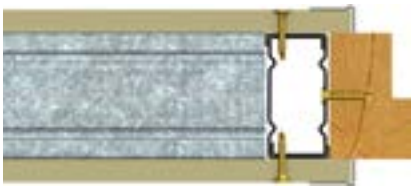
INTERNAL WALL FRAMING



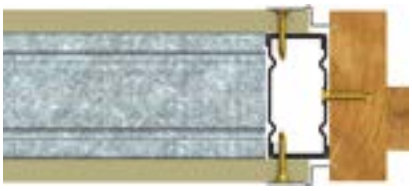
DETAIL A: DOOR/WINDOW HEAD DETAIL



DETAIL B: EXTRUDED ALUMINIUM DOOR JAMB PROFILE



DETAIL B: TIMBER DOOR JAMB WITH STOPPING BEAD TO LINING BOARD



DETAIL B: TIMBER DOOR JAMB WITH SHADOWLINE DETAIL

INSTALLATION DETAILS: WALLS (continued)

Plumbing/Electrical Services

Copper or brass piping and fittings should be isolated from direct contact with the steel framing. This can be achieved by insulating the piping with neoprene sheeting or tape, or by lagging the pipe. Where the piping is run through the service holes of the studs, plastic grommets should be used to isolate the pipe, and prevent water hammer.

Similar care, in isolating the framing, should be taken when contact with dissimilar metals is possible – typically where lead flashing is used in the construction.

Electrical services can be run through the service holes of the 0.50, 0.55 and 0.75bmt studs without requiring grommets, due to the unique flaring of the service holes. Grommets should be used for 1.15bmt studs or greater as service holes are punched and do not have any flaring around the holes.

Generally, services are run through the pre-punched service holes. In brick veneer construction, services may be run through the wall cavity, and fixed to the flanges of the studs, using appropriate saddle clamps.

DRILLING

Where extra service holes are required they may be positioned using a hole saw or similar, and grommets should be fitted. Additional service holes should be positioned as close as practical to the centreline of the stud *(refer Figure 35).*
NOTE: The maximum hole diameter should not exceed 50mm for a 92mm stud without checking.

NOTCHING

Notching of the studs should not exceed 35mm under any circumstances.

Notching of the studs should be in accordance with the details shown in Figure 36.

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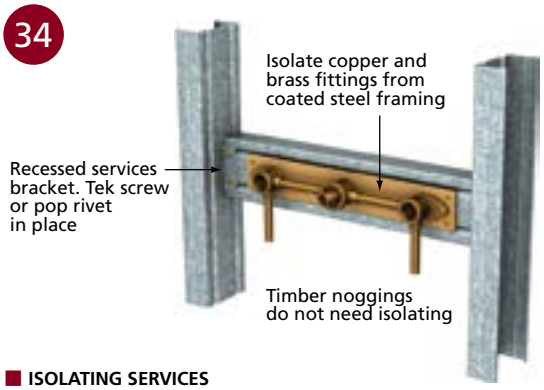

ISOLATING SERVICES

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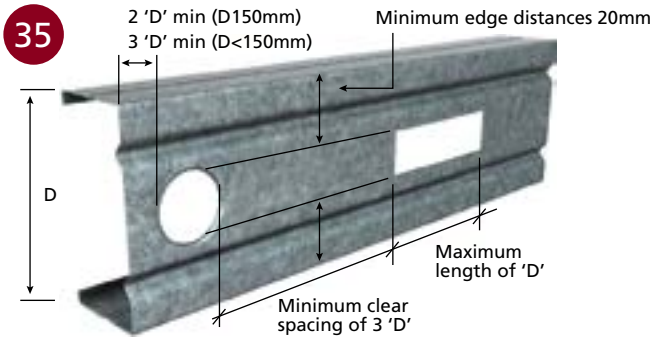
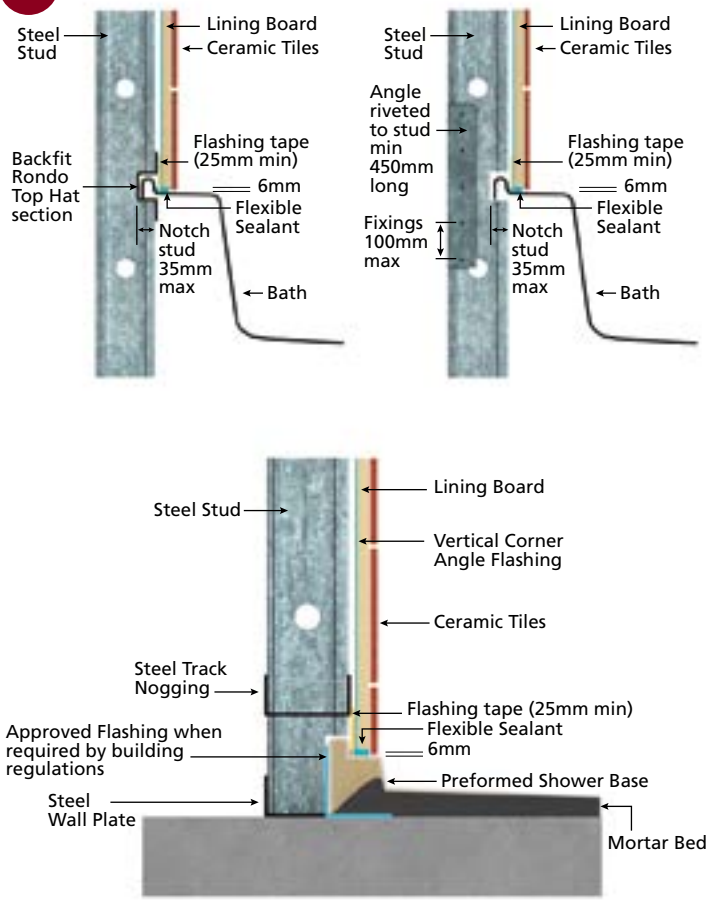


HOLE DRILLING

36



NOTCHING

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MAXIMUM WALL HEIGHTS

TABLE 6: INTERNAL NON-LOAD BEARING WALLS – L/240 PLASTERBOARD INCLUDING FIRE RATED

STUD WIDTH		51mm		64mm			76mm			92mm			150mm	
BMT		0.50	0.75	0.50	0.75	1.15	0.55	0.75	1.15	0.55	0.75	1.15	0.75	1.15
PLASTERBOARD LININGS (mm)		**SINGLE STUDS @ 600mm CENTRES**												
LINED BOTH SIDES	1x10mm	2770	2910	3330	3930	4170	3700	4430	4650	4540	4830	5110	6550	7220
	1x13mm	3200	3320	3720	4220	4430	4130	5020	5220	4940	5500	5750	6990	7540
	1x16mm	3380	3520	3910	4350	4520	4300	5250	5420	5180	5710	5920	7190	7650
LINED ONE SIDE	1x10mm	2320	2600	2720	3130	3530	3200	3580	4050	3610	4130	4690	5330	6810
	1x13mm	2320	2600	2720	3250	3580	3240	3820	4050	3610	4180	4690	5370	6810
	1x16mm	2320	2600	2750	3280	3590	3250	3870	4050	3610	4200	4690	5370	6810
PLASTERBOARD LININGS (mm)		**SINGLE STUDS @ 450mm CENTRES**												
LINED BOTH SIDES	1x10mm	3020	3200	3580	4180	4460	4020	4780	5070	4850	5270	5620	7140	7750
	1x13mm	3420	3570	3930	4430	4690	4410	5330	5570	5210	5890	6190	7520	8040
	1x16mm	3550	3710	4130	4600	4820	4580	5580	5790	5450	6120	6390	7620	8130
LINED ONE SIDE	1x10mm	2520	2860	2930	3410	3870	3500	3910	4450	4050	4520	5150	6510	7400
	1x13mm	2520	2860	2930	3530	3930	3580	4170	4450	4050	4610	5150	6510	7400
	1x16mm	2520	2860	3020	3560	3950	3600	4220	4450	4050	4630	5150	6510	7400
PLASTERBOARD LININGS (mm)		**SINGLE STUDS @ 400mm CENTRES**												
LINED BOTH SIDES	1x10mm	3130	3320	3690	4280	4590	4160	4930	5240	4990	5460	5840	7340	7970
	1x13mm	3510	3680	4020	4530	4810	4530	5450	5720	5330	6050	6380	7610	8190
	1x16mm	3620	3750	4220	4710	4950	4700	5710	5950	5560	6280	6580	7750	8300
LINED ONE SIDE	1x10mm	2630	2970	3070	3540	4020	3640	4070	4620	4210	4700	5360	6740	7650
	1x13mm	2630	2970	3070	3660	4090	3740	4320	4620	4210	4800	5360	6740	7650
	1x16mm	2630	2970	3140	3700	4100	3760	4380	4620	4210	4820	5360	6740	7650
PLASTERBOARD LININGS (mm)		**SINGLE STUDS @ 300mm CENTRES**												
LINED BOTH SIDES	1x10mm	3390	3620	3960	4570	4930	4510	5310	5690	5340	5930	6390	7840	8570
	1x13mm	3730	3940	4260	4780	5120	4830	5770	6110	5640	6450	6860	8110	8740
	1x16mm	3800	4020	4450	4980	5270	5010	6030	6330	5860	6690	7070	8230	8850
LINED ONE SIDE	1x10mm	2890	3270	3380	3900	4430	4010	4480	5090	4630	5180	5900	7350	8290
	1x13mm	2890	3270	3380	4010	4490	4130	4730	5090	4640	5290	5920	7350	8290
	1x16mm	2890	3270	3460	4050	4510	4150	4790	5090	4640	5310	5930	7350	8290

NOTES:

1. *Deflection Limit is span/240 (or span/360 as applicable) to a maximum of 30mm at 0.25 kPa, in accordance with the BCA Specification C1.8 – 2005.*
2. *Maximum wall heights refer to the structural wall heights only. Maximum wall heights may be reduced from those in the table for fire rated walls, refer to your plasterboard manufacturer for this information.*
3. *The tabulated heights are not for axial loads but do include self weight and lateral pressures.*
4. *Shelf loading is not permitted on the tabulated wall heights.*
5. *Loadings: a. Pultimate = 0.375 kPa*
   b. Pservice = 0.25 kPa
6. *These walls are not for external applications.*
7. *All loading in accordance with AS1170:2002.*
8. *Walls analysed in accordance with AS4600:2005.*
9. *Noggings in accordance with table shown on facing page.*
10. *BMT = Base Metal Thickness.*
11. *The above wall heights are suitable for up to two layers of the nominated thickness.*
12. *See table on Page 100 for Nogging requirement.*
13. *Table assumes the same or like gauge is used for both Stud and Track sections. The above wall heights may change if using dissimilar gauge product*

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MAXIMUM WALL HEIGHTS (continued)

TABLE 7: INTERNAL NON-LOAD BEARING WALLS – L/360 BRITTLE SUBSTRATES – CFC etc.

STUD WIDTH		51mm		64mm			76mm			92mm			150mm	
BMT		0.50	0.75	0.50	0.75	1.15	0.55	0.75	1.15	0.55	0.75	1.15	0.75	1.15
PLASTERBOARD LININGS (mm)		**SINGLE STUDS @ 600mm CENTRES**												
LINED BOTH SIDES	1x10mm	2540	2660	2990	3480	3680	3340	4010	4210	4030	4410	4650	5830	6420
	1x13mm	2900	3010	3320	3720	3900	3700	4510	4680	4370	4970	5180	6190	6740
	1x16mm	3000	3120	3500	3890	4040	3870	4740	4890	4590	5190	5370	6380	6890
LINED ONE SIDE	1x10mm	2000	2270	2340	2700	3070	2780	3100	3530	3210	3590	4090	5260	6030
	1x13mm	2000	2270	2340	2850	3160	2930	3400	3530	3240	3730	4130	5260	6030
	1x16mm	2000	2270	2450	2890	3180	2960	3460	3530	3250	3760	4150	5260	6030
PLASTERBOARD LININGS (mm)		**SINGLE STUDS @ 450mm CENTRES**												
LINED BOTH SIDES	1x10mm	2740	2890	3190	3680	3930	3600	4300	4550	4290	4770	5070	6320	7000
	1x13mm	3070	3210	3490	3900	4120	3920	4750	4970	4590	5270	5540	6630	7270
	1x16mm	3130	3280	3670	4090	4280	4100	5000	5180	4810	5510	5740	6810	7410
LINED ONE SIDE	1x10mm	2210	2500	2580	2980	3380	3060	3420	3880	3540	3950	4500	5790	6630
	1x13mm	2210	2500	2580	3110	3470	3220	3700	3880	3610	4100	4570	5790	6630
	1x16mm	2210	2500	2690	3150	3490	3260	3770	3880	3620	4130	4580	5790	6630
PLASTERBOARD LININGS (mm)		**SINGLE STUDS @ 400mm CENTRES**												
LINED BOTH SIDES	1x10mm	2820	2990	3280	3770	4040	3720	4420	4690	4400	4920	5250	6530	7260
	1x13mm	3140	3290	3560	3980	4220	4020	4850	5090	4690	5400	5700	6820	7510
	1x16mm	3190	3350	3750	4180	4380	4190	5100	5310	4900	5640	5900	6990	7650
LINED ONE SIDE	1x10mm	2290	2600	2680	3090	3510	3180	3550	4040	3680	4110	4680	6020	6900
	1x13mm	2290	2600	2680	3230	3600	3350	3840	4040	3760	4260	4750	6020	6900
	1x16mm	2290	2600	2800	3270	3620	3390	3900	4040	3780	4290	4770	6020	6900
PLASTERBOARD LININGS (mm)		**SINGLE STUDS @ 300mm CENTRES**												
LINED BOTH SIDES	1x10mm	3030	3240	3510	4010	4330	4000	4720	5050	4700	5300	5700	7090	7920
	1x13mm	3320	3510	3760	4200	4490	4270	5110	5410	4960	5730	6090	7330	8130
	1x16mm	3340	3540	3940	4400	4660	4440	5360	5620	5160	5960	6290	7490	8260
LINED ONE SIDE	1x10mm	2520	2860	2950	3410	3870	3500	3910	4450	4050	4520	5150	6630	7590
	1x13mm	2520	2860	2950	3530	3950	3670	4180	4450	4150	4670	5230	6630	7590
	1x16mm	2520	2860	3070	3570	3970	3710	4240	4450	4180	4710	5250	6630	7590

MINIMUM NUMBER OF NOGGINGS

WALL HEIGHT (m)	LINING CONDITION	NUMBER OF NOGGINGS
0 – 4.4	Both sides	0
4.4 – 8.8		1
0 – 3.0	Lined one side	1
3.0 – 6.0		2
6.0 – 8.0		3
8.0+		4

NOTE: Walls connected to the underside of a concrete slab must be installed with deflection head track and an additional row of Noggings 100mm down if unlined, or lined one side only.

SHELF LOAD TABLES

Permissible Shelf Loadings for Steel Stud Walls

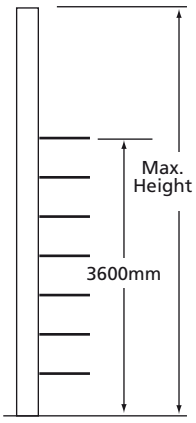
TABLE 6: MAXIMUM ALLOWABLE LOADS

(2400mm – 3600mm wall height. Walls lined both sides with 1x13mm plasterboard)

MAXIMUM ALLOWABLE LOAD IN KG PER METRE RUN OF SHELF (for fasteners designed by structural engineer)																
WALL HEIGHT (mm)		**2400**			**2700**			**3000**			**3300**			**3600**		
STUD SIZE		**64 x 0.50 BMT**			**64 x 0.50 BMT**			**76 x 0.55 BMT**			**76 x 0.55 BMT**			**92 x 0.55 BMT**		
SHELF WIDTH (mm)		**200**	**300**	**400**	**200**	**300**	**400**	**200**	**300**	**400**	**200**	**300**	**400**	**200**	**300**	**400**
Number of shelves equally spaced over full height	1	127	95	77	58	43	33	140	107	87	62	45	38	73	57	47
	2	102	80	65	58	43	33	120	93	77	58	45	38	73	57	47
	3	63	47	38	28	22	17	70	53	43	30	23	18	37	28	23
	4	53	40	33	27	20	17	60	47	38	30	23	18	35	27	22
	5	42	32	25	18	13	12	47	35	28	20	15	12	23	18	15
	6	37	27	22	17	13	10	42	32	25	18	15	12	23	18	15
LOAD MULTIPLICATION FACTOR FOR ALTERNATIVE STUD SIZES																
64 x 0.75 BMT		1.75	1.75	1.75	1.75	1.75	1.75	1.20	1.20	1.20	1.20	1.20	1.20	—	—	—
76 x 0.55 BMT		1.40	1.40	1.40	1.40	1.40	1.40	1.00	1.00	1.00	1.00	1.00	1.00	—	—	—
76 x 0.75 BMT		2.20	2.20	2.20	2.20	2.20	2.20	1.55	1.55	1.55	1.55	1.55	1.55	—	—	—
92 x 0.55 BMT		1.60	1.60	1.60	1.65	1.65	1.65	1.15	1.15	1.15	1.15	1.15	1.15	1.00	1.00	1.00
92 x 0.75 BMT		2.75	2.75	2.75	2.80	2.80	2.80	1.95	1.95	1.95	1.95	1.95	1.95	1.65	1.65	1.65

TABLE 7: MAXIMUM ALLOWABLE LOADS (4200mm – 6000mm wall height)

MAXIMUM ALLOWABLE LOAD IN KG PER METRE RUN OF SHELF (for fasteners designed by structural engineer)													
WALL HEIGHT (mm)		**4200**			**4800**			**5400**			**6000**		
STUD SIZE		**150 x 0.75 BMT**			**150 x 0.75 BMT**			**150 x 0.75 BMT**			**150 x 1.15 BMT**		
SHELF WIDTH (mm)		**200**	**300**	**400**	**200**	**300**	**400**	**200**	**300**	**400**	**200**	**300**	**400**
Number of shelves equally spaced over bottom 3600mm as shown	1	658	550	483	500	433	367	367	300	233	383	283	217
	2	375	325	283	267	233	200	183	158	133	200	150	117
	3	283	242	217	183	167	150	125	108	92	133	100	82
	4	225	200	175	158	133	117	100	83	72	100	78	63
	5	192	158	142	125	108	100	82	72	57	83	63	52
	6	158	133	123	108	100	83	70	62	47	72	53	43



DESIGN ASSUMPTIONS:

1. *Stud spacing = 600mm*
2. *Deflection checked to the lesser of H/480 under shelf loads (G) or H/360 under shelf loads with combined internal pressure (G + Ws)*
3. *Internal pressure checked at 0.375kPa (Wu) ultimate and 0.25kPa (Ws) service*
4. *Walls are lined both sides with 13mm plasterboard*
5. *Studs are continuous in length and no splicing is allowed*
6. *All calculations are based on Rondo sections*
7. *Shelving is attached to one side of the wall only*
8. *BMT = Base Metal Thickness*
9. *To obtain kg per stud per shelf, multiply the values in the above table by 0.6*

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SHELF LOAD TABLES (continued)

Non-Fire Rated Steel Stud Systems

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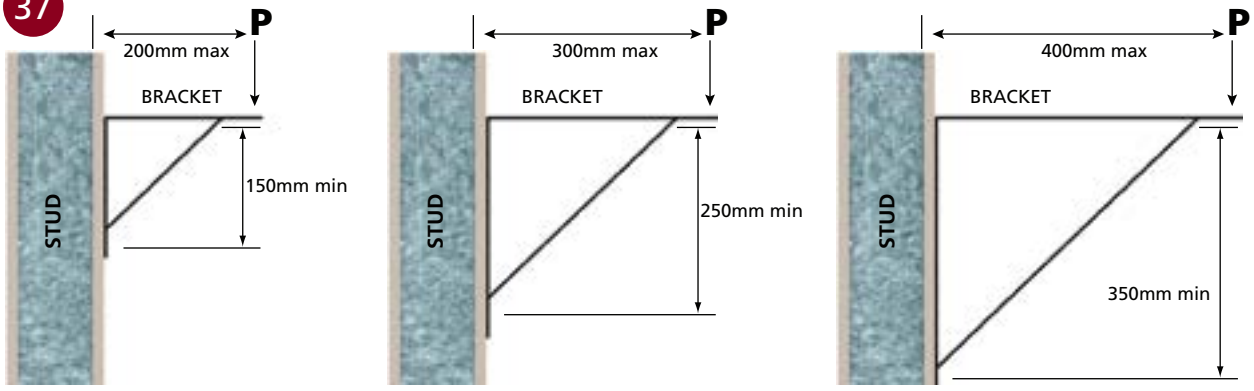

■ **BRACKETS**

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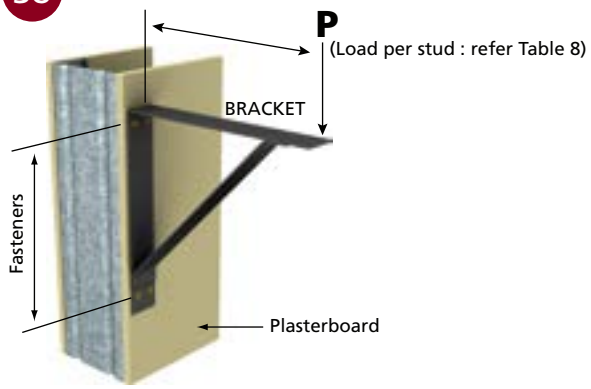


■ **FASTENERS**

TABLE 8: MAXIMUM LOADINGS FOR BRACKETS

STUD GAUGE (BMT)	MAXIMUM LOADING 'P' PER STUD (KG) (where fasteners consist of 2# 10 gauge fasteners at each location)		
	TYPE 1 BRACKET	TYPE 2 BRACKET	TYPE 3 BRACKET
0.50	25	30	33
0.55	27	33	36
0.75	36	44	49
1.15	57	70	76

NOTES: 1. Fixings shown in Figure 3 consist of 2# 10 gauge fasteners at each fixing location
2. Design is for bracket connection only – bracket and shelf design by others
3. Loads greater than those listed above must be independently designed for
4. Fasteners used must be 10 gauge and have the properties listed in Table 15

TABLE 9: FASTENER PROPERTIES (10 GAUGE)

STUD GAUGE BMT (mm)	PULLOUT FORCE kN ($\varnothing N_{ou}$)	SHEAR STRENGTH KN ($\varnothing V_b$)
0.50	0.34	0.54
0.55	0.37	0.62
0.75	0.50	0.99
1.15	0.77	1.87

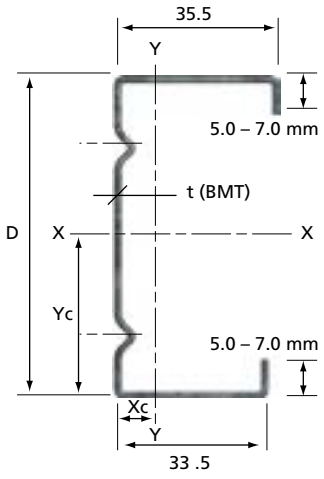
NOTE: Pullout and shear capacity based on Grade 300 steel brackets of minimum thickness 1.50mm

SECTION PROPERTIES

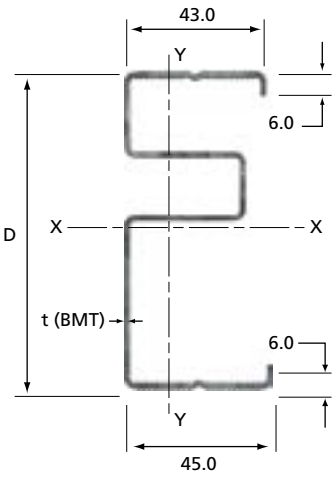
Lipped Studs

MATERIAL SPECIFICATIONS

Steel Grade: G2 Z275 to AS1397
Yield Strength: Fy – 270 MPa
Coating Grade: Z275 – 275g/m² zinc
Ultimate: Fu = 330 MPa



WALL STUD



QUIET STUD

TABLE 12: SECTION PROPERTIES FOR LIPPED STUDS

BMT	PART NO	DIMENSIONS				GROSS AREA	MOMENT OF AREA		SECTION MODULUS		TORSION Constant	WARPING Constant
		D mm	t mm	Xc mm	Yc mm	mm²	Ixx 10^3 mm⁴	Iyy 10^3 mm⁴	Zxx mm³	Zyy mm³	J mm⁴	Iw mm⁶
0.50	401	50.8	0.50	12.0	26.3	64.1	29.1	9.88	1148	428	5.35	5.23E6
	112	63.5	0.50	10.3	33.1	70.5	47.6	10.3	1493	422	5.96	7.78E6
0.55	403	76.2	0.55	9.40	39.5	84.7	79.4	12.0	2076	475	8.64	12.78E6
	251	92.1	0.55	8.60	47.5	93.3	123.1	12.7	2662	486	9.52	19.55E6
0.75	489	50.8	0.75	11.1	26.8	94.6	42.3	13.9	1659	582	18.07	6.62E6
	491	63.5	0.75	10.4	30.7	108.0	72.3	15.9	2281	656	20.24	12.22E6
	493	76.2	0.75	9.50	37.2	117.0	109.0	16.5	2872	650	21.93	17.75E6
	495	92.1	0.75	8.60	45.1	129.0	168.9	17.5	3685	667	24.18	27.26E6
	511	150.0	0.75	6.50	74.1	167.6	533.4	19.9	7144	701	32.28	82.56E6
1.15	661	63.5	1.15	10.5	31.2	154.9	102.7	23.5	3239	972	70.47	16.2E6
	671	76.2	1.15	9.60	37.5	169.5	157.1	25.0	4121	997	76.91	24.67E6
	681	92.1	1.15	8.70	45.4	187.8	245.2	26.5	5315	1021	84.97	38.35E6
	691	150.0	1.15	6.50	74.2	254.5	788.9	30.3	10490	1073	114.3	120.4E6
RONDO QUIET STUD®												
0.55	RQST	92.0	0.55	16.5	48.9	139.2	149.8	30.6	3067	1097	14.1	59.8E6

NOTE: Section properties are approximate only and may be subject to revision

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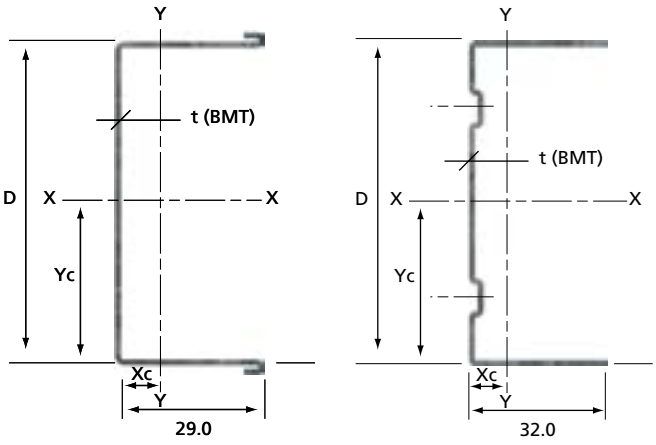
SECTION PROPERTIES (continued)

Wall Stud Track

MATERIAL SPECIFICATIONS

Steel Grade: G2 Z275 to AS1397
Yield Strength: Fy – 270 MPa
Coating Grade: Z275 – 275g/m^2 zinc
Ultimate: Fu = 330 MPa



0.50/0.70 BMT HEMMED **0.75/1.15 BMT**

TABLE 13: SECTION PROPERTIES FOR WALL TRACKS

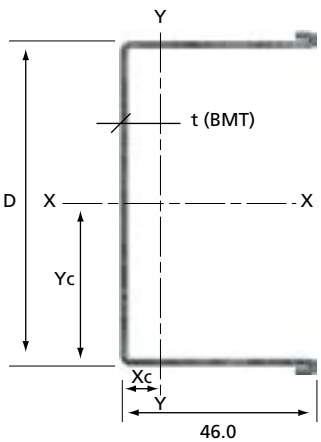
BMT	PART NO	DIMENSIONS				GROSS AREA	MOMENT OF AREA		SECTION MODULUS		TORSION Constant	WARPING Constant
		D mm	t mm	Xc mm	Yc mm	mm^2	Ixx 10^3 mm^4	Iyy 10^3 mm^4	Zxx mm^3	Zyy mm^3	J mm^4	Iw mm^6
0.50	400	52.5	0.50	8.91	26.3	56.7	26.5	6.12	1020	313	4.85	2.84E6
	111	65.2	0.50	8.04	32.6	63.1	43.6	6.57	1348	322	5.38	4.73E6
	402	77.9	0.50	7.32	39.0	69.4	65.9	6.95	1703	329	5.91	7.20E6
	250	93.75	0.50	6.58	46.9	77.0	101.8	7.33	2185	335	6.57	11.2E6
0.70	490	53.1	0.70	8.79	26.6	79.4	37.4	8.40	1430	432	13.3	3.97E6
	492	65.5	0.70	7.94	32.8	88.3	60.7	9.01	1876	443	14.7	6.51E6
	494	78.1	0.70	7.23	39.1	97.2	91.5	9.51	2367	453	16.2	9.86E6
	496	94.5	0.70	6.48	47.3	107.8	143.5	10.1	3061	462	18.0	15.5E6
1.15	660	65.9	1.15	7.53	33.0	142.4	96.1	13.50	2973	589	63.3	9.70E6
	670	78.6	1.15	6.84	39.3	157.0	145.4	14.30	3757	604	69.7	14.8E6
	680	94.5	1.15	6.13	47.3	176.0	225.2	15.00	4826	618	77.8	22.9E6

NOTE: Section properties are approximate only and may be subject to revision

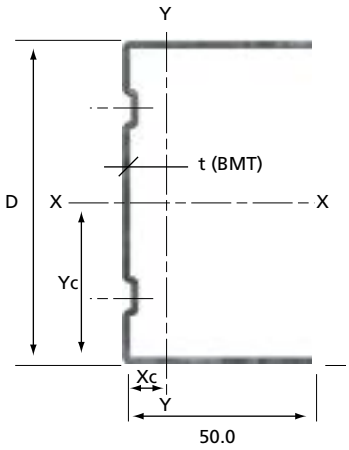
Deflection Head Track

MATERIAL SPECIFICATIONS

Steel Grade: G2 Z275 to AS1397
Yield Strength: Fy – 270 MPa
Coating Grade: Z275 – 275g/m^2 zinc
Ultimate: Fu = 330 MPa



0.70 BMT HEMMED



1.15 BMT sections

TABLE 14: SECTION PROPERTIES FOR DEFLECTION HEAD TRACK

BMT	PART NO	DIMENSIONS				GROSS AREA	MOMENT OF AREA		SECTION MODULUS		TORSION Constant	WARPING Constant
		D mm	t mm	Xc mm	Yc mm	mm^2	Ixx 10^3 mm^4	Iyy 10^3 mm^4	Zxx mm^3	Zyy mm^3	J mm^4	Iw mm^6
0.70	488	53.1	0.70	15.9	26.6	105.7	51.0	26.7	1947	920	17.1	13.5E6
	497	65.5	0.70	14.7	32.8	113.7	82.1	28.7	2537	950	18.5	21.7E6
	498	78.1	0.70	13.6	39.1	120.4	122.7	30.4	3174	974	20.0	32.5E6
	499	94.5	0.70	12.4	47.3	133.4	190.2	32.4	4058	999	21.8	50.4E6
0.75	510	152.4	0.75	9.58	76.2	175.0	627.4	40.4	8277	1034	34.9	164.7E6
1.15	663	65.9	1.15	14.7	33	187.8	137.7	47.2	4257	1400	81.5	34.7E6
	673	78.6	1.15	13.6	39.3	204.7	205.3	50.1	5304	1440	88.0	52.3E6
	683	94.5	1.15	12.4	47.3	220.8	312.6	53.2	6701	1480	96.0	80.5E6
	690	152.4	1.15	9.53	76.2	287.5	953.4	61.1	12610	1573	125.4	248.3E6

NOTE: Section properties are approximate only and may be subject to revision

TABLE 15: SCREW FIXING DATA

APPLICATION	RECOMMENDED SCREW	SIZE
FLOORING Joists to Bearers Bearers to Posts Bracketing & Cleats **FRAMING** Tracks to Steel Members Wall Studs to Steel Columns Bracketing & Cleats External Face Connections Plumbing/Electrical Brackets **ROOFING** Trusses to Top Plates Roof Battens to Trusses Bracketing & Cleats Roof Sheeting to Battens Roof Battens to Trusses	**HEXAGON HEAD DRILL POINT**  FOR STEEL UP TO 4mm THICK	8–18 x 12mm 8–18 x 20mm 10–16 x 16mm 10–16 x 22mm 12–14 x 20mm 12–14 x 35mm 14–10 x 20mm 14–10 x 42mm
	 FOR STEEL UP TO 6mm THICK	10–24 x 16mm 10–24 x 25mm 12–24 x 20mm 14–20 x 20mm 14–20 x 22mm 14–20 x 30mm 14–20 x 40mm
FRAMING Studs to Tracks Studs to Studs Bracketing & Cleats Internal Face Connections Plumbing/Electrical Brackets Bracing Straps Noggings to Studs Tracks to Studs **CEILING/ROOFING** Ceiling Battens to Joists Roof Battens to Trusses Bracketing & Cleats	**BUTTON HEAD NEEDLE POINT**  FOR STEEL UP TO 0.8mm THICK	8 x 14mm 8 x 25mm 8 x 32mm
	WAFER HEAD DRILL POINT  FOR STEEL UP TO 4mm THICK	10–16 x 16mm 10–16 x 22mm 10–24 x 16mm 10–24 x 22mm 10–24 x 30mm 10–24 x 40mm
INTERNAL LININGS Plasterboard Wall & Ceilings	**BUGLE HEAD S-POINT/NEEDLE POINT**  FOR STEEL UP TO 0.8mm THICK	6–18 x 25mm 6–18 x 30mm 6–18 x 42mm 7–16 x 50mm 8–15 x 60mm 8–15 x 75mm
	BUGLE HEAD DRILL POINT  FOR STEEL UP TO 6mm THICK	6–20 x 25mm 6–20 x 30mm 6–20 x 45mm

NOTE: Screws should comply with AS/NZS 3566-2 2002 Corrosion Resistance.

APPLICATION	RECOMMENDED SCREW	SIZE
INTERNAL LININGS Fibre cement linings in wet areas	 FOR STEEL UP TO 0.8mm THICK	8–18 x 20mm
	 FOR STEEL UP TO 4mm THICK	8–18 x 25mm
Compressed sheeting to steel studs	 MINIMUM STUD GAUGE ≥ 1.0mm	8–18 x 33mm 8–18 x 38mm 10–24 x 30mm 10–24 x 45mm

TABLE 16: OTHER FASTENERS

APPLICATION	RECOMMENDED SCREW	SIZE
Stud or track fixing to concrete and masonry	 NOTE: TWO FIXINGS FOR TRACKS ≥ 100MM. CHECK BEFORE USING ON FIRE RATED APPLICATIONS	Refer manufacturer's data
Stud or track fixing to steel	 NOTE: TWO FIXINGS FOR TRACKS ≥ 100MM. CHECK BEFORE USING ON FIRE RATED APPLICATIONS	Refer manufacturer's data
Stud or track fixing to concrete and masonry		Refer manufacturer's data

NOTE: Screw fixing information provided by ITW Buildex. Specific details should be checked with the screw manufacturer before commencing work.

GLOSSARY OF TERMS

BCA REQUIREMENTS
The BCA requirements only relate to lightweight fire rated construction, not to partitions in general. There is currently no Australian Standard which covers non-fire rated partition framing specifically. The main presumption is that there is no reason why a fire rated partition should be constructed any differently (in terms of loading and serviceability criteria) than a normal non-fire rated partition.

DEAD LOAD (G)
That part of structure, which is not readily moveable, such as flooring, linings etc. Most dead loads applicable for building materials are detailed in AS1170.1.
As dead loads are present at all times the deflection limits applicable when checking serviceability for dead load only cases are generally more stringent.

DEFLECTION LIMIT
A criterion applied to check the "serviceability" of a partition or ceiling system.
For a non-load bearing partition with "flexible linings" (i.e. plasterboard) the BCA requirements for lightweight partitions H/240 (where H = wall height) provides acceptable serviceability.
Example: if wall height is 2700mm calculation is 2700/240 = 11.25mm max. lateral deflection at mid height of wall.
Normally where brittle finishes (i.e. tiled bathroom) are applied to the partition the deflection limit is increased to H/360. For shelf loaded walls, the deflection limit is generally increased to H/480 to reduce the secondary effects of the shelf load.
Deflection limits can and do vary depending on the use and function of the building, and there are no prescribed limits for non-fire rated partitions.

SINGLE, DOUBLE AND CONTINUOUS SPAN
Single Span:
Where a single member is supported at at each end only.
Double Span:
Where a single member is supported at three points along its length.
Continuous Span:
Where a single member is supported at four or more points along its length i.e. a 6m length of Furring Channel suspended from a Top Cross Rail Grid system.
Where double span and continuous span values are stated, the design assumes that all the spans are equal.

INTERNAL PRESSURE
The design load applied to the soffit of the ceiling, either upward (uplift) or downward.
Sometimes this pressure may be due to the ceiling being used as a pressurised plenum for mechanical services.
The design load may vary in certain parts of buildings depending upon the exposure the ceiling has to the exterior, such as in factories with large roller doors etc. In these situations the contract specification should be consulted or clarification sought from the project coordinators. The direction of the design load is important so the ceiling requirements for "downstrutting" may be determined. Normally the deflection criteria are relaxed for ceilings subjected to wind loads.

LATERAL PRESSURE
The design load applied to the face of the wall.
The BCA requirements for lightweight partitions are sufficient for internal partitions in an effectively sealed building – 0.25kPa.
The design load may vary in certain parts of buildings (i.e. lift shafts, etc.) and for certain building classes (i.e. Class 9B buildings). Also, the design load may vary due to external wind load exposure, such as in factories with large roller doors etc. In these situations the contract specification should be consulted or clarification sought from the project coordinators.

LATERAL PRESSURE TYPE — PERMISSIBLE vs ULTIMATE
As the current design code for Cold-Formed Steel Sections (ASNZS4600) is in Limit State Format it is appropriate that all loads are specified as Ultimate values.
In terms of wind loading the Ultimate wind pressure is 1.5 times higher than the permissible pressure.

LIVE LOAD (Q)

The load resultant from occupancy or use of the building, such as persons walking (floor live loads), storage loads, impact loads etc. Live loads are detailed in AS1170.1, and may vary depending on the use and function of the building.
As live loads are removable or intermittent the deflection limits applicable when checking serviceability for live load cases are generally relaxed, as opposed to dead load.

SERVICEABILITY

A criterion that defines acceptable in-service performance of a partition or ceiling. The criterion is usually specified as a deflection limit, but may also be specified as an acoustic rating.

WIND DOWN (Wd)

The resultant forces from the wind load, which tends to generate compression load in the stud framing. Wind downwards may not occur on every project.
As wind loads are intermittent (i.e. the wind tends to gust) the deflection limits applicable when checking serviceability for wind load cases are generally relaxed, as opposed to dead load.
It is important for the wind up and wind down cases that the wind load is clearly described, and the loading is calculated in accordance with AS1170.2 or AS4055 as applicable.
AS1170.2 Wind Loads is applicable for all normal structures, both low rise and high rise.
AS4055 Wind Loads for Housing is only applicable for buildings with an eaves height of 6.0m and/or a maximum height at any point of 8.5m. In general terms the code applies up to two storey domestic structures or similar.

WIND UP (Wu)

The resultant force from the wind load, particularly on roofs sheeted with metal decking, which tends to generate a tension load in the stud framing. Wind uplift may not occur on every project, such as a tiled roof subjected to an N2 (W33) wind load, under serviceability.
It is important for the wind up and wind down cases that the wind load is clearly described, and the loading is calculated in accordance with AS1170.2 or AS4055 as applicable.

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RONDO MAXIFRAME® EXTERNAL WALL FRAMING SYSTEM

SUMMARY

The Rondo MAXIframe® External Wall Framing system is paving the way for light-weight steel framing in external wall construction. The system has been expertly engineered to offer builders a more efficient, versatile and cost effective design option than traditional external wall framing construction methods.

The system incorporates standard Rondo 92mm Studs as the main framing, with the inclusion of two new major profiles, MAXIjamb® and MAXItrack®, and three complementary cleats to provide a simple, yet solid structure.

SUITABLE FOR:

- External Wall Systems
- Vented External Walls
- Non-Vented External Walls
- Load Bearing Walls by design
- Window and Door Jambs
- Non-Fire Rated Systems
- Fire Rated Systems
- Dual exterior cladding and interior linings support
- Insulation in wall cavity
- Access for services within outer walls

SPECIAL FEATURES

- MAXIjamb can support and carry greater load than regular wall studs, therefore removing the need for boxed or back to back stud configurations
- MAXItrack provides a positive connection between stud and deflection head which has allowed the Nogging track normally located 100mm below the head track to be removed
- Greater performance capacities than traditional external wall framing construction methods
- Available in custom lengths
- MAXIjamb is made from hi tensile steel, 1.2BMT G500
- MAXIjamb can be used as both a vertical jamb member around openings, or horizontal head and sill member in window openings.
- Majority of Stud and Track is hemmed for safety and increased strength
- Manufactured with a minimum coating of Z275

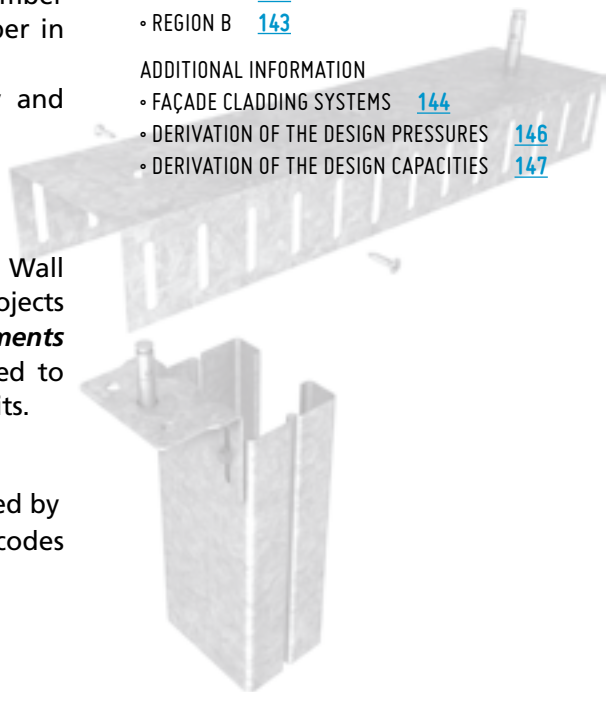
IN PRACTICE

Since its release in 2011, Rondo's MAXIframe External Wall Framing System has already been used in significant projects across Australia and New Zealand. In the ***Century Apartments project in Queensland***, the MAXIframe system was used to create a solid framing foundation in all 76 residential units.

IMPORTANT NOTE:

Rondo recommends its products and systems are installed by a qualified tradesperson and according to the relevant codes and standards outlined on page 256 of this manual.

CONTENTS:



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MAXIFRAME® COMPONENTS

CLEATS

201	92mm x 2.9mm Base Bracket
202	92mm x 1.5mm Sill Bracket
203	92mm x 2.9mm Slotted Head Bracket

JAMB STUD

200	MAXIjamb Stud 92mm x 1.20bmt

SLOTTED DEFLECTION HEAD TRACK

S683	MAXItrack 92mm x 1.15 bmt

WALL TRACK

680	92mm x 32mm x 1.15bmt

NOGGING TRACK

506	92mm x 0.70bmt

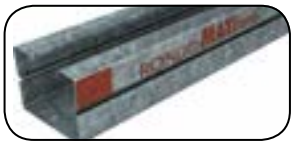
WALL STUD

681	92mm x 1.15bmt

CLEATS

201 202 203

JAMB STUD



200

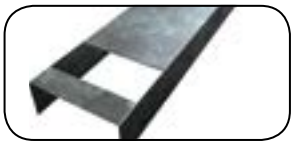
SLOTTED DEFLECTION HEAD TRACK

S683

WALL TRACK

680

NOGGING TRACK



506

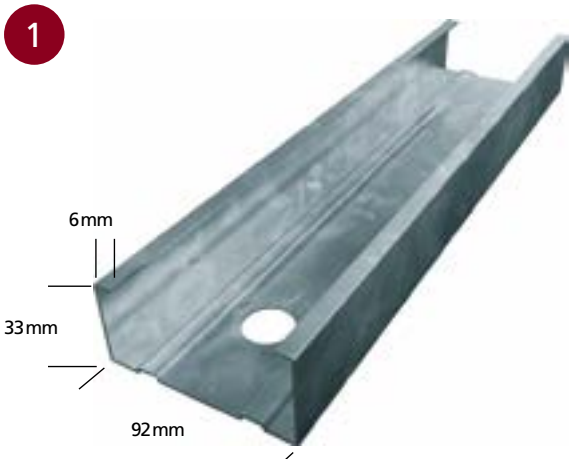
WALL STUD

681

SECTION PROPERTIES

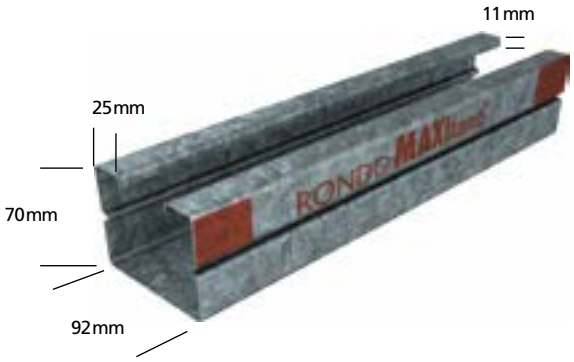
Wall Stud & MAXIjamb

1



■ 681 WALL STUD

2



■ 200 MAXIJAMB

TABLE 1: SECTION PROPERTIES

RONDO PART NO	DEPTH (mm)	GAUGE t (mm)	AREA GROSS A (mm^2)	WEIGHT (kg/m)
681	92.1	1.15	187.8	1.52
200	92.1	1.20	350.6	2.83

RONDO PART NO	MOMENT OF INERTIA (10^3 mm^4)		RADIUS OF GYRATION (mm)		CENTROID (mm)		SHEAR CENTRE (mm)	MONO-SYMMETRY CONSTANT (mm)	TORSION CONSTANT (mm^4)	WARPING CONSTANT (10^6 $mm^{6)}$
	Ixx	Iyy	Rxx	Ryy	Xc	Yc	Xo	ßy	J	Iw
681	242.1	25.8	35.9	11.7	8.70	46.0	-22.6	101.2	83.4	40.5
200	492.8	258	37.4	27.1	30.4	46.0	-71.9	156.3	168.3	820

NOTE: Section properties are gross, based on the centerline of the section. Gauge (t) is specified as Base Metal Thickness (BMT).

TABLE 2: DESIGN VALUES

RONDO PART NO	SECTION CAPACITY ϕM_{sx} (kNm)	MEMBER MOMENT CAPACITY ϕM_{bx} (kNm)	DISTORTIONAL MOMENT CAPACITY ϕM_{bdx} (kNm)	SHEAR CAPACITY ϕV_v (kN)	FULL LATERAL RESTRAINT FLR (mm)
681	1.256	Varies	1.1241	12.9	830
200	5.027	Varies	4.129	18.0	1580

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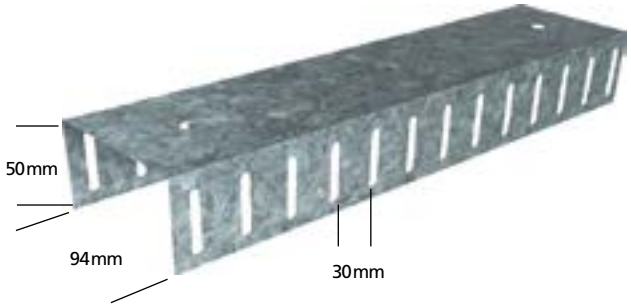
SECTION PROPERTIES (continued)

Deflection Head & Wall Track

3



■ S683 MAXITRACK SLOTTED DEFLECTION HEAD TRACK

4

■ 680 WALL TRACK

TABLE 3: SECTION PROPERTIES

RONDO PART NO	DEPTH (mm)	GAUGE t (mm)	AREA GROSS A (mm^2)	WEIGHT (kg/m)
S683	94.5	1.15	221	1.61
680	94.5	1.15	176	1.42

RONDO PART NO	MOMENT OF INERTIA (10^3 mm^4)		RADIUS OF GYRATION (mm)		CENTROID (mm)		SHEAR CENTRE (mm)	MONO-SYMMETRY CONSTANT (mm)	TORSION CONSTANT (mm^4)	WARPING CONSTANT (10^6 mm^6)
	Ixx	Iyy	Rxx	Ryy	Xc	Yc	Xo	ßy	J	Iw
S683	318.9	56.3	38.2	16.0	12.9	47.2	-32.0	113.7	96.1	83.8
680	227.2	16.0	35.6	8.9	5.8	47.2	-15.7	108.6	75.8	20.8

NOTE: Section properties are gross, based on the centerline of the section. Gauge (t) is specified as Base Metal Thickness (BMT).

TABLE 4: DESIGN VALUES

RONDO PART NO	SECTION CAPACITY ϕM_{sx} (kNm)	MEMBER MOMENT CAPACITY ϕM_{bx} (kNm)	DISTORTIONAL MOMENT CAPACITY ϕM_{bdx} (kNm)	SHEAR CAPACITY ϕV_v (kN)	FULL LATERAL RESTRAINT FLR (mm)
S683	1.080	Varies	–	12.9	1090
680	0.9823	Varies	–	12.9	690

Nogging Track & Cleats

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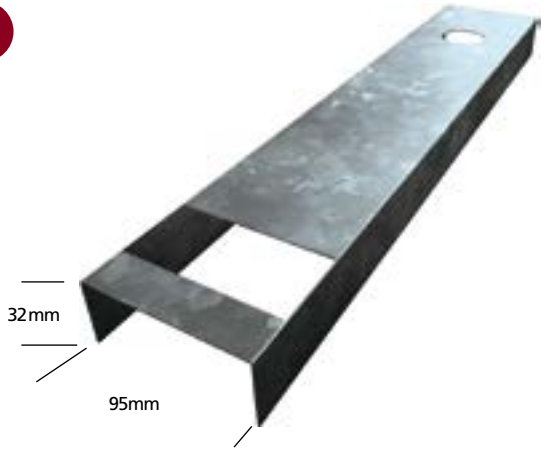

■ 506 NOGGING TRACK

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■ 201 JAMB BASE BRACKET

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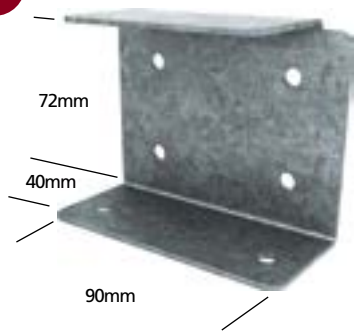

■ 202 SILL/HEADER BRACKET

8

■ 203 SLOTTED JAMB HEAD BRACKET

TABLE 5: SECTION PROPERTIES

RONDO PART NO	DEPTH (mm)	GAUGE t (mm)	AREA GROSS A (mm^2)	WEIGHT (kg/m)
506	94.5	0.70	107.8	0.86

RONDO PART NO	MOMENT OF INERTIA (10^3 mm^4)		RADIUS OF GYRATION (mm)		CENTROID (mm)		SHEAR CENTRE (mm)	MONO-SYMMETRY CONSTANT (mm)	TORSION CONSTANT (mm^4)	WARPING CONSTANT (10^6 mm^6)
	Ixx	Iyy	Rxx	Ryy	Xc	Yc	Xo	ßy	J	Iw
506	129.8	7.08	35.5	8.2	5.20	47.2	-14.2	110.4	16.8	10.9

NOTE: Section properties are gross, based on the centerline of the section. Gauge (t) is specified as Base Metal Thickness (BMT).

RONDO PART NO	GAUGE t (mm)
201	2.9
202	1.5
203	2.9

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DESIGN DATA

Wind Loading & Serviceability

The wind loading presented in this manual has been calculated in accordance with AS/NZS1170.2.
A more detailed evaluation of the wind loading may be found on Page 146. Some of the assumptions used in the determination of the design pressures are summarised below:

BUILDING IMPORTANCE LEVEL

The designer is responsible for checking the building importance level in accordance with the Building Code of Australia (BCA) Section B. The design pressures have been determined based on a Building Importance Level 3, in accordance with the BCA, using a V1000 wind speed.

REGIONS A & B

The design tables are suitable for checking the MAXIframe systems located within Wind Regions A & B of Australia and New Zealand.

For Australia, Regions A & B cover the vast majority of the country, with the exception of the coastal regions above 25° latitude on the East Coast and 27° latitude on the west coast. (*Refer to Figure 9.)*

The excluded areas are classified as cyclonic and require significantly higher wind loading to be applied to the framing.

For New Zealand, Region W and the alpine regions are excluded due to the higher wind loading required in these areas. These areas are located between the red contour lines and shading on the map in Figure 9.

In these locations, specific designs will be required and we recommend that you discuss your requirements with your Rondo Technical Representative.

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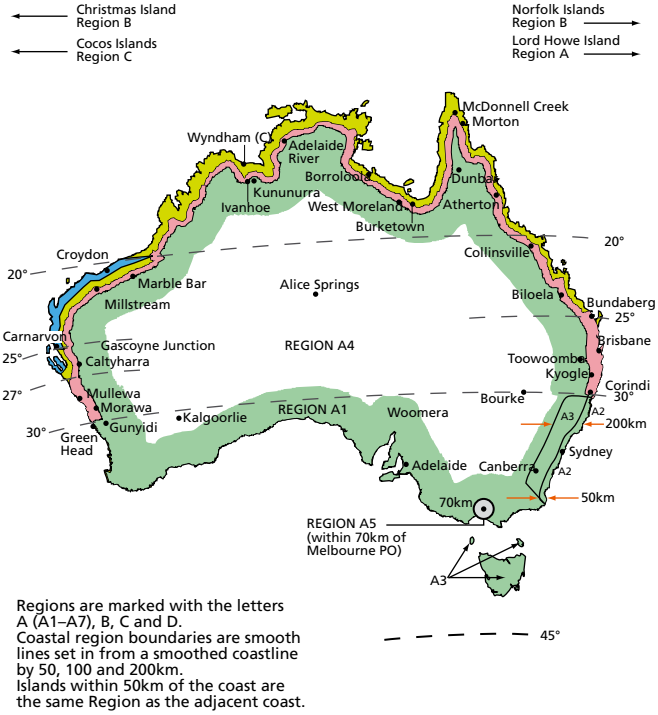
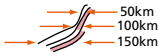
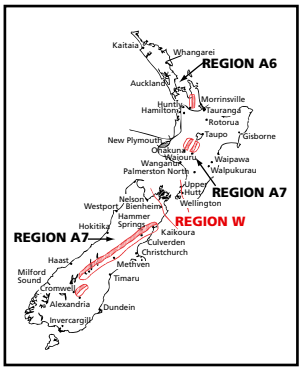


Regions are marked with the letters A (A1–A7), B, C and D.
Coastal region boundaries are smooth lines set in from a smoothed coastline by 50, 100 and 200km.
Islands within 50km of the coast are the same Region as the adjacent coast.





Region 'A'
Region 'B'
Region 'C'
Region 'D'

WIND REGIONS A & B FOR AUSTRALIA & NEW ZEALAND

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TERRAIN CATEGORIES

The design tables are suitable for checking the MAXIframe systems located in Terrain Categories 3 and 2.5.

Terrain Category 2 has not been considered due to possible differences in terrain categories between ultimate and serviceability and designs for these locations should be referred to your Rondo Technical Representative.

For clarification of Terrain Categories refer to Figure 10.

The design tables for Terrain Category 3 can be used for Terrain Category 4, although this may be conservative

SERVICEABILITY

The design tables have been prepared for H/240 and H/360 deflection limits, to accommodate both flexible and "brittle" cladding types. Rondo recommends using, as a minimum, the H/360 tables for all brick veneer construction.

The design tables do not consider the wall linings for serviceability, except for lateral restraint (i.e. there is no composite action assumed).

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Category 2.5
Terrain with few trees and isolated obstructions.
This is an intermediate classification between Category 2 and 3.

Category 3
Terrain with numerous closely-spaced obstructions such as areas of suburban housing. (3 metres to 5 metres high)

TERRAIN CATEGORIES

DESIGN DATA (continued)

Loading Assumptions

WALL STUDS

The wall stud framing solutions presented in this manual have been determined assuming the unrestrained flange (i.e. unlined flange) is in compression, for both the positive and negative wind pressures. The contributory wall load width has been taken as shown in Figure 11.

NOGGINGS

Noggings are assumed to provide lateral and torsional restraint to the studs. At the Nogging location, rotation in a plane perpendicular to the plane of loading (ie; through the minor axis) is assumed to be fixed.

The following Nogging configurations are assumed in the tables:

1 row mid height:

Walls up to and including 3000mm high

2 rows equispaced:

Walls greater than 3000mm high.

Rondo does not recommend attaching top hats vertically, to the pre-punched 0.70bmt Noggings. Due to the punch out configuration, the Noggings do not have sufficient capacity or rigidity to accommodate laterally imposed loads. Where top hats are required to be installed vertically, Rondo recommends the introduction of a secondary horizontal top hat member.

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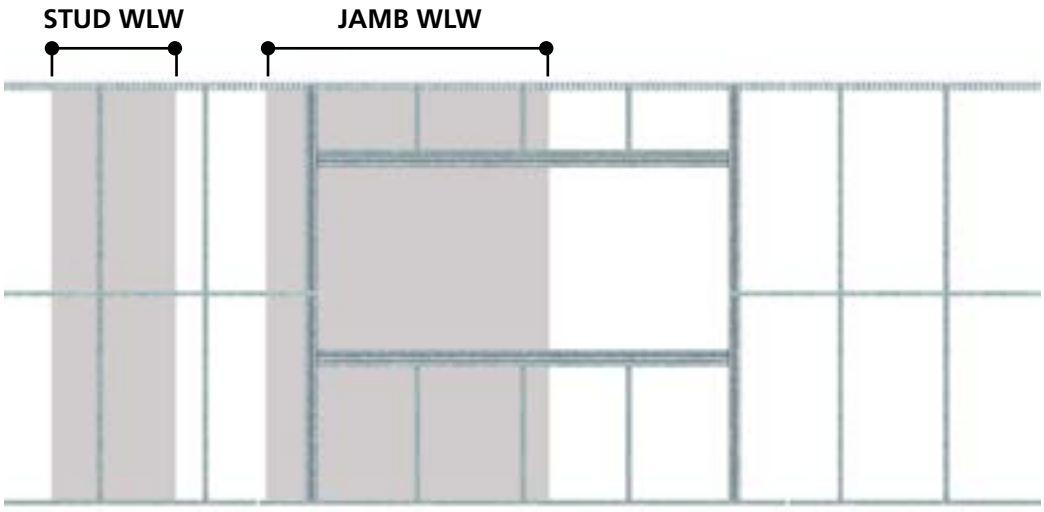


■ ASSUMED WALL LOAD WIDTH (WLW)

WALL LININGS

Where the wall linings are fixed to one flange, it is assumed to provide lateral restraint only. Where the wall linings are fixed to both flanges, it is assumed to provide lateral and torsional restraint. The linings may be fixed either vertically or horizontally to the studs; however, the joints in the linings should always be staggered, and the linings should always be installed in accordance with the manufacturer's recommendations.

FASTENERS

The use of mechanical fasteners, such as self drilling screws, provide a fast and effective means of securing the framing. The design tables assume a certain degree of restraint at the member intersection and connection points, and this can be achieved by screw fastening. Table 6 provides the screw shear capacity, based on tilting and bearing, along with the pullout (tension) capacity, for both #8 and 10# gauge screws.

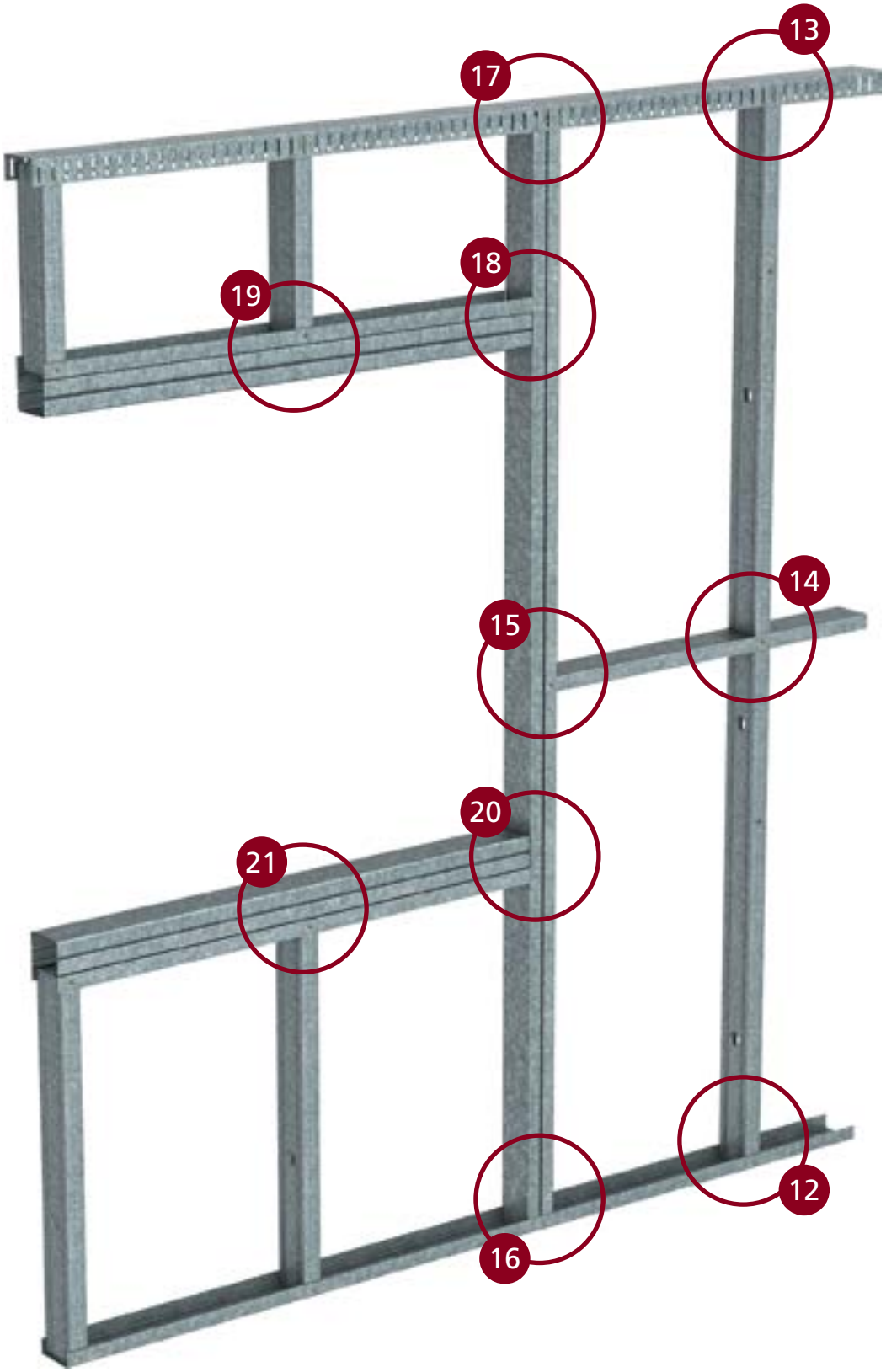
TABLE 6: SCREW SHEAR AND PULLOUT CAPACITY

SCREW GAUGE	8	10	8	10
MINIMUM STEEL THICKNESS	SHEAR CAPACITY ϕV_b kN		PULLOUT CAPACITY ϕN_{ou} kN	
1.15mm	1.75	1.87	0.68	0.77
1.20mm*	2.94	3.14	1.11	1.27

NOTES:
*1. * t = 1.20mm Fu = 520MPa, all other steel thicknesses Fu = 330MPa.*
2. Screw fasteners to be in accordance with AS3566.
3. Screw coating to be selected in accordance with the manufacturer's recommendations.

INSTALLATION DETAILS

Typical MAXIframe System



Circled areas on the drawing refer to figures shown in more detail on the following pages.

Base Track

The base track anchor is required to withstand the shear forces resulting from the wind loading onto the face of the wall. The base track anchor is to be independently checked for the minimum capacity specified below.

All Rondo tracks are pre-punched, with a 10.5mm diameter hole at 150mm centres, along their centerline to allow easier installation of the track fasteners. Rondo recommends the maximum spacing of the base track anchors as shown in Table 7.

The fixing between the stud and track is to be a single #8 wafer head tek screw, minimum, per side.

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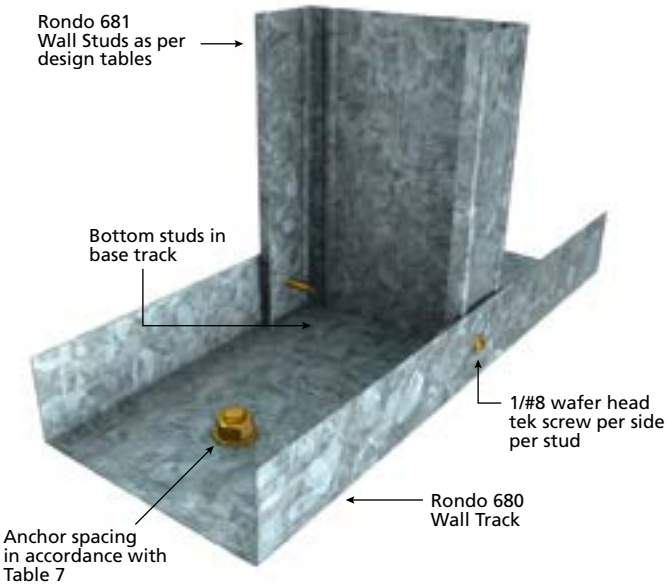

TYPICAL BASE TRACK FIXING DETAILS

TABLE 7: MAXIMUM ANCHOR SPACING

ANCHOR SIZE (mm)	**ADOPTED SPACING** (mm)	**MAXIMUM DESIGN PRESSURE** (kPa)
8	600	2.50
	450	3.40
	300	5.10

NOTES:
1. The above table is based on a maximum wall height of 3.2m.
2. Anchor to be checked for minimum shear capacity of 3.10kN.
3. Anchors to be selected and installed in accordance with manufacturer's recommendations.
4. Minimum edge distance to concrete to be 50mm.
5. Dynabolts to be installed with washers in place.

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INSTALLATION DETAILS (continued)

Slotted Deflection Head Track

The MAXItrack deflection head track anchors are the same as the base track anchors.

The new MAXItrack is slotted along the flanges, to provide allowance for building vertical movements, and provides a positive connection between the stud and deflection head.This has allowed the Nogging 100mm below the head track to be removed. Consideration of the connection capacity has been accounted for in the wall framing tables.

The MAXItrack slotted deflection head connection has greater capacity than the traditional deflection head connection, therefore the wall framing tables in this manual are exclusively for use with the MAXItrack product and system components.

CONNECTIONS

Connection between the stud and MAXItrack is via 1/#10 wafer head tek screw per side, per stud, as shown.

TO CONCRETE:

The standard clearance between the top of the stud and the slab soffit is 20mm, which accommodates up to 15mm incremental slab deflection, with tolerance.

TO STEELWORK:

Where the steelwork carries roof or floor loads, a deflection head will be required. Where the steelwork is in place only as lateral support to the stud framing a deflection head is not required.

For roof uplift, the MAXItrack can be installed with an initial stud clearance of 5mm, which will give an allowance of up to 15mm for roof uplift.

NOTE:
The allowance for structural movement is to be confirmed by the project engineer prior to commencing work on site.

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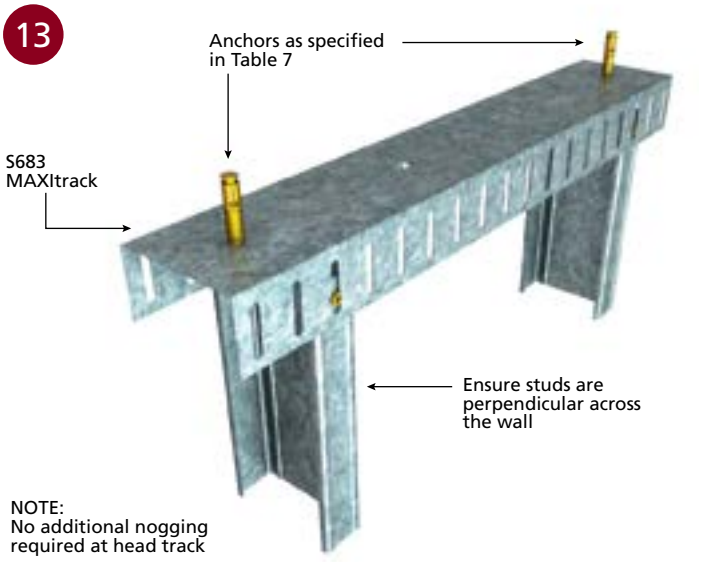
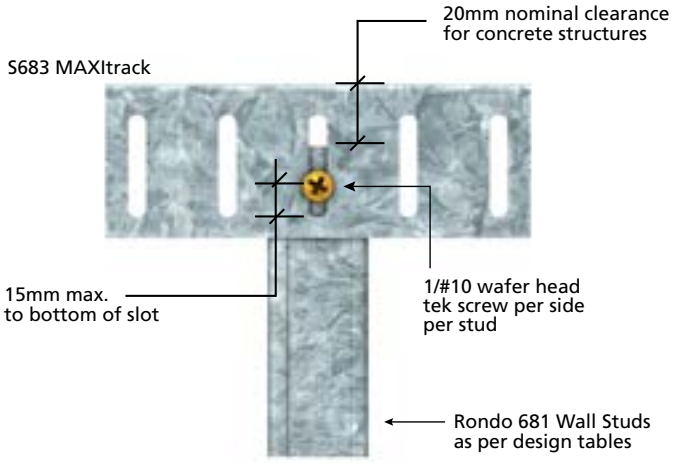


TYPICAL MAXITRACK CONNECTION DETAILS



TYPICAL MAXITRACK FIXING DETAIL

Noggings

Noggings are a very important part of the overall stud framing system as they provide lateral and torsional restraint to the wall studs, thereby increasing the load that can be carried by the studs. However, Noggings do not improve the deflection of the framing.

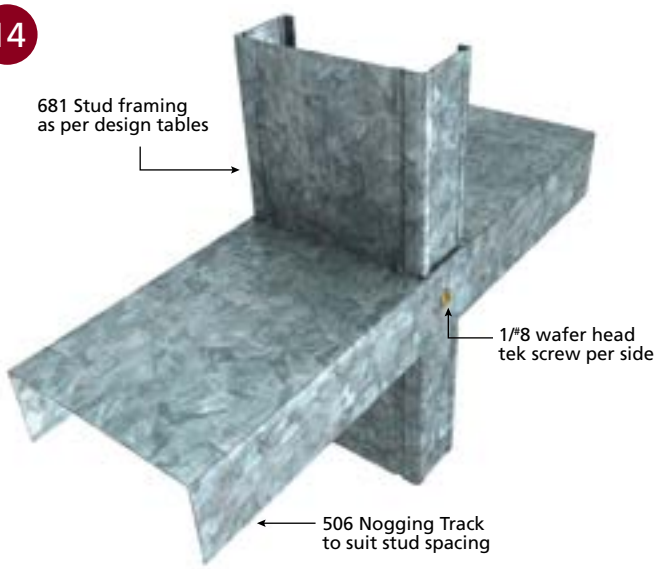
Rondo produces continuous Nogging track, which has pre-punched slots as standard at 450mm and 600mm centres. Other sizes can be ordered as a special.

The Nogging track can be laid over the base track, and after the studs are positioned, slid up the wall and secured in place. Alternatively, individual Noggings may be cut from the continuous track and installed separately.

The Nogging is required to be fastened to each stud using 1/#8 wafer head tek screw.

Noggings are to be installed as noted in Table 8.

14



TYPICAL NOGGING DETAIL

TABLE 8: NOGGING REQUIREMENTS

WALL HEIGHT (mm)	**NOGGINGS REQUIRED**
UP TO 3000	1 row mid height
> 3001	2 rows equispaced

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NOGGING TRACK FIXING DETAIL AT MAXIJAMB

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INSTALLATION DETAILS (continued)

Jamb Studs

MAXIJAMB BASE CONNECTION

The MAXIjamb base cleats have strengthening gussets in the corners, and have been profiled to match the MAXIjamb and other Rondo products. The cleat capacity has been derived from load testing of the connection.

The design charts for the MAXIjamb, have been prepared based on the typical connection shown here.

FIXING DETAILS

TO THE MAXIJAMB SECTION:

Set the face with the two holes against the web of the MAXIjamb, and install using 2/#10 hexagon head tek screws.

Note: The MAXIjamb base bracket is to be fitted to the MAXIjamb web, unless noted otherwise.

TO CONCRETE:

Use the central hole, in the base of the bracket with a 10mm Expanding Type Anchor, and washer.

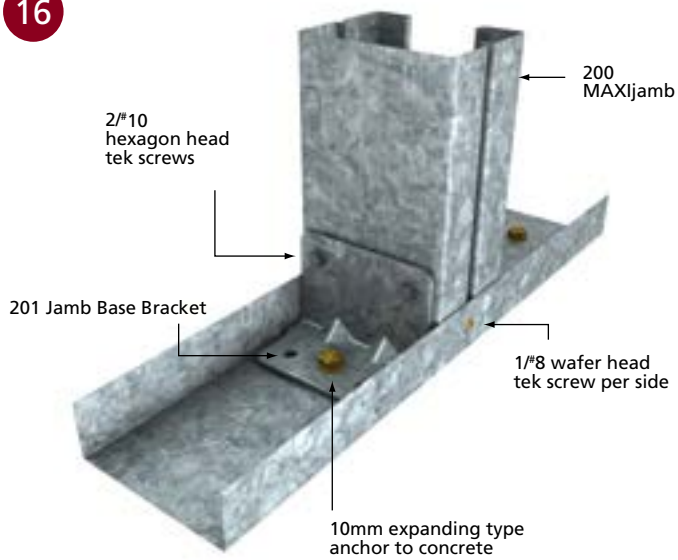
TO STEELWORK:

Use the central hole with an M10 Grade 4.6 Bolt, and washer under the head.

Alternatively:

Use the two outer fixing holes with #12 Series 500 Hexagon Head tek screws.

16



TYPICAL MAXIJAMB BASE FIXING DETAILS

MAXIJAMB HEAD CONNECTION

The MAXIjamb head cleats have strengthening gussets in their corner, and have been profiled to match the MAXIjamb and other Rondo products. The cleat capacity has been derived from actual load testing of the connection.

The design charts for the MAXIjamb, have been prepared based on the typical connection shown here.

FIXING DETAILS

TO THE MAXIJAMB SECTION:

Set the face with the two vertical slots against the web of the MAXIjamb, and install using 2/#10 hexagon head tek screws.

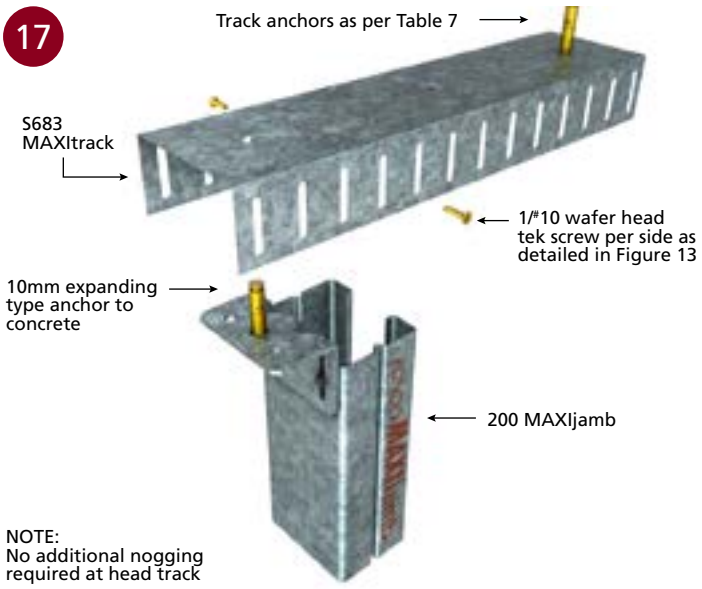
Note: The MAXIjamb head bracket is to be fitted to the MAXIjamb web, unless noted otherwise.

TO THE STRUCTURE:

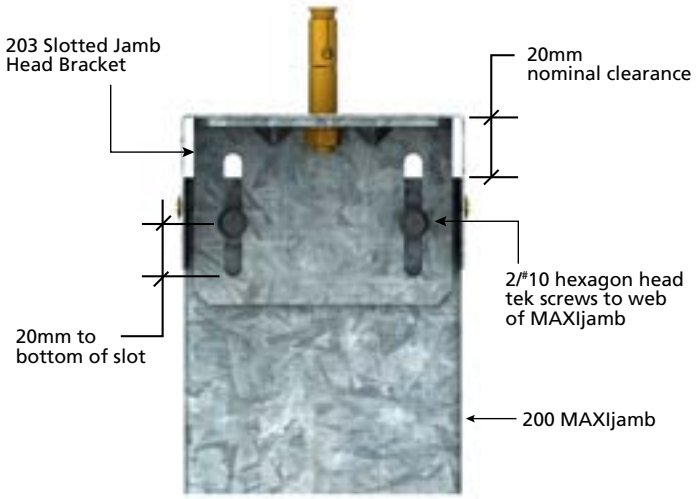
The fixing requirements for the MAXIjamb head bracket are the same as for the base bracket on Page 121.

TO THE MAXITRACK:

To the MAXIjamb stud, install 1/#10 wafer head tek screw per side.



EXPLODED VIEW OF MAXIJAMB HEAD CONNECTION



FIXING DETAILS FOR MAXIJAMB HEAD

INSTALLATION DETAILS (continued)

Jamb Studs (continued)

MAXIJAMB 202 SILL & HEADER CONNECTION

The 202 bracket design means one fixing flange is visible and the other invisible. Once the bracket is installed against the web of the MAXIjamb using 4/#10 wafer head tek screws, the MAXIjamb section has to be 'rolled' into place as illustrated *(Figures* Ⓐ, Ⓑ, Ⓒ*)*.

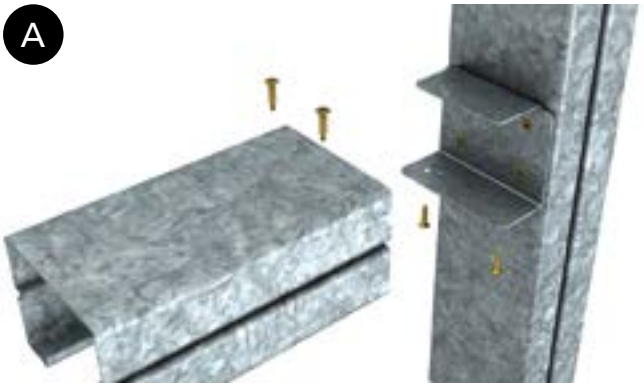
The exposed flange has two pre-drilled holes for fixing to the MAXIjamb, whilst the flange that is now inside the MAXIjamb should be secured by fixing the screws through the top, 25mm in from the inside jamb face and 25mm from the outer edge of the section *(Figure* Ⓓ*)*.

This bracket is fixed to the MAXIjamb with the shorter internal flange facing the opening.

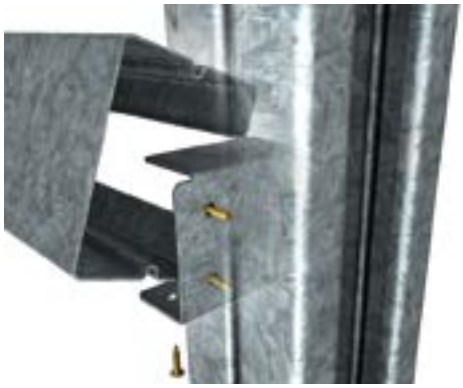
For example: when securing the sill member the short flange faces up and when securing the header, it faces down. *(For your convenience, the Rondo 202 Sill/Header Bracket is stamped accordingly on its inner face.)*

Once finally secured into place, the outer face of the 202 Sill/Header Bracket will align neatly with the face of the MAXIjamb section, both internally and externally as shown in Figures 18 & 19.

A

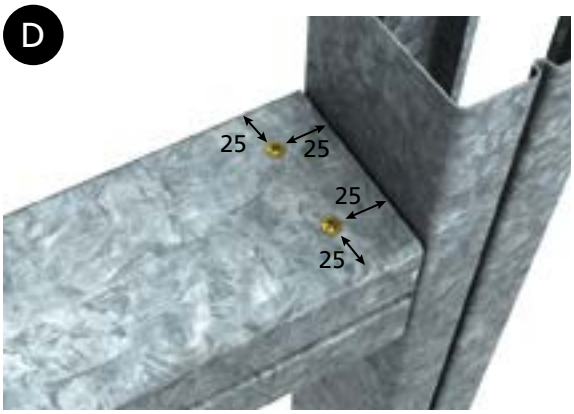


B



C

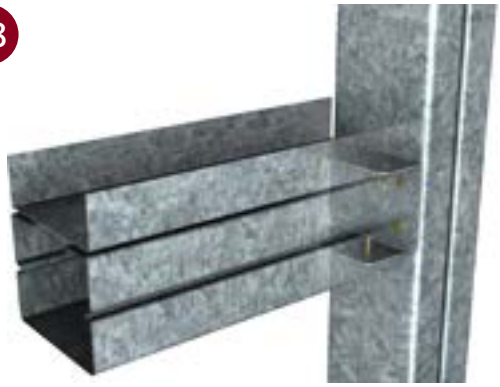
D



MAXIJAMB HEAD & SILL MEMBER DETAILS

Above and/or below openings formed with the MAXIjamb profile, whether it is used as a head or sill member, require securing to the MAXIjamb with standard 92mm track screwed to it and "jack" studs screwed off appropriately *(see Figures 18-21)*.

18



19

20

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INSTALLATION DETAILS (continued)

Jamb Studs (continued)

The jamb studs are located immediately adjacent to the window or door opening, such that they support and carry the wind loading applied across the width of the wall opening. The load carried by the jamb stud is significantly greater than that carried by the wall studs, which accordingly requires strengthening of the jamb.

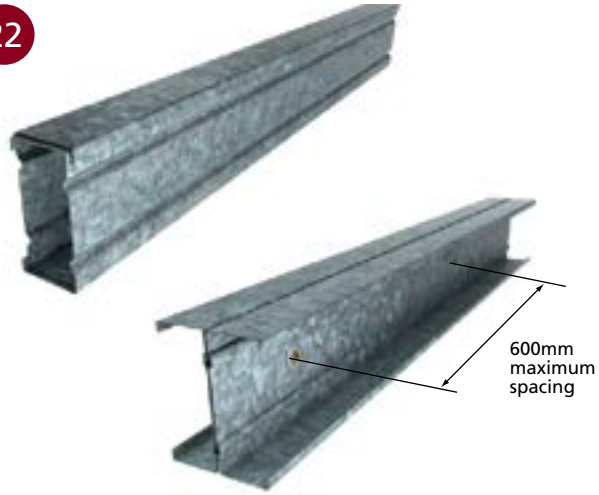
MULTIPLE STUD SECTIONS

Whilst the MAXIframe system will provide a faster and more cost-effective construction solution, the multiple stud method may still apply from time to time and is shown for comparative purposes.
Typically, strengthening of the jamb studs was achieved by using multiple stud sections, either boxed together or fixed back-to-back *(refer Figure 22)*.
The MAXIjamb uses a similar mass of steel as a double 92 x 1.15bmt lipped stud section, however, the section performance has been improved by using high tensile steel (G500) and carefully redistributing the steel within the profile *(refer Figures 23 & 24).*

MAXIMUM OPENING WIDTHS

When using multiple studs to frame openings, the number of jamb studs required can be determined based on the number of studs in the adjoining wall section. Table 9 may be used to determine the number of stud sections, either side of a wall opening, based on the maximum spacing of the studs in the adjoining wall framing.

22



BOXED AND BACK-TO-BACK STUD SECTIONS

23

MAXIJAMB

24

TYPICAL STUD FRAMING SECTIONS

TABLE 9: MULTIPLE STUDS TO OPENINGS (WHEN NOT USING MAXIJAMB)

STUD SPACING (mm)	NUMBER OF WALL STUDS EITHER SIDE OF OPENING												
	OPENING WIDTH (MM)												
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200
300	2	2	3	3	4	4	–	–	–	–	–	–	–
400	2	2	2	3	3	4	4	4	–	–	–	–	–
450	2	2	2	3	3	3	4	4	4	–	–	–	–
600	1	2	2	2	2	3	3	3	3	4	4	4	4

NOTES:
1. The specified studs are the Rondo 92 x 1.15bmt lipped studs.
2. Where more than two (2) studs are specified, they shall be configured as boxed studs plus one stud back to back or double boxed studs.
3. Back to back studs are to be fixed together at 600mm maximum centres using #10 tek screws.

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WALL STUD DESIGN TABLES

How to read the tables

The wall stud framing tables are configured as shown in Figure 25.

EXAMPLE:
Using the data below, refer to Figure 26.

DATA:
Region A Terrain Category 3
Brick veneer construction so adopt H/360 deflection limits
Slab thickness allowance = 200mm
Check the stud framing for the second floor

1. Overall building height: 18m
   (less than 21m therefore OK)
2. Check ground level: RL 19.00
   In terms of the tables RL 19.00 equals 0 height
3. Check second floor height: This can be done simply by summing the floor heights, which gives:
   z = (3 x 3) + (3 / 2) = 10.5m (above ground level)
   Round this up to 11m
4. Check wall height:
   Floor to floor = 3m
   slab thickness = 200m
   Wall height = 2.8m
5. Check Framing in General Areas:
   Refer to Table 12 on page 132 and, using the 11m height (Gen), the frame can be checked as follows:

   Stud Framing:
   92 x 1.15bmt lipped studs
   600mm centres generally.
   1 row of Nogging as the wall height is less than 3.0m.

   Head Track:
   92 x 50 x 1.15bmt Slotted Deflection Head Track.

   Base Track:
   92 x 30 x 1.15bmt Wall Track standard.
6. Check Framing in Corner Zone
   Overall Building Height: 18m
   Refer to Table 12 on page 132 using 18m (CnrA) the frame can be checked as follows:

   Stud Framing:
   92x1.15bmt Lipped Studs
   450 centres maximum
   Head & Base Tracks as specified above.

25

		11	
ZONE		**Gen**	**Cnr A**
Pult		**1.17**	**1.35**
Pser		**0.76**	**0.87**
STUD HEIGHT (m)	**2.5**	600	600
	2.6	600	600
	2.7	600	600
	2.8	600	450
	2.9	450	450

Height to centre of wall above ground level. Reference Z_H

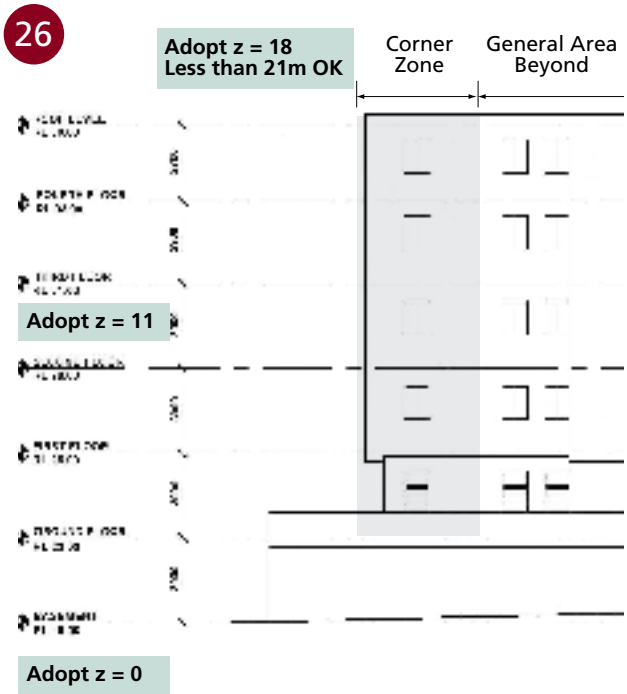
Location on Building. Reference WA1 & SA2 respectively

Ultimate and Serviceability Design Pressures

Maximum height of stud framing in m

EXTRACT OF CONFIGURATION OF WALL STUD FRAMING TABLES, FROM PAGES 130 ON

26



EXAMPLE

WALL STUD DESIGN TABLES

Region A

TABLE 10: REGION A: TERRAIN CATEGORY 3 — H/240

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		10		11		12		13		14		15	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		**1.14**	**1.31**	**1.17**	**1.35**	**1.20**	**1.39**	**1.24**	**1.43**	**1.27**	**1.47**	**1.31**	**1.51**
Pser		**0.74**	**0.85**	**0.76**	**0.87**	**0.78**	**0.90**	**0.80**	**0.92**	**0.82**	**0.95**	**0.85**	**0.98**
STUD HEIGHT (m)	**2.5**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**
	2.6	600	600	600	600	600	600	600	600	600	600	600	600
	2.7	600	600	600	600	600	600	600	600	600	600	600	600
	2.8	600	600	600	600	600	600	600	600	600	600	600	600
	2.9	600	600	600	600	600	600	600	600	600	600	600	600
	3.0	600	600	600	600	600	600	600	600	600	450	600	450
	3.1	600	600	600	600	600	450	600	450	600	450	600	450
	3.2	600	450	600	450	600	450	600	450	450	450	450	450

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		16		17		18		19		20		21	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		**1.34**	**1.54**	**1.37**	**1.58**	**1.40**	**1.61**	**1.43**	**1.65**	**1.46**	**1.68**	**1.48**	**1.70**
Pser		**0.86**	**1.00**	**0.88**	**1.02**	**0.90**	**1.04**	**0.92**	**1.07**	**0.94**	**1.09**	**0.96**	**1.10**
STUD HEIGHT (m)	**2.5**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**
	2.6	600	600	600	600	600	600	600	600	600	600	600	600
	2.7	600	600	600	600	600	600	600	600	600	600	600	600
	2.8	600	600	600	600	600	600	600	600	600	600	600	600
	2.9	600	600	600	450	600	450	600	450	600	450	600	450
	3.0	600	450	600	450	600	450	600	450	450	450	450	450
	3.1	600	450	600	450	450	450	450	450	450	450	450	450
	3.2	450	450	450	450	450	450	450	450	450	400	450	400

NOTES:
1. *Where the Stud spacing is specified as "N/A", contact a Rondo Technical Sales Representative.*
2. *One (1) row of Nogging for wall heights up to and including 3.0m, two (2) rows of Nogging for wall heights over 3.0m high.*

RONDO DESIGN PARAMETERS:
• 92 x 1.15mm BMT G2 Lipped Studs • Standard studs and tracks, with Slotted Deflection Head Tracks • Overall Building Height must be less than 21m.

WIND LOADING PARAMETERS:
V_R = 46 m/s
Cpe = 0.8, -0.65
Cpi=-0.3, 0.2
Kl=1.5 for General Wall areas in accordance with AS/NZS1170.2:2011 Cl 5.4.4
Kl for Corner Zones as appropriate T5.6 (AS/NZS1170.2:2011)
Mz,cat assumed to vary with height

TABLE 11: REGION A: TERRAIN CATEGORY 2.5 — H/240

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		10		11		12		13		14		15	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		1.38	1.59	1.42	1.63	1.45	1.67	1.48	1.71	1.52	1.75	1.55	1.79
Pser		0.89	1.03	0.92	1.06	0.94	1.08	0.96	1.11	0.98	1.13	1.00	1.16
STUD HEIGHT (m)	2.5	600	600	600	600	600	600	600	600	600	600	600	600
	2.6	600	600	600	600	600	600	600	600	600	600	600	600
	2.7	600	600	600	600	600	600	600	600	600	600	600	600
	2.8	600	600	600	600	600	600	600	600	600	450	600	450
	2.9	600	450	600	450	600	450	600	450	600	450	600	450
	3.0	600	450	600	450	450	450	450	450	450	450	450	450
	3.1	450	450	450	450	450	450	450	450	450	450	450	450
	3.2	450	450	450	450	450	400	450	400	450	400	450	400

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		16		17		18		19		20		21	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		1.58	1.82	1.60	1.85	1.63	1.88	1.66	1.91	1.68	1.94	1.70	1.96
Pser		1.02	1.18	1.04	1.20	1.06	1.22	1.07	1.24	1.09	1.26	1.10	1.27
STUD HEIGHT (m)	2.5	600	600	600	600	600	600	600	600	600	600	600	600
	2.6	600	600	600	600	600	600	600	600	600	600	600	600
	2.7	600	600	600	600	600	600	600	450	600	450	600	450
	2.8	600	450	600	450	600	450	600	450	600	450	600	450
	2.9	450	450	450	450	450	450	450	450	450	450	450	450
	3.0	450	450	450	450	450	450	450	400	450	400	450	400
	3.1	450	450	450	400	450	400	450	400	450	400	450	400
	3.2	450	400	450	400	450	300	450	300	400	300	400	300

NOTES:
1. *Where the Stud spacing is specified as "N/A", contact a Rondo Technical Sales Representative.*
2. *One (1) row of Nogging for wall heights up to and including 3.0m, two (2) rows of Nogging for wall heights over 3.0m high.*

RONDO DESIGN PARAMETERS:
• 92 x 1.15mm BMT G2 Lipped Studs • Standard studs and tracks, with Slotted Deflection Head Tracks • Overall Building Height must be less than 21m.

WIND LOADING PARAMETERS:
V_R = 46 m/s
Cpe = 0.8, -0.65
Cpi=-0.3, 0.2
Kl=1.5 for General Wall areas in accordance with AS/NZS1170.2:2011 Cl 5.4.4
Kl for Corner Zones as appropriate T5.6 (AS/NZS1170.2:2011)
Mz,cat assumed to vary with height

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WALL STUD DESIGN TABLES

Region A (continued)

TABLE 12: REGION A: TERRAIN CATEGORY 3 — H/360

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		10		11		12		13		14		15	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		**1.14**	**1.31**	**1.17**	**1.35**	**1.20**	**1.39**	**1.24**	**1.43**	**1.27**	**1.47**	**1.31**	**1.51**
Pser		**0.74**	**0.85**	**0.76**	**0.87**	**0.78**	**0.90**	**0.80**	**0.92**	**0.82**	**0.95**	**0.85**	**0.98**
STUD HEIGHT (m)	**2.5**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**
	2.6	600	600	600	600	600	600	600	600	600	600	600	600
	2.7	600	600	600	600	600	450	600	450	600	450	600	450
	2.8	600	450	600	450	600	450	600	450	450	450	450	450
	2.9	450	450	450	450	450	450	450	450	450	450	450	400
	3.0	450	450	450	400	450	400	450	400	450	400	450	400
	3.1	450	400	450	400	450	300	400	300	400	300	400	300
	3.2	400	300	400	300	400	300	400	300	300	300	300	300

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		16		17		18		19		20		21	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		**1.34**	**1.54**	**1.37**	**1.58**	**1.40**	**1.61**	**1.43**	**1.65**	**1.46**	**1.68**	**1.48**	**1.70**
Pser		**0.86**	**1.00**	**0.88**	**1.02**	**0.90**	**1.04**	**0.92**	**1.07**	**0.94**	**1.09**	**0.96**	**1.10**
STUD HEIGHT (m)	**2.5**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**
	2.6	600	600	600	450	600	450	600	450	600	450	600	450
	2.7	600	450	600	450	450	450	450	450	450	450	450	450
	2.8	450	450	450	450	450	450	450	450	450	400	450	400
	2.9	450	400	450	400	450	400	450	400	450	300	450	300
	3.0	450	300	400	300	400	300	400	300	400	300	400	300
	3.1	400	300	400	300	300	300	300	300	300	300	300	300
	3.2	300	300	300	300	300	300	300	300	300	N/A	300	N/A

NOTES:
1. *Where the Stud spacing is specified as "N/A", contact a Rondo Technical Sales Representative.*
2. *One (1) row of Nogging for wall heights up to and including 3.0m, two (2) rows of Nogging for wall heights over 3.0m high.*

RONDO DESIGN PARAMETERS:
• 92 x 1.15mm BMT G2 Lipped Studs • Standard studs and tracks, with Slotted Deflection Head Tracks • Overall Building Height must be less than 21m.

WIND LOADING PARAMETERS:
V_R = 46 m/s
Cpe = 0.8, -0.65
Cpi=-0.3, 0.2
Kl=1.5 for General Wall areas in accordance with AS/NZS1170.2:2011 Cl 5.4.4
Kl for Corner Zones as appropriate T5.6 (AS/NZS1170.2:2011)
Mz,cat assumed to vary with heightKl=1.25 for General Wall areas in accordance with AS/NZS1170.2:2002 Cl 5.4.4

TABLE 13: REGION A: TERRAIN CATEGORY 2.5 — H/360

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		10		11		12		13		14		15	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		**1.38**	**1.59**	**1.42**	**1.63**	**1.45**	**1.67**	**1.48**	**1.71**	**1.52**	**1.75**	**1.55**	**1.79**
Pser		**0.89**	**1.03**	**0.92**	**1.06**	**0.94**	**1.08**	**0.96**	**1.11**	**0.98**	**1.13**	**1.00**	**1.16**
STUD HEIGHT (m)	**2.5**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**450**	**600**	**450**
	2.6	600	450	600	450	600	450	600	450	600	450	450	450
	2.7	600	450	450	450	450	450	450	450	450	450	450	450
	2.8	450	450	450	450	450	400	450	400	450	400	450	400
	2.9	450	400	450	400	450	400	450	300	400	300	400	300
	3.0	400	300	400	300	400	300	400	300	300	300	300	300
	3.1	300	300	300	300	300	300	300	300	300	300	300	300
	3.2	300	300	300	300	300	N/A	300	N/A	300	N/A	300	N/A

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		16		17		18		19		20		21	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		**1.58**	**1.82**	**1.60**	**1.85**	**1.63**	**1.88**	**1.66**	**1.91**	**1.68**	**1.94**	**1.70**	**1.96**
Pser		**1.02**	**1.18**	**1.04**	**1.20**	**1.06**	**1.22**	**1.07**	**1.24**	**1.09**	**1.26**	**1.10**	**1.27**
STUD HEIGHT (m)	**2.5**	**600**	**450**	**600**	**450**	**600**	**450**	**600**	**450**	**600**	**450**	**600**	**450**
	2.6	450	450	450	450	450	450	450	450	450	450	450	450
	2.7	450	450	450	400	450	400	450	400	450	400	450	400
	2.8	450	400	450	400	450	300	400	300	400	300	400	300
	2.9	400	300	400	300	400	300	400	300	300	300	300	300
	3.0	300	300	300	300	300	300	300	300	300	300	300	300
	3.1	300	300	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A
	3.2	300	N/A	300	N/A	300	N/A	300	N/A	N/A	N/A	N/A	N/A

NOTES:
1. *Where the Stud spacing is specified as "N/A", contact a Rondo Technical Sales Representative.*
2. *One (1) row of Nogging for wall heights up to and including 3.0m, two (2) rows of Nogging for wall heights over 3.0m high.*

RONDO DESIGN PARAMETERS:
• 92 x 1.15mm BMT G2 Lipped Studs • Standard studs and tracks, with Slotted Deflection Head Tracks • Overall Building Height must be less than 21m.

WIND LOADING PARAMETERS:
VR = 46 m/s
Cpe = 0.8, -0.65
Cpi=-0.3, 0.2
Kl=1.5 for General Wall areas in accordance with AS/NZS1170.2:2011 Cl 5.4.4
Kl for Corner Zones as appropriate T5.6 (AS/NZS1170.2:2011)
Mz,cat assumed to vary with height

WALL STUD DESIGN TABLES

Region B

TABLE 14: REGION B: TERRAIN CATEGORY 3 — H/240

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		10		11		12		13		14		15	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		1.93	2.23	1.99	2.30	2.05	2.36	2.11	2.43	2.16	2.50	2.22	2.57
Pser		0.78	0.90	0.80	0.92	0.82	0.95	0.84	0.97	0.87	1.00	0.89	1.03
STUD HEIGHT (m)	2.5	600	600	600	450	600	450	600	450	600	450	600	450
	2.6	600	450	600	450	600	450	450	450	450	450	450	450
	2.7	450	450	450	450	450	450	450	450	450	450	450	400
	2.8	450	450	450	450	450	400	450	400	450	400	450	400
	2.9	450	400	450	400	450	300	400	300	400	300	400	300
	3.0	400	300	400	300	400	300	400	300	300	300	300	300
	3.1	450	400	450	400	450	300	400	300	400	300	400	300
	3.2	450	300	400	300	400	300	400	300	400	300	300	300

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		16		17		18		19		20		21	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		2.27	2.62	2.33	2.68	2.38	2.74	2.43	2.80	2.48	2.86	2.51	2.90
Pser		0.91	1.05	0.93	1.08	0.95	1.10	0.97	1.12	1.00	1.15	1.01	1.16
STUD HEIGHT (m)	2.5	600	450	450	450	450	450	450	450	450	450	450	450
	2.6	450	450	450	450	450	450	450	400	450	400	450	400
	2.7	450	400	450	400	450	400	450	400	450	300	450	300
	2.8	450	300	400	300	400	300	400	300	400	300	400	300
	2.9	400	300	400	300	300	300	300	300	300	300	300	300
	3.0	300	300	300	300	300	300	300	300	300	N/A	300	N/A
	3.1	400	300	400	300	300	300	300	300	300	300	300	300
	3.2	300	300	300	300	300	300	300	300	300	300	300	300

NOTES:
1. *Where the Stud spacing is specified as "N/A", contact a Rondo Technical Sales Representative.*
2. *One (1) row of Nogging for wall heights up to and including 3.0m, two (2) rows of Nogging for wall heights over 3.0m high.*

RONDO DESIGN PARAMETERS:
• 92 x 1.15mm BMT G2 Lipped Studs • Standard studs and tracks, with Slotted Deflection Head Tracks • Overall Building Height must be less than 21m.

WIND LOADING PARAMETERS:
VR = 60 m/s
Cpe = 0.8, -0.65
Cpi=-0.3, 0.2
Kl=1.5 for General Wall areas in accordance with AS/NZS1170.2:2011 Cl 5.4.4
Kl for Corner Zones as appropriate T5.6 (AS/NZS1170.2:2011)
Mz,cat assumed to vary with height

TABLE 15: REGION B: TERRAIN CATEGORY 2.5 — H/240

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		10		11		12		13		14		15	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		2.35	2.71	2.41	2.78	2.47	2.84	2.52	2.91	2.58	2.98	2.64	3.05
Pser		0.94	1.09	0.97	1.11	0.99	1.14	1.01	1.17	1.04	1.20	1.06	1.22
STUD HEIGHT (m)	2.5	450	450	450	450	450	450	450	450	450	450	450	450
	2.6	450	450	450	400	450	400	450	400	450	400	450	400
	2.7	450	400	450	400	450	400	450	300	400	300	400	300
	2.8	400	300	400	300	400	300	400	300	400	300	300	300
	2.9	300	300	300	300	300	300	300	300	300	300	300	300
	3.0	300	300	300	300	300	300	300	N/A	300	N/A	300	N/A
	3.1	300	300	300	300	300	300	300	300	300	300	300	300
	3.2	300	300	300	300	300	300	300	300	300	N/A	300	N/A

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		16		17		18		19		20		21	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		2.69	3.10	2.73	3.15	2.77	3.20	2.82	3.25	2.86	3.31	2.89	3.34
Pser		1.08	1.24	1.10	1.26	1.11	1.28	1.13	1.30	1.15	1.33	1.16	1.34
STUD HEIGHT (m)	2.5	450	400	450	400	450	400	450	400	450	400	450	400
	2.6	450	400	450	300	450	300	400	300	400	300	400	300
	2.7	400	300	400	300	400	300	400	300	300	300	300	300
	2.8	300	300	300	300	300	300	300	300	300	300	300	300
	2.9	300	300	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A
	3.0	300	N/A	300	N/A	300	N/A	300	N/A	N/A	N/A	N/A	N/A
	3.1	300	300	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A
	3.2	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A

NOTES:
1. *Where the Stud spacing is specified as "N/A", contact a Rondo Technical Sales Representative.*
2. *One (1) row of Nogging for wall heights up to and including 3.0m, two (2) rows of Nogging for wall heights over 3.0m high.*

RONDO DESIGN PARAMETERS:
• 92 x 1.15mm BMT G2 Lipped Studs • Standard studs and tracks, with Slotted Deflection Head Tracks • Overall Building Height must be less than 21m.

WIND LOADING PARAMETERS:
VR = 60 m/s
Cpe = 0.8, -0.65
Cpi=-0.3, 0.2
Kl=1.5 for General Wall areas in accordance with AS/NZS1170.2:2011 Cl 5.4.4
Kl for Corner Zones as appropriate T5.6 (AS/NZS1170.2:2011)
Mz,cat assumed to vary with height

WALL STUD DESIGN TABLES

Region B (continued)

TABLE 16: REGION B: TERRAIN CATEGORY 3 — H/360

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		10		11		12		13		14		15	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		**1.93**	**2.23**	**1.99**	**2.30**	**2.05**	**2.36**	**2.11**	**2.43**	**2.16**	**2.50**	**2.22**	**2.57**
Pser		**0.78**	**0.90**	**0.80**	**0.92**	**0.82**	**0.95**	**0.84**	**0.97**	**0.87**	**1.00**	**0.89**	**1.03**
STUD HEIGHT (m)	**2.5**	**600**	**600**	**600**	**450**	**600**	**450**	**600**	**450**	**600**	**450**	**600**	**450**
	2.6	600	450	600	450	600	450	450	450	450	450	450	450
	2.7	450	450	450	450	450	450	450	450	450	450	450	400
	2.8	450	450	450	450	450	400	450	400	450	400	450	400
	2.9	450	400	450	400	450	300	400	300	400	300	400	300
	3.0	400	300	400	300	400	300	400	300	300	300	300	300
	3.1	450	300	400	300	400	300	400	300	400	300	300	300
	3.2	400	300	400	300	300	300	300	300	300	300	300	300

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		16		17		18		19		20		21	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		**2.27**	**2.62**	**2.33**	**2.68**	**2.38**	**2.74**	**2.43**	**2.80**	**2.48**	**2.86**	**2.51**	**2.90**
Pser		**0.91**	**1.05**	**0.93**	**1.08**	**0.95**	**1.10**	**0.97**	**1.12**	**1.00**	**1.15**	**1.01**	**1.16**
STUD HEIGHT (m)	**2.5**	**600**	**450**	**450**	**450**	**450**	**450**	**450**	**450**	**450**	**450**	**450**	**450**
	2.6	450	450	450	450	450	450	450	400	450	400	450	400
	2.7	450	400	450	400	450	400	450	400	450	300	450	300
	2.8	450	300	400	300	400	300	400	300	400	300	400	300
	2.9	400	300	400	300	300	300	300	300	300	300	300	300
	3.0	300	300	300	300	300	300	300	300	300	N/A	300	N/A
	3.1	300	300	300	300	300	300	300	300	300	300	300	300
	3.2	300	300	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A

NOTES:
1. *Where the Stud spacing is specified as "N/A", contact a Rondo Technical Sales Representative.*
2. *One (1) row of Nogging for wall heights up to and including 3.0m, two (2) rows of Nogging for wall heights over 3.0m high.*

RONDO DESIGN PARAMETERS:
• 92 x 1.15mm BMT G2 Lipped Studs • Standard studs and tracks, with Slotted Deflection Head Tracks • Overall Building Height must be less than 21m.

WIND LOADING PARAMETERS:
VR = 60 m/s
Cpe = 0.8, -0.65
Cpi=-0.3, 0.2
Kl=1.5 for General Wall areas in accordance with AS/NZS1170.2:2011 Cl 5.4.4
Kl for Corner Zones as appropriate T5.6 (AS/NZS1170.2:2011)
Mz,cat assumed to vary with height

TABLE 17: REGION B: TERRAIN CATEGORY 2.5 — H/360

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		10		11		12		13		14		15	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		2.35	2.71	2.41	2.78	2.47	2.84	2.52	2.91	2.58	2.98	2.64	3.05
Pser		0.94	1.09	0.97	1.11	0.99	1.14	1.01	1.17	1.04	1.20	1.06	1.22
STUD HEIGHT (m)	2.5	450	450	450	450	450	450	450	450	450	450	450	450
	2.6	450	450	450	400	450	400	450	400	450	400	450	400
	2.7	450	400	450	400	450	400	450	300	400	300	400	300
	2.8	400	300	400	300	400	300	400	300	400	300	300	300
	2.9	300	300	300	300	300	300	300	300	300	300	300	300
	3.0	300	300	300	300	300	300	300	N/A	300	N/A	300	N/A
	3.1	300	300	300	300	300	300	300	300	300	N/A	300	N/A
	3.2	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A

		HEIGHT TO CENTRE OF WALL ABOVE "GROUND LEVEL" (m)											
		16		17		18		19		20		21	
ZONE		Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A	Gen	Cnr A
Pult		2.69	3.10	2.73	3.15	2.77	3.20	2.82	3.25	2.86	3.31	2.89	3.34
Pser		1.08	1.24	1.10	1.26	1.11	1.28	1.13	1.30	1.15	1.33	1.16	1.34
STUD HEIGHT (m)	2.5	450	400	450	400	450	400	450	400	450	400	450	400
	2.6	450	400	450	300	450	300	400	300	400	300	400	300
	2.7	400	300	400	300	400	300	400	300	300	300	300	300
	2.8	300	300	300	300	300	300	300	300	300	300	300	300
	2.9	300	300	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A
	3.0	300	N/A	300	N/A	300	N/A	300	N/A	N/A	N/A	N/A	N/A
	3.1	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A	300	N/A
	3.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTES:
1. *Where the Stud spacing is specified as "N/A", contact a Rondo Technical Sales Representative.*
2. *One (1) row of Nogging for wall heights up to and including 3.0m, two (2) rows of Nogging for wall heights over 3.0m high.*

RONDO DESIGN PARAMETERS:
• 92 x 1.15mm BMT G2 Lipped Studs • Standard studs and tracks, with Slotted Deflection Head Tracks • Overall Building Height must be less than 21m.

WIND LOADING PARAMETERS:
VR = 60 m/s
Cpe = 0.8, -0.65
Cpi=-0.3, 0.2
Kl=1.5 for General Wall areas in accordance with AS/NZS1170.2:2011 Cl 5.4.4
Kl for Corner Zones as appropriate T5.6 (AS/NZS1170.2:2011)
Mz,cat assumed to vary with height

MAXIJAMB DESIGN CHARTS

How to use the charts

The MAXIjamb design charts have been presented in a graphical format, with coloured pressure lines providing the envelope within which the MAXIjamb is suitable. The opening framing requirements for each pressure may be determined by running a vertical line up the graph at the required wall height, then where it bisects the relevant coloured pressure line run a horizontal line left to determine the maximum opening.

The required coloured pressure line may be determined from the Wall Stud Design Tables.

Where an acceptable solution cannot be found within the table you will need to refer this back to your engineer, or alternatively to your Rondo Technical Representative.

COMPARISON:

As a comparison between the MAXIjamb and using multiple studs, in the example shown the MAXIjamb stud may be used to frame a maximum window opening of say, 1950mm *(see Figure 27).*

Checking this against Table 9 on page 128 would require a minimum of three (3) 92 x 1.15bmt Lipped Studs to frame the opening.

Note that the stud spacing from the Wall Design Table indicates studs at 600mm centres are suitable. The MAXIjamb provides a considerable advantage over conventional framing.

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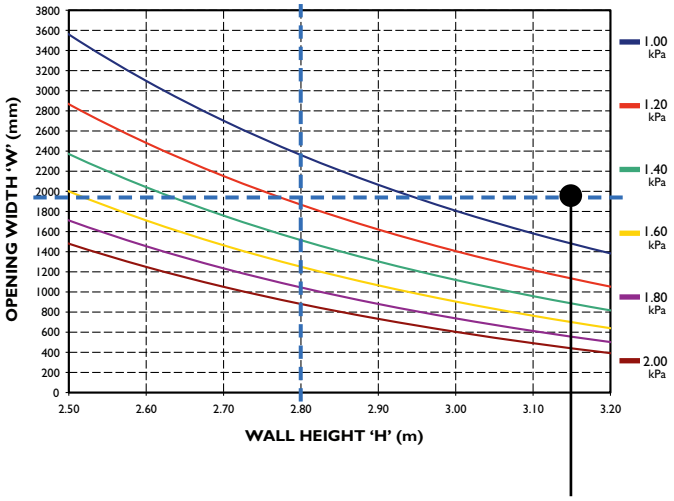
		11	
ZONE		**Gen**	**Cnr A**
Pult		**1.17**	**1.35**
Pser		**0.76**	**0.87**
STUD HEIGHT (m)	**2.5**	600	600
	2.6	600	600
	2.7	600	600
	2.8	600	450
	2.9	450	450

1. Check the required pressure from the Wall Stud Design Tables to identify the appropriate coloured pressure line to use in the graph. *(1.17kPa Pressure in this example)*

2. Run a vertical line through at the required wall height.



3. Run a horizontal line across where the vertical line bisects the required coloured pressure line.
Hint: Interpolate between pressure lines as required.

4. Read off the maximum window opening at vertical axis intersection.
Say, 1950mm Maximum Opening.

■ USING THE DEEIGN GRAPHS

TO TOP PAGE

Jamb Stud Design: Region A

CHART J1: DESIGN REGION A — H/240

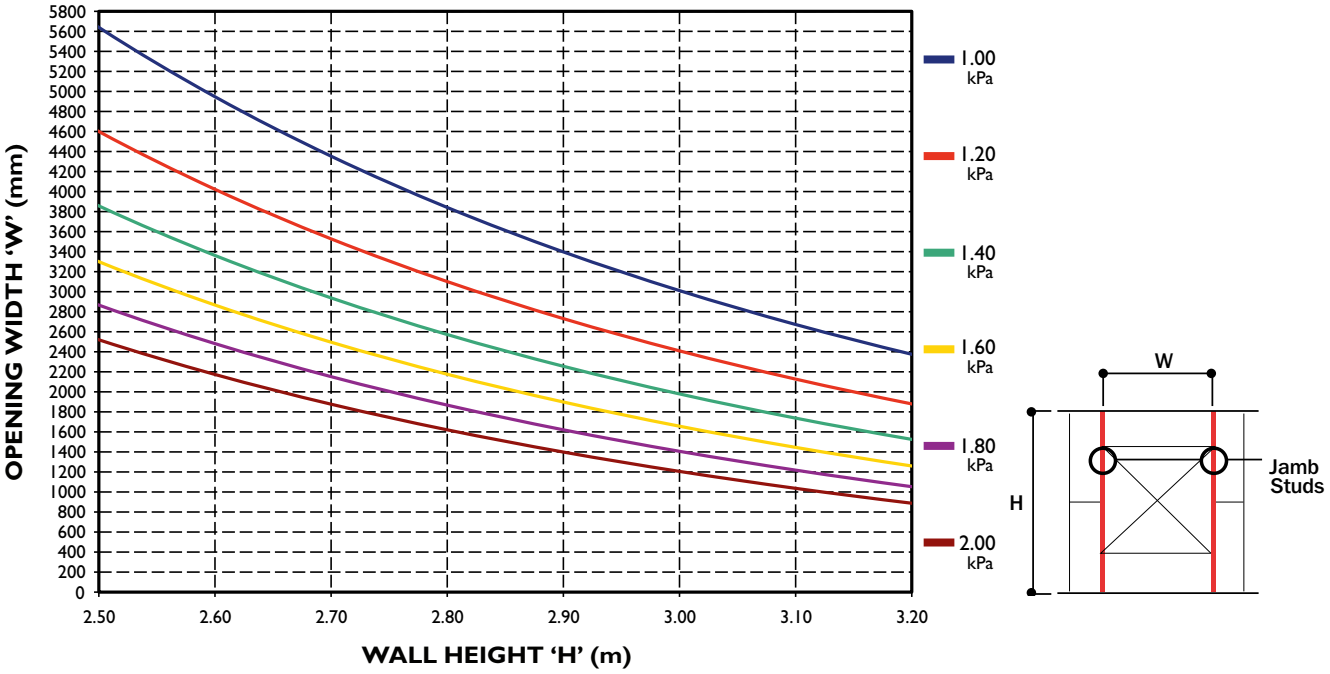
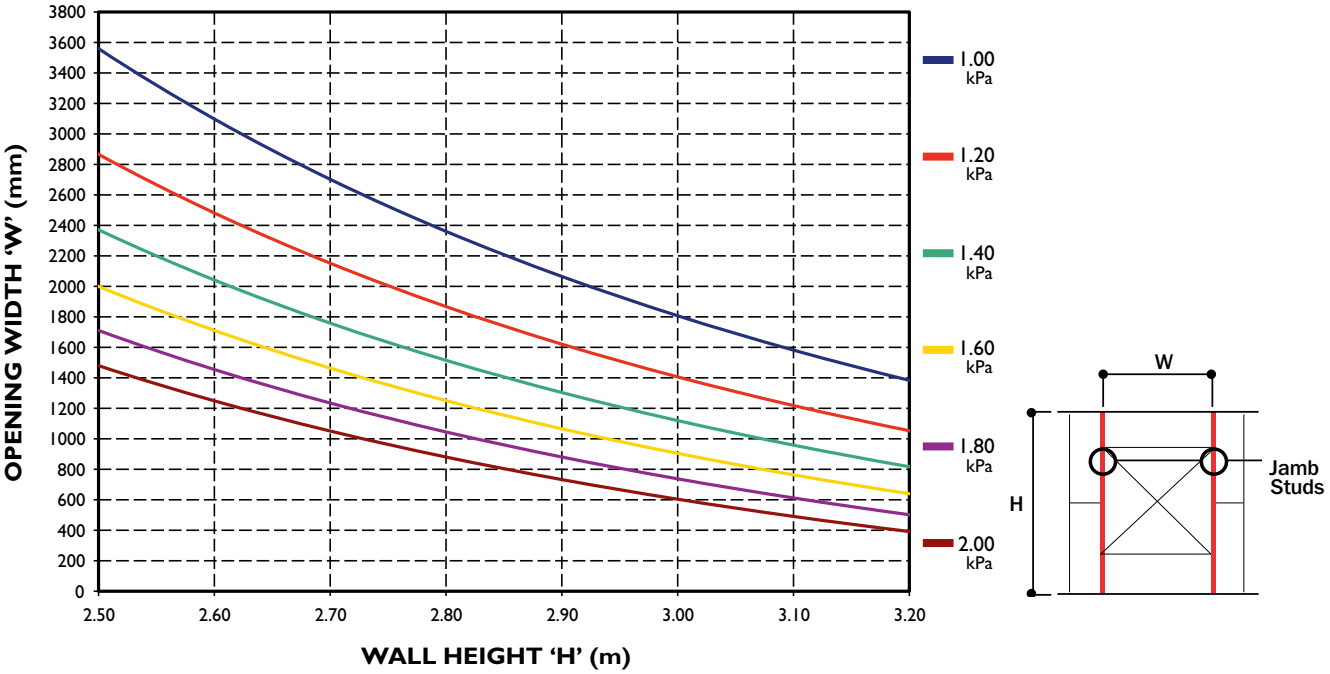


CHART J2: DESIGN REGION A — H/360



TO TOP PAGE

MAXIJAMB DESIGN CHARTS (continued)

Jamb Stud Design: Region B

CHART J3: DESIGN REGION B — H/240

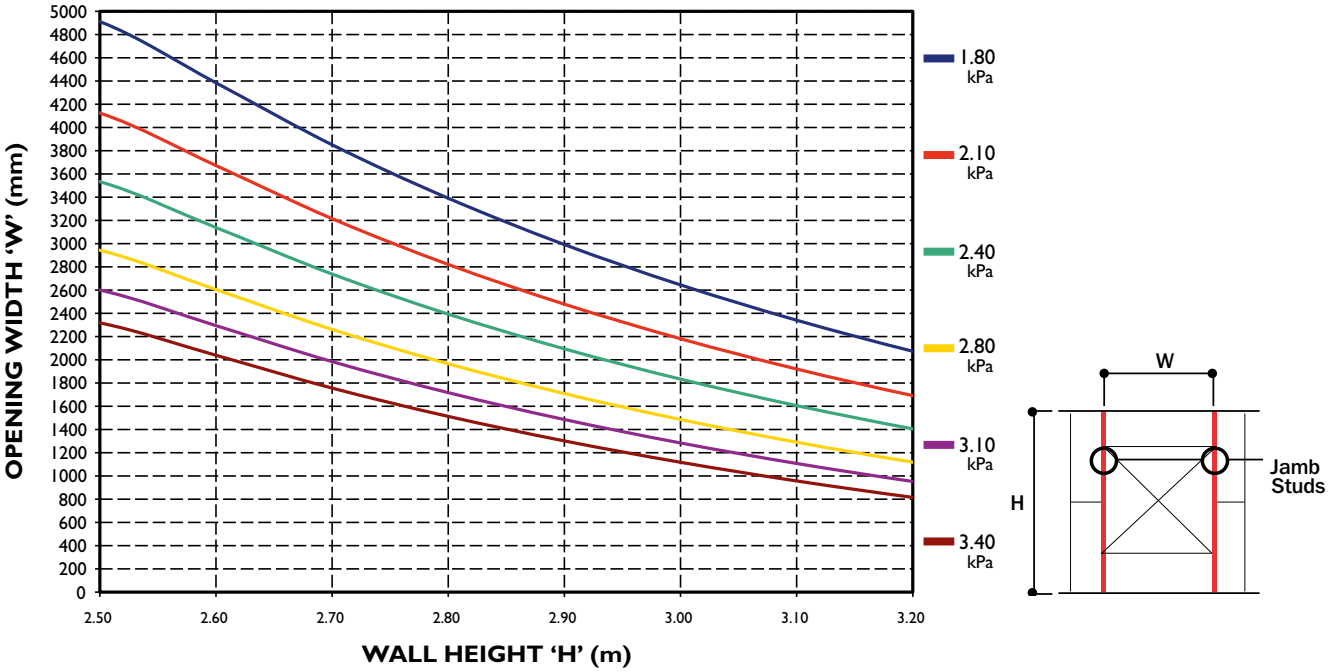
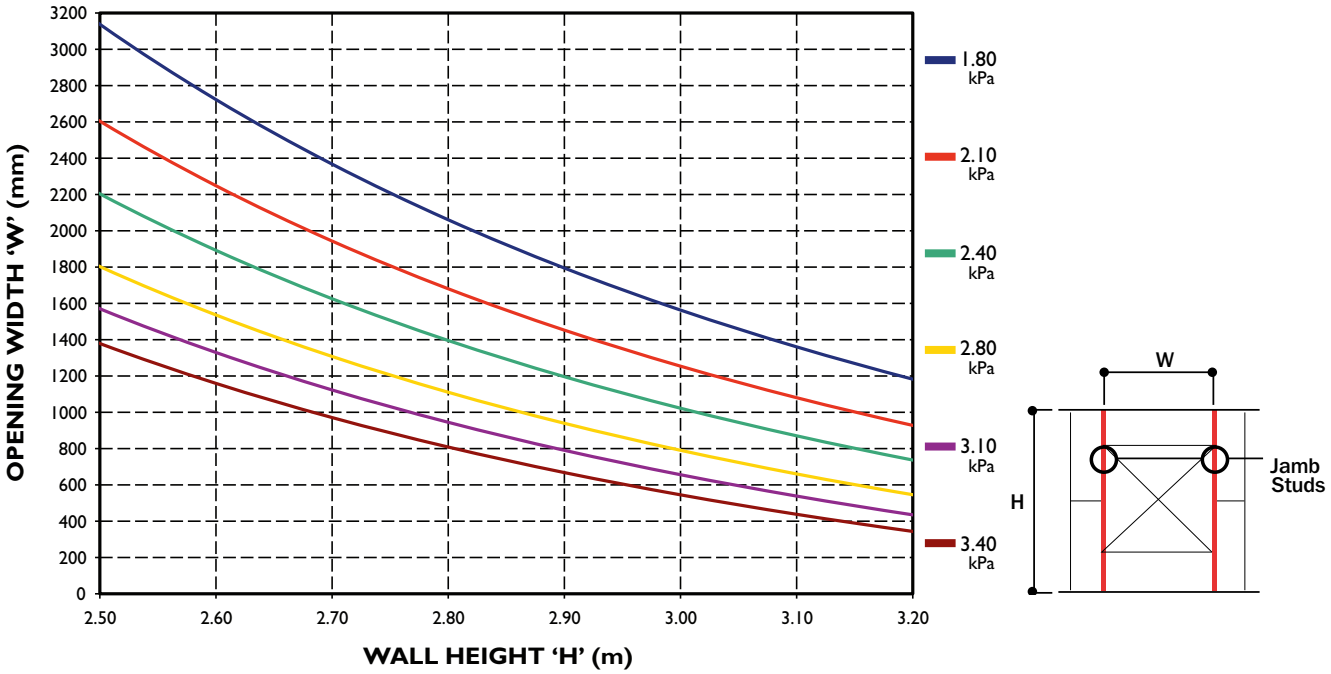


CHART J4: DESIGN REGION B — H/360



MAXIJAMB SILL & HEADER FRAMING

The sill and header members are used to frame the window opening, such that they support and carry the wind loading applied across the window opening. The load carried by the sill and header member is significantly greater than that carried by the wall studs, as indicated by Figure 28.

The sill and header framing can be made up of a single wall track section or combination track and MAXIjamb horizontally. The combination framing is shown in Figure 29.

The tables and charts presented for the sill and header consider the above two framing options. Table 18 may be used for the single track section, and Charts SH1 to SH4 may be used to determine the maximum span for the MAXIjamb/track combination shown.

WALL LOAD WIDTH (WLW)

Wall Track: WLW = 1200mm

MAXIjamb: WLW = $\frac{\text{Wall Height (H)}}{2}$

INTERPOLATION

Where the Wall Load Width (WLW) of the sill or header is other than specified, the maximum span of the track section may be estimated using a squared function interpolation as follows:

New Span (mm) =

$$\left\{\frac{(\text{Tabulated span})^2 \times \text{WLW}}{\text{New WLW}}\right\}^{0.5}$$

EXAMPLE:

Checking a wall track sill in Region A, for L/240 deflection limit, at 1.60kPa with a WLW = 1500mm

New Span =

$\{[1950]^2 \times 1200/1500\}^{0.5} = 1740\text{mm}$

Refer to Table 18 for span.

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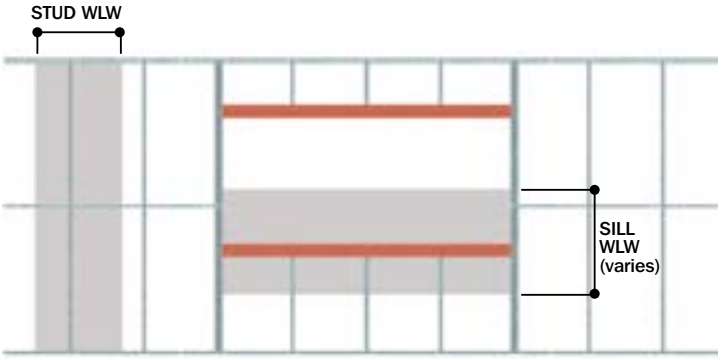

■ SILL & HEADER FRAMING DETAILS

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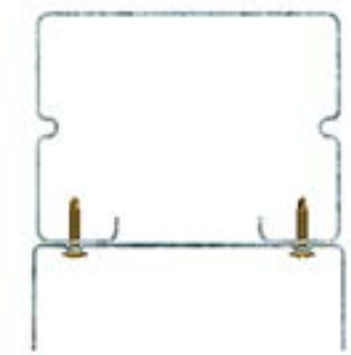

■ MAXIJAMB & TRACK COMBINATION SECTIONS

TABLE 18: MAXIMUM SPAN OF WALL TRACK (mm)

		ULTIMATE DESIGN PRESSURE (kPa)					
LOCATION	**DEFLEC-TION LIMIT**	**1.00**	**1.20**	**1.40**	**1.60**	**1.80**	**2.00**
REGION A	L/240	2500	2250	2100	1950	1850	1750
	L/360	2300	2150	2050	1950	1850	1750
		1.80	2.10	2.40	2.70	3.00	3.40
REGION B	L/240 & L/360	1850	1700	1600	1450	1300	1150

NOTES:

1. The above table is based on a wall load width (WLW) of 1200mm.

2. The above table assumes a screwed stud and track fixing either end, similar to a wall stud base track connection.

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MAXIJAMB SILL & HEADER DESIGN

Region A

CHART SH1: H/240 (MAXIJAMB + 92 x 32 x 1.15BMT TRACK)

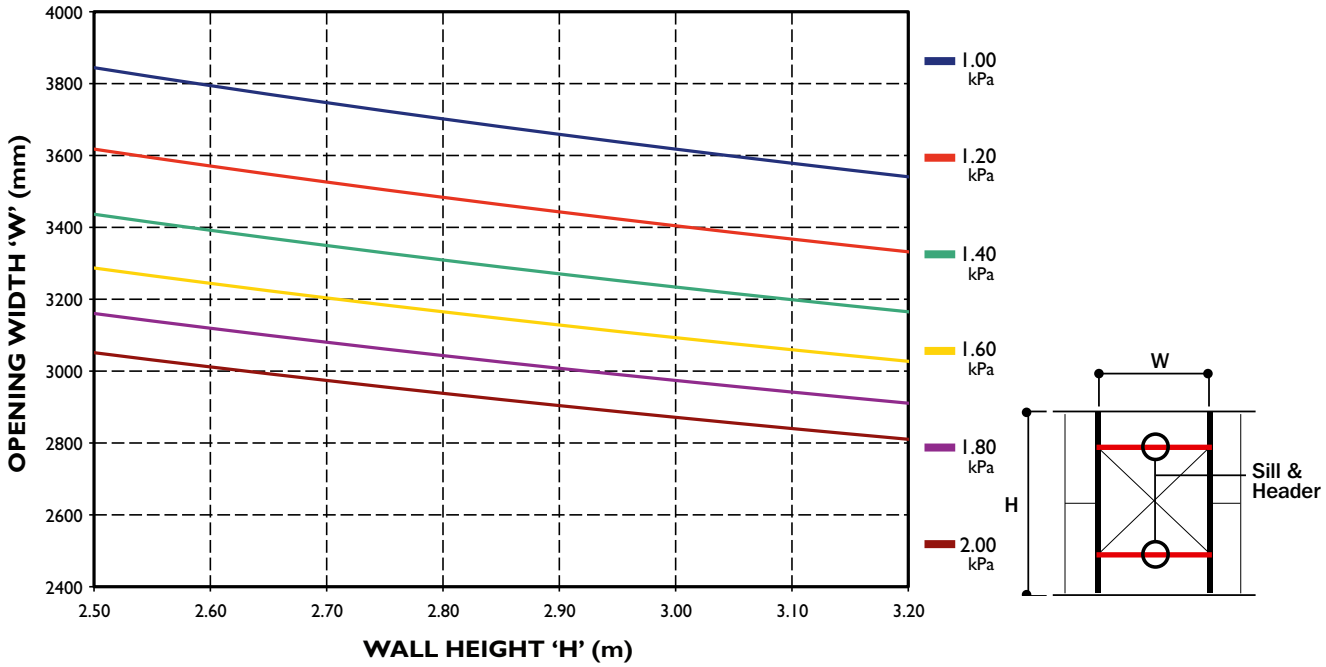


CHART SH2: H/360 (MAXIJAMB + 92 x 32 x 1.15BMT TRACK)

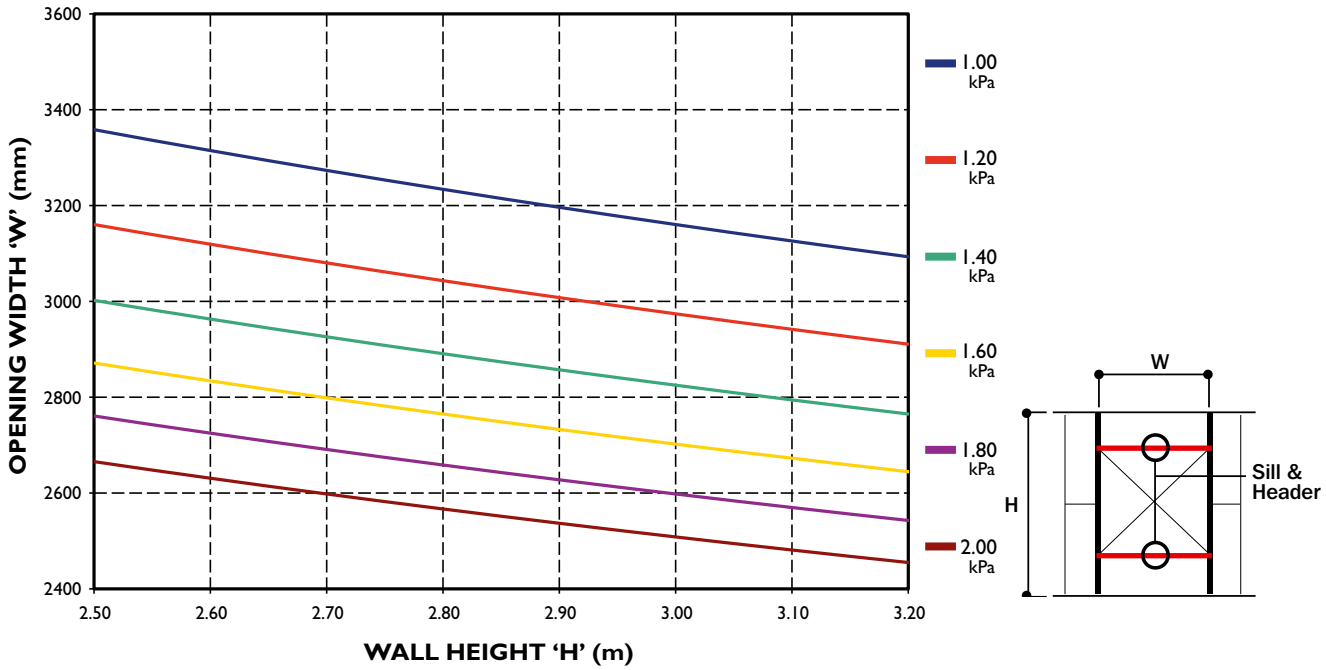


CHART SH3: H/240 (MAXIJAMB + 92 x 32 x 1.15BMT TRACK)

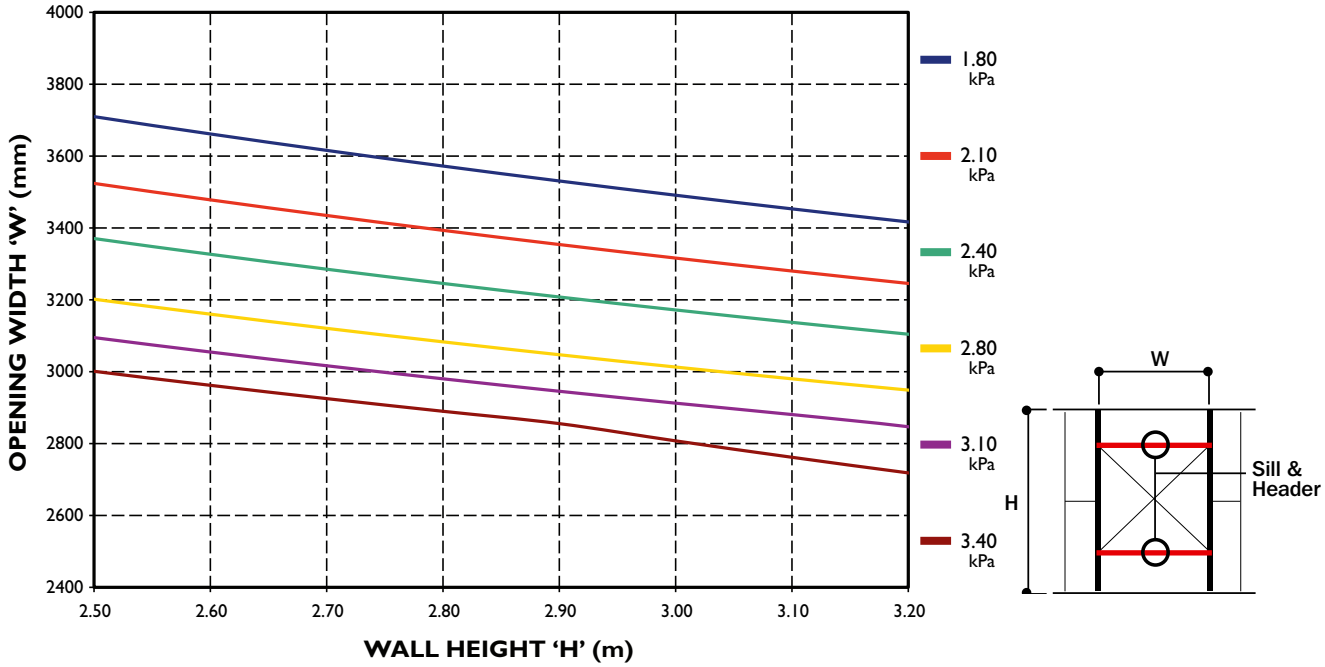
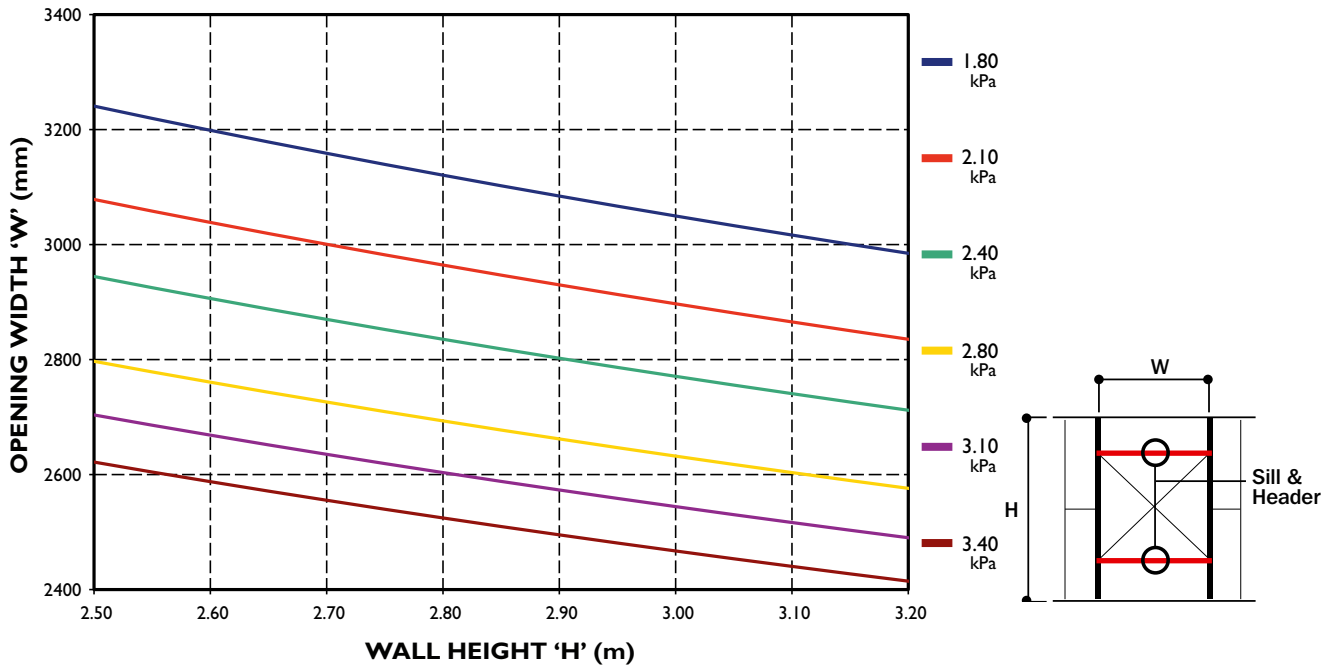


CHART SH4: H/360 (MAXIJAMB + 92 x 32 x 1.15BMT TRACK)



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TOP HATS

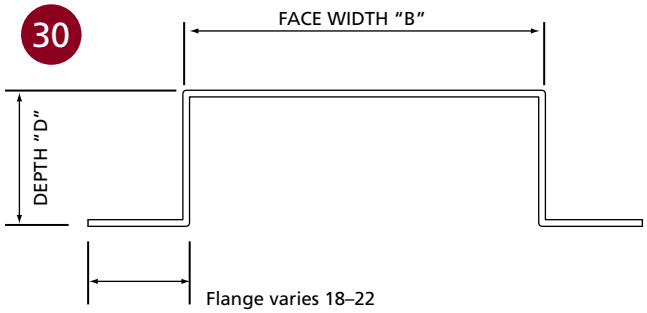
The use of top hat sections over steel stud framing frequently occurs, in particular for Metal Deck, CFC and Composite panel cladding systems. When the top hat is installed horizontally, across the face of the studs, Table 19 can be used to check the adequacy of the proposed top hat.

AUTOCLAVED AERATED CONCRETE PANELS

The stud framing design tables and charts presented in this manual have been prepared on the basis of a vented façade, with both internal and external pressures considered. Accordingly, the design data may be used for the design of stud framing clad with AAC Panels.
For AAC Panels construction Rondo recommends that the AAC Panels bear on either the floor slab or a shelf angle. The stud framing has not been checked to support the weight of the AAC panels.

METAL DECK CLADDING

The stud framing design tables and charts presented in this manual can be used to check framing supporting metal deck cladding. Rondo recommends using the H/240 span tables for these applications, as the cladding is flexible enough to tolerate the reduced deflection limits.



Part No.	H515
H	Indicates thickness = 1.15bmt gauge
5	Indicates face width B = 50mm face width
15	Indicates section depth D = 15mm depth

■ TOP HAT SECTION

TABLE 19: TOP HAT ULTIMATE CAPACITY (kPa)

TOP HAT SECTION	600mm SPACING SINGLE SPAN	600mm SPACING CONTINUOUS
H515	2.15	3.40*
H525	7.60	3.40*
H535	8.50*	3.40*
H550	8.50*	3.40*
H715	2.50	3.40*
H725	8.50*	3.40*
H735	8.50*	3.40*
H750	8.50*	3.40*

NOTES:
1. Maximum span of top hats not to exceed 600mm typical.
2. Deflection: L / 360 or better.
3. Fixing 1/#10 tek screw per leg per stud typical. Pullout capacity ϕNou = 1.54kN, based on 1.15bmt G2 grade steel.
4. "" indicates connection capacity controls.*

BRICK VENEER

Brick veneer is probably the most common form of construction, and the H/360 tables in this manual can be used to check the stud framing. Whilst many people use higher deflection than H/360, over many years, this has been found to be sufficient for this form of construction.

Quite often the external wall will be "wrapped" to improve the thermal efficiency of the wall, and this will necessitate a face fixing of the brick tie. Face fixing of the brick ties results in the screw fixing being pulled out of the stud framing under negative pressures on the wall. Table 20 provides the maximum design pressures for the given brick tie setout.

When stainless steel brick ties are used, they are to be electrolytically isolated from the galvanized steel framing members. The screw fasteners shall be selected in accordance with the manufacturer's recommendations; however Rondo does not recommend the use of stainless steel fasteners in direct contact with the frame.

Brick ties should be installed to minimise the eccentricity, by ensuring the brick tie is screw fixed as close as possible to the web of the stud.

TABLE 20: DESIGN PRESSURES

	DESIGN PRESSURE (kPa)	
	STUD SPACING (mm)	
VERTICAL TIE SPACING (mm)	**450**	**600**
450	3.82	2.86
600	2.86	2.15

NOTES:

1. Screw fastener: 1/#8 tek screw.

2. Design pressure is based on a single #8 tek screw fastener. Capacity may be increased for multiple fasteners.

DERIVATION OF THE DESIGN PRESSURES

The design pressures used in these tables have been determined in accordance with AS/NZS1170.2:2002 as follows:

BUILDING IMPORTANCE LEVEL

The designer is responsible for checking the building importance level in accordance with the Building Code of Australia (BCA) Section B. The building importance level dictates the annual probability of exceedance and subsequently the appropriate Regional Wind Speed (V_R).

For the design tables, a Regional Wind Speed of V_{1000} has been used, which equates to a Building Importance Level 3. This will be conservative for a building of Importance Level 2, with about a 4.5% and 8% difference in the Ultimate design pressure for Regions A and B respectively.

For buildings of Importance Level 4 a specific design will be required, and this should be discussed with your Rondo Technical Representative.

DESIGN WIND SPEED

The Design Site Wind Speed is determined as follows:

$V_{sit,\beta} = V_R M_d (M_{z,cat} M_s M_t)$ **... 2.2**

Where:

M_d = 1 Directionality has not been considered
For Region A, the value of M_d can vary between 0.8 to 1.0 depending on the orientation of the building. In Region B, the value of M_d is 1.0. Accordingly, the use of M_d = 1 will be correct in Region B, or potentially conservative in Region A.

M_s = 1 Shielding has not been considered

M_t = 1 Topography has not been considered
The designer should be aware that an assumption of M_t = 1 is not necessarily a conservative solution. Accordingly, the designer should check the topographical multiplier M_t in accordance with AS/NZS1170.2 before using the design tables.

$M_{z,cat}$ Varies with Terrain category and building height

The design site wind speed is therefore taken as:

$$V_{des,\theta} = V_R M_{z,cat}$$

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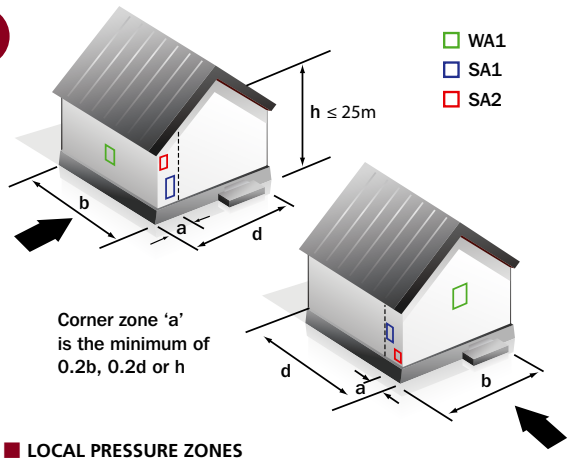

■ LOCAL PRESSURE ZONES

DESIGN WIND PRESSURE

The Design Wind Pressure (p) is determined as follows:

$p = (0.5 \rho_{air}) [V_{des.\theta}]^2 C_{fig} C_{dyn}$ **....2.4(1)**

Where:

ρ_{air} = 1.2kg/m³

C_{dyn} = 1

C_{fig} = Varies depending on location on building

Thus equation 2.4(1) can be simplified to:

$p = 0.6 [V_{des.\theta}]^2 C_{fig}$

The tables have been presented in terms of General Areas (Gen) and Corner A (Cnr A) which relate to the following locations on the building:

Gen = Windward wall location beyond the corner zones
WA1 wall areas per Figure 21

Cnr A = Zone within 0.5a of the building corner, for buildings less than 25m high
SA2 wall areas per Figure 21

C_{fig} – General Areas

For the General Areas, C_{fig} has been determined as follows:

$C_{fig} = [C_{pe} K_l - C_{pi}]$

Where:

C_{pe} = +0.8 AS/NZS1170.2 Table 5.2(A) Wind speed varies with height

K_l = 1.5 AS/NZS1170.2 Table 5.6 for WA1

C_{pi} = -0.3 AS/NZS1170.2 Table 5.1(A) Windward wall permeable, or all walls equally permeable.

Façade permeability has been considered for the building internal pressures. The tables may not be valid for buildings containing dominant openings, which should be independently considered by the designer.

For the windward wall case, C_{fig} = **1.5**

C_{fig} – Corner Zone A

For the Corner Zone A, C_{fig} has been determined as follows:

$C_{fig} = [C_{pe} K_l - C_{pi}]$

Where:

C_{pe} = -0.65 AS/NZS1170.2 Table 5.2(C)

K = 2.00 AS/NZS1170.2 Table 5.6 for SA2, corresponding to Cnr A table

C_{pi} = +0.2 AS/NZS1170.2 Table 5.1(A) Windward wall permeable, or all walls equally permeable.

Façade permeability has been considered for the building internal pressures. The tables may not be valid for buildings containing dominant openings, which should be independently considered by the designer.

For the Cnr A wall case, C_{fig} = **1.50**

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DERIVATION OF THE DESIGN CAPACITIES

SECTION MOMENT CAPACITY

$\phi_b M_{sx} = \phi_b Z_{ex} f_y$ **...3.3.2.2**

Where:

ϕ_b = 0.95

Z_{ex} = the effective section modulus with the extreme compression or tension fibre at f_y

f_y = yield stress of the steel

MEMBER MOMENT CAPACITY

$\phi_b M_{bx} = \phi_b Z_c f_c$ **...3.3.3.2(1) or 3.3.3.3(1) respectively**

Where:

ϕ_b = 0.90

Z_c = the effective section modulus with the extreme compression fibre at f_c

f_c = M_c / Z_f

M_c = the critical moment

Z_f = the full unreduced section modulus for the extreme compression fibre.

Member Moment Capacity – Flexural Torsional Buckling

$\phi_b M_b = \phi_b Z_c f_c$ **3.3.3.2(1)**

The critical moment M_c is calculated as follows:

For $\lambda_b \leq 0.60$: $M_c = M_y$

For $0.60 < \lambda_b < 1.336$ $M_c = 1.11 M_y [1 - (10 \lambda_b^2 / 36)$

For $\lambda_b \leq 1.336$ $M_c = M_y (1 / \lambda_b^2)$

λ_b = Non-dimensional slenderness ratio used to determine M_c

$= \sqrt{My/Mo}$

M_o = elastic buckling moment Calculated by the flexural torsional buckling analysis software

Member Moment Capacity – Distortional Buckling

$\phi_b M_b = \phi_b Z_c f_c$ **...3.3.3.3(1)**

The critical moment M_c is calculated as follows:

For $\lambda_d \leq 0.674$: $M_c = M_y$

For $\lambda_d > 0.674$: $M_c = M_y / \lambda_d [1 - (0.22 / \lambda_d)]$

λ_d = Non-dimensional slenderness ratio used to determine M_c

$= \sqrt{M_y / M_{od}}$

M_{od} = distortional buckling moment $= Z_f f_{od}$

f_{od} = elastic distortional buckling stress Calculated in accordance with AS/NZS4600 Appendix D or Thinwall

SHEAR CAPACITY

$\phi_v V_v = \phi_v \, 0.64 \, t_w^2 \sqrt{E \, k_v f_y}$ **...3.3.4(2)**

for the wall stud sections

$= \phi_v \dfrac{0.905E \, k_v \, t_w^3}{d_1}$ **...3.3.4(3)**

for the MAXIjamb sections

Where:

ϕ_v = 0.90

k_v = 5.34

d_1/t_w = 73.93 for the 92 x1.15 BMT sections

= 69.75 for the MAXIjamb section

The web ribbing has been ignored in the shear capacity determination, and d_1 has been taken as the width of the stud less material thickness and internal bend radii.

COMBINED MOMENT & SHEAR CAPACITY

$$\left(\frac{M^*}{\phi M_s}\right)^2 + \left(\frac{V^*}{\phi V_v}\right)^2 \leq 1.0$$

Bending and shear is checked at all points along the stud.

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RONDO QUIET STUD® ACOUSTIC STUD SYSTEM

SUMMARY

Rondo QUIET STUD® is a major breakthrough in acoustic control. Its unique design, combined with appropriate lining board systems, forms an effective buffer against unwanted noise and a cost-effective solution to Australia's acoustic control provisions.
Fast and simple to install, it leaves more usable floor space in a similar footprint and is almost exactly the same as standard drywall construction, resulting in lower installation costs and virtual fail-safe acoustic wall system.

SUITABLE FOR:

- Acoustic control provisions
- Acoustic wall system
- Non-Fire Rated Systems
- Fire Rated Systems
- Inter-tenancy walls

SPECIAL FEATURES

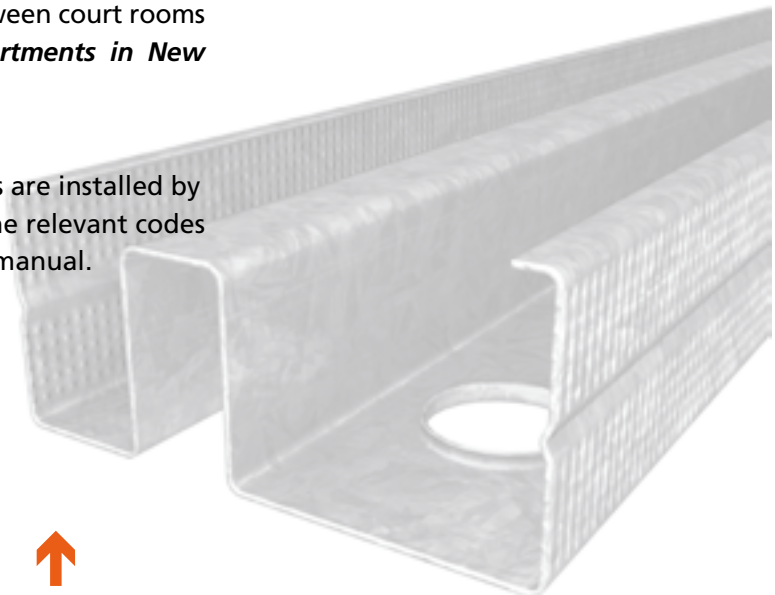
- Achieves superior performance in a smaller footprint, leaving more floor space
- Quick installation as it is virtually the same as standard drywall construction, resulting in lower labour costs
- Single profile; no need for staggered stud method of installation
- Utilises standard Rondo 92mm top and bottom wall tracks
- Bell-mouthed service holes for electrical cabling
- Studs are designed for a friction fit into top & bottom wall track
- Manufactured with a minimum coating of Z275

IN PRACTICE

The Rondo QUIET STUD® system has been used in a range of projects, including apartments, hotel refurbishments, schools, universities, hospitals and offices. At the ***District Law Court in Western Australia***, Rondo QUIET STUD® was used as an effective buffer against unwanted noise between court rooms and at the recent ***Clyde Quay Wharf Apartments in New Zealand***, between the inter-tenancy walls.

IMPORTANT NOTE:
Rondo recommends its products and systems are installed by a qualified tradesperson and according to the relevant codes and standards outlined on page 256 of this manual.

CONTENTS:



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RONDO QUIET STUD® COMPONENTS

QUIET STUD

RQST	92mm x 45mm x 0.55bmt

WALL TRACK

250	92mm x 28mm x 0.50bmt with hem

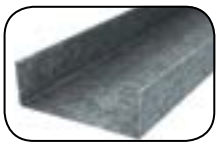
DEFLECTION HEAD TRACK

499	92mm x 50mm x 0.70bmt Deflection Head Track

QUIET STUD

RQST

WALL TRACK



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DEFLECTION HEAD TRACK

499

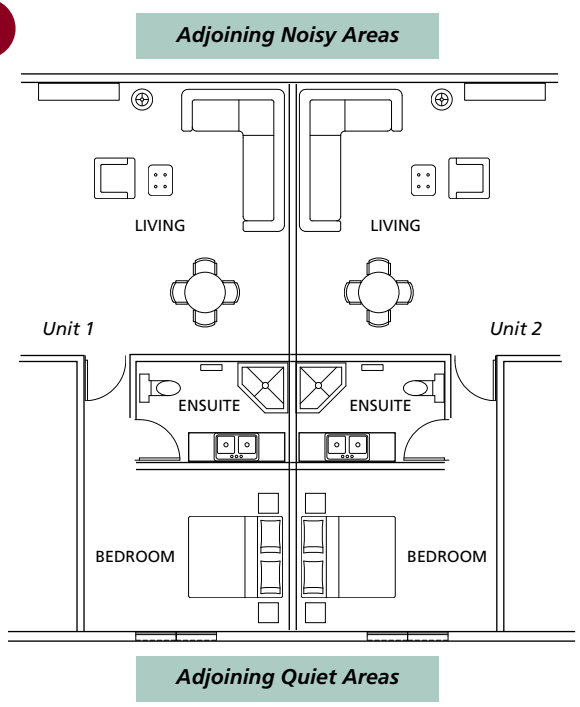
SOUND ISOLATION DESIGN FOR WALLS

Good acoustic control begins with good acoustic design.

In the case of adjoining dwellings that have a common inter-tenancy wall, noise intrusion can be limited by considering a range of factors including:

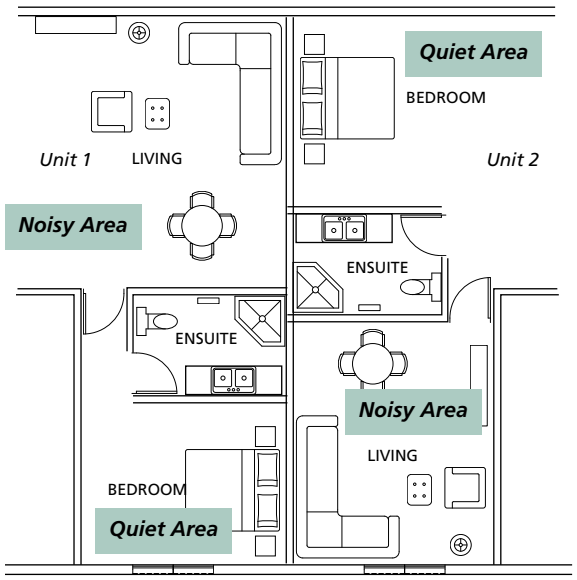
- Plan quiet areas in one unit adjacent to quiet areas in the adjoining unit.
- Plan quiet areas that are not immediately adjacent to plumbing, sanitary services or similar.
- Design walls to be full-height, to underside of soffit or roof above.
- Use high quality acoustic-grade insulation in the wall cavity.
- Use high quality, durable acoustic sealant at wall, floor or ceiling intersections and around penetrations.
- Minimise penetrations in sound-rated walls and ensure that power outlets and light switches are not installed back-to-back.
- Minimise the incidents of other flanking paths (ie; doors next to other doors etc).
- Use quieter pipe constructions to reduce noise generated by pipes and other services.
- Use Rondo QUIET STUD®

1



■ EXAMPLE OF GOOD ACOUSTIC DESIGN PRACTICE

2



■ EXAMPLE OF BAD ACOUSTIC DESIGN PRACTICE

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SOUND ISOLATION DESIGN FOR WALLS (continued)

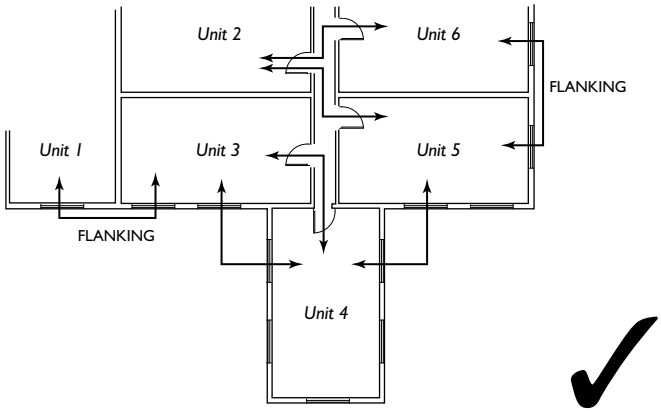
Good acoustic design practice takes into account the noise generated in a building space and ensures that, where possible, like areas in adjacent units are designed and constructed back-to-back *(refer Figure 1)*.

Noisy areas should be grouped together and sharing common walls where possible, i.e. wet areas, toilets, etc. in adjacent units should be designed and constructed back-to-back. This can also assist with reducing the ultimate construction cost of the building.

Another good acoustic design practice is to maximise the distance between access doors or external windows of adjoining units. This will limit potential flanking paths.

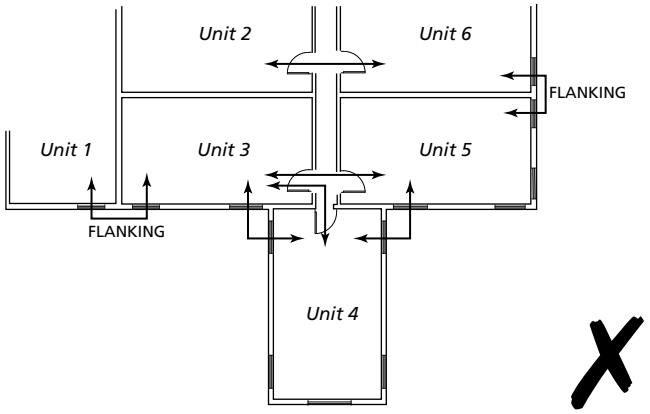
There are many other design issues that need to be taken into consideration to ensure good acoustic performance in walls and ceilings, including design of penetrations, plumbing and waste pipe services, hydraulic and mechanical services, acoustic sealants, door and window openings to name just a few. Rondo recommends that the user examine various publications such as those provided by the leading plasterboard manufacturers as well as the ABCB Sound Insulation 2004 Guideline available from the Australian Building Codes Board.

3



EXAMPLE OF GOOD ACOUSTIC DESIGN PRACTICE TO MINIMISE FLANKING PATHS

4



EXAMPLE OF BAD ACOUSTIC DESIGN PRACTICE AS FLANKING PATHS ARE DIRECTLY ADJACENT TO ONE ANOTHER

SOUND ISOLATION PROVISIONS

BUILDING CLASSES

Way back in 2004 the Building Code of Australia (BCA) was amended in response to mounting evidence that the existing sound insulation code was not meeting community expectations.

The purpose of these amendments was to reduce noise transmission between attached dwellings (high-rise and multi residential apartments etc) and between dwellings and units and other areas within a building such as common amenities, corridors and stairwells.

Table 1 refers to the classes of building covered by these amendments as categorised by the BCA.

PROVISIONS

The BCA deals only with sound insulation between dwellings and does not address issues such as external noises or noise transfer from within a unit to outside of the building.

The provisions deal with both wall & floor/ceiling requirements but it is only wall requirements that we are concerned with in this specific document.

To meet the new code requirements, manufacturers have three basic ways to satisfy the BCA sound insulation requirements:

- *Prescriptive Approach* – Laboratory Tested Systems
- *Performance Approach* – Conduct a Field Test specified in the Verification Method of the BCA
- *Performance Approach* – Use Expert Judgement or Opinion that the systems meet Deemed-to-Satisfy levels.

The current BCA minimum requirements for sound insulation are as shown in Table 2.

TABLE 1: BUILDING CLASSES

CLASS 1*	One or more attached dwellings separated by a fire-resisting wall (ie; terrace, villa, row house etc) or a small boarding house, guest house, hostel or similar less than 300m^2 and one which more than 12 persons would not ordinarily be resident.
CLASS 2	A building containing two or more sole-occupancy units each being a separate dwelling (ie; flats, apartments, units etc).
CLASS 3	A residential building other than Class 1 or 2 such as a large boarding house, back-packers accommodation, residential part of a hotel/school/detention centre or health-care building etc.
CLASS 9C	Aged care building.

*NOTE: * The BCA sound insulation provisions Volume One, Part F5 only apply to Building Classes 2, 3 & 9c. The provisions of Volume Two, Parts 2.4 & 3.8.6 apply to Class 1 buildings. Refer to the BCA for exact definitions.*

TABLE 2: SOUND INSULATION PROVISIONS OF THE BCA

CLASS	WALLS SEPARATING	R_w & C_{tr}	R_w	DISCONTINUOUS CONSTRUCTION
1	Habitable rooms (other than kitchens) of one building from a bathroom, laundry, kitchen, etc in another Class 1 building	50	–	Yes
	Rooms between Class 1 buildings other than above	50	–	No
2&3	Habitable rooms (other than kitchens) of one SOU from a bathroom, laundry, kitchen etc in another SOU	50	–	Yes
	Rooms between SOU's other than above	50		No
	SOU's from public corridor, stairway etc	–	50	No
	SOU's from plant room or lift shaft	–	50	Yes
9C	SOU's from a kitchen or laundry	–	45	Yes
	SOU's from other SOU's (other than above), or from a sanitary compartment, bathroom, plant room etc.	–	45	No

NOTE: SOU = Sole-occupancy Unit

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SOUND ISOLATION PROVISIONS (continued)

Definitions

IMPACT NOISE

At the same time as sound insulation requirements were modified, the BCA also made changes to the provisions dealing with impact noise.

Impact noise occurs in adjoining tenancies and occurs on the floor or wall of that tenancy. In the case of walls, a typical source of impact is the slamming of doors on cupboards mounted on the common wall between tenancies.

The amendments also try and deal with audible noise which is generated by vibrations in the structure (structure-borne noise) which could come from mechanical equipment or vibrations from plumbing services or similar.

To deal with this particular issue of impact noise the BCA added further detail in relation to walls which separate:

(a) a bathroom, sanitary compartment, laundry or kitchen in one SOU from a habitable room (other than a kitchen) in an adjoining unit; or

(b) a SOU from a plant room or lift shaft.

The Clause states that a wall in a building required to have an impact sound insulation rating must-

(i) for a Class 2 or 3 building be of discontinuous construction; and

(ii) for a Class 9c aged care building, must-

(a) for other than masonry, be two or more separate leaves without rigid mechanical connection except at the periphery; or

(b) be identical with a prototype that is no less resistant to the transmission of impact sound when tested in accordance with… *(various specifications referred to further in the BCA)*.

IMPORTANT:

As potentially alterations to these provisions can be made from year to year reference should always be made to the current BCA Volume One Part 5 Sound Transmission and Insulation "Deemed-to-Satisfy Provisions" for up to date information.

GLOSSARY OF TERMS

R_w

The Weighted Sound Reduction Index refers to the airborne sound insulating rating of a particular building element. This value is measured in a laboratory environment and is applied to walls, ceilings/floors, ceilings/roofs as well as to doors and windows.

The higher the numerical rating the greater the sound insulating value of the relevant building element.

$R_w + C_{tr}$

The addition of the C_{tr} refers to a spectrum adaptation term for a rating which adds a correction for the effects of low frequency sound. The use of the term $R_w + C_{tr}$ has been necessary due to the increase in low frequency sound sources such as surround sound systems, traffic and aircraft noise as well as some musical instruments, the "doof, doof" factor if you will?

Two walls might have the same R_w rating but not the same resistance to low frequency sound therefore it may be necessary to adjust the design of the wall which is likely to be affected by the low frequency sound

Discontinuous Construction

The BCA states that discontinuous construction means having a 20mm cavity between 2 separate leaves, i.e. a double steel stud wall or similar with a 20mm cavity between the studs.

Sources and further recommended reading:

It is important to keep up with current guidelines in respect to the important issue of sound insulation. Rondo recommends that if unsure reference should be made to the major plasterboard manufacturer's literature as well as to current ACBC – Australian Building Code Board publications.

NOTE:
The result of the impact sound insulation requirements is that the Rondo QUIET STUD® cannot be used as a single leaf construction where impact sound insulation is required. However, this should only be in isolated cases in apartments as good design practice will ensure mirrored image layouts where habitable rooms are immediately adjacent to one another and non-habitable rooms likewise *(see page 151)*.

RONDO QUIET STUD® ACOUSTIC SYSTEM

PERFORMANCE COMPARISON

To fully understand how innovative the Rondo QUIET STUD® performs as an acoustic solution, comparison tests were conducted using the exact same configuration of plasterboard lining, insulation, sealants and installation details on both a standard Rondo 92mm x 0.55bmt lipped C Steel Stud and the Rondo 92mm x 0.55bmt QUIET STUD® to compare performance.

As can be seen from the results shown in Table 3, the Rondo QUIET STUD® had a significant increase in performance both in the R_w value (5dB better performance) and the combined $R_w + C_{tr}$ value (8dB better performance) when compared to the standard Rondo lipped C Steel Stud section. Even better performance can be expected when compared to timber stud framing of equal width.

Comparison tests were also performed using the exact same plasterboard, insulation and sealant configuration, but using staggered 64mm x 32mm x 0.50bmt lipped C steel studs in a 92mm track.
The Rondo QUIET STUD® system achieved the same $R_w + C_{tr}$ performance as the staggered stud systems, yet is a much simpler system to install.

TABLE 3: PERFORMANCE COMPARISON WITH TRADITIONAL LIPPED C STUD

STUD	BOARD LININGS	INSULATION	R_W	C_{TR}	R_W+C_{TR}	CSIRO TEST NO.	
Rondo 92mm x 0.55bmt lipped steel stud	2x13mm Fire-Rated plasterboard (mass 21kg/m²) both sides	TAC100	52	(-9)	43	TL434a	
Rondo 92mm x 0.55bmt QUIET STUD®	2x13mm Fire-Rated plasterboard (mass 21kg/m²) both sides	TAC100	57	(-6)	51	TL434d	

NOTES: 1. Insulation used was 100mm polyester infill, 14 kg/m3 manufactured by Tontine Fibres.
2. Tests conducted and verified at CSIRO laboratories, Highett, Melbourne in February/March 2005.

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ACOUSTIC PERFORMANCE

Rondo QUIET STUD® has been subject to rigorous acoustic testing at both CSIRO Acoustic Laboratory in Melbourne and Auckland University Acoustic Laboratory using a variety of plasterboard linings. The suggested Noise Control Systems listed on the following page are the results of such testing. However, the respective plasterboard manufacturer should be contacted to determine the final acoustic specification as they may hold more recent test data than those suggested systems listed. They can also determine fire resistance of the nominated system where this is applicable.

FIRE RATING

QUIET STUD® will behave in a similar way to traditional lipped steel studs in a fire*.
For full fire rating information contact your respective plasterboard manufacturer.
**NB: QUIET STUD® has been the subject of BRANZ Report FAR 2521 to determine fire resistance.*

PLASTERBOARD (AND OTHER LINING BOARDS)

Rondo QUIET STUD® has been developed in conjunction with Australasia's leading plasterboard manufacturers. These manufacturers each make a range of Fire-Rated and Sound-Rated plasterboard linings and they can quickly determine the optimum configuration to achieve the desired level of performance using the Rondo QUIET STUD® .
Test certifications or expert opinions based on the original test results can be supplied. Rondo recommends that prior to specifying or installing QUIET STUD®, your respective plasterboard manufacturer be contacted to provide the final, optimal design.
Rondo QUIET STUD® could be installed using other wallboard linings (fibre cement sheet etc) but it is best to contact the lining board manufacturer for an opinion on acoustic performance.

INSULATION (SOUND CONTROL INFILL)

Insulation or sound control infill plays an integral part in the performance of the acoustic wall system. It is therefore most important that the insulation used on your project is of equal or better acoustic performance to that used in our various tested systems on the following page. The respective insulation or plasterboard system manufacturer can easily and quickly verify acoustic performance.

FIRE/ACOUSTIC SEALANT

Acoustic performance of a stud wall system is severely degraded by the presence of gaps in the constructed system. These can occur around penetrations or perimeters. To maintain acoustic performance, it is therefore critical to ensure that all perimeters and penetration gaps are carefully sealed using high-quality acoustic sealant to make construction virtually air-tight. Please refer to the respective plasterboard manufacturer for their acoustic sealant specification. If the system is required to be fire-rated, then the sealant will also need to be fire-rated.

DIFFERENCE BETWEEN LABORATORY & ON-SITE RESULTS

The ratings and values stated on the following page have been achieved through testing and calculation with precise techniques and equipment under ideal controlled conditions.
To attain optimum performance on-site, careful attention to detail in the design and construction is paramount. If the basic principles of good acoustic design and construction practice are ignored, the performance of the system can be jeopardised. It is therefore most important that the specifications of the plasterboard manufacturers are strictly followed on site.
Based on industry advice, the BCA allows a concession of up to 5dB in performance when tested on-site where measurement sometimes is not ideal *(i.e. background noise or the size/volume of the tested room can affect results, etc.).*
As a consequence, Rondo cannot guarantee that the results on the following page will be matched on-site but with careful attention to detail during the erection of the stud wall system, and by strictly following the installation details of the plasterboard manufacturers, the assembly should produce a result closely comparable with the tested or estimated values.

SUGGESTED NOISE CONTROL SYSTEMS (WHERE C_{TR} VALUE NOT TAKEN INTO CONSIDERATION)

It must be noted that some Australian states have not yet adopted current BCA sound provisions for Class 1, 2, 3 & 9c buildings. In some cases, only an R_w rating value is required.
This is equally so for non-residential buildings which are not so affected by the low bass-type frequencies from electronic sound equipment. Rondo QUIET STUD® is just as effective in helping reduce noise transmission from room to room in non-residential buildings *(i.e. offices, schools, universities, hospitals, etc.).* Table 5 shows indicative R_w values only using QUIET STUD® and various plasterboard configurations.

TABLE 4: QUIET STUD ACOUSTIC SYSTEMS – CLASS 1, 2, 3 & 9C RESIDENTIAL BUILDINGS

STUD	BOARD LININGS	INSULATION	R_W	C_{TR}	R_W+C_{TR}	CSIRO TEST NO.	
Rondo 92mm x 0.55bmt QUIET STUD®	10mm Sound-Rated plasterboard (mass 8.2kg/m²) + 13mm Fire-rated plasterboard (mass 10.5kg/m2) 1 side 1 x 13mm Fire-rated plasterboard (mass 10.5kg/m²) other side	TAC100 100mm polyester 14kg/m³	53	(-9)	44	TL434e	
Rondo 92mm x 0.55bmt QUIET STUD®	2x13mm Fire-Rated plasterboard (mass 21kg/m²) 1 side 1 x 13mm Fire-rated plasterboard (mass 10.5kg/m²) other side	100NCB 100mm glass wool 14kg/m³	55	(-7)	48	TL434c	
Rondo 92mm x 0.55bmt QUIET STUD®	2x13mm Fire-Rated plasterboard (mass 21kg/m²) both sides	TAC100 100mm polyester 14kg/m³	57	(-6)	51	TL434d	
Rondo 92mm x 0.55bmt QUIET STUD®	2x13mm Fire-Rated plasterboard (mass 21kg/m²) both sides	100NCB 100mm glass wool 14kg/m³	57	(-5)	52	TL434b	

NOTES: 1. Insulation: TAC100 = 100mm polyester infill, 14 kg/m³ manufactured by Tontine Fibres or equal equivalent.
100NCB = 100mm glass wool Noise Control Batts, 14 kg/m³ manufactured by Insulation Solutions or equal equivalent.
2. Rondo 92mm x 0.55bmt QUIET STUD® friction fit to track @ 600mm centres.
3. Tests conducted and verified at CSIRO laboratories, Highett, Melbourne in February/March 2005.
4. Consult with your plasterboard manufacturer/supplier to verify their particular brand of plasterboard and accompanying system will achieve at least equal results to those above.

TABLE 5: QUIET STUD NOISE CONTROL SYSTEMS – NON-RESIDENTIAL BUILDINGS

STUD	BOARD LININGS	INSULATION	R_W RATING	
Rondo 92mm x 0.55bmt QUIET STUD®	1x13mm Fire-Rated plasterboard (mass 10.5kg/m²) both sides.	Either TAC100 or 100NCB (14kg/m3)	50 ± 1 dB	
Rondo 92mm x 0.55bmt QUIET STUD®	2x13mm Fire-Rated plasterboard (mass 21kg/m²) 1 side 1 x 13mm Fire-rated plasterboard (mass 10.5kg/m²) other side	Either TAC100 or 100NCB (14kg/m3)	55 (CSIRO test TL434c with glass wool)	
Rondo 92mm x 0.55bmt QUIET STUD®	2x13mm Fire-Rated plasterboard (mass 21kg/m²) 1 side, 3x13mm Fire-Rated plasterboard (mass 31.5kg/m²) other side.	Either TAC100 or 100NCB (14kg/m3)	60 ± 1 dB	

NOTES: 1. Calculations based on systems tested at CSIRO laboratories, Highett, Melbourne.
2. Insulation: TAC100 = 100mm polyester infill, 14 kg/m3 manufactured by Tontine Fibres or equal equivalent.
100NCB = 100mm glass wool Noise Control Batts, 14 kg/m³ manufactured by Insulation Solutions or equal equivalent.
3. Consult with your plasterboard manufacturer/supplier to verify their particular brand of plasterboard and accompanying system will achieve at least equal results to those above.

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INSTALLATION DETAILS

STRUCTURAL DESIGN

• All walls in this brochure using QUIET STUD® have been designed as internal, non-loadbearing walls.
• These walls have been designed for lateral loads only using the composite action of the studs and sheeting.
• The walls have been designed to meet the design pressure of ultimate 0.375kPa and serviceability 0.25kPa. Deflection has been limited to height/240 *(based on BCA Specification C1.8 – Structural Tests for Lightweight Construction)*.
• For walls with higher wind loadings or for enquiries outside the scope of this document, please contact your specialist Rondo Technical Representative.

FRAMING

• Rondo 92mmx32mmx0.55bmt steel top & bottom wall track nominally fixed at 600mm centre maximum spacings to floor and ceiling and within 100mm of end of track section or,
• If a Deflection Head is required or the wall is above 4800mm in height, install Rondo 92mmx50mmx0.70bmt deflection head track at top of frame.
• QUIET STUD® 92mmx45mmx0.55bmt nominal with a 6mm return installed @ 600mm maximum centre spacings *(or as specified – refer to Table 6 Maximum Wall Heights on Page* 159*)*.
• Studs should be a friction fit installation to track section to allow an approx 15mm expansion gap at the top of the frame (20mm where a deflection head detail is required or as nominated by the structural engineer).
• First and end studs may be fixed to the track section with #8g Metal Tek screws for extra rigidity.
• Ensure studs are aligned in the same direction except for end stud.
• Studs may be boxed around door or window openings for added rigidity.
• No Noggings are required in QUIET STUD® applications providing walls are lined both sides of the stud frame in accordance with plasterboard manufacturers' specifications.
• To maintain the integrity of the acoustic wall system, try and avoid heavyweight fixtures from being attached to the stud wall frame. Where this is unavoidable, Rondo can provide specialist advice through our Technical Representatives *(phone 1300 367 663)*.
For lightweight fixtures such as towel rails, taps, etc., a timber Nogging/batten may be installed between the studs with one of the studs being installed the reverse way so that the web of the two studs are facing each other. Ensure that acoustic or fire sealant, as recommended by the lining board manufacturer, is used around any penetrations to maintain integrity of the wall frame.

LINING BOARD: INSTALLATION, FIXING, FINISHING & JOINTING

• Please refer to the respective plasterboard or other lining board manufacturer for their complete lining and finishing specifications.
• Rondo recommends that the lining board be installed as per the requirements of Australia/New Zealand Standard AS/NZS 2589.1:2007
– *"Gypsum linings in residential and light commercial construction – application and finishing"*

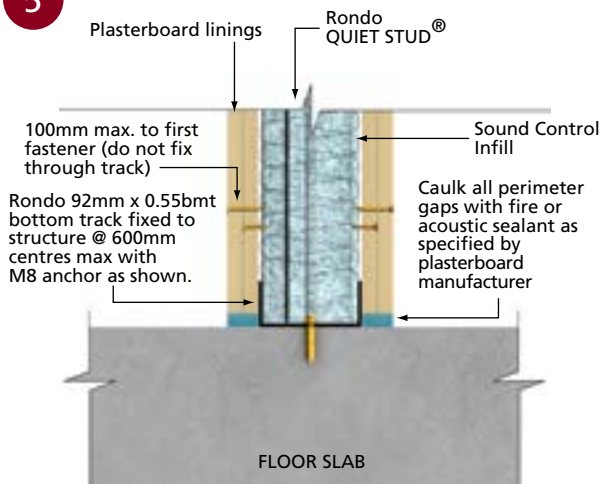
SOUND CONTROL INFILL

• Rondo has conducted thorough acoustic testing of various QUIET STUD® wall systems using several insulation types. To ensure a fail-safe acoustic control system Rondo recommends using high quality acoustic insulation either as per our Noise Control Systems listed on page 157 or that equal in performance through verification from the insulation manufacturer or the plasterboard system manufacturer.
• Fit insulation between QUIET STUD® at nominated centres.

ACOUSTIC SEALANT & CAULKING

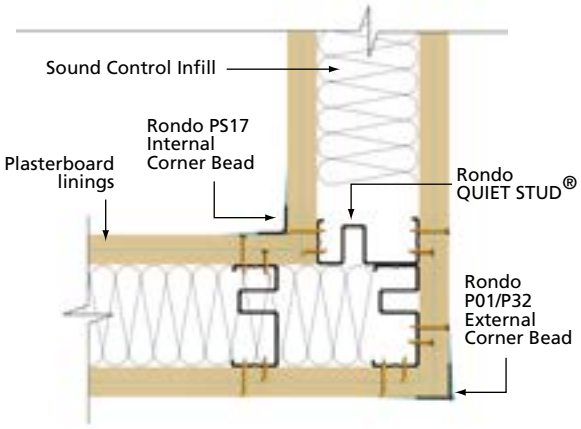
• To attain specified acoustic performance (and FRL performance where nominated) it is essential that high quality fire and acoustic rated sealant be used at all perimeter gaps and around all penetrations.
• Please refer to the respective plasterboard or other lining board manufacturer for their complete specifications on the installation of acoustic sealant and caulking.

5



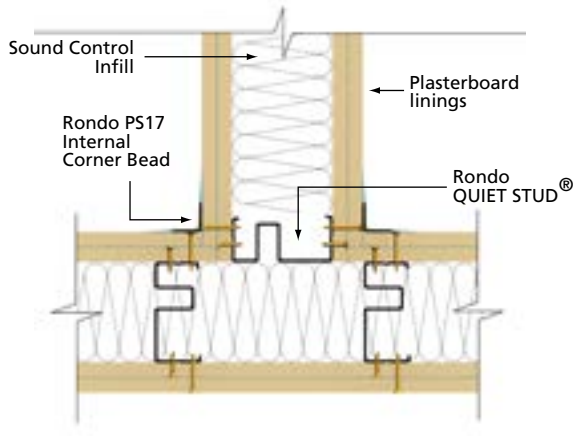
■ WALL BASE DETAIL

6



■ CORNER DETAIL

7



■ 'T' INTERSECTION DETAIL

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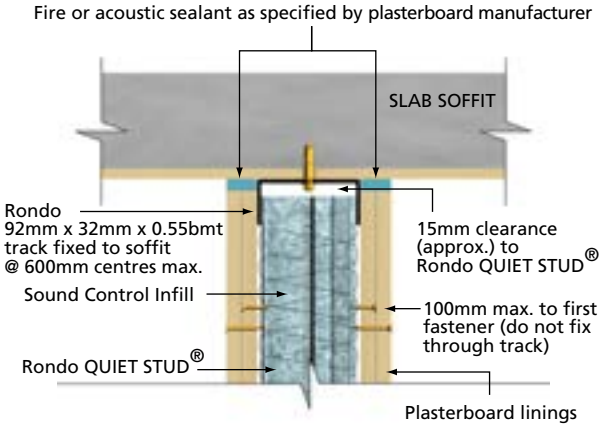

■ WALL HEAD DETAIL (FRICTION FIT HEAD)

TABLE 6: MAXIMUM WALL HEIGHTS

PLASTERBOARD	STUD CENTRES	
	600	450
1 x 10mm Both Sides	3700	4020
1 x 13mm Both Sides	4130	4410
1 x 16mm Both Sides	4300	4580
2 x 10mm Both Sides	3700	4020
2 x 13mm Both Sides	4130	4410
2 x 16mm Both Sides	4300	4580

NOTES:
1. Lateral pressure is 0.25kPa in accordance with the BCA Specification C1.8.
2. Deflection limited to span/240
3. All walls above contain NO Nogging

IMPORTANT
It is critical that the correct size fastener is chosen when fixing plasterboard sheets to Rondo QUIET STUD®.
The screws must NOT penetrate through the stud flange into the return leg of Rondo QUIET STUD® which is 24mm from the stud flange in one direction.
Typically, a 25mm long 'Type S' needle point screw is ideal for fixing the first layer of plasterboard. Clarification should be sought from the respective plasterboard manufacturer for fixing subsequent layers of plasterboard.

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MASONRY WALL BATTENS

For Internal Applications

Rondo Furring Channels and adjustable clips are the ideal combination for battening out irregular walls, ready for the fixing of building boards. Furring Channels with an adjustable clip will correct irregular surfaces of 25mm *(refer Figure 1).*

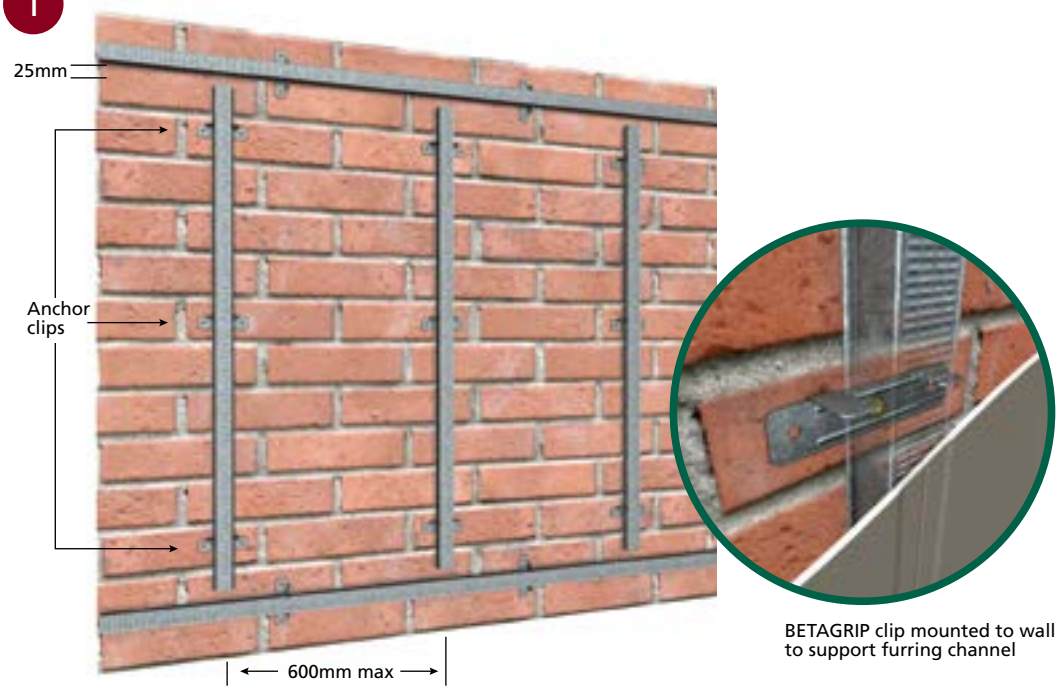
For surfaces which do not require any alignment but require a cavity for cables or plumbing, Rondo Batten 333 can be used.

Clips should be spaced in accordance with Table 1.

Clips may be of the adjustable or acoustic type as shown previously, depending on the application.

Masonry fasteners should be selected in accordance with the manufacturer's recommendations.

1



BETAGRIP clip mounted to wall to support furring channel

MASONRY WALL BATTENS

TABLE 1: MAXIMUM ANCHOR SPACING

FURRING CHANNEL	CLIP SPACING (mm)
333	900
308	900
129`	1200

NOTE: The above spacings are the maximum recommended installation requirements. This may not be suitable for high traffic areas or external applications.

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MASONRY WALL INSTALLATION WITH MEMBRANE INSULATION

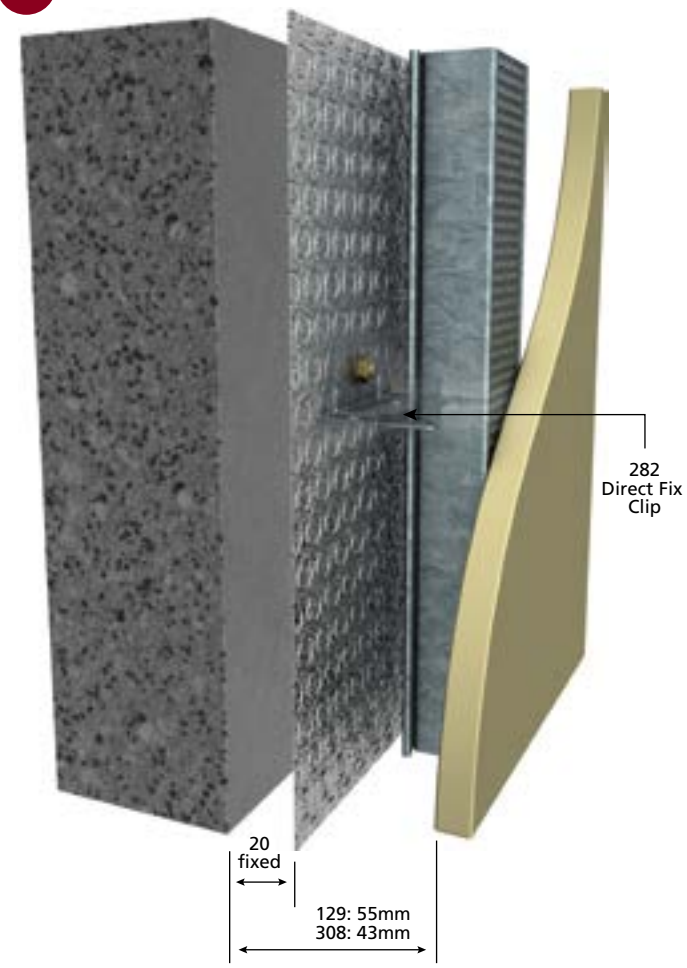
Direct Fix Furring Channel Clips for Internal Applications

Rondo produces two clips to assist the application of single or double layer reflective membrane insulation on masonry or concrete walls which are to be lined with building board that is fixed to Furring Channel.

282 DIRECT FIX CLIP

This clip suits single membrane applications, which require a 20mm air space between the inside face of the structure and the membrane.
The 129 or 308 Furring Channel is then installed by clipping into the 282 Direct Fix Clip *(see Figure2)*.
This then provides a second air space between the inside of the board and the insulation.
The 282 Direct Fix Clip is non-adjustable and therefore more suited to tilt-up panel construction.
If adjustment is required, the clip must be 'packed out'. An alternative would be to use either Rondo BG01 or BG02 BETAGRIP® clips which offer adjustment of the Furring Channel but do not facilitate the air space which would have to be achieved by the use of plastic spacers provided by the insulation manufacturer.

2



282 DIRECT FIX CLIP IN SITU

BG05 BETAFIL® CLIP

The introduction of more stringent thermal insulation standards has resulted in the use of double layers of reflective insulation being specified on some projects.

The Rondo BETAFIL® Clip effectively provides the three air spaces; structure to insulation, between insulation layers and then between the outer insulation layer and board *(see Figure3).*

It should be noted that the space between the two layers of insulation is produced by the installer fixing plastic spacer blocks, as illustrated, onto the clip. The spacers are supplied by the insulation manufacturer.

Unlike the 282 clip, Furring Channel can be adjusted so that it is secured plumb by utilising the appropriate fixing teeth on the clip.

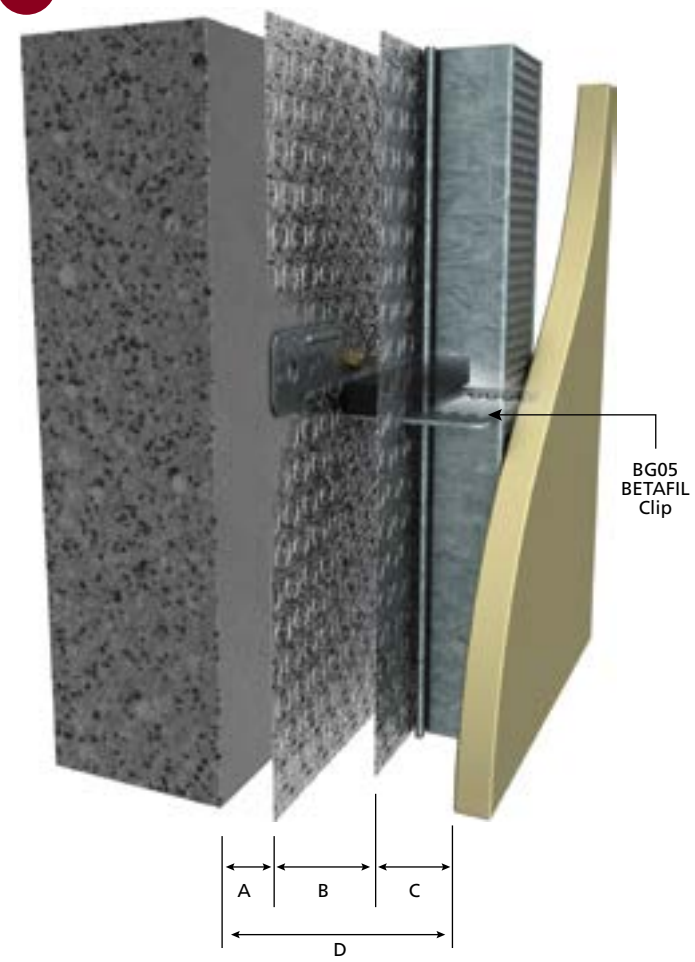
FIXING

The installer should consult the fixings supplier for the appropriate product to use depending on the structure.

Rondo 282 and BETAFIL® clips are designed for internal use only and should be spaced at no more than 1200mm apart using 129 Furring Channel. These centres suit Furring Channel spaced at 600mm centres.

The insulation supplier can provide more information on insulation properties when using these clips.

3



Nominal Dimensions:
A = 18mm
B = 32mm
C = 28mm – 48mm (in 5mm increments)
D = 78mm – 98mm

BG05 DIRECT FIX CLIP IN SITU

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