

the **PROFESSIONAL**
series

**SERIES NZ C2:
STEEL STUD AND TRACK**

V1

RONDO®

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Please note: This technical literature has been produced to be used STRICTLY and SPECIFICALLY with genuine Rondo products. Calculations and recommendations in this literature are based on detailed testing, tolerances, and performance of Rondo Steel products. The use of this guide with non-Rondo products is NOT recommended due to a high risk of non-compliant design and installation outcomes.

We want you to know that we've rallied the best, and most experienced experts at Rondo to produce this book so that we can offer professionals like yourself a detailed technical reference to use.

Despite our efforts however, products, systems and Building Codes do change over time, and interpretations may also vary, which means we cannot accept any liability for any of the information (or lack of information) in this manual, or any consequences which happen as a result.

We also recommend you check that you are referring to the latest edition. You can do this by comparing your book to the one currently available on our website at www.rondo.co.nz.

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STEEL STUD AND TRACK

C2.1 INTRODUCTION

The Rondo Steel Stud and Track framing system provides a durable, practical and light-weight structure for all your internal non-load bearing applications. The availability of various sizes and gauges, coupled with complementary components such as noggings, tracks, curved tracks and specialist cleats ensure the Rondo Steel Stud and Track framing systems are suitable for almost all situations.

Rondo have designed and supplied steel stud and track systems for hospitals, hotels, defence facilities, apartment buildings, commercial buildings, retail centres, industrial buildings, museums, and many other buildings all of which have their own specific requirements.

SUITABLE FOR:

- Non-load bearing internal partitions
- Internal partitions with added fixture loads
- Load bearing internal partitions (by design only)
- Window and door opening framing
- Fire-rated Walls
- Acoustic rated walls
- External wall systems
- Bulkheads
- Seismic solutions

Not all systems are covered in this Professional Series. For systems outside the scope of this series refer to Rondo for technical assistance and/or clarification.

SPECIAL FEATURES:

- Light gauge studs and both light and medium gauge tracks are hemmed for safety and performance
- Stud and track sections can be ordered in custom lengths
- Bell mouth service holes in the light and medium gauge studs mitigate damage to services
- Flexible track are available for curved walls
- Z275 zinc coating to all stud and track sections provides durability
- Profiles vary from 51mm up to 150mm in depth and gauges vary from 0.50bmt through to 1.15bmt in most sizes
- Rondo QUIETSTUD® , specifically profiled to improve acoustic performance, available in 0.55bmt and 0.75bmt

C2.2 COMPONENTS

TABLE 2.2(A): LIPPED WALL STUDS AND WALL TRACKS

LIPPED WALL STUDS – LIGHT GAUGE		
PART NO.	DESCRIPTION	BMT
W550	51mm (w) x 36mm (h) Steel Stud with hem	0.50
112	64mm (w) x 36mm (h) Steel Stud	
403	76mm (w) x 36mm (h) Steel Stud with hem	0.55
251	92mm (w) x 36mm (h) Steel Stud	



W550 / 112
403 / 251

LIPPED WALL STUDS – MEDIUM GAUGE		
489	51mm (w) x 36mm (h) Steel Stud	0.75
491	64mm (w) x 36mm (h) Steel Stud	
493	76mm (w) x 36mm (h) Steel Stud	
495	92mm (w) x 36mm (h) Steel Stud	
511	150mm (w) x 36mm (h) Steel Stud	



489 / 491 / 493
495 / 511

LIPPED WALL STUDS – HEAVY GAUGE		
661	64mm (w) x 36mm (h) Steel Stud	1.15
671	76mm (w) x 36mm (h) Steel Stud	
681	92mm (w) x 36mm (h) Steel Stud	
691	150mm (w) x 36mm (h) Steel Stud	



661 / 671
681 / 691

WALL TRACKS – LIGHT GAUGE		
400	51mm (w) x 28mm (h) Wall Track with hem	0.50
111	64mm (w) x 28mm (h) Wall Track with hem	
402	76mm (w) x 28mm (h) Wall Track with hem	
250	92mm (w) x 28mm (h) Wall Track with hem	



400 / 111
402 / 250

WALL TRACKS – MEDIUM GAUGE		
490	51mm (w) x 28mm (h) Wall Track with hem	0.70
492	64mm (w) x 28mm (h) Wall Track with hem	
494	76mm (w) x 28mm (h) Wall Track with hem	
496	92mm (w) x 28mm (h) Wall Track with hem	



490 / 492
494 / 496

WALL TRACKS – HEAVY GAUGE		
660	64mm (w) x 32mm (h) Wall Track	1.15
670	76mm (w) x 32mm (h) Wall Track	
680	92mm (w) x 32mm (h) Wall Track	



660 / 670 / 680

DEFLECTION HEAD TRACK – LIGHT GAUGE

PART NO.	DESCRIPTION	BMT
480	64mm (w) x 50mm (h) Deflection Head Track with hem	0.50
482	76mm (w) x 50mm (h) Deflection Head Track with hem	
483	92mm (w) x 50mm (h) Deflection Head Track with hem	



480 / 482 / 483

DEFLECTION HEAD TRACK – MEDIUM GAUGE

488	51mm (w) x 50mm (h) Deflection Head Track with hem	0.70
497	64mm (w) x 50mm (h) Deflection Head Track with hem	
498	76mm (w) x 50mm (h) Deflection Head Track with hem	
499	92mm (w) x 50mm (h) Deflection Head Track with hem	
510	150mm (w) x 50mm (h) Deflection Head Track	0.75



**488 / 497 / 498
499 / 510**

DEFLECTION HEAD TRACK – HEAVY GAUGE

663	64mm (w) x 50mm (h) Deflection Head Track	1.15
673	76mm (w) x 50mm (h) Deflection Head Track	
683	92mm (w) x 50mm (h) Deflection Head Track	
690	150mm (w) x 50mm (h) Deflection Head Track	



**663 / 673
683 / 690**

FLEXIBLE TRACK

103	51mm (w) x 32mm (h) Flexible Track	0.50
107	64mm (w) x 50mm (h) Deflection Head Flexible Track	
108	76mm (w) x 50mm (h) Deflection Head Flexible Track	
109	92mm (w) x 50mm (h) Deflection Head Flexible Track	
110	150mm (w) x 50mm (h) Deflection Head Flexible Track	



**103 / 107 / 108
109 / 110**

SLOTTED DEFLECTION HEAD TRACK – MEDIUM GAUGE

PART NO.	DESCRIPTION	BMT
S497	64mm (w) x 50mm (h) Slotted Deflection Head Track with hem	0.70
S498	76mm (w) x 50mm (h) Slotted Deflection Head Track with hem	
S499	92mm (w) x 50mm (h) Slotted Deflection Head Track with hem	
S510	150mm (w) x 50mm (h) Slotted Deflection Head Track with hem	0.75



S497 / S498
S499 / S510

SLOTTED DEFLECTION HEAD TRACK – HEAVY GAUGE

S663	64mm (w) x 50mm (h) Slotted Deflection Head Track	1.15
S673	76mm (w) x 50mm (h) Slotted Deflection Head Track	
S683	92mm (w) x 50mm (h) Slotted Deflection Head Track	
S690	150mm (w) x 50mm (h) Slotted Deflection Head Track	



S663 / S673
S683 / S690

NOGGINGS

214	64mm Double Punch Nogging Track	0.70
215	76mm Double Punch Nogging Track	
216	92mm Double Punch Nogging Track	
217	150mm Double Punch Nogging Track	0.75
222	FAST-FIX Nogging®	0.70
501	Continuous Nogging Bracket	0.75
503	51mm (w) Nogging track	0.70
504	64mm (w) Nogging track	
505	76mm (w) Nogging track	
506	92mm (w) Nogging track	
507	150mm (w) Nogging track	0.75



222



501



214 / 215 / 216 / 217
503 / 504 / 505
506 / 507

C2.3 PRODUCT DATA

PROPERTIES OF STEEL

Refer to Section A6.3 for the properties of the steel used for the design of the roll formed Stud and Track components.

C2.3.1 WALL STUDS

MATERIAL SPECIFICATIONS:

Steel Grade: G250

Yield strength: $F_y = 250\text{MPa}$

Coating Grade: Z275 - 275g/m² zinc

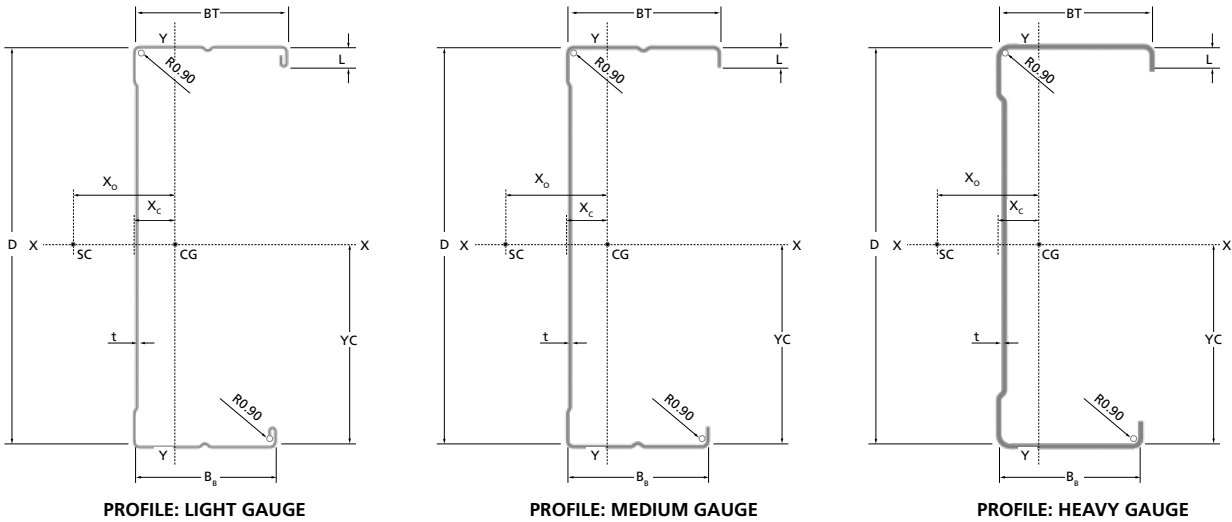


FIGURE C2.3.1(A) : WALL STUD PROFILES

TABLE C2.3.1(A): LIGHT GAUGE WALL STUD SECTION PROPERTIES

PART NO.	DIMENSIONS				CENTROID		SHEAR CENTRE	AREA	MOMENT OF INERTIA			SECTION MODULUS		TORSION CONSTANT	WARPING CONSTANT	WEIGHT
	D	B _b	BT	L	t	X _c	Y _c	X _o	A _g	I _{xx}	I _{yy}	Z _{xx}	Z _{yy}	J	I _w	SW
	mm	mm	mm	mm	mm	mm	mm	mm	mm ²	10 ³ mm ⁴	10 ³ mm ⁴	mm ³	mm ³	mm ⁴	10 ⁶ mm ⁶	kg/m
W550	50.8	32.8	35.4	5.00	0.50	11.87	25.64	-28.5	66.0	29.98	10.50	1160	461	5.503	5.589	0.550
112	63.5	32.8	35.4	5.00	0.50	10.83	32.07	-26.7	72.4	49.48	11.32	1533	475	6.033	8.954	0.600
403	76.2	32.8	35.4	5.00	0.55	9.91	38.45	-24.9	86.3	81.87	13.09	2116	530	8.705	14.474	0.717
251	92.1	32.8	35.4	5.00	0.55	9.00	46.46	-23.2	95.1	126.48	13.87	2708	542	9.587	22.047	0.792

TABLE 2.3.1(B): MEDIUM GAUGE WALL STUD SECTION PROPERTIES

489	50.8	32.8	35.4	5.00	0.75	10.78	25.55	-26.0	93.5	41.86	13.46	1618	567	17.530	6.602	0.780
491	63.5	32.8	35.4	5.00	0.75	9.79	31.97	-24.2	103.0	69.24	14.46	2143	585	19.318	10.797	0.892
493	76.2	32.8	35.4	5.00	0.75	8.95	38.42	-22.7	112.4	104.75	15.29	2703	598	21.079	16.263	0.967
495	92.1	32.8	35.4	5.00	0.75	8.10	46.39	-21.1	124.5	162.45	16.16	3476	612	23.338	24.988	1.063
511	150	33.4	36.0	6.40	0.75	6.00	75.49	-16.9	167.9	516.14	18.27	6851	641	31.478	76.486	1.372

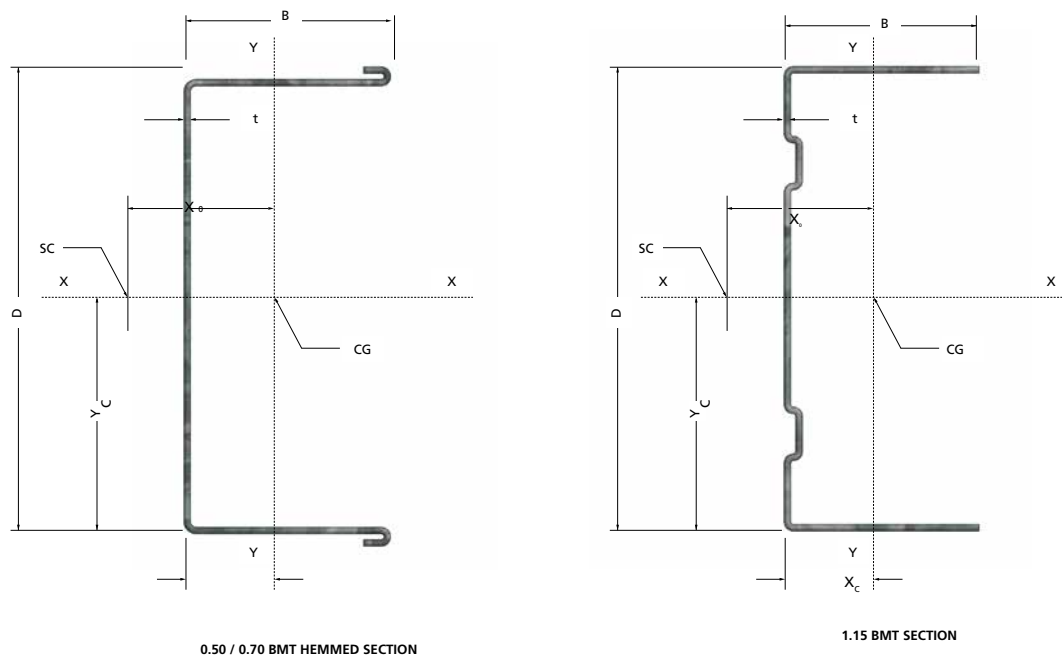
TABLE 2.3.1(C): HEAVY GAUGE WALL STUD SECTION PROPERTIES

661	63.5	33.4	36.0	6.40	1.15	9.63	31.76	-24.6	158.4	104.44	22.80	3234	929	69.833	17.931	1.256
671	76.2	33.4	36.0	6.40	1.15	8.82	38.17	-22.9	173.0	158.87	24.04	4104	949	76.272	26.800	1.375
681	92.1	33.4	36.0	6.40	1.15	7.98	46.19	-21.2	191.3	246.81	25.33	5282	967	84.332	40.919	1.522
691	150	33.4	36.0	6.40	1.15	5.92	75.29	-16.8	257.9	788.60	28.47	10399	1009	113.685	123.24	2.063

NOTES:

- The above table lists the gross section properties calculated in accordance with AS/NZS4600, using the accurate method with all elements including flats and bends located on the centre-line.
- Product dimensions are the nominal sizes based on total coated thickness (TCT).
- Section properties (X_c to I_w) are calculated using base metal thickness (BMT).
- Section modulus is the minimum value, for both the major and minor axes.
- Moment of inertia and Section Modulus is about the rectangular axis as applicable.
- X_c taken from web centreline.
- For effective width calculations, the effective section properties are to be calculated in accordance with AS/NZS4600.

C2.3.2 WALL TRACKS



■ FIGURE C2.3.2(A): WALL STUD PROFILES

■ TABLE C2.3.2(A): LIGHT GAUGE WALL TRACK SECTION PROPERTIES

PART NO.	DIMENSIONS			CENTROID		SHEAR CENTRE	AREA	MOMENT OF INERTIA		SECTION MODULUS		TORSION CONSTANT	WARPING CONSTANT	WEIGHT
	D	B	T	X_c	Y_c	X_o		I_{xx}	I_{yy}	Z_{xx}	Z_{yy}			
	mm	mm	mm	mm	mm	mm	mm^2	$10^3 mm^4$	$10^3 mm^4$	mm^3	mm^3	mm^4	$10^6 mm^6$	kg/m
400	52.5	29.0	0.50	8.97	26.00	-21.76	58.47	26.712	6.168	1018	312	4.873	2.894	0.480
111	65.2	29.0		8.09	32.35	-20.22	64.82	43.897	6.628	1347	321	5.402	4.804	0.533
402	77.9	29.0		7.37	38.70	-18.92	71.17	66.310	7.007	1703	328	5.931	7.300	0.587
250	93.8	29.0		6.63	46.65	-17.53	79.12	102.523	7.395	2187	335	6.594	11.309	0.650

■ TABLE C2.3.2(B): MEDIUM GAUGE WALL TRACK SECTION PROPERTIES

490	53.1	29.0	0.70	8.79	26.55	-21.35	81.40	37.50	8.41	1413	424	13.30	3.977	0.700
492	65.8	29.0		7.92	32.90	-19.85	90.29	61.49	9.03	1870	436	14.75	6.591	0.730
494	78.5	29.0		7.21	39.25	-18.56	99.18	92.76	9.54	2365	446	16.20	10.004	0.803
496	94.4	29.0		6.48	47.20	-17.19	110.31	143.28	10.06	3037	455	18.02	15.481	0.893

■ TABLE C2.3.2(C): HEAVY GAUGE WALL TRACK SECTION PROPERTIES

660	65.9	32.0	1.15	7.87	32.70	-19.46	146.04	98.40	14.70	2988	625	64.38	10.639	1.153
670	78.6	32.0		7.16	39.05	-18.22	160.64	148.62	15.52	3784	640	70.82	16.149	1.273
680	94.5	32.0		6.42	47.00	-16.90	178.93	229.91	16.36	4868	655	78.88	24.994	1.433

NOTES:

1. Section properties are based on gross section only.
2. The specified yield strength has been determined in accordance with AS/NZS4600 Clause 8.1.1
3. Section modulus is the minimum value, for both the major and minor axes
4. Moment of inertia and Section Modulus is about the rectangular axis as applicable.

C2.3.3 DEFLECTION HEAD TRACKS

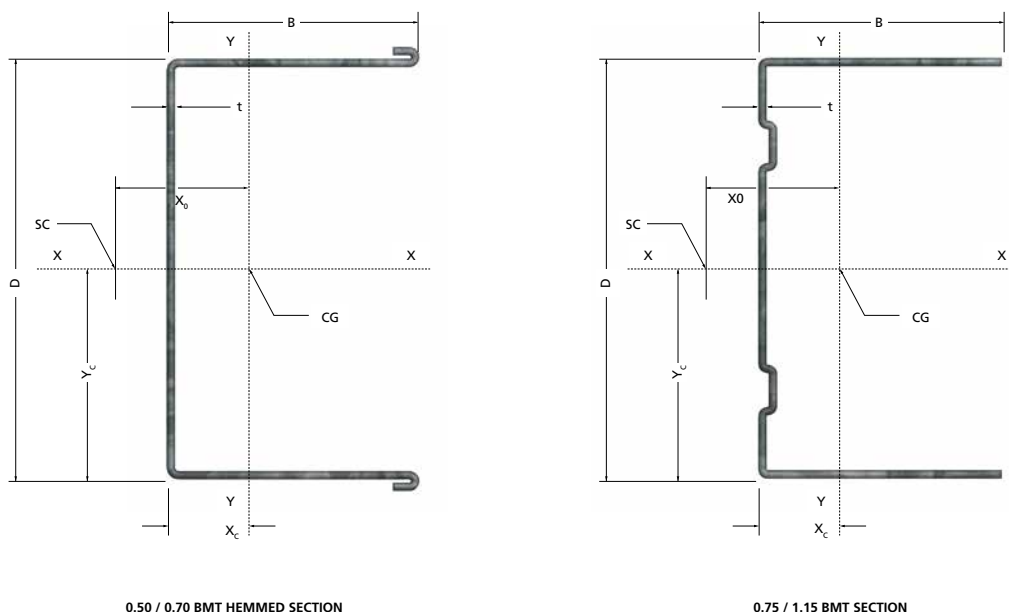


FIGURE C2.3.3(A): DEFLECTION HEAD TRACKS

TABLE C2.3.3(A): LIGHT GAUGE DEFLECTION HEAD TRACK SECTION PROPERTIES

PART NO.	DIMENSIONS					GROSS AREA A_g mm ²	MOMENT OF INERTIA		SECTION MODULUS		TORSION CONSTANT J mm ⁴	WARPING CONSTANT I_w 10 ⁶ mm ⁶	WEIGHT SW kg/m
	D	B	T	X_c	Y_c		I_{xx}	I_{yy}	Z_{xx}	Z_{yy}			
	mm	mm	mm	mm	mm		10 ³ mm ⁴	10 ³ mm ⁴	mm ³	mm ³			
479	52.50	45.6	0.50	16.04	26.00	74.91	36.01	19.30	1373	659	6.24	9.660	0.633
480	65.20	45.6		14.79	32.60	81.26	58.82	20.81	1805	682	6.77	15.732	0.686
482	77.90	45.6		13.72	38.95	87.61	88.19	22.09	2265	699	7.30	23.605	0.740
483	93.80	45.6		12.57	46.90	95.56	134.98	23.47	2879	717	7.96	36.196	0.807

TABLE C2.3.3(B): MEDIUM GAUGE DEFLECTION HEAD TRACK SECTION PROPERTIES

488	53.10	45.6	0.70	15.88	26.30	104.68	51.01	25.53	1923	910	17.10	13.536	0.866
497	65.80	45.6		14.57	32.65	113.57	83.07	28.75	2526	941	18.55	21.982	0.940
498	78.50	45.6		13.58	39.00	122.46	124.28	30.52	3168	965	20.00	32.918	1.013
499	94.40	45.6		12.45	46.95	133.59	189.89	32.40	4025	989	21.82	50.389	1.105
510	152.40	50.0	0.75	9.88	75.83	187.79	636.64	42.69	8357	1075	35.21	174.596	1.549

TABLE C2.3.2(C): HEAVY GAUGE WALL TRACK SECTION PROPERTIES

663	65.90	50.0	1.15	15.06	32.70	187.44	140.00	49.94	4251	1454	82.63	36.839	1.520
673	78.60	50.0		13.97	39.05	202.05	208.56	53.01	5310	1496	89.07	55.498	1.638
683	94.50	50.0		12.81	47.00	220.33	317.51	56.28	6723	1538	97.13	85.390	1.787
690	152.40	50.0		9.84	75.95	286.92	966.81	64.67	12691	1634	126.48	262.819	2.327

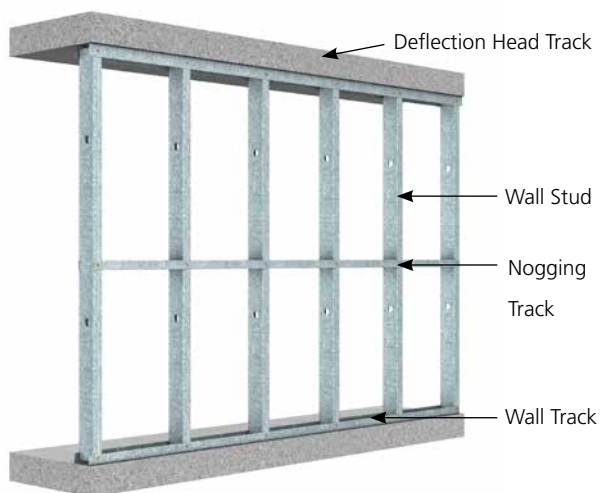
NOTES:

1. Section properties are based on gross section only.
2. The specified yield strength has been determined in accordance with AS/NZS4600 Clause 8.1.1
3. Section modulus is the minimum value, for both the major and minor axes
4. Moment of inertia and Section Modulus is about the rectangular axis as applicable.

C2.4 STANDARD INTERNAL WALLS

C2.4.1 INTERNAL STUD WALL FRAMING

Figure C2.4.1(A) provides a simple overview of a typical non-load bearing wall application, and identifies the common components, namely base track, wall studs, noggings and head tracks.



■ FIGURE C2.4.1(A): TYPICAL NON-LOAD BEARING INTERNAL WALL

C2.4.1.1 WALL TRACKS



■ FIGURE C2.4.1.1(A): WALL TRACK

Wall tracks are a “C” section which provide a friction fit for the wall studs. Wall tracks have a shorter flange than a deflection head track and are typically used at the base of the wall and in some instances where head connections do not need to accommodate significant deflection. There is no requirement to isolate the track sections from slabs, unless specifically stated.

Wall 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 track sections.

C2.4.1.2 DEFLECTION HEAD TRACKS



■ FIGURE C2.4.1.2(A): DEFLECTION HEAD TRACK

Deflection head track is similar section as wall track with deeper flanges. Deeper flanges allow the wall stud to be terminated with a gap to the slab above while still supporting it in place. This gap allows the structure above to deflect without transferring axial load to the wall studs.

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:

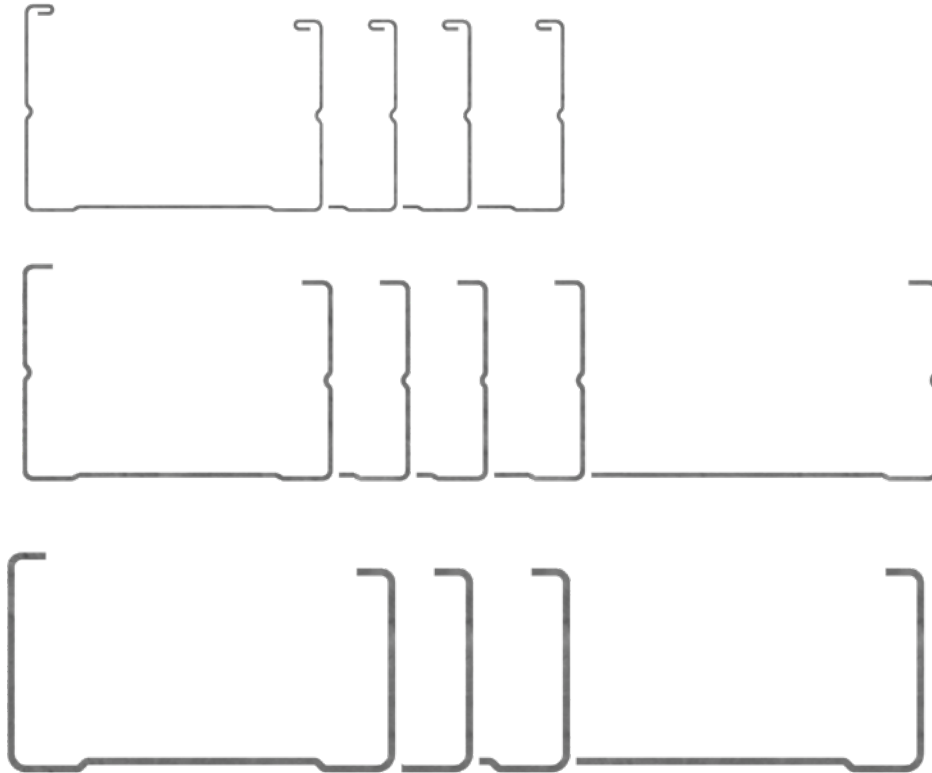
Where the steelwork carries roof or floor loads a deflection head will be required. But deflection head is not required where the steel work is in place only as a lateral support to the stud framing.

When fixing to steel roof framing or purlins, the standard clearance between the top of the stud and the steel is 5mm, which allows 15mm maximum upward movement and 5mm maximum downward movement.

NOTES:

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

C.2.4.1.3 WALL STUDS



■ FIGURE C.2.4.1.3(A): WALL STUD

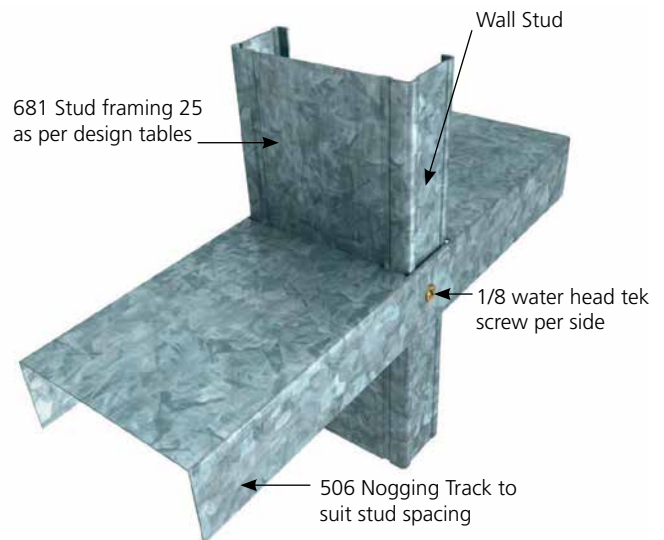
Rondo manufacture lipped C studs in various gauges such as 0.5/0.55 (light gauge), 0.75 (medium gauge) and 1.15 BMT (heavy gauge) for stud depths of 51, 64, 76, 92 and 150mm. The Rondo light and medium gauge studs have standard 25mm bellmouthed service holes. Being bell-mouthed with no protruding sharp edges eliminates the need for fitting grommets for electrical cabling. Punched round holes are processed at designated centres along the 1.15bmt studs.

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 0.5, 0.55 and 0.75bmt studs may be spliced to extend the overall stud length. Studs of 1.15bmt or greater might be spliced back to back. Refer section C2.6.2 for splicing details.

C.2.4.1.4 NOGGINGS

Noggings are required in the stud framing for various reasons but most commonly used to reduce the unrestrained (torsional / flexural-torsional) length of the stud wall. The greater the unrestrained length, the less efficient the wall design becomes. Rondo provide a wide range of



■ FIGURE C.2.4.1.4(A): NOGGINGS

nogging tracks to the market and each of them having been designed to suit a specific application. The Rondo nogging track is produced in 0.70 bmt to suit all stud sizes, 0.75 bmt to suit 150mm and in 0.50 bmt in snap-lock application for quicker installation. Noggings selection and design are further discussed on page 14.

C2.4.2 MAXIMUM WALL HEIGHT TABLES

C2.4.2.1 DESIGN ASSUMPTIONS

The information herein has been prepared based on the following general design assumptions:

TRACKS GENERALLY

Wall and deflection head tracks are to be secured in place in accordance with the details on page 50 section C2.4.4 In locations of slab edges, set downs or similar, the maximum wall track or deflection head track unsupported overhang is not to exceed $D/6$, where D is the nominal stud depth as follows:

■ TABLE C2.4.2.1(A): MAXIMUM TRACK OVERHANG

NOMINAL STUD DEPTH (D) (mm)	MAXIMUM TRACK OVERHANG (mm)
51	8
64	10
76	12
92	15
150	25

Track fastener edge distances are to be maintained to the slab edge, set down or similar.

There are no additional actions, other than the wall stud actions, applied to the wall tracks at any location. These loading scenarios require independent design evaluation.

WALL TRACKS

The wall track gauge should be selected, as a minimum, to match the same gauge as the wall studs derived from the maximum wall height design tables, as follows:

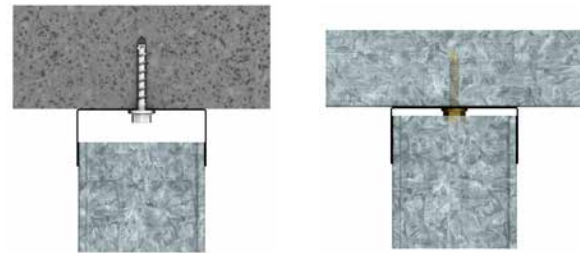
■ TABLE C2.4.2.1(B): WALL TRACK GAUGE

WALL STUD GAUGE (bmt)	WALL TRACK GAUGE (bmt)
0.50 / 0.55	0.50
0.75	0.70 / 0.75
1.15	1.15

The design tables have been prepared based on securing of the wall tracks to the structure at no more than 600mm spacing. Refer to Rondo for clarification where this is not the case.

Refer to Table C2.4.2.2(A) and (B) notes for Deflection Head Track requirements along with ceiling fixing limitations.

Deflection head track should be used for all slab to slab construction. Check deflection head tracks for vertical movement allowances per the following figure.



■ FIGURE C2.4.2.1(A): HEAD TRACK FIXING TO CONCRETE AND METAL DECK ROOF

Refer to Table C2.4.2.2(A) and (B) notes for Deflection Head Track requirements along with ceiling fixing limitations. Deflection head tracks installed to the underside of metal deck roofs require provision for roof uplift or downward deflection. Rondo recommends the head track be installed in accordance with Figure C2.4.2.1(A), which accommodates vertical building movement per Table A6.1.2(A).

Refer to Rondo for further design consideration if the expected building movements are outside of these limits.

Where the roof purlins are installed at up to 1200mm centres the deflection head track may be used to bridge the gap within the following limitations:

■ TABLE C2.4.2.1(C): DEFLECTION HEAD TRACK BRIDGING

DEFLECTION HEAD TRACK GAUGE (bmt)	WALL HEIGHT (mm)	MAXIMUM DESIGN PRESSURE (kPa)
64 x 0.70mm	2400	0.375
92 x 0.70mm	3000	0.40
	3300	0.375
150 x 0.75mm	3000	0.80
	4000	0.60
	5000	0.45
64 x 1.15mm	3000	0.90
	4000	0.65
92 x 1.15mm	3000	1.35
	4000	1.00
	5000	0.80
150 x 1.15mm	4500	1.50
	5000	1.35
	6000	1.10

0.50bmt Deflection Head Tracks are not to be used for bridging between roof purlins.

Where the purlins spacing exceeds 1200mm refer to Rondo for design solution.

Head track bridging to purlins shall not be utilised for fire-rated walls.

WALL STUDS

The information herein has been prepared based on the following assumptions:

Walls lined one side have been checked for the unrestrained flange in compression. Accordingly, the pressures nominated may be taken as positive or negative.

Cutting, notching, drilling of holes or similar are not permitted unless in accordance with the Section 2.6 : Additional Details.

Splicing of wall studs is not permitted within 25 – 75% of the wall height. Outside of this area, the studs may be spliced in accordance with the Section 2.6 : Additional Details.

If splicing of the wall studs within the mid 50% of the wall height is required, refer to Rondo for a specific design.

Head and base track connections have been treated as pin joints with torsional restraint of the wall studs. This assumption is based on the following:

1. Screw fasteners are installed in accordance with the installation details herein.
2. Noggings are installed in accordance with the installation details herein.
3. Where linings are nominated, they are installed in accordance with the manufacturers recommendations over the full height of the studs.

Unless noted otherwise for example, ceiling loads transferred to walls under seismic actions in wall height tables. There are no point loads, concentrated loads or the like applied to the wall studs at any locations. These loading scenarios require independent design evaluation.

Services such as electrical cabling, plumbing or the like, installed within the wall cavity, are to be adequately restrained and isolated from the steel studs using grommets or similar approved.

Axial loading of the studs, other than self-weight plus linings, has not been considered unless noted otherwise.

NOGGINGS

The information herein has been prepared based on the following assumptions:

Noggings specified herein have been checked in accordance with AS/NZS4600 to provide lateral restraint to the wall studs only.

The use of noggings for standing on, using as a tread for accessing a roof space or the like is not permitted and has not been considered.

Rondo recommends a horizontal noggings at all fibre cement sheet joints for tiled walls.

The maximum wall height tables have been prepared assuming noggings have been installed in accordance with the following tables:

■ TABLE C2.4.2.1(D): NOGGINGS – WALLS LINED BOTH SIDES

WALL HEIGHT (mm)	NO OF ROWS OF NOGGING(S)
0 - 4400	0
> 4400 - 8000	1
> 8000	2

The nominated maximum wall heights are an empirical derivation based on experience.

In some instances, installing noggings at lower wall heights may assist in fitting the wall linings.

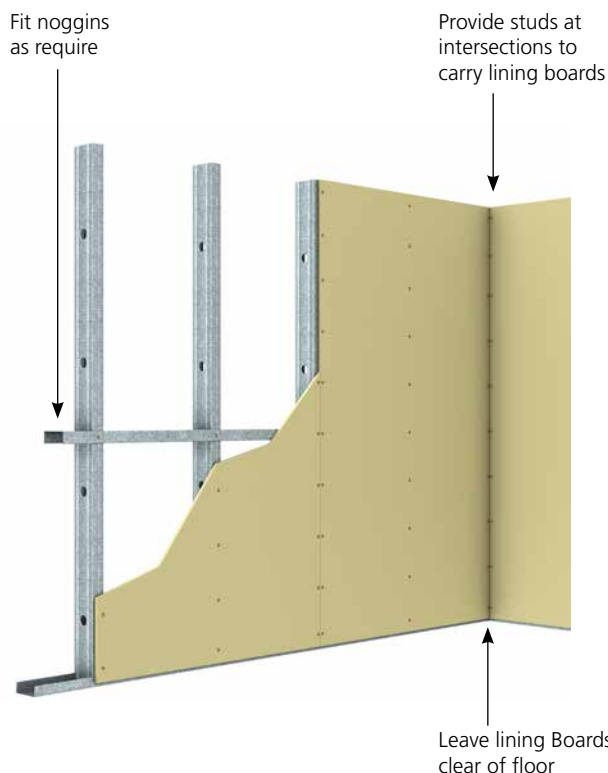
■ TABLE C2.4.2.1(E): NOGGINGS – WALLS LINED ONE SIDE

WALL HEIGHT (mm)	NO OF ROWS OF NOGGING(S)
0 - 3000	1
> 3000 - 6000	2
> 6000 – 8000	3
8000 +	4

The above recommended noggings requirements do not include the noggings at the deflection head track, which is therefore additional to the above requirements and is provided for torsional restraint at the connection.

The nominated maximum wall height is generally based on a slenderness ratio (L / r_y) of 300, across all the Rondo stud sections.

The above noggings requirements do not preclude the possibility that a more efficient design could be achieved using more or less noggings.



■ FIGURE C2.4.1.4(B) NOGGINGS

NOTES:
Head and base track specific installation details should be checked with the Rondo Professional Series and/or the lining board manufacturer's published data.

For use of Rondo FAST-FIX® the two methods of fixing can be used, see FIGURE C2.7.1(A) and (B). For when a method can be used see table C2.4.2.1(G).

■ TABLE C2.4.2.1(F): NOGGINGS – WALLS LINED ONE SIDE

WALL TYPE	TAB/FACE-FIX X 3 SCREWS	SCREWS FACE-FIX X 2 SCREWS
LINED BOTH SIDES: FULL HEIGHT (all stud types)	✓	✓
LINED ONE SIDE: FULL HEIGHT* (all stud types)	✓	✓
PARTIALLY LINED BOTH SIDES (all stud types)	✓	✗
STAGGERED STUD WALLS	✓	✗
QUIET STUD WALLS	✓	✗

C2.4.2.2 MAXIMUM WALL HEIGHT TABLES

TABLE C2.4.2.2(A): REGION NZ1-NZ3 - H/200 - SEISMIC Fph = 1.30xWp - NO FIXED CEILINGS

Wult (kPa)		REGION NZ1 to NZ3 DEFLECTION LIMIT H/200 Fph:1.3xWp													
		STUD WIDTH		64mm			76mm			92mm			150mm		
		BMT		0.50	0.75	1.15	0.55	0.75	1.15	0.55	0.75	1.15	0.75	1.15	
LINING CONFIG.	Total Lining Mass (kg/m ²)														
0.375	PLASTERBOARD		SINGLE STUD @ 600mm CENTRES												
	LINED BOTH SIDES	14.00	2780	3500	4175	3260	3885	4640	3620	4340	5070	5655	7000		
		23.00	2755	3475	4435	3235	3855	5225	3590	4310	5745	5605	7295		
		30.60	2660	3335	4525	3110	3690	5045	3445	4110	5645	5300	7405		
		46.00	2175	2740	3750	2545	3030	4185	2820	3380	4680	4360	6150		
	LINED ONE SIDE	11.50	2765	3200	3595	3270	3775	4080	3630	4170	4725	5665	6810		
		15.30	2775	3225	3610	3255	3825	4080	3615	4180	4725	5640	6810		
		23.00	2755	3325	3640	3230	3850	4080	3585	4195	4725	5600	6810		
	PLASTERBOARD		SINGLE STUD @ 400mm CENTRES												
	LINED BOTH SIDES	14.00	3405	4250	4605	3995	4750	5260	4435	5310	5855	6920	7740		
		23.00	3375	4245	4820	3960	4710	5735	4400	5265	6340	6865	7960		
		30.60	3235	4030	4950	3775	4460	5955	4180	4970	6480	6390	8060		
46.00		2655	3330	4520	3105	3685	5040	3440	4110	5640	4800	7395			
LINED ONE SIDE	11.50	3165	3645	4120	3805	4290	4670	4330	4795	5410	6780	7535			
	15.30	3210	3675	4140	3820	4345	4670	4330	4815	5410	6780	7535			
	23.00	3165	3785	4200	3820	4520	4670	4330	4880	5410	6780	7535			
PLASTERBOARD		SINGLE STUD @ 300mm CENTRES													
LINED BOTH SIDES	14.00	3930	4525	4950	4560	5275	5705	5120	5895	6345	7600	8300			
	23.00	3895	4745	5135	4570	5425	6125	5075	6065	6725	7815	8470			
	30.60	3700	4595	5285	4320	5085	6310	4780	5655	6870	7250	8565			
	46.00	3050	3815	5140	3565	4220	5735	3950	4285	6415	4690	8385			
LINED ONE SIDE	11.50	3485	3995	4530	4205	4695	5140	4765	5275	5980	7285	8100			
	15.30	3540	4025	4550	4225	4750	5140	4765	5300	5985	7285	8100			
	23.00	3485	4135	4620	4275	4935	5140	4765	5390	6005	7285	8100			
PLASTERBOARD		SINGLE STUD @ 600mm CENTRES													
LINED BOTH SIDES	14.00	2415	3045	3815	2835	3375	4145	3145	3770	4520	4910	6455			
	23.00	2400	3025	4065	2815	3355	4660	3125	3750	5140	4875	6745			
	30.60	2385	3015	4080	2795	3340	4630	3105	3730	5200	4850	6835			
	46.00	2175	2740	3750	2545	3030	4185	2820	3380	4680	4360	6150			
LINED ONE SIDE	11.50	2420	2920	3290	2840	3380	3785	3155	3775	4380	4920	6340			
	15.30	2415	2930	3290	2830	3370	3785	3145	3765	4380	4905	6340			
	23.00	2400	2975	3290	2810	3355	3785	3120	3745	4380	4875	6340			
PLASTERBOARD		SINGLE STUD @ 400mm CENTRES													
LINED BOTH SIDES	14.00	2960	3725	4230	3470	4130	4735	3855	4620	5250	6015	7170			
	23.00	2940	3700	4435	3450	4110	5205	3830	4590	5785	5980	7380			
	30.60	2925	3685	4510	3430	4090	5380	3810	4570	5930	5945	7465			
	46.00	2655	3330	4520	3105	3685	5040	3440	4110	5640	4800	7395			
LINED ONE SIDE	11.50	2935	3345	3780	3470	3910	4330	3865	4365	5015	6025	7015			
	15.30	2935	3365	3785	3465	3945	4330	3850	4370	5015	6005	7015			
	23.00	2935	3430	3800	3445	4055	4330	3830	4370	5015	5975	7015			
PLASTERBOARD		SINGLE STUD @ 300mm CENTRES													
LINED BOTH SIDES	14.00	3420	4165	4560	4005	4765	5180	4450	5275	5795	6055	7695			
	23.00	3395	4270	4740	3980	4735	5590	4425	5295	6205	6055	7865			
	30.60	3375	4245	4835	3960	4710	5770	4400	5265	6325	6865	7945			
	46.00	3050	3815	5140	3565	4220	5735	3950	4285	6415	4690	8215			
LINED ONE SIDE	11.50	3230	3680	4170	3820	4300	4765	4420	4835	5520	6055	7535			
	15.30	3235	3700	4180	3820	4335	4765	4420	4840	5520	6730	7535			
	23.00	3230	3770	4205	3820	4460	4765	4420	4865	5520	6055	7535			

NOTES TO MAXIMUM WALL HEIGHT TABLE C2.4.2.2(A) – NO FIXED CEILINGS TO WALLS

1. The Maximum Wall Height presented is the lower wall height from an Ultimate and Serviceability Limit State analysis as nominated below, it considers both Wind and Seismic design actions and covers buildings up to Importance level 3.
2. The wind pressure nominated on the Maximum Wall Height Tables (Wult) is an Ultimate Limit State design pressure. Rondo recommends the project specific internal design pressure (p_i) be determined in accordance with Rondo Professional Series C1: Wall Design Data and AS/NZS 1170.2. Refer to the Maximum Wall Height Table with a design pressure greater than that calculated.
3. Horizontal Seismic action (F_{ph}) is nominated as a multiple of the weight of the part (W_p) under an earthquake. The Maximum Wall Height Table is suitable for project specific applications up to a ULS, $F_{ph} = 1.3 \times W_p$.
4. Deflection has been checked as follows:
 - a. span/240 to a maximum of 30mm at a Serviceability pressure of 0.25kPa
 - b. span/200 or span/360, as nominated, at a Serviceability Pressure calculated in accordance with AS/NZS 1170.2:2011
5. 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 specification.
6. Imposed loads:
 - a. imposed axial loads have not been considered in the tables, but self-weight has been included in combination with the nominated lateral design actions
 - b. shelf loading has not been considered
 - c. FF&E, eccentric or loading other than the nominated wind and seismic pressure has not been considered and requires a specific design to be completed based on the actual imposed loads
7. The wall design tables are not applicable for external applications.
8. All Load combinations in accordance with AS/NZS 1170.0.
9. Walls analysed in accordance with AS/NZS 4600.
10. Noggings in accordance with the details provided on page 14 and Rondo Professional Series C3: Noggings.
11. BMT = Base Metal Thickness.
12. Wall track gauge in accordance with Table C2.4.2.1(B)

13. Head tracks, unless noted otherwise, are assumed to be deflection heads with 20mm maximum clearance. Maximum Wall Height Table C2.4.2.2(A) is based on the head track gauge as per the following table:

STUD BMT	DEFLECTION HEAD TRACK BMT
0.50 / 0.55 / 0.75	0.70
1.15	1.15

14. The above head track gauge may not necessarily provide the maximum allowable wall height.

Seismic considerations:

15. Seismic design actions have been determined and considered in accordance with NZS 1170.5 for the nominated lining and dead weight of the wall framing.
16. Maximum Wall Height Table C2.4.2.2(A) does not consider lateral seismic loads from ceilings fixed to the wall. For walls with ceilings perimeter fixed to them refer to Table C2.4.2.2(B) below.

TABLE C2.4.2.2(B): REGION NZ1-NZ3 - H/200 - SEISMIC Fph = 1.30xWp - FIXED CEILING'S CONSIDERED

Wult (kPa)		REGION NZ1 to NZ3											DEFLECTION LIMIT H/200 Fph:1.3xWp				
		STUD WIDTH		64mm			76mm			92mm			150mm				
		BMT		0.50	0.75	1.15	0.55	0.75	1.15	0.55	0.75	1.15	0.75	1.15			
LINING CONFIG.	Total Lining Mass (kg/m ²)																
0.375	PLASTERBOARD		SINGLE STUD @ 600mm CENTRES														
	LINED BOTH SIDES	14.00	2665	2870	3425	2800	2995	3770	2910	3180	4285	3950	6775				
		23.00	2305	2785	3285	2710	2915	3560	2830	3080	3955	3695	5750				
		30.60	2090	2700	3190	2625	2830	3435	2740	2995	3770	3545	5230				
		46.00	1795	2355	3005	2165	2660	3230	2445	2815	3510	3325	4590				
	LINED ONE SIDE	11.50	2685	2885	3475	2815	3020	3850	2930	3215	4405	2495	6810				
		15.30	2650	2860	3400	2790	2985	3735	2900	3165	4225	3905	6570				
		23.00	1695	1670	3285	1685	1660	3560	1675	1650	3955	1610	5740				
	PLASTERBOARD		SINGLE STUD @ 400mm CENTRES														
	LINED BOTH SIDES	14.00	2840	3155	4140	3040	3375	4780	3225	3700	5740	5135	7740				
		23.00	2755	3055	3850	2955	3240	4340	3115	3505	5040	4590	7960				
		30.60	2670	2970	3680	2870	3150	4090	3030	3385	4670	4295	7095				
46.00		2280	2795	3445	2695	2970	3760	2850	3185	4190	3905	5960					
LINED ONE SIDE	11.50	2855	3185	4120	3065	3420	4670	3260	3770	5410	5355	7535					
	15.30	2830	3135	4085	3025	3350	4670	3205	3665	5410	5035	7535					
	23.00	1660	3055	3845	1645	2495	4335	1630	2405	5035	4585	7535					
PLASTERBOARD		SINGLE STUD @ 300mm CENTRES															
LINED BOTH SIDES	14.00	3015	3470	4950	3300	3805	5705	3580	4310	6345	6535	8300					
	23.00	2930	3320	4480	3180	3590	5200	3410	3980	6220	5605	8470					
	30.60	2845	3225	4215	3095	3460	4810	3300	3790	5640	5125	8565					
	46.00	2670	3040	3855	2910	3255	4305	3110	3530	4915	4520	7240					
LINED ONE SIDE	11.50	2495	3525	4530	3345	3885	5140	3640	4435	5980	6910	8100					
	15.30	3000	3445	4550	3280	3770	5140	3550	4250	5985	6350	8100					
	23.00	1630	3320	4475	2495	3590	5140	2310	3980	6005	5600	8100					
0.50	PLASTERBOARD		SINGLE STUD @ 600mm CENTRES														
	LINED BOTH SIDES	14.00	2415	2870	3425	2800	2995	3770	2910	3180	4285	3950	6455				
		23.00	2305	2785	3285	2710	2915	3560	2830	3080	3955	3695	5750				
		30.60	2090	2700	3190	2625	2830	3435	2740	2995	3770	3545	5230				
		46.00	1795	2355	3005	2165	2660	3230	2445	2815	3510	3325	4590				
	LINED ONE SIDE	11.50	2420	2885	3290	2815	3020	3785	2930	3215	4380	2495	6340				
		15.30	2415	2860	3290	2790	2985	3735	2900	3165	4225	3905	6340				
		23.00	1695	1670	3285	1685	1660	3560	1675	1650	3955	1610	5740				
	PLASTERBOARD		SINGLE STUD @ 400mm CENTRES														
	LINED BOTH SIDES	14.00	2840	3155	4140	3040	3375	4735	3225	3700	5250	5135	7170				
		23.00	2755	3055	3850	2955	3240	4340	3115	3505	5040	4590	7380				
		30.60	2670	2970	3680	2870	3150	4090	3030	3385	4670	4295	7095				
46.00		2280	2795	3445	2695	2970	3760	2850	3185	4190	3905	5960					
LINED ONE SIDE	11.50	2855	3185	3780	3065	3420	4330	3260	3770	5015	5355	7015					
	15.30	2830	3135	3785	3025	3350	4330	3205	3665	5015	5035	7015					
	23.00	1660	3055	3800	1645	2495	4330	1630	2405	5015	4585	7015					
PLASTERBOARD		SINGLE STUD @ 300mm CENTRES															
LINED BOTH SIDES	14.00	3015	3470	4560	3300	3805	5180	3580	4310	5795	6535	7695					
	23.00	2930	3320	4480	3180	3590	5200	3410	3980	6205	5605	7865					
	30.60	2845	3225	4215	3095	3460	4810	3300	3790	5640	5125	7945					
	46.00	2670	3040	3855	2910	3255	4305	3110	3530	4915	4520	7240					
LINED ONE SIDE	11.50	2495	3525	4170	3345	3885	4765	3640	4435	5520	6780	7535					
	15.30	3000	3445	4180	3280	3770	4765	3550	4250	5520	6350	7535					
	23.00	1630	3320	4205	2495	3590	4765	2310	3980	5520	5600	7535					

NOTES TO MAXIMUM WALL HEIGHT TABLE C2.4.2.2(B) – FIXED CEILINGS CONSIDERED

1. The Maximum Wall Height presented is the lower wall height from an Ultimate and Serviceability Limit State analysis as nominated below, it considers both Wind and Seismic design actions and covers buildings up to Importance level 3.
2. The wind pressure nominated on the Maximum Wall Height Tables (Wult) is an Ultimate Limit State design pressure. Rondo recommends the project specific internal design pressure (p_i) be determined in accordance with Rondo Professional Series C1: Wall Design Data and AS/NZS 1170.2. Refer to the Maximum Wall Height Table with a design pressure greater than that calculated.
3. Horizontal Seismic action (F_{ph}) is nominated as a multiple of the weight of the part (W_p) under an earthquake. The Maximum Wall Height Table is suitable for project specific applications up to a ULS, $F_{ph} = 1.3 \times W_p$.
4. Deflection has been checked as follows:
 - a. span/240 to a maximum of 30mm at a Serviceability pressure of 0.25kPa
 - b. span/200 or span/360, as nominated, at a Serviceability Pressure calculated in accordance with AS/NZS 1170.2:2011
5. 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 specification.
6. Imposed loads:
 - a. imposed axial loads have not been considered in the tables, but self-weight has been included in combination with the nominated lateral design actions
 - b. shelf loading has not been considered
 - c. FF&E, eccentric or loading other than the nominated wind and seismic actions have not been considered and requires a specific design to be completed based on the actual imposed loads
7. The wall design tables are not applicable for external applications.
8. All Load combinations in accordance with AS/NZS 1170.0.
9. Walls analysed in accordance with AS/NZS 4600.
10. Noggings in accordance with the details provided on page 14 and Rondo Professional Series C3: Noggings.
11. BMT = Base Metal Thickness.
12. Wall track gauge in accordance with Table C2.4.2.1(B)
13. Head tracks, unless noted otherwise, are assumed to be deflection heads with 20mm maximum clearance. Deflection Head Track BMT = 1.15mm has been considered for Maximum Wall Height Table C2.4.2.2(B)

Seismic considerations:

14. Seismic design actions have been determined and considered in accordance with NZS 1170.5 for the nominated lining and dead weight of the wall framing.
15. Maximum Wall Height Table C2.4.2.2(B) considers lateral seismic loads from ceilings fixed to the wall in combination with seismic loads mentioned in point 14.
16. When ceilings are attached to the stud walls, for seismic restraint, the ceiling length shall not exceed 10m. Where the ceiling is fixed to both sides of the wall the actual ceiling length is the sum of the ceiling length on either side of the wall and shall be less than 10m.
17. Total ceiling weight including linings, grid, lighting, partitions insulation etc. not to exceed 9.5kg/m²
18. Ceiling fixing height above floor level assumed as follows:

MAX WALL HEIGHT (mm)	CEILING HEIGHT (mm)
< 2400	0.9 x Wall Height
≥ 2400	2400

19. The ceiling attachment shall be in accordance with the Rondo ceiling design.

C2.4.3 DESIGN EXAMPLE

WORKED EXAMPLE:

Consider a residential apartment building located in Auckland.

From the indicative image below, the total building height (h) is assumed to be 15m and the walls we want to design are at reference height (z) = 10m.

Project Location: Auckland (NZ1)

Importance Level: 2

Terrain Category: 3



Step 1: Scope of works

In this example we are going to check the required configuration of internal walls W1, W2 and W3 at a height $z = 10\text{m}$.

The wall configuration needs to be checked for seismic and wind loads.

Majority of the wind load checks in this example (with the exception of Step 4) will consider only a facade leakage case. Dominant opening design case is more complex and should be discussed directly with Rondo to achieve an optimum project specific specification.

In accordance with table C2.4.2.6(A), we have allowed the wall to received a maximum ceiling length for seismic load checking.

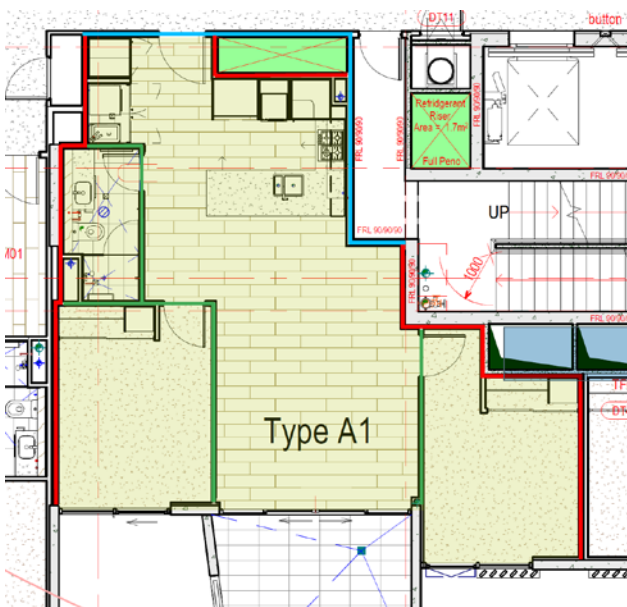


FIGURE C2.4.3(A) WALL LAYOUT

- █ W1 = Pressure sealed Twin Walls with 15.3kg/m² lining on one side.
- █ W2 = Pressure sealed Single skin walls with 15.3kg/m² lining on both sides.
- █ W3 = Non-Pressure sealed Single skin walls with 9kg/m² lining on both sides.

Step 2: Determine the Seismic Action F_{ph} / W_p

Following parameters are given in the above example.

- Floor Height to Check - 10m
- Location - Auckland
- Site sub-soil class - C
- Importance level - 2

From Table A3.5.2(C) the hazard design factor (Z) for Auckland will be 0.13

Then, referring to Figure A3.5.2(C) for IL2, Z=0.13 and site sub soil classification C, F_{ph} / W_p will be 1.0.

Step 3: Determine the appropriate basic pressure

Project Location: Region NZ1

Importance Level: 2

Terrain Category: 3

$z: 10\text{m}$

Using the above variables, refer to Table A3.4.2(A) which is duplicated in part below:

TABLE C2.4.3(A): REGION NZ1 BASIC WIND PRESSURES IL2

REGION NZ1 & NZ2 - BASIC WIND				
FLOOR HEIGHT	IMPORTANCE LEVEL 2			
	TERRAIN CATEGORY			
Z (M)	1	2	2.5	3
10	1.417	1.215	1.028	0.837
20	1.579	1.417	1.239	1.074
30	1.692	1.524	1.365	1.215

At $z = 10\text{m}$:

$p_u = 0.837 \text{ kPa}$

Step 4: Check Wall Type W1

The W1 wall is an inter-tenancy wall and will be:

- fire-rated construction
- 64mm twin stud wall to achieve the discontinuous construction
- Wall height will be floor height minus slab thickness, which is 3000mm
- Linings 1 x 16mm FR plasterboard one side (15.3kg/m²)

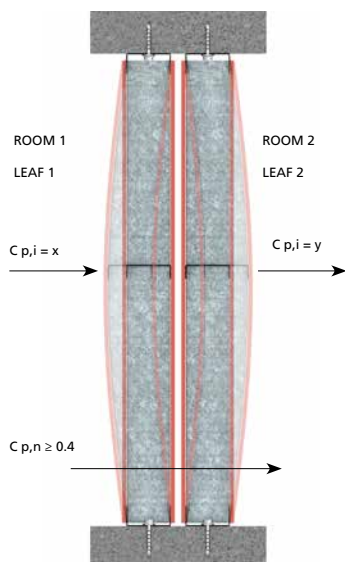


FIGURE C2.4.3(B): PRESSURE SEALED TWIN WALL

For the twin wall system there is no need to consider the pressure on the opposing side of the wall as there is no connectivity between the leaves and therefore no load transfer.

We consider each leaf of the wall separately and design as lined one side stud framing. The pressure is calculated based on the pressure coefficient $C_{p,i,n1}$ acting across on leaf only.

a: Consider façade leakage

With reference to Table A3.4.3.1(A), and assuming a permeable façade, the internal pressure coefficients will be $C_{p,i} = -0.3$ or $+0.2$.

Adopt the largest absolute value for $C_{p,i}$ (which will be 0.3) and consider this to be the net pressure coefficient acting across 'leaf 1' ($C_{p,i,n1}$)

Then using the extract of Table C1.3.3.1(A) below, use $C_{p,n} = 0.3$ the internal design pressures can be determined as follows for $z = 10m$:

TABLE C2.4.3(B): REGION NZ1 INTERNAL PRESSURES IL2 TC3

REGION NZ1 & NZ2 - IMPORTANCE LEVEL				
FLOOR HEIGHT	TERRAIN CATEGORY 3			
	$C_{p,i,N}$			
Z (M)	0.2	0.3	0.4	0.5
10	0.167	0.251	0.335	0.419
20	0.215	0.322	0.429	0.537
30	0.243	0.365	0.486	0.608
40	0.263	0.394	0.526	0.657
50	0.278	0.417	0.556	0.696
60	0.289	0.433	0.577	0.722
70	0.299	0.449	0.599	0.749

TABLE C2.4.3(C): INTERNAL PRESSURES (W1)

WALL TYPE	WALL MARKING	$p_{i,u}$ (kPa)
W1 – Pressure sealed twin wall		0.251

NOTES:

1. Internal pressure considering $C_{p,n} = 0.3$ acting across one leaf of the wall.

b: Consider an opening in the facade

There is a balcony and a sliding door to the lounge room, accordingly the internal pressures resulting from the opening needs to be considered as follows:

With reference to Table A3.4.3.1(B), and estimating an opening ratio of 6 or more, the internal pressure coefficients will be $C_{p,i} = K_a K_l C_{p,e}$

For this example, the apartment is located in the centre of the building elevation and away from corner zones of the building.

This then directs us to Table A3.4.3.2(A), for the windward wall case, where $C_{p,e} = +0.8$.

Considering opening is located in general zone of the building, $K_l = 1.5$ and K_a is adopted as 1.0.

Using the basic pressure from Step 3 the internal pressure can be calculated in accordance with A3.4.3.1 as follows:

$$p_{i,u1} = P_u C_{p,i} K_{c,i} K_v$$

$$p_{i,u1} = P_u (K_a K_l C_{p,e}) K_{c,i} K_v$$

$$p_{i,u1} = 0.837 (1.0 \times 1.5 \times 0.8) 1.0 \times 1.085 = 1.08 \text{ kPa}$$

Where: $K_{c,i} = 1.0$ (for twin walls) $K_v = 1.085$ (Large opening leading into small volume)

It is assumed that openings may be left open during wind speeds not exceeding a return period (R) of 1 years. Accordingly, the internal design pressure can be reduced as follows:

$$P_{i,u2} = p_{i,u1} \times (V_{R2} / V_{R1})^2$$

$$= 1.08 \times (31/45)^2$$

$$= 0.51 \text{ kPa}$$

Note: The value for V_{R2} is subjective and can be rationalised for project specific applications. Contact Rondo for value analysis.

TABLE C2.4.3(D): INTERNAL PRESSURES (W1)

WALL TYPE	WALL MARKING	$p_{i,u}$ (kPa)
W1 – Pressure sealed twin wall		0.51

c: Check AS/NZS1170.2 Clause 5.3.3

The twin wall is assumed to provide an effective seal between two spaces and as such must consider a net pressure coefficient $C_{pi,n}$ across both leaves greater than or equal to 0.4. Therefore the minimum requirement for $C_{pi,n1}$ will be $0.4 / 2 = 0.2$. The net pressure coefficient used in a) and b) are both greater than 0.2 hence satisfying Clause 5.3.3 of AS/NZS 1170.2

d: Summary internal pressure

The design internal pressure will be the maximum of parts (a), (b) and (c) above, as follows:

■ TABLE C2.4.3(E): SUMMARY INTERNAL PRESSURES (W1)

WALL TYPE	WALL MARKING	$p_{i,u}$ (kPa)
W1 – Pressure sealed twin wall		0.51

Refer to the wall height table corresponding to closest design pressure and seismic action F_{ph}/W_p , typically GREATER than the calculated wind pressure and seismic actions. In this example $W_{ult} = 0.51\text{kPa}$ has been rationalised to the 0.50kPa table.pressure.

e: Summary design - If there are NO ceilings fixed to wall

■ TABLE C2.4.3(F): MAXIMUM WALL HEIGHT 0.50kPa, $F_{ph} = 1.3xW_p$, NO FIXED CEILINGS REGION B1

		REGION NZ1 to NZ3					DEFLECTION LIMIT $H/200$ $F_{ph}:1.3xW_p$						
Wult (kPa)	STUD WIDTH	64mm			76mm			92mm			150mm		
		BMT		0.50	0.75	1.15	0.55	0.75	1.15	0.55	0.75	1.15	0.75
	LINING CONFIG.	Total Lining Mass (kg/m ²)											
0.50	PLASTERBOARD		SINGLE STUD @ 600mm CENTRES										
	LINED BOTH SIDES	14.00	2960	3725	4230	3470	4130	4735	3855	4620	5250	6015	7170
		23.00	2940	3700	4435	3450	4110	5205	3830	4590	5785	5980	7380
		30.60	2925	3685	4510	3430	4090	5380	3810	4570	5930	5945	7465
		46.00	2655	3330	4520	3105	3685	5040	3440	4110	5640	4800	7395
	LINED ONE SIDE	11.50	2935	3345	3780	3470	3910	4330	3865	4365	5015	6025	7015
		15.30	2935	3365	3785	3465	3945	4330	3850	4370	5015	6005	7015
		23.00	2935	3430	3800	3445	4055	4330	3830	4370	5015	5975	7015

Notes:

Check maximum wall height from Table C2.4.2.2(A). $W_{ult} = 0.50\text{kPa}$, $F_{ph} = 1.3xW_p$ which is greater than $1.0xW_p$ required for this example.

With reference to the above table extract the wall design assuming no ceilings are fixed to the wall, is as follows:

- Wall Studs: 64 x 0.75bmt Lipped studs
 - 400mm centres maximum
 - 1 Row of nogging mid wall
 - height (+ 1 row 100mm below head track)
- Head Track: 64 x 50 x 0.70bmt Deflection Head Track
- Base Track: 64 x 28 x 0.70bmt Wall Track
- Wall Height: 3000mm (ok, Max = 3365mm)
- Linings: 1 x 16mm FR plasterboard one side

f: Summary design - If there are FIXED ceilings to wall

TABLE C2.4.3(G) MAXIMUM WALL HEIGHT 0.50kPa, Fph = 1.3xWp, CONSIDERING FIXED CEILINGS

REGION NZ1 to NZ3		DEFLECTION LIMIT H/200 Fph:1.3xWp											
Wult (kPa)	STUD WIDTH		64mm			76mm			92mm			150mm	
	BMT		0.50	0.75	1.15	0.55	0.75	1.15	0.55	0.75	1.15	0.75	1.15
	LINING CONFIG.	Total Lining Mass (kg/m ²)											
0.50	PLASTERBOARD		SINGLE STUD @ 600mm CENTRES										
	LINED BOTH SIDES	14.00	2840	3155	4140	3040	3375	4735	3225	3700	5250	5135	7170
		23.00	2755	3055	3850	2955	3240	4340	3115	3505	5040	4590	7380
		30.60	2670	2970	3680	2870	3150	4090	3030	3385	4670	4295	7095
		46.00	2280	2795	3445	2695	2970	3760	2850	3185	4190	3905	5960
	LINED ONE SIDE	11.50	2855	3185	3780	3065	3420	4330	3260	3770	5015	5355	7015
		15.30	2830	3135	3785	3025	3350	4330	3205	3665	5015	5035	7015
		23.00	1660	3055	3800	1645	2495	4330	1630	2405	5015	4585	7015

From maximum wall height table C2.4.2.2(B) when the wall is required to support a fixed ceiling, for the same configuration above, the maximum wall height achievable is 3135mm.

Therefore, the same configuration can be used with the following changes:

Head Track: 64 x 50 x 1.15mm bmt DHT

Ceiling limitations must be in accordance with Table C2.4.2.2(B) notes.

Step 5: Check Wall Type W2

The W2 wall is a common wall and will be:

- fire-rated construction
- 92mm single skin stud wall
- Wall height 3000mm
- 1 x 16mm FR plasterboard both sides

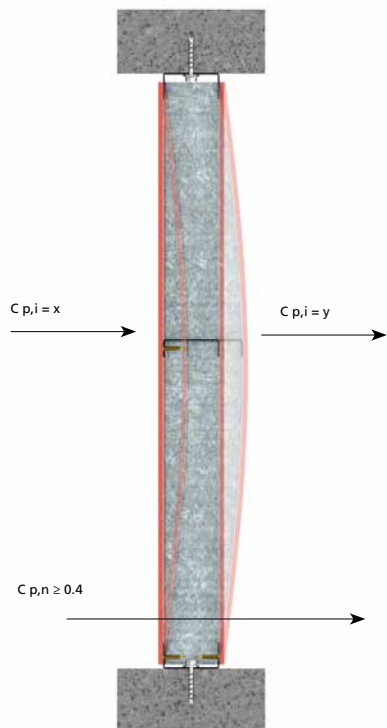


FIGURE C2.4.3(C): PRESSURE SEALED SINGLE SKIN WALL

For the single skin wall system, the pressure on the opposing side of the wall needs to be considered.

a: Consider façade leakage

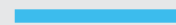
From previous, $C_{p,i} = -0.3$ or $+0.2$, then coupled with ± 0.2 on the opposing side to give the worst case, gives $C_{p,i,n} = -0.5$ or $+0.4$.

Then using the extract of Table C1.3.3.1(A) below, the internal design pressures can be determined as follows for $z = 10\text{m}$:

■ TABLE C2.4.3(H): REGION NZ1 INTERNAL PRESSURES IL2 TC3

REGION NZ1 & NZ2 - IMPORTANCE LEVEL				
FLOOR HEIGHT	TERRAIN CATEGORY 3			
	$C_{p,i,n}$			
Z (M)	0.2	0.3	0.4	0.5
10	0.167	0.251	0.335	0.419
20	0.215	0.322	0.429	0.537
30	0.243	0.365	0.486	0.608
40	0.263	0.394	0.526	0.657
50	0.278	0.417	0.556	0.696
60	0.289	0.433	0.577	0.722
70	0.299	0.449	0.599	0.749

■ TABLE C2.4.3(I): INTERNAL PRESSURES (W2)

WALL TYPE	WALL MARKING	$p_{i,u}$ (kPa)
W2 – Pressure sealed single skin wall		0.419

NOTES:

1. Internal pressure considering $C_{p,n} = 0.5$ acting across wall.

b: Consider an opening in the facade

Refer to Rondo for rational assessment of dominant opening wind pressure


c: Check AS/NZS1170.2 Clause 5.3.3

The internal pressures have been checked considering a $C_{p,i} = -0.5$ which is greater than the minimum 0.4.

d: Summary internal pressure and design

The design internal pressure will be the maximum of parts (a), (b) and (c) above, as follows:

■ TABLE C2.5.3(J) INTERNAL PRESSURES (W2)

WALL TYPE	WALL MARKING	$p_{i,u}$ (kPa)
W2 – Pressure sealed single skin wall		0.419

NOTES:

1. Pressure rationalized to 0.50kPa for maximum wall height table.

■ TABLE C2.5.3(K) MAXIMUM WALL HEIGHT 0.50kPa, Fph = 1.3xWp, CONSIDERING FIXED CEILINGS

		REGION NZ1 to NZ3					DEFLECTION LIMIT H/200 Fph:1.3xWp						
Wult (kPa)	STUD WIDTH		64mm			76mm			92mm			150mm	
	BMT		0.50	0.75	1.15	0.55	0.75	1.15	0.55	0.75	1.15	0.75	1.15
	LINING CONFIG.	Total Lining Mass (kg/m ²)											
0.50	PLASTERBOARD		SINGLE STUD @ 600mm CENTRES										
	LINED BOTH SIDES	14.00	2840	3155	4140	3040	3375	4735	3225	3700	5250	5135	7170
		23.00	2755	3055	3850	2955	3240	4340	3115	3505	5040	4590	7380
		30.60	2670	2970	3680	2870	3150	4090	3030	3385	4670	4295	7095
		46.00	2280	2795	3445	2695	2970	3760	2850	3185	4190	3905	5960
	LINED ONE SIDE	11.50	2855	3185	3780	3065	3420	4330	3260	3770	5015	5355	7015
		15.30	2830	3135	3785	3025	3350	4330	3205	3665	5015	5035	7015
23.00		1660	3055	3800	1645	2495	4330	1630	2405	5015	4585	7015	

With reference to the above Table C2.4.2.2(B) extract the wall design is as follows:

Wall Studs: 92 x 0.55bmt Lipped studs

400mm centres maximum

0 Rows of nogging

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

Base Track: 92 x 28 x 0.50bmt Wall Track

Wall Height: 3000mm (ok, Max = 3030mm)

Linings: 1 x 16mm FR plasterboard both sides

Fixed ceilings attached to wall framing in accordance with Table C2.4.2.2(B) Notes.

Step 6: Check Wall Type W3

The W3 wall is an intra-tenancy wall and will be:

- Non-fire-rated construction
- 64mm single skin stud wall
- Wall height will be floor height minus slab thickness, which is 3000mm
- Linings 1 x 13mm plasterboard both sides

For the non-pressure sealed walls, the pressure on the opposing side of the wall can be considered if necessary, alternatively the code minimum requirements of $C_{p,n} = 0.3$ may be applied, and the same design pressure as that for wall type W1, facade leakage check will apply.

TABLE C2.4.3(L): INTERNAL PRESSURES (W3)

WALL TYPE	WALL MARKING	$p_{i,u}$ (kPa)
W3- Non pressure sealed wall		0.251

NOTES:

1. Pressure rationalized to 1.00kPa for maximum wall height table.

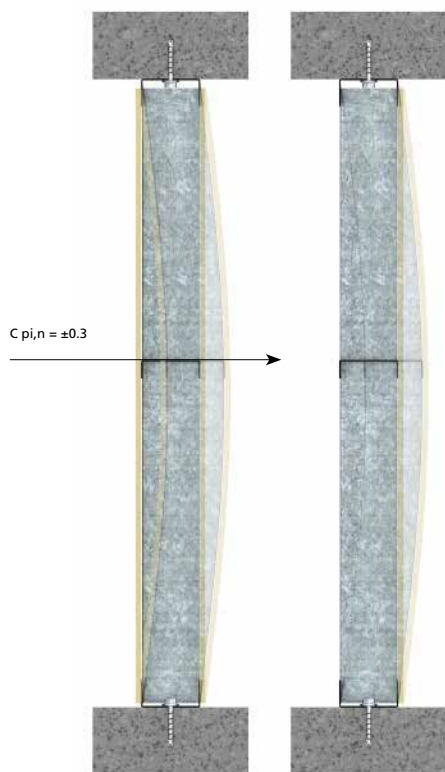


FIGURE C2.4.3(D): NON PRESSURE SEALED WALL

■ TABLE C2.4.3(M): MAXIMUM WALL HEIGHT 0.375kPa, $F_{ph} = 1.3xW_p$, CONSIDERING FIXED CEILINGS

		REGION NZ1 to NZ3					DEFLECTION LIMIT $H/200$ $F_{ph}:1.3xW_p$						
Wult (kPa)	STUD WIDTH		64mm			76mm			92mm			150mm	
	BMT		0.50	0.75	1.15	0.55	0.75	1.15	0.55	0.75	1.15	0.75	1.15
	LINING CONFIG.	Total Lining Mass (kg/m ²)											
0.375	PLASTERBOARD		SINGLE STUD @ 600mm CENTRES										
	LINED BOTH SIDES	14.00	2840	3155	4140	3040	3375	4780	3225	3700	5740	5135	7740
		23.00	2755	3055	3850	2955	3240	4340	3115	3505	5040	4590	7960
		30.60	2670	2970	3680	2870	3150	4090	3030	3385	4670	4295	7095
		46.00	2280	2795	3445	2695	2970	3760	2850	3185	4190	3905	5960
	LINED ONE SIDE	11.50	2855	3185	4120	3065	3420	4670	3260	3770	5410	5355	7535
		15.30	2830	3135	4085	3025	3350	4670	3205	3665	5410	5035	7535
23.00		1660	3055	3845	1645	2495	4335	1630	2405	5035	4585	7535	

With reference to the above Table C2.4.2.2(B) extract the wall design is as follows:

- Wall Studs: 64 x 0.75bmt Lipped studs
 400mm centres maximum
 0 Rows of nogging
- Head Track: 64 x 50 x 1.15bmt Deflection Head Track
- Base Track: 64 x 28 x 0.70bmt Wall Track
- Wall Height: 3000mm
- Linings: 1 x 13mm plasterboard both sides

Please note, in the above example the results are conservative based on the limitations of applying multiple variables to one table. In assuming there are fixed ceilings under seismic actions along with an over estimation of applicable F_{ph} , the framing results will be conservative. A more efficient design will be achievable for this application, refer to Rondo for more information.

C2.4.4 STANDARD DETAILS

C2.4.4.1 TRACK (HEAD/BASE) FIXING DETAILS

a. Track fixing to concrete substrate

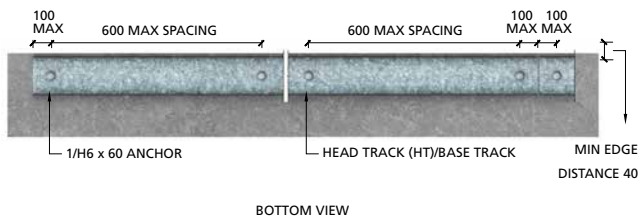


FIGURE C2.4.4(A)a: TRACK FIXING TO CONCRETE SUBSTRATE (TRACK WIDTH 51,64,76 AND 92mm)

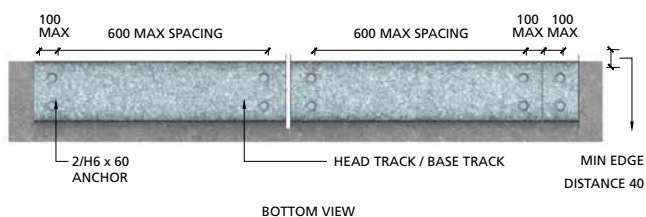


FIGURE C2.4.4(A)B1: TRACK FIXING TO CONCRETE SUBSTRATE (TRACK WIDTH 150MM)

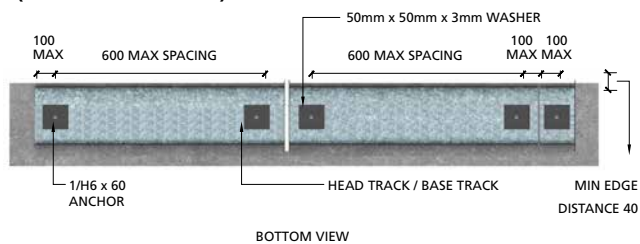


FIGURE C2.4.4(A)B2: TRACK FIXING TO CONCRETE SUBSTRATE (TRACK WIDTH 150MM)

b. Track fixing to steel substrate

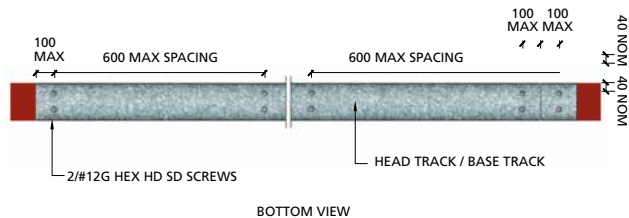


FIGURE C2.4.4(B)a: TRACK FIXING TO STEEL SUBSTRATE (TRACK WIDTH 51,64,76 AND 92mm)

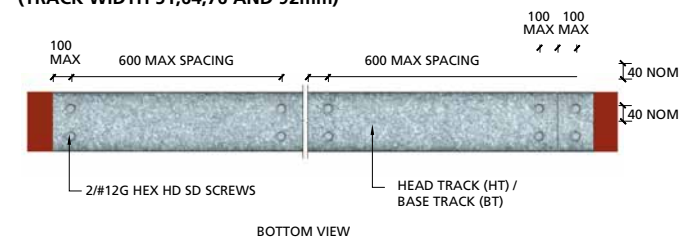
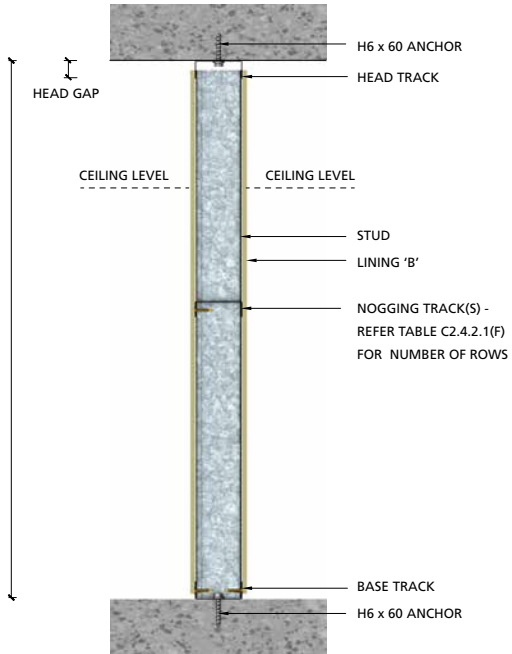


FIGURE C2.4.4(B)b TRACK FIXING TO STEEL SUBSTRATE (TRACK WIDTH 150MM)

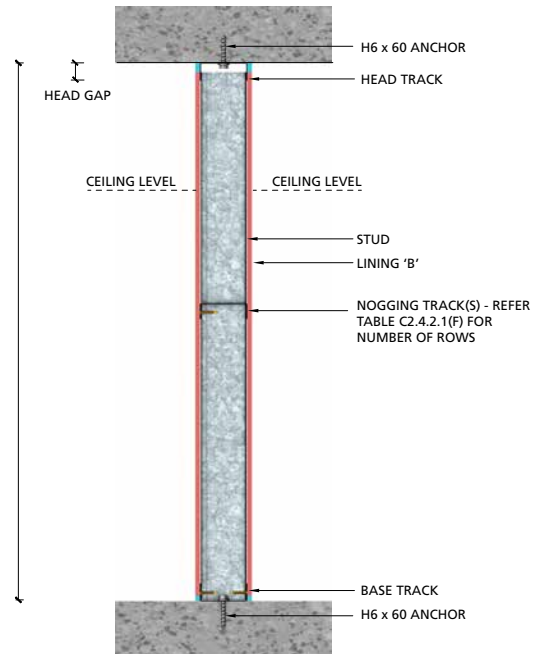
C2.4.4.2 LINED BOTH SIDES WALLS

a. Non Pressure sealed walls



■ FIGURE C2.4.4.2(A): NON PRESSURE SEALED WALL

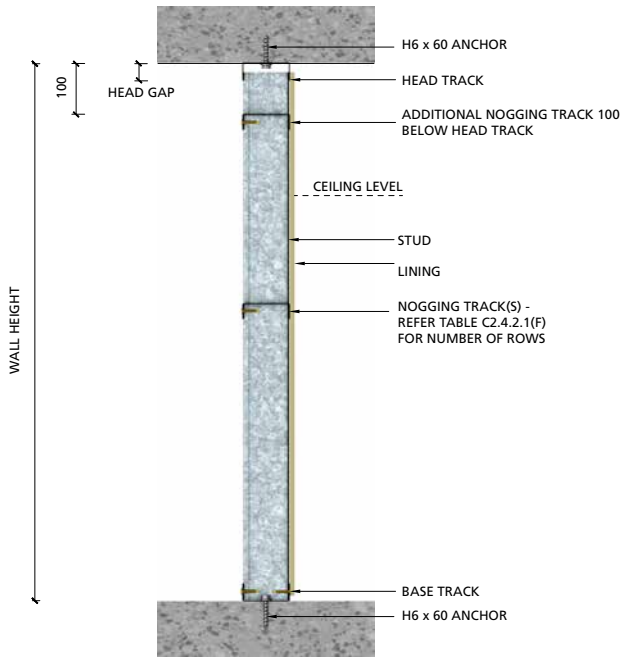
b. Pressure sealed walls



■ FIGURE C2.4.4.2(B): PRESSURE SEALED WALL

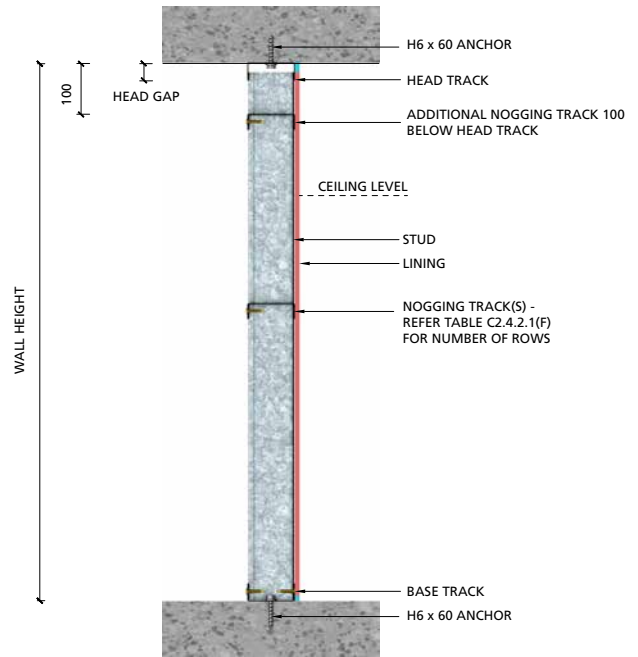
C2.4.4.3 LINED ONE SIDE WALL

a. Non Pressure sealed walls



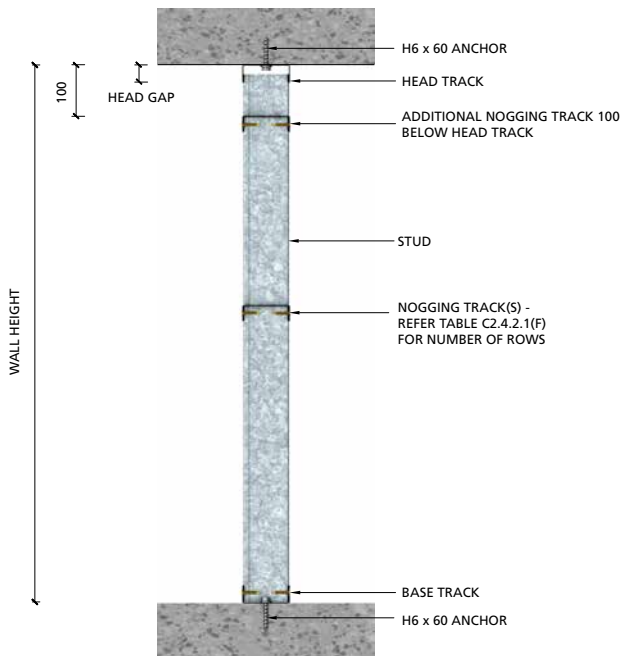
■ FIGURE C2.4.4.3(A): NON PRESSURE SEALED WALL

b. Pressure sealed walls



■ FIGURE C2.4.4.3(B): PRESSURE SEALED WALL

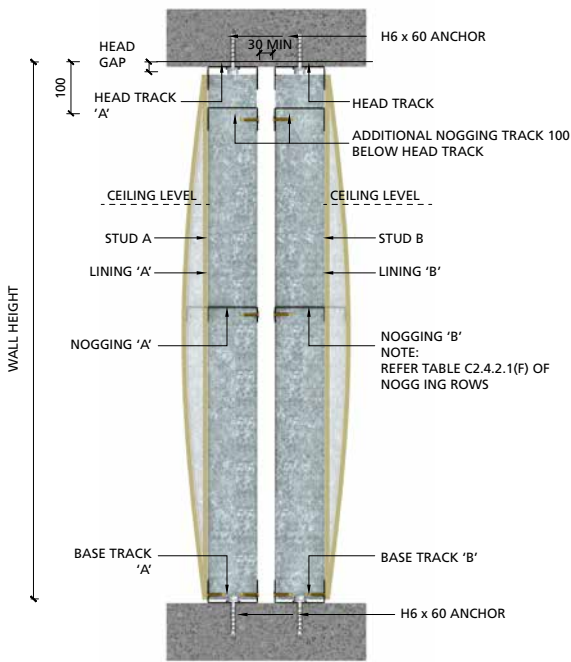
C2.4.4.4 UNLINED WALL



■ FIGURE C2.4.4.4(A): UNLINED WALL

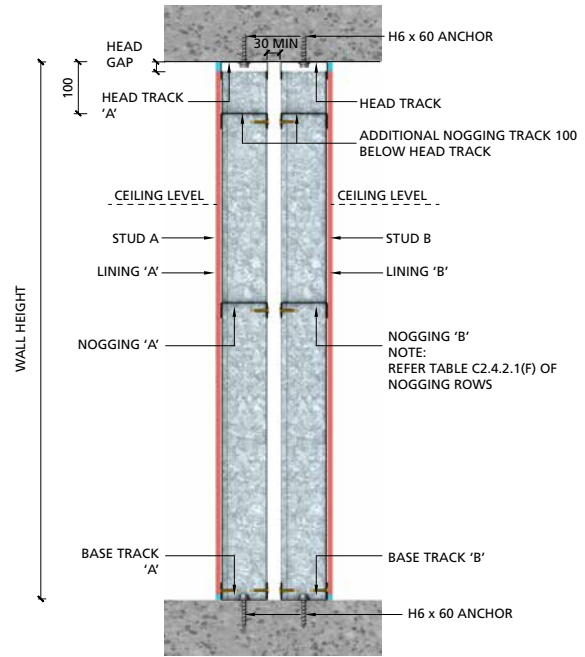
C2.4.4.5 LINED BOTH SIDES TWIN WALLS

a. Non Pressure sealed walls



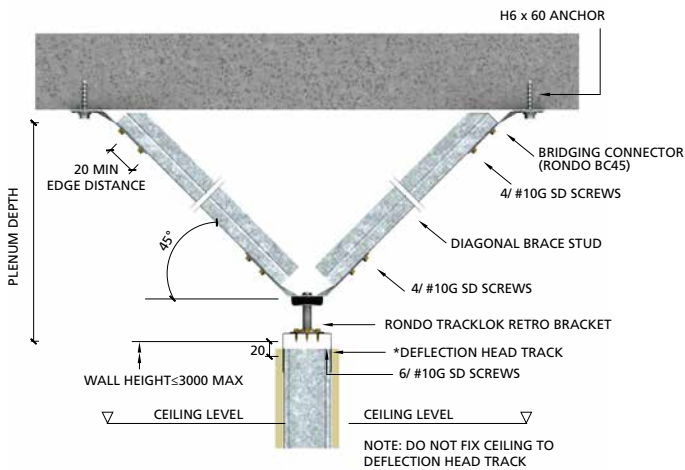
■ FIGURE C2.4.4.5(A): NON PRESSURE SEALED WALL

b. Pressure sealed walls



■ FIGURE C2.4.4.5(B): PRESSURE SEALED WALL

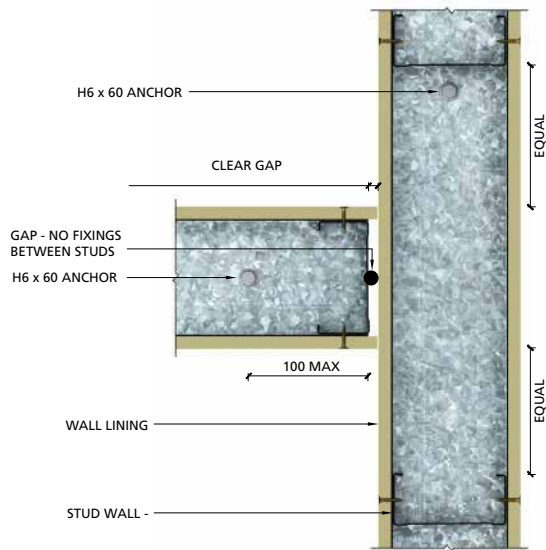
C2.4.4.6 BRACING CONNECTION DETAILS FOR PARTIAL HEIGHT WALLS



■ FIGURE C2.4.4.6(A): BRACING CONNECTION DETAILS FOR PARTIAL HEIGHT WALLS

C2.4.4.7 WALL JUNCTION DETAILS

a. T-junction

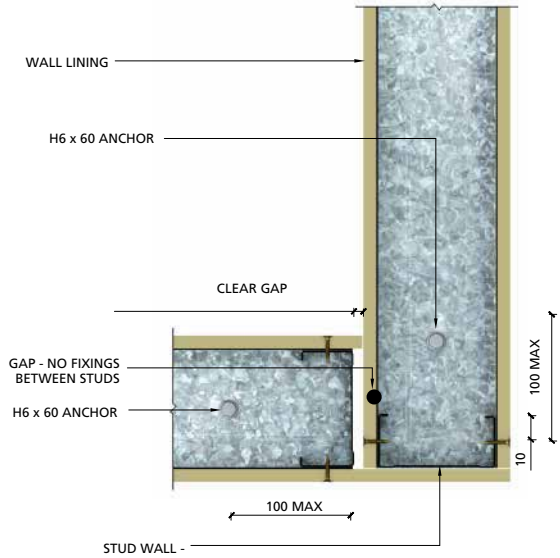


■ FIGURE C2.4.4.7(A): T-JUNCTION

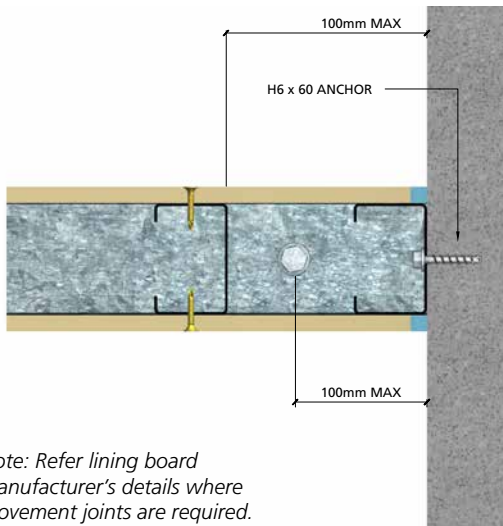
b. L-junction

c. Concrete Intersection

d. Angled wall

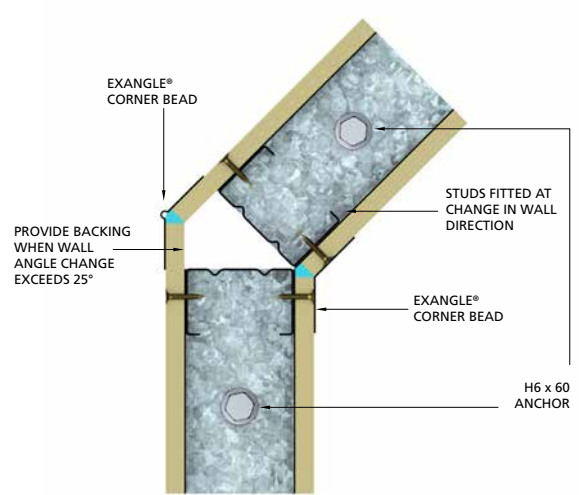


■ FIGURE C2.4.4.7(B): L-JUNCTION



Note: Refer lining board manufacturer's details where movement joints are required.

■ FIGURE C2.4.4.7(C): CONCRETE INTERSECTION

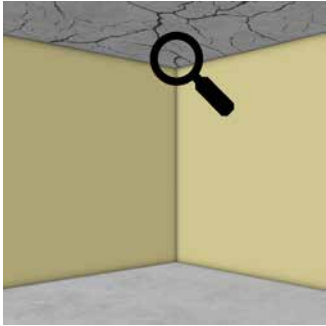
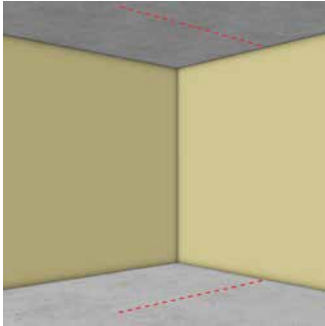

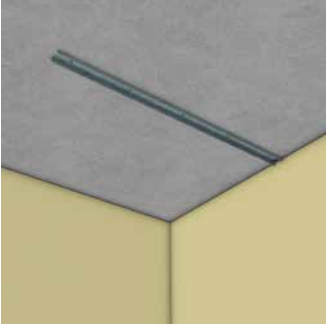
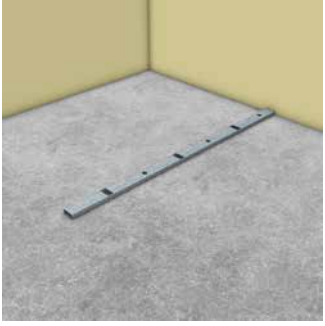

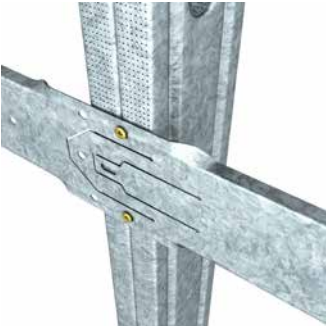
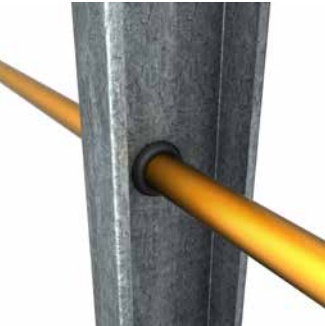



■ FIGURE C2.4.4.7(D): ANGLED WALL

C2.4.5 INSTALLATION

INSTALLATION SUMMARY

Figure's C2.4.5(A) to (G) below provides an overview of the installation procedure for a typical internal walls with lining on both sides. This is a general guide only. There might be variations in the construction based on the project specific requirements. Mark out base and track at the same time or you will stand on the track to mark out top.

		
<p>1. Check base and head substrate</p>	<p>2. Mark head and base track location</p>	<p>3. Install base</p>
		
<p>4. Install head track</p>	<p>5. Lay nogging tracks in the base track.</p>	<p>6. Install wall studs & fix base</p>
		
<p>7. Fix nogging in place</p>	<p>8. Service</p>	<p>9. Install lining</p>

■ FIGURE 2.4.5(A): STANDARD STUD WALL INSTALLATION

INSTALLATION PROCEDURE

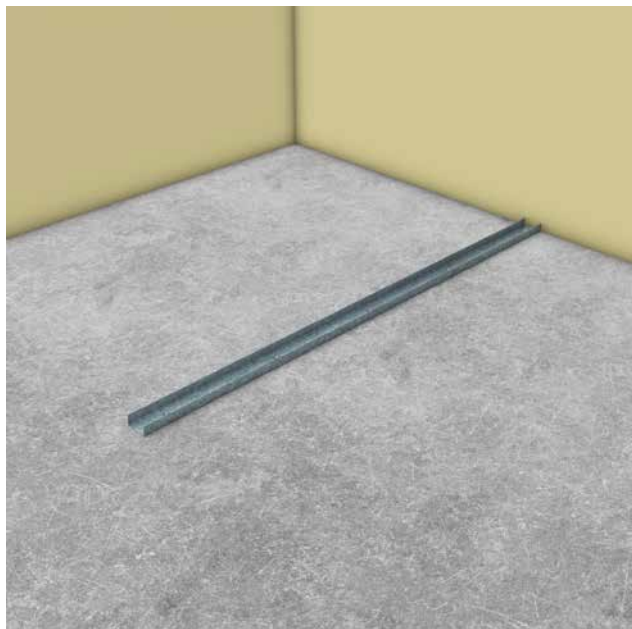
Step 1 – Pre-installation

- (1.1) Inspect the work area and ensure it is ready to proceed.
- (1.2) Ensure the façade will effectively protect the framing from direct weather exposure.
- (1.3) Ensure the concrete is sound and does not contain laitance.

Step 2 – Installing Wall Tracks

- (2.1) Set out the base tracks in accordance with the architectural plans.
- (2.2) Check and confirm the base track size and gauge are consistent with the design.
- (2.3) Secure the tracks in position with approved fasteners.
- (2.4) Ensure the track fixings are located not more than 100mm from the track ends, and not more than 600mm centres. The track fastener spacings should not exceed the recommendations by Rondo.

NOTE: If the wall is not fire-rated, PAF's may be used as the permanent fastenings and should be installed in accordance with the manufacturer's recommendation. Please contact Rondo for PAF spacing specific to your wall requirements.

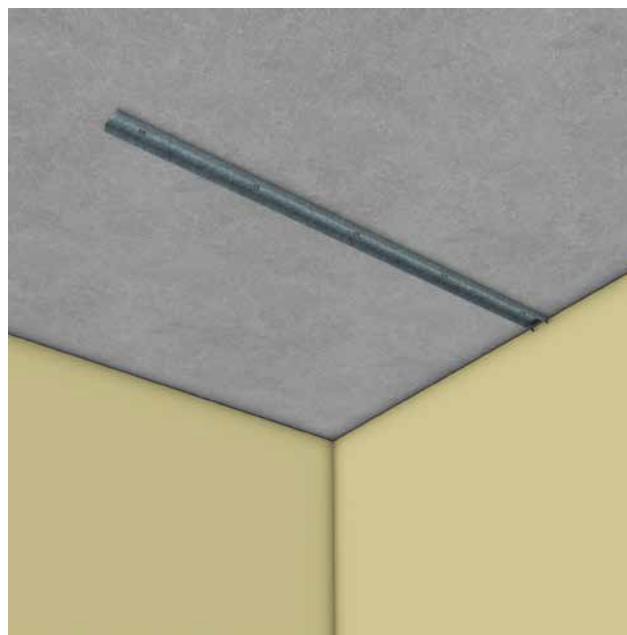


■ FIGURE C2.4.5(B): BASE TRACK INSTALLATION

Step 3 – Installing Head Tracks

- (3.1) Transfer the floor track setout to the structure above.
- (3.2) Be careful when handling the tracks overhead and use appropriate safety measures.
- (3.3) Check and confirm the head track size and gauge is consistent with the design.
- (3.4) Secure the head tracks in position with the approved fasteners.
- (3.5) Ensure the track fixings are located not more than 100mm from the track ends, and not more than 600mm centres. The track fastener spacings should not exceed the recommendations by Rondo.
- (3.6) Power actuated fasteners (PAF's) may be used as temporary fixings to assist installation.

NOTE: If the wall is not fire rated, PAF's may be used as the permanent fastenings and should be installed in accordance with the manufacturer's recommendation. Please contact Rondo for PAF spacing specific to your wall requirements.

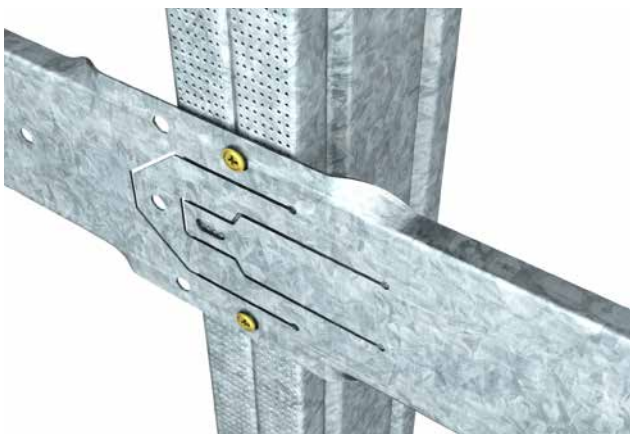


■ FIGURE C2.4.5(C): HEAD TRACK INSTALLATION

Step 4 – Installing Noggings

NOTES: Rondo manufacture several different noggling types and depending on the noggling type used could change the installation sequence. Refer to the noggling section of this manual for further details.

- (4.1) Pre-punched noggling tracks should be laid in the base tracks, flanges down, before installing the wall studs.



■ FIGURE C2.4.5(D): NOGGING INSTALLATION

Step 5 – Installing Wall Studs

- (5.1) Check and confirm the wall stud size and gauge is in accordance with the design.
- (5.2) Confirm the type of construction and head track detailing requirements for the project.

NOTES: For walls spanning slab to slab, typically a 20mm gap is maintained between the top of the wall stud and the underside of the slab. Accordingly, the wall studs should be cut 20mm short of the measured slab to slab height.

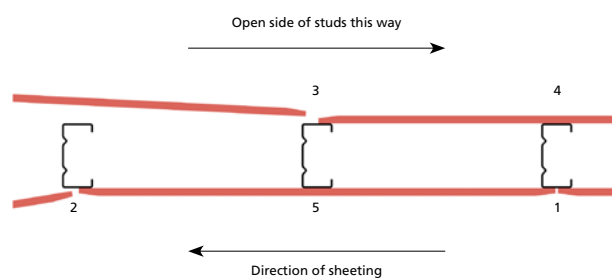
Similarly, for walls spanning slab to metal deck roofing, typically a 5mm gap is maintained between the top of the wall stud and the underside of the roof structure. Accordingly, the wall studs should be cut 5mm short of the measured slab to roof height.

- (5.3) Measure and cut the wall studs to length.
- (5.4) Install the wall stud into the base track, at an angle, then using a twisting motion rotate the stud until they are perpendicular to the track. The studs will remain in position under friction. Each stud shall be screw fixed to the base track with 1/#8G screw per side of the stud.



■ FIGURE C2.4.5(E): ROTATE STUDS INTO POSITION

- (5.5) Rotate the stud into the head track. Check the studs are plumb. Do not fix the studs through the head tracks.
- (5.6) Ensure the studs are bottomed in the base tracks.
- (5.7) Continue to install studs in the same direction at no more than the stud spacing nominated on the design. The open end of the studs should be facing the direction the sheeting will begin.



■ FIGURE C2.4.5(F): ORIENTATE STUDS IN THE SAME MANNER

Studs should be orientated such that the service holes are aligned horizontally when installed.

NOTES: The stud spacing should not exceed 600mm, unless designed accordingly.

Never fix wall studs to deflection head tracks in slab to slab construction.

Step 6 – Fix Noggings In Place

- (6.1) Once the wall studs are all installed, the noggling tracks can be lifted into position.
- (6.2) For walls lined one side, the noggings are to be screw fixed to the unlined side of the wall as a minimum. At the head track, the noggling must be positioned and installed in accordance with the lining board manufacturers recommendations for all fire rated installations.
- (6.3) For walls lined both sides, the noggings may be screw fixed either side as appropriate.



■ FIGURE C2.4.5(G) NOGGING FIXING DETAILS

Step 7 – Services Fix Out

Once the wall framing is completed, the first fix out is likely to proceed. It is important to recheck the framing after the fix out to ensure it is ready for sheeting.

Ensure the wall stud spacing is in accordance with the design, and the wall studs are plumb.

Ensure any cutting, notching or additional service holes are in accordance with the limitations on Section 2.6: Additional Details.

Ensure all services and the like are appropriately isolated or shielded from the stud framing.

NOTE: Rondo recommends all services and the like be coordinated with the framing to ensure adequate clearances are maintained and there are no adverse impacts on the framing due to the installation of such services.

Step 8 – Linings Installation

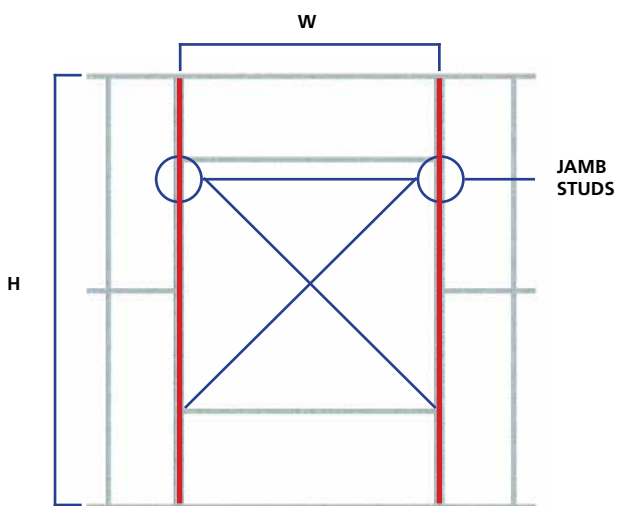
- (8.1) With the framing and first fitout completed, the wall linings may now be installed.
- (8.2) Wall linings may be installed vertically or horizontally, in accordance with the manufacturer's recommendations. Where necessary, the lining board manufacturer will need to confirm the lining requirements for the higher internal design pressures, as applicable.
- (8.3) Ensure lining board joints are staggered either side of the wall. Do not fix lining boards to head or base tracks unless specifically designed.

C2.5 INTERNAL WALL OPENINGS

Window and door openings require specific consideration to ensure the concentrated loads that arise in these locations are suitably accommodated in the design.

C2.5.1 JAMB STUDS

Jamb studs are the vertical framing members located adjacent to any wall opening. The jamb studs carry the resulting loads attributed to the wall opening, as detailed in Figure C2.5.1(A) below.



■ FIGURE C2.5.1(A): JAMB STUDS TO OPENINGS

When openings occur in conventionally framed wall sections, the jamb studs can be readily determined based on the stud spacing of the wall studs outside of the opening location. The table below may be used to determine the required number of studs adjacent to a wall opening to make up a Jamb combination.

JAMB STUDS FOR OPENINGS			
WALL STUD SPACING	MAXIMUM OPENING WIDTH (W)		
	NO. OF STUDS ADJACENT TO OPENING		
	2	3	4
600	1800	3000	N/A
450	1350	2250	3000
400	1200	2000	2800
300	900	1500	2100

■ TABLE C2.5.1(A): JAMB STUD COMBINATIONS



■ FIGURE C2.5.1(B): EXAMPLE OF 3 STUD JAMB COMBINATION

NOTES TO TABLE:

1. The jamb studs are to be the same size and gauge as the wall studs adjacent.
2. For 2 studs, they are assumed to be boxed. For 3 or more studs they are assumed to be screw fixed together at no more than 600mm centers using #10G screws.
3. The above design table can be used for all internal design pressures.
4. Actions, other than self-weight, internal pressures or seismic have not been considered in the design.
5. Jack studs, above or below the wall opening, are assumed to be at 600mm centres maximum.
6. Maximum opening width limited to 3000mm, for larger opening widths refer to Rondo for information.

Where Table C2.5.1(A) does not provide a solution refer to the Duplex Stud or Maxijamb sections of this manual. Alternatively, refer to Rondo for a specific design.

C2.5.2 HEAD TRACK

The building movement allowance at the head is to be maintained at all wall openings. At no time should the jamb studs be screw or rigidly fixed to the head track.

Where multiple studs are used to form a jamb stud, it is necessary that the jamb stud connection to the structure is strengthened. Figures C2.5.3(A) to C2.5.4(A) provides details and limitations of some jamb stud top connections.

C2.5.3 BOXED HEAD TRACK CONNECTION

A simple means of increasing the capacity of the head track is to box it using a short length of wall stud, per Figure C2.5.3(A) below:

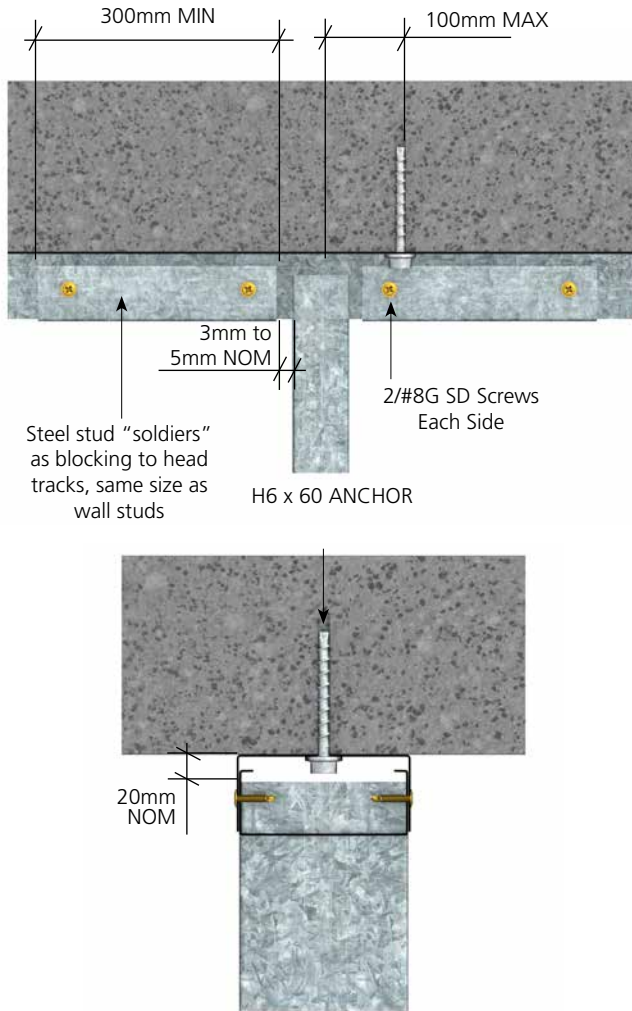


FIGURE C2.5.3(A): BOXING OF HEAD TRACK

This connection may be used within the following limitations:

TABLE C2.5.3(A): JAMB STUD COMBINATIONS

WALL HEIGHT (mm)	STUD SPACING OUTSIDE THE OPENING (mm)	MAX OPENING WIDTH (mm)	MAX CEILING LENGTH (mm)	MAX ULS WIND PRESSURE (kPa)
0.70bmt DEFLECTION HEAD TRACK				
3400	600	800	6000	0.375
3400	400	1000	6000	0.375
1.15bmt DEFLECTION HEAD TRACK				
3400	600	1800	6000	0.50
3400	400	2000	6000	0.50
4000	600	1600	6000	0.50
4000	400	1800	6000	0.50

NOTES TO TABLE:

- The jamb studs are to be the same size and gauge as the wall studs adjacent.
- For the 1.15bmt Deflection Head Track these assume the wall studs are also 1.15bmt.
- Allowance for 1 x 13mm palsterboard on each side of the wall.
- Seismic $F_{ph} \leq 1.30W_p$
- where the details above do not provide a solution contact Rondo for a specific design.

C2.5.4 CLEATED HEAD TRACK CONNECTION

Alternatively, a Rondo slotted cleat may be used to strengthen the head track connection. The cleat takes all the load rather than passing it through the head track.

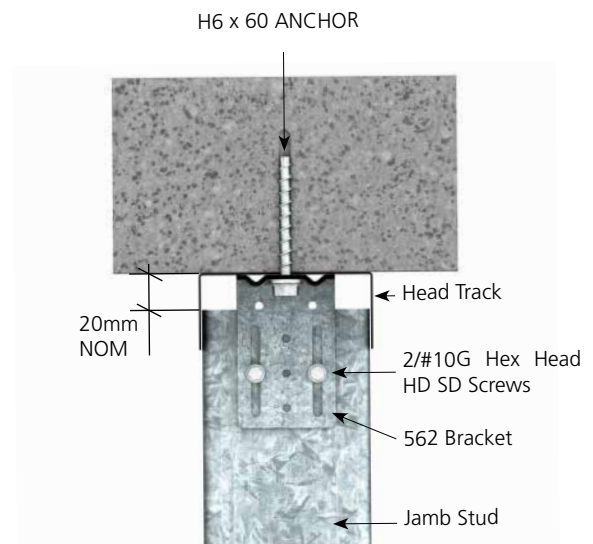


FIGURE C2.5.4(A) 562 SLOTTED CLEATS

The cleats are slotted to maintain the allowance for incremental slab deflection.

Screw fixings should be placed in the slots to maintain a clear 20mm downward movement for slabs, or a clear 15mm upward movement for metal deck roofs.

Figure C2.5.4(A) above shows a typical cleated jamb stud head connection and Table C2.5.4(A) and (B) provide the cleat configurations and limitations under which they can be used:

■ TABLE C2.5.4(A): 562 CLEAT ONE SIDE OF JAMB STUD

WALL HEIGHT (mm)	STUD SPACING OUTSIDE THE OPENING (mm)	MAX OPENING WIDTH (mm)	MAX CEILING LENGTH (mm)	MAX ULS WIND PRESSURE (kPa)
3400	600	1880	6000	0.375
3400	400	2080	6000	0.375
4000	600	1730	6000	0.375
4000	400	1930	6000	0.375
3400	600	1880	6000	0.50
3400	400	2080	6000	0.50
4000	600	1730	6000	0.50
4000	400	1930	6000	0.50

- NOTES TO TABLE:
- The jamb studs are to be the same size and gauge as the wall studs adjacent.
 - Fixing to concrete to be Rondo H6 x 60 ANCHOR.
 - Fixing to structural steel to be 2/#12G Hex head self-drilling screws.
 - Fixings to jamb studs to be 1/#10G Hex head self-drilling screw in each slot.
 - Maximum opening width limiter to 3000mm, for larger opening widths refer to Rondo for information.
 - Max lining weight considered is 23kg/m².
 - Seismic acceleration ≤ 1.30g.
 - Total weight of ceiling considered is 10.5kg/m².
 - Where the ceiling is fixed to both sides of the wall, the actual length is the sum of the ceiling length on either side of the wall and shall be less than the above limit.
 - The ceiling height is assumed to be no greater than 0.9 x the overall wall height.

■ TABLE C2.5.4(B): 562 CLEAT BOTH SIDES OF JAMB STUD

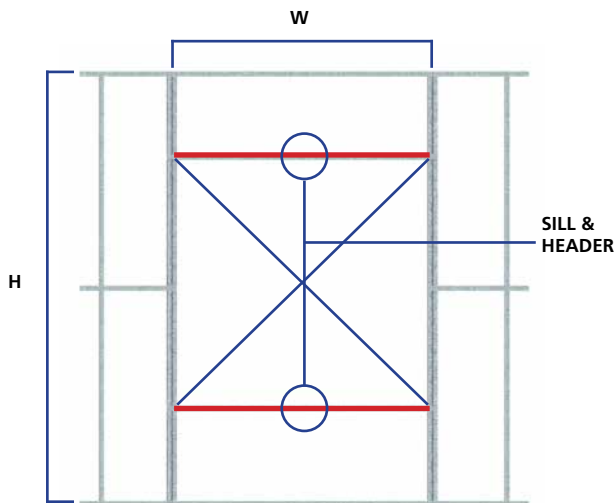
WALL HEIGHT (mm)	STUD SPACING OUTSIDE THE OPENING (mm)	MAX OPENING WIDTH (mm)	MAX CEILING LENGTH (mm)	MAX ULS WIND PRESSURE (kPa)
3400	600	3000	6000	0.50
4000	600	3000	6000	0.50
4500	600	3000	6000	0.50
5000	600	3000	6000	0.50

- NOTES TO TABLE:
- The jamb studs are to be the same size and gauge as the wall studs adjacent.
 - Fixing to concrete to be H6 x 60 Anchor.
 - Fixing to structural steel to be 2/#12G Hex head self-drilling screws.
 - Fixing to jamb stud to be 1/#10G Hex head self-drilling screw in each slot.
 - Allowance for 1 x 13mm palsterboard on each side of the wall.
 - Seismic Fph ≤ 1.30Wp
 - Maximum opening width limiter to 3000mm, for larger opening widths, refer Rondo for information.

Where the above does not provide a solution refer to the Duplex Stud or Maxijamb sections of this manual. Alternatively, refer to Rondo for a specific design.

C2.5.5 SILLS AND HEADERS

Sills and headers are the horizontal framing members across the bottom and top of the wall openings respectively. These members span between the jamb studs and support the intermediate jack studs.



■ FIGURE C2.5.5(A): SILLS AND HEADERS

When openings occur in conventionally framed wall sections, the sills and headers cannot be readily determined. The Rondo Wall Tracks may be used to frame these openings, using simple connections to the jamb studs.

The table below may be used to check the sill member as required:

■ TABLE C2.5.5(A) SILL MEMBERS

WALL TRACK	MAX OPENING WIDTH (mm)	MAX ULS WIND PRESSURE (kPa)
64x28x0.50bmt	1540	0.375
64x28x0.70bmt	1940	0.375
64x32x1.15bmt	2580	0.375
76x28x0.50bmt	1680	0.375
76x28x0.70bmt	2200	0.375
76x32x1.15bmt	2960	0.375
92x28x0.50bmt	1850	0.375
92x28x0.70bmt	2570	0.375
92x32x1.15bmt	3430	0.375
64x28x0.50bmt	1330	0.500
64x28x0.70bmt	1680	0.500
64x32x1.15bmt	2340	0.500
76x28x0.50bmt	1450	0.500
76x28x0.70bmt	1910	0.500
76x32x1.15bmt	2670	0.500
92x28x0.50bmt	1600	0.500
92x28x0.70bmt	2220	0.500
92x32x1.15bmt	3080	0.500

NOTES TO TABLE:

1. The above design table is based on load with of 1500mm (S1).
The span should be prorated for another load widths
2. Serviceability taken as 0.75 times the ultimate pressure.
3. Seismic $F_{ph} \leq 1.30W_p$
4. Deflection limited to $L/200$ under service pressure.
5. Where the details above do not provide a solution contact Rondo for a specific design.

For the headers, an allowance has been made to carry the weight of the linings over the opening.

This should be checked against the installation to ensure it is not exceeded.

The table below may be used to check the header member as required:

■ TABLE C2.5.5(B1) - HEADER MEMBERS WITHOUT CEILING LOAD

WALL TRACK	MAX OPENING WIDTH (mm)	MAX ULS WIND PRESSURE (kPa)
64x28x0.50bmt	1080	0.375
64x28x0.70bmt	1330	0.375
64x32x1.15bmt	1920	0.375
76x28x0.50bmt	1130	0.375
76x28x0.70bmt	1410	0.375
76x32x1.15bmt	2040	0.375
92x28x0.50bmt	1170	0.375
92x28x0.70bmt	1500	0.375
92x32x1.15bmt	2140	0.375
64x28x0.50bmt	1000	0.500
64x28x0.70bmt	1240	0.500
64x32x1.15bmt	1780	0.500
76x28x0.50bmt	1050	0.500
76x28x0.70bmt	1320	0.500
76x32x1.15bmt	1910	0.500
92x28x0.50bmt	1100	0.500
92x28x0.70bmt	1420	0.500
92x32x1.15bmt	2050	0.500

■ TABLE C2.5.5(B2) - HEADER MEMBERS WITH CEILING LOAD

WALL TRACK	MAX OPENING WIDTH (mm)	MAX ULS WIND PRESSURE (kPa)
64x28x0.50bmt	1080	0.375
64x28x0.70bmt	1000	0.375
64x32x1.15bmt	1430	0.375
76x28x0.50bmt	850	0.375
76x28x0.70bmt	1090	0.375
76x32x1.15bmt	1560	0.375
92x28x0.50bmt	910	0.375
92x28x0.70bmt	1200	0.375
92x32x1.15bmt	1710	0.375
64x28x0.50bmt	1000	0.500
64x28x0.70bmt	1000	0.500
64x32x1.15bmt	1430	0.500
76x28x0.50bmt	850	0.500
76x28x0.70bmt	1090	0.500
76x32x1.15bmt	1560	0.500
92x28x0.50bmt	910	0.500
92x28x0.70bmt	1200	0.500
92x32x1.15bmt	1710	0.500

NOTES TO TABLE:

1. The above design table is based on load with of 1500mm (H1)
The span should be prorated for another load widths
2. Allowance for 1 x 13mm plasterboard on each side of the wall over the top of the opening, to maximum depth of 1.0m
3. Serviceability taken as 0.75 times the ultimate pressure
4. Seismic $F_{ph} \leq 1.30W_p$
5. Deflection limited to $L/200$ under service pressure.
6. Where the details above do not provide a solution contact Rondo for a specific design.
7. Max length of ceiling fixed to wall considered is 10m.

C2.5.6 PRO-RATA SPAN

In Tables C2.5.5(A) and (B) above the spans are based on a load width of 1500mm. The load width should be calculated as follows:

$$\text{Sill } (S_2) = \text{Sill height} + \frac{1}{2} \text{ window height}$$

$$\text{Header } (H_2) = \text{Head height} + \frac{1}{2} \text{ window height}$$

The simple method is to pro-rata the member span using the applicable load widths as follows:

$$O_2 = O_1 \times (S_1 / S_2)^{0.333}$$

Where;

O_1 = original window opening (mm)

O_2 = revised member span (mm)

S_1 = original sill load width (1500mm)

S_2 = revised sill load width (mm)

E.g. based on the site measurements, the actual sill load width is 1200mm (S_2). The original opening was 1960mm (O_1) and the revised opening will be as follows:

$$\begin{aligned} O_2 &= 1960 \times (1500 / 1200)^{0.333} \\ &= 2110\text{mm} \end{aligned}$$

The same method can be used for the headers, where H1 and H2 are substituted for S1 and S2 respectively.

C2.5.7 SILL AND HEADER CONNECTIONS

The sill and headers can be secured to the jamb studs using a stud offcut and a screw fixing to the sill or header, as detailed below.



■ FIGURE C2.5.7(A) SILL AND HEADER CONNECTION

The above connection is not to be used beyond the limits given in Table C2.5.7(A) below:

■ TABLE C2.5.7(A) MAXIMUM OPENING WIDTH

WALL TRACK / WALL STUD GAUGE	MAXIMUM OPENING WIDTH - W (mm)			
	INTERNAL PRESSURE (kPa)			
	0.50	0.75	1.00	1.25
0.50bmt/0.50bmt	1780	1190	-	-
0.50bmt/0.75bmt	2470	1650	1230	990
0.70bmt/0.50bmt	2480	1650	1240	990
0.70bmt/0.75bmt	3000	2280	1710	1370
1.15bmt/0.75bmt	3000	2280	1710	1370
1.15bmt/1.15bmt	3000	3000	3000	2580

NOTES TO TABLE:

- The above design table is based on a load width of 1500mm (H1). The span should be prorated for other load widths.

HOW TO READ THE TABLE:

WALL TRACK / WALL STUD GAUGE
0.50bmt/0.50bmt
0.50bmt/0.75bmt

The sill or header gauge is nominated first, followed by the gauge of the stud connected to the jamb stud.

In the above example, the first row is presenting the results for 0.50bmt sill or header and fixed to the jamb stud using a 0.50bmt stud. The second row is presenting the results for 0.50bmt sill or header and fixed to the jamb stud using a 0.75bmt stud.

Example:

Internal design pressure = 0.75kPa

Maximum wall height = 3100mm

Lined both sides with 13mm plasterboard

Region A H/200 deflection limit

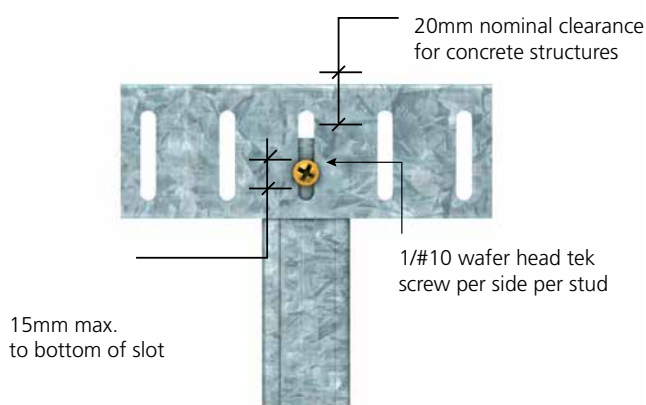
Wall is nominated as 64mm stud

Maximum opening = 1550mm

C2.6 ADDITIONAL DETAILS

C2.6.1 SLOTTED DEFLECTION HEAD TRACKS

Rondo slotted deflection head track is available in two different gauges, being 0.70bmt and 1.15bmt. The deflection head track is slotted along either flange and allows for a screwed connection to the wall stud, whilst still maintaining allowance for incremental slab deflection.



■ FIGURE C2.6.1(A): SLOTTED DEFLECTION HEAD TRACK

The screwed connection greatly improves the lateral strength of the head track, as both flanges are utilised in resisting the head track reaction.

When using slotted deflection head tracks, it is no longer necessary to install the nogging 100mm below the head track for walls lined one side.

Care should be taken when using slotted deflection head track as these systems can cause racking forces (and subsequently noise) in the wall panels when the building undergoes inter-storey drift. Rondo recommends non-slotted deflection head track be used for internal walls where capacity permits.

Fixing to Concrete

The standard 20mm nominal clearance is still required between the top of the wall stud and slab soffit, when fixing to concrete.

Fixing to Steelwork

Where the steelwork carries metal deck roof loads, roof uplift should be expected. Accordingly, the studs only require 5mm clearance and this allows for 15mm roof uplift.

Where the steelwork carries floor loads only, uplift of the steelwork is not expected, and the deflection head track can be installed the same as for a concrete floor slab.

In some instances, steelwork is placed for lateral restraint of the stud framing and carries neither roof nor floor loads. In these instances, a deflection head is not required.

NOTES:

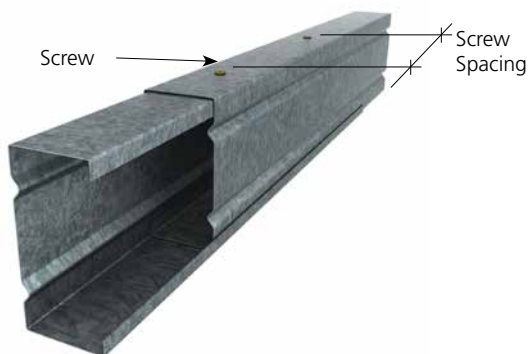
1. The allowance for structure movement should always be confirmed with the project engineer prior to commencing work on site.

C2.6.2 SPLICING OF WALL STUDS

All Rondo studs are manufactured such that they can be simply boxed by placing the short flange inside the long flange and pressing the two sections together.

The boxed sections are more torsionally stable than the open C stud, and this lends itself to splicing the studs.

Rondo recommends the wall studs are always installed in a single length wherever possible. Notwithstanding this, sometimes it will be necessary to splice the studs and the following table provides the limitations under which this can be undertaken:



■ FIGURE C2.6.2(A): SPLICING DETAILS

■ TABLE C2.6.2(A): WALL STUD SPLICING DETAILS

SPLICE LOCATION (%)	Nom. STUD SIZE (mm)	STUD GAUGE (bmt)	SCREW SPACING (mm) ^(2,3)	NO OF FASTENERS $s_{(4,5,6)}$
0 – 10	ALL	0.5	260	2
	ALL	0.55	270	2
	≤ 76	0.75	260	2
	≤ 92		300	
	150		360	3
	≤ 92	1.15	350	2
150	460		3	
10 – 25	ALL	0.5	340	2
	ALL	0.55	550	2
	≤ 51	0.75	300	2
	≤ 64		370	
	≤ 76		470	
	≤ 92	1.15	410	3
	≤ 150		560	4
	≤ 64		440	2
	≤ 76		560	2
	≤ 92		480	3
	≤ 150		720	4

NOTES:

1. Splice location is given as a percentage of wall height ie; 0 – 10% means the splice needs to be within 400mm of the top or bottom of the wall for a wall height of 4.0m.
2. Screw spacing is measured between the outer screws.
3. Splice length = screw spacing + 40mm minimum.
4. Additional screws to be equally spaced between outer screws.
5. All screws to be #8G minimum.
6. Number of screws shown are per side of stud.

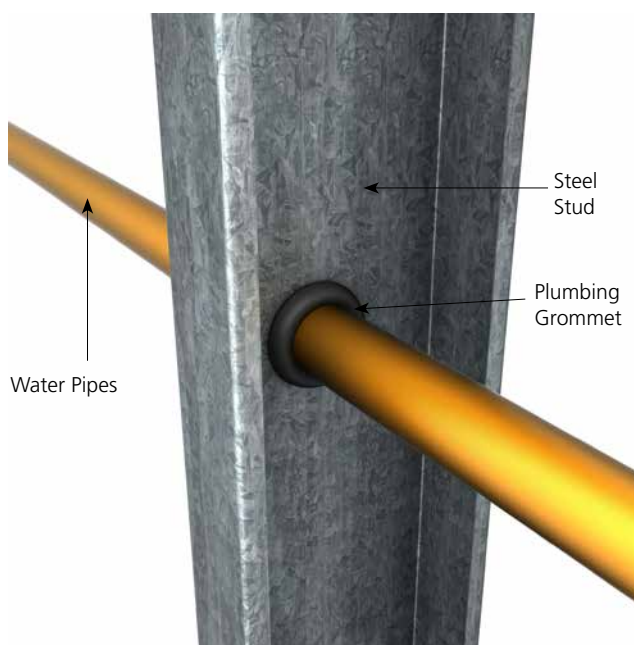
C2.6.3 PLUMBING AND ELECTRICAL SERVICES INTERACTION

The Rondo steel studs can be used to restrain minor plumbing and electrical services within the wall cavity. However, the following limitations should be considered.

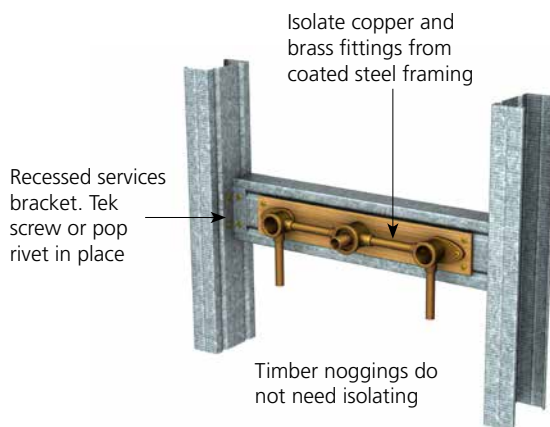
Plumbing Services

In addition to the relevant code requirements, all plumbing elements are required to be adequately restrained and isolated from the framing to prevent contact.

Plastic grommets, or similar approved, are to be fitted within the service holes to isolate such services. Grommets can also act as a suppressant to water hammer or similar.



■ FIGURE C2.6.3(A): PLUMBING GROMMETS



■ FIGURE C2.6.3(B): ISOLATING PLUMBING SERVICES

Nylon or nylon coated saddle clamps are recommended.

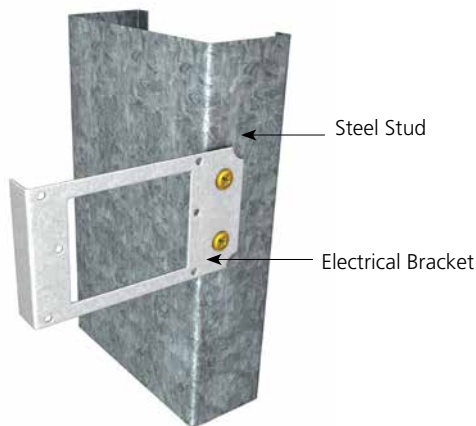
The use of plywood noggings or the like to support services should be checked with the project requirements prior to commencing work on site. Metal stud or track sections can be used to support services however, suitable isolation of the service shall be maintained.

Electrical Services

All electrical services are to be installed strictly in accordance with the relevant code requirements.

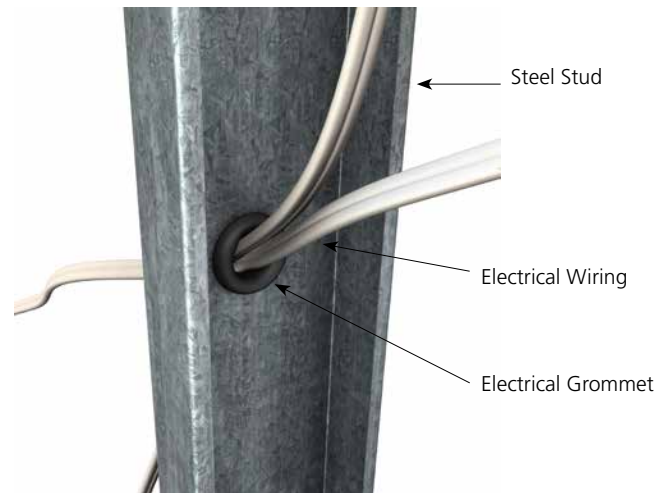
Where permanent earthing of the framing is required it shall be installed in accordance with the requirements of the local electricity authority. Additionally, temporary earthing shall be provided, as necessary, until the permanent earthing is installed.

Electrical backing plates may be fixed to the stud flange, using appropriate low-profile wafer head screws.



■ FIGURE C2.6.3(C): ELECTRICAL BACKING PLATES

Plain service holes and any additional service holes cut into the framing are to be fitted with a suitable grommet prior to wiring.

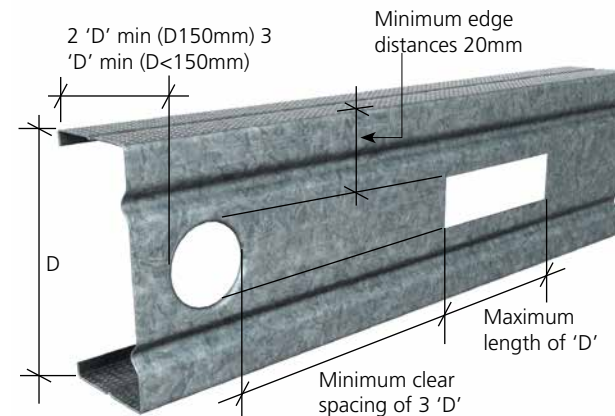


■ FIGURE C2.6.3(D): ISOLATING ELECTRICAL SERVICES

Care should be taken that pulling of wiring does not damage or disturb the framing.

Additional Service Holes

Where additional service holes are required, they shall be in accordance with Figure C2.6.3(E) below:



■ FIGURE C2.6.3(E): ADDITIONAL SERVICE HOLES

Holes are to be cut as close as possible to the centreline of the stud.

Holes are to be neatly cut. Gas cutting, or the like, is not permitted.

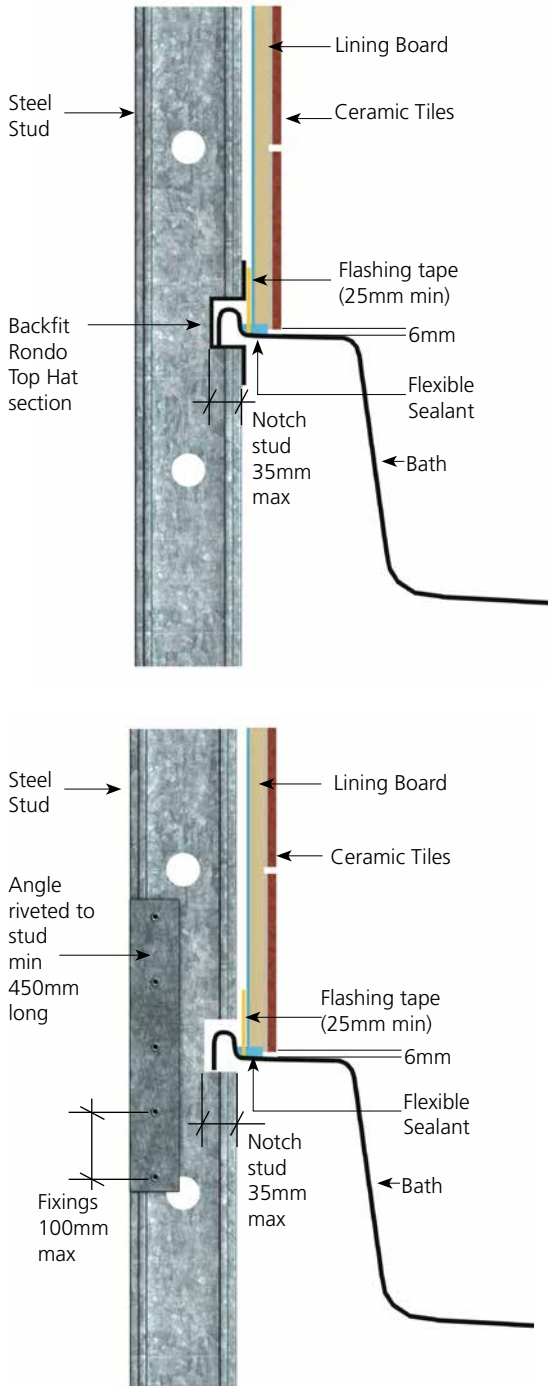
Where required, the zinc coating shall be made good using cold gal or similar approved.

6.4 NOTCHING OF STUDS

Wherever possible, notching of the wall stud flange is to be avoided. However, where it cannot be avoided, the wall stud shall be suitably strengthened as detailed in Figure C2.6.4(A).

C2.6.5 ELECTROLYTIC CORROSION

Although becoming less popular, copper and brass elements can cause electrolytic corrosion to the Rondo stud and track sections. They are to be physically isolated from direct contact with the Rondo framing.



■ FIGURE C2.6.4(A): NOTCHING OF STUDS

Notching of wall studs is complex and requires a specific design to be checked. Refer to Rondo for details.

C2.7 SPECIAL WALLS

C2.7.1 STAGGERED STUDS

Staggered stud wall systems are typically designed to achieve higher acoustic performance than conventional stud framing lined both sides.

These wall systems achieve good sound ratings and provide an effective measure against sound transmission and impact.

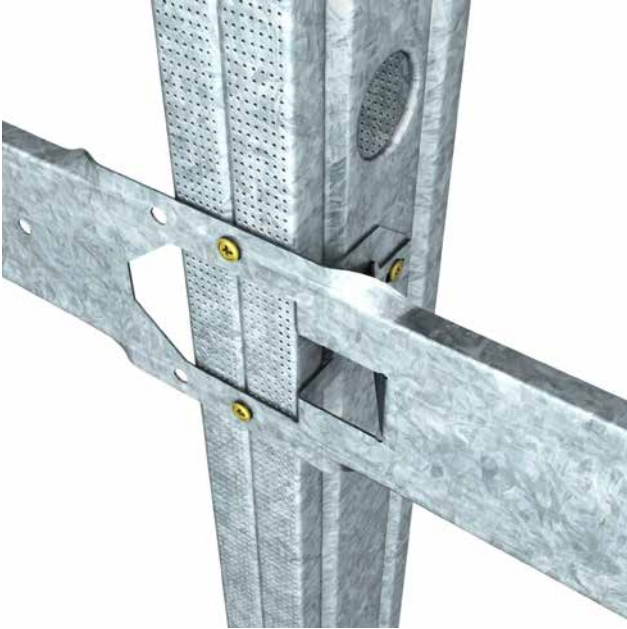
The standard staggered stud wall consists of 64mm studs installed within a 92mm base track and deflection head track. The studs are installed at up to 600mm centres either side of the wall.

Design Tables

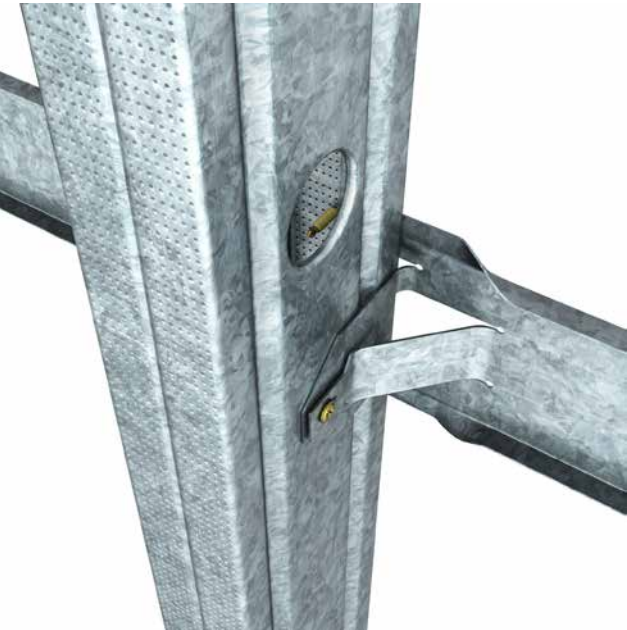
Refer to Rondo for staggered stud wall configurations.

Noggings

When noggings are required, the Rondo Fast-Fix nogging is to be used and requires the tab and stiffener to be bent out across the web of the stud and fixed in place with three (3) screws. Refer to Figure C2.7.1(A) and (B) below for details.



■ FIGURE C2.7.1(A): FAST-FIX NOGGING



■ FIGURE C2.7.1(B): FAST-FIX NOGGING

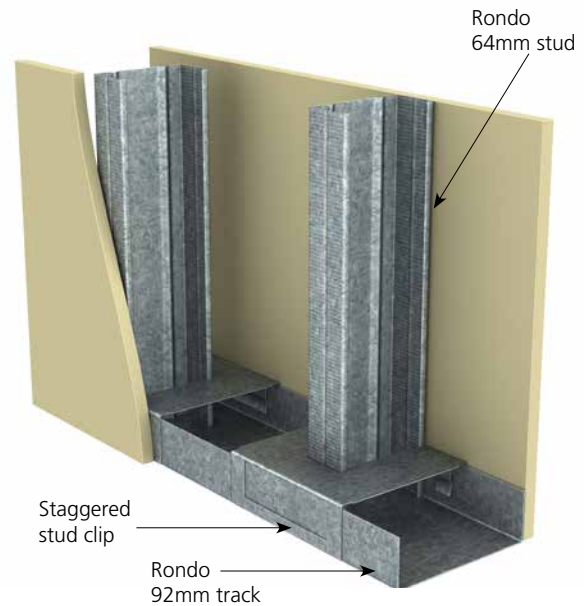
Connections

The Rondo design tables are produced assuming a rotational restraint to the wall stud at the head and wall track connections.

Head tracks in accordance with Table C2.4.2.1(A).

Staggered Stud Clip

The Staggered stud clip, Figure C2.7.1(C), can be installed when using the 64mm studs in a 92mm track.

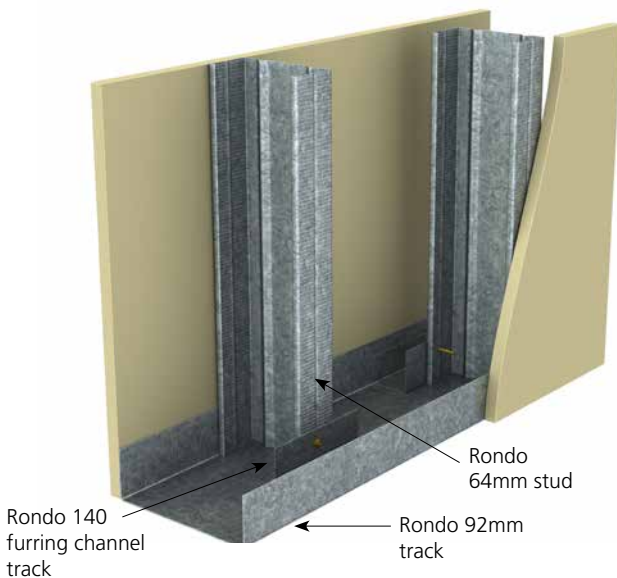


■ FIGURE C2.7.1(C): STAGGERED STUD CLIP

The clip will need to be screwed in place when used in the head track. In this instance, all screws are to be kept clear of the wall stud such that the stud may still slide within the clip.

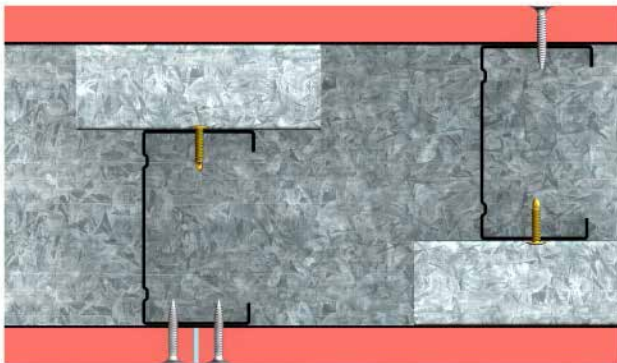
Typical Base Track Connections

When using other than a 64mm stud, blocking can be fitted within the tracks, refer Figure C2.7.1(D), to restrain the studs in position and prevent rotation.



■ FIGURE C2.7.1(D): TYPICAL STAGGERED STUD WALLS

In the base track, where no allowance for building movement is required, the Rondo #140 perimeter channel can be used up against the 64mm wall studs in a 92mm wall track with a screw fixing as shown in Figure C2.7.1(E) below.

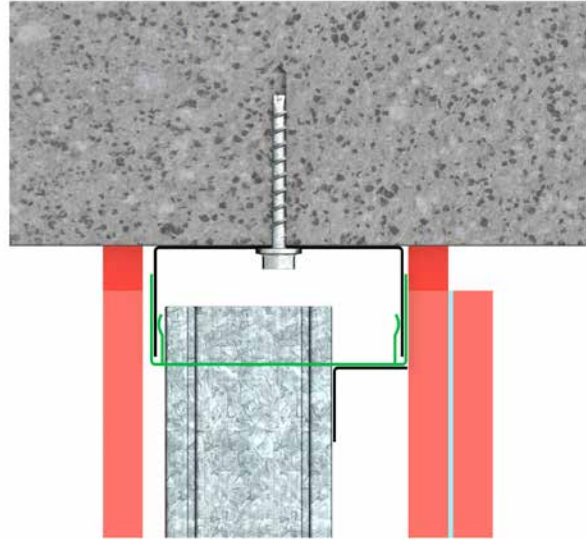


■ FIGURE C2.7.1(E): STAGGERED STUD BASE CONNECTION

When other studs are used, the #140 perimeter channel can be swapped with an appropriate angle (angle min gauge). In this instance the angle needs to be connected to the wall track which can be achieved using two PAF's. The fastener in this instance is only connecting the angle to the track and is not considered as the primary wall anchor.

Typical Head Track Connections

For the head track, building movement is to be maintained. In this instance, the Rondo prepunched nogging track in the same size as the head track can be used in conjunction with a small angle up against the flange of the wall stud as shown in Figure C2.7.1(F) below.



■ FIGURE C2.7.1(F): STAGGERED STUD HEAD TRACK CONNECTION

Rondo Quietstud can be used for acoustic rated walls and are generally faster and easier to install than staggered stud systems.

Studs in staggered walls can require a nogging, for this use the Rondo FAST-FIX NOGGING®.

C2.7.2 CURVED WALLS

The following details have been found to be acceptable for plasterboard walls, however Rondo recommends confirming the installation details with the lining board manufacturer prior to commencing work on site.

Rondo produces a “flexible” track, which is pre-processed to allow it to be bent in the shape of a curve. The track can be shaped to form a continuous spline if necessary.

For curved walls, maximum wall heights are to be assessed using Tables C2.4.2.7(A) and C2.4.2.7(B) as applicable. Where the internal pressure exceeds 0.50kPa refer to Rondo for a design solution.

Whilst flexible, the minimum track inside radius should not be less than those specified below, for the nominated track size.

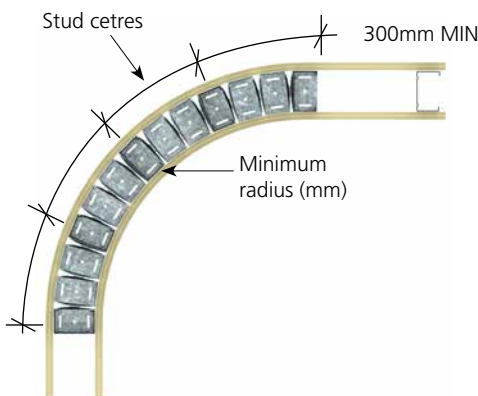


FIGURE C2.7.2(A) FLEXIBLE TRACK

TABLE C2.7.2(A): MINIMUM FLEXIBLE TRACK RADIUS

MINIMUM CURVING RADIUS FOR RONDO FLEXIBLE TRACKS	
NOMINAL TRACK SIZE (mm)	MINIMUM RADIUS (mm)
51	180
64	200
76	230
92	280
150	475

The flexible tracks are to be fixed at each stud location, for stud spacing 300mm or greater and thereafter, as required to maintain the correct radius. Fixing spacing is not to exceed 600mm centres under any circumstances.

The wall studs are to be fixed to both sides of the wall track using 1/#8G self-drilling screw per side, to prevent stud rotation.

When plasterboard lined walls are curved the stud spacing needs to be reduced to provide additional lateral restraint to the linings.

Do not use wetting agents that can damage the wall studs zinc coating when curving plasterboard. Potable water is recommended.

Table C2.7.2(B) provides the maximum stud spacing against the wall radius.

TABLE C2.7.2(B): CURVED WALL MAXIMUM STUD SPACING

PLASTER-BOARD THICKNESS (mm)	CURVING RADIUS (mm) FOR MAXIMUM STUD SPACING (mm)				
	900 - 2000	2001 - 2500	2501 - 3000	3001 - 4000	> 4000
6.50	150	300	350	450	550
10	150	300	350	400	500
13	-	250	300	400	500
16	-	-	-	250	350

NOTES:

- The above table has been reproduced from CSR’s published data. The lining board manufacturer should be consulted if different.
- Tighter radius may be possible, subject to manufacturers recommendations.

The 6.50mm thick plasterboard sheets, installed in two layers, will achieve quite tight radii. The additional weight of the second layer will not impact the wall design and it is recommended to use the 10mm wall height tables to assess the maximum allowable wall height for these linings.

Fire-rated walls may have further limitations on their use in curved walls and the lining board manufacturer is to be consulted.

Where flexible track is required to span between purlins or other structure, the tracks are to be strengthened using the following profiled cut plywood backing fixed to the web of the track.

TABLE C2.7.2(C): PLYWOOD STIFFENER

NOMINAL TRACK SIZE (mm)	PLYWOOD STRESS GRADE	PLYWOOD IDENTIFICATION
All tracks	F14	21-30-7

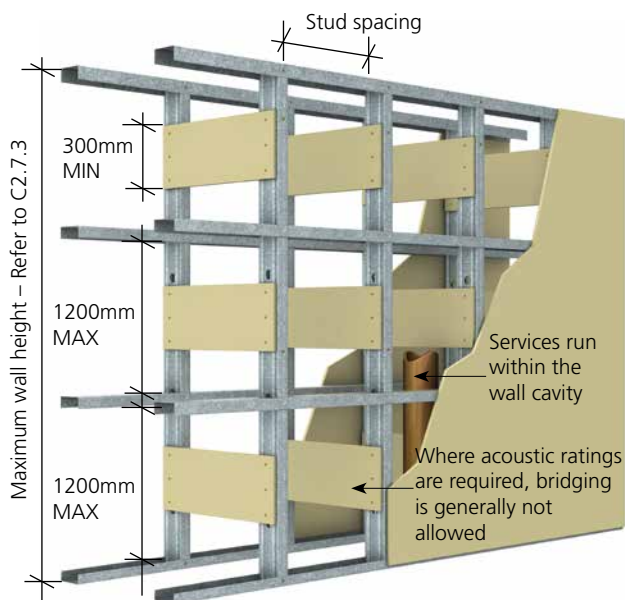
NOTES:

- The above table assumes the purlin spacing is not more than 1200mm.
- Maximum internal pressure not to exceed 0.50kPa.
- Plywood backing to be the same width as the nominal track size.
- 400mm deep plywood stiffener with the face grain parallel to the span.

C2.7.3 BRIDGED CHASE WALLS

Bridged chase walls can be used to conceal large bore pipes, services or the like provided there are no acoustic limitations.

The walls are constructed as two parallel skins of wall framing which are then cross braced at regular intervals to provide load sharing per Figure C2.7.3(A).



■ FIGURE C2.7.3(A): TYPICAL BRIDGED CHASE WALL

Deflection Head Tracks

The deflection head track gauge should be selected, as a minimum, per table C2.4.2.1(C1) based on the gauge of the wall studs derived from the maximum wall height design tables below.

Section C2.4.2.1(C1) provides additional limitations and assumptions for the Deflection Head tracks, all of which is still applicable for bridged chase walls.

0.50bmt Deflection Head Tracks are not to be used on bridged chase wall systems.

Noggings

The bridged chase wall maximum height tables have been prepared assuming noggings are installed in accordance with Table C2.7.3(A).

■ TABLE C2.7.3(A) NOGGINGS

WALL HEIGHT (mm)	NUMBER OF NOGGINGS REQUIRED
0 - 2100	1 row
2101 - 3150	2 rows
3151 - 4200	3 rows
4201 - 5250	4 rows
5251 - 6300	5 rows
6301 - 7350	6 rows

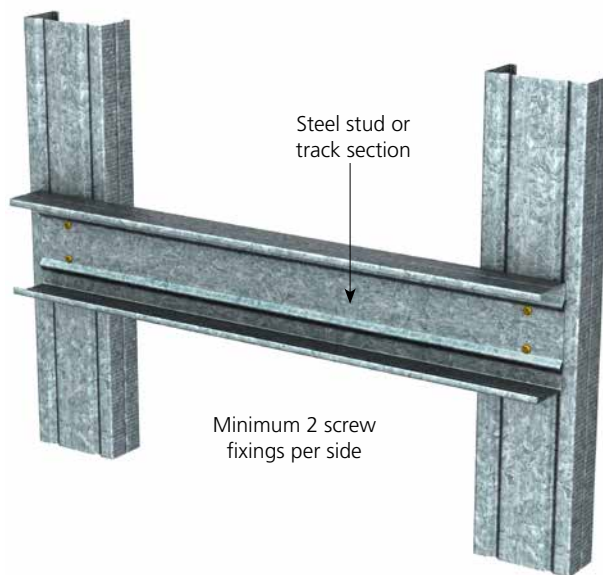
NOTE:

1. Noggings rows to be equally spaced over wall height.

The cross bracing (bridging) between the walls can be either stud or track sections or plasterboard sections however they must be installed at each noggging location unless noted otherwise, for example, ceiling loads transferred to walls under seismic actions in wall height tables. There are no point loads, concentrated loads or the like applied to the wall studs at any location. These loading scenarios require independent design evaluation.

Steel Stud Bridging

Steel stud sections may be used in the same gauge as wall studs to provide bridging between the two wall leaves.



■ FIGURE C2.7.3(B): STUD BRIDGING

The stud sections are to be installed using 2/#8G self-drilling screws to each stud typical.

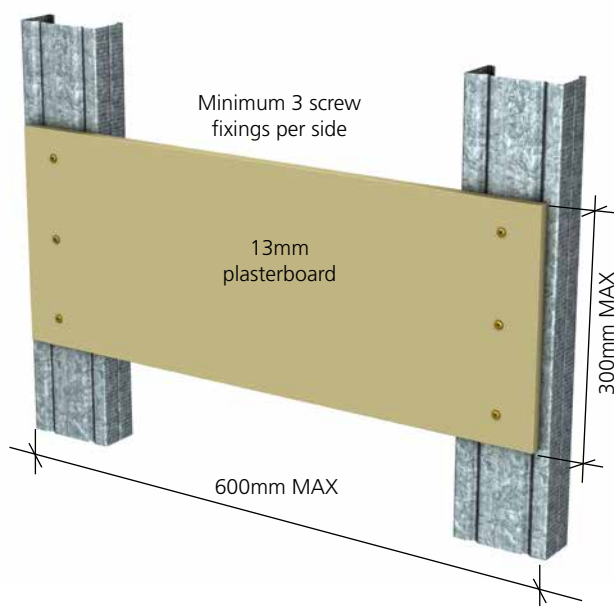
Plasterboard Bridging

Plasterboard sections to be 13mm minimum and 300mm deep.

Maximum cavity width for plasterboard, not to exceed 600mm between centre of walls.

Minimum screw edge distance to be 15mm.

Refer to Rondo for plasterboard bridging wall applications.



■ FIGURE C2.7.3(C): STUD BRIDGING

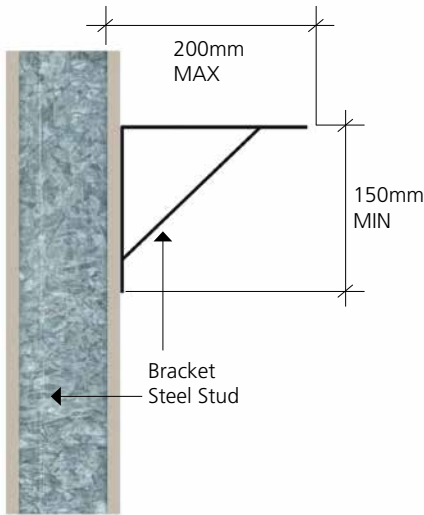
C2.8 SHELF LOADING

Shelf loading to wall studs is a complex issue and requires a known configuration to solve the problem.

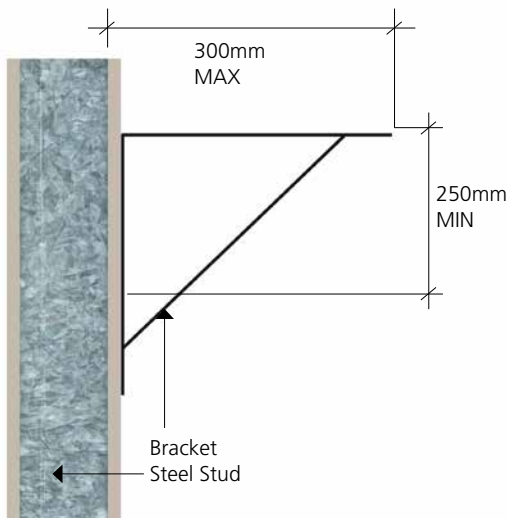
The following information is provided as an example, however, should your installation differ from these details contact Rondo for a specific design solution.

The shelf projection should be measured from the outer fac of the support back to the face of the stud ie; include the wall linings.

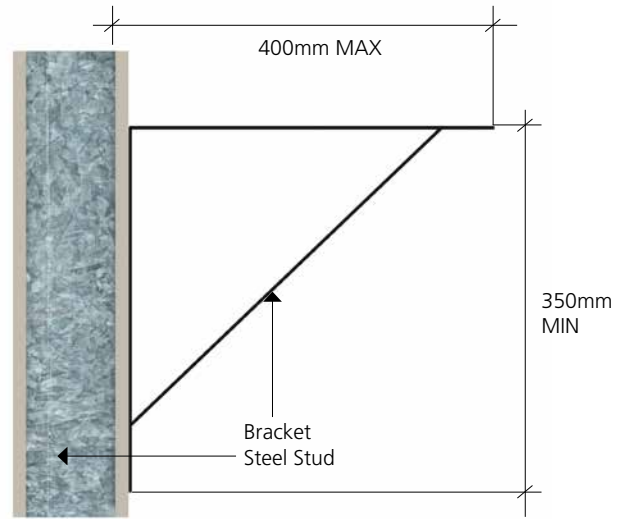
The scrow spacing is a key element in achieving the nominated loads. If the actual scrow spacing is between the dimensions listed below always use the bracket type which gives a smaller scrow spacing.



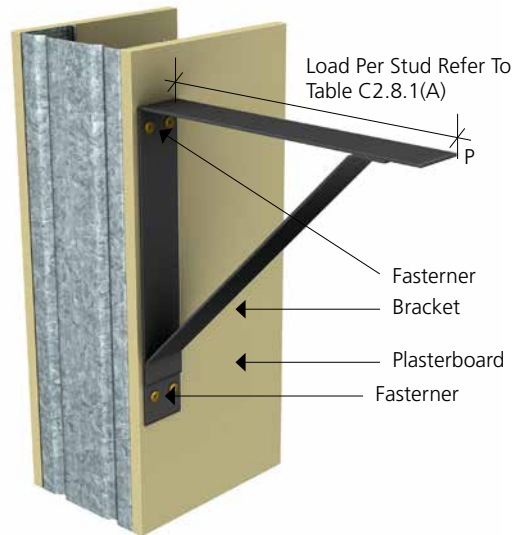
■ FIGURE C.2.8.1(A) TYPE 1 BRACKET



■ FIGURE C.2.8.1(B) TYPE 2 BRACKET



■ FIGURE C.2.8.1(C) TYPE 3 BRACKET



■ FIGURE C.2.8.1(D) FASTENERS FOR BRACKETS

■ TABLE C2.8.1: MAXIMUM BRACKET LOADING

STUD GAUGE (bmt)	MAXIMUM LOADING "P" PER STUD (kg)		
	TYPE 1	TYPE 2	TYPE 3
0.50	34	38	40
0.55	37	41	44
0.75	51	57	60
1.15	78	87	92

"P" is the imposed load to be put on the shelf. The design table considers all necessary load factors and combinations.

The above table requires 2/#10G self-drilling screws to be used at both the top and bottom of the bracket.

For alternative scrow fastener details refer to Section C2.6.4(B).

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