MiTek®

SHORT WALL BRACING GUIDE

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MITEK SHORT WALL BRACING GUIDE

INTRODUCTION

Contemporary house plans offer large open living spaces with minimal walls. This presents challenges with providing adequate bracing for lateral stability of the build. As such, there is a need to optimize the available short length of walls for bracing capacity. Current timber framing standard AS 1684 does not offer adequate bracing elements for short walls. As per AS 1684, any strap braced element is limited to min. 1800mm length and any sheet braces wall is limited to min. 900mm length to develop full capacity.

MiTek Short Wall Bracing Solutions offers medium and high-capacity bracing options to suit short length of walls in contemporary residential and commercial builds.

MSWB SOLUTIONS

MSWB: MiTek Short Wall Braces: High-performance bracing elements for short lengths of walls.

MSWB are MiTek high performance wall braces for short lengths of walls, providing significant bracing capacities where AS 1684 – Residential timber framing standards, does not provide a bracing solution. Ideal for domestic and commercial projects alike MSWB S, D and T are MiTek medium capacity strap braced short walls offering capacities to as short as 600mm length of walls.

MiTek MSWB13, MSWB20, MSWB25, MSWB30 and MSWB40 are nail-plated trussed wall braces offering capacities to as short as 450mm length of walls.

MSWB P25, MSWB P30, MSWB P36 and MSWB P40 are MiTek Posi-Strut Short Wall Brace offering capacities to as short as 340mm length of walls

Medium Capacity	
MSWB S	Single Cross Strap Brace using MiTek PS2030 or SB
MSWB D	Double Cross Strap Brace using MiTek PS2030 or SB
MSWB T	Triple Cross Strap Brace using MiTek PS2030 or SB

High Capacity	
MSWB 13	Nail Plated Truss Brace with 13kN of hold-down in 20MPa concrete.
MSWB 20	Nail Plated Truss Brace with 20kN of hold-down in 20MPa concrete.
MSWB 25	Nail Plated Truss Brace with 25kN of hold-down in 20MPa concrete.
MSWB 30	Nail Plated Truss Brace with 30kN of hold-down in 20MPa concrete.
MSWB 40	Nail Plated Truss Brace with 40kN of hold-down in 20MPa concrete.
MSWB P25	Posi-Strut Short Wall Brace with 30kN of hold-down in 20MPa concrete.
MSWB P30	Posi-Strut Short Wall Brace with 30kN of hold-down in 20MPa concrete.
MSWB P36	Posi-Strut Short Wall Brace with 32kN of hold-down in 20MPa concrete.
MSWB P40	Posi-Strut Short Wall Brace with 32kN of hold-down in 20MPa concrete.

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GENERAL NOTES FOR DESIGN GUIDE

1. MSWB can be installed independently in a wall frame and between openings. Design of opening jamb studs and related elements in a load bearing wall is to be independent of the brace walls. All wall frame plates and common studs to be designed for project loading conditions in addition to wall braces.
2. Unless specified, adjust capacity of MSWB S, D and T braces to height of wall using multipliers as below. Not to be used for any other MSWB:

Wall Height (H)	2700	3000	3300	3600	3900	4200
Cap. Multiplier	1.0	0.9	0.8	0.75	0.7	0.64

3. Specified wall heights are nominal for strap brace walls. As such capacity of 2400mm wall height can be used for walls 2200mm – 2500mm height, 2700mm for 2500mm - 2800mm height; 3000mm for 2800mm – 3100mm height.
4. MSWB have specified hold-down requirements to floor below or to concrete foundations. Refer typical details for hold down fixings. These requirements need consideration in floor bearer design or foundation design and are to be provided by the building designer or building contractor for recommended performance.
5. Nominated design capacities include contribution from plasterboard cladding fixed to one face of the brace wall for external walls and both faces for internal walls.
6. All capacities in capacity tables are in kN (kilonewton)
7. MSWB are high performance elements. They are not to be notched, cut, modified or drilled for any purpose or services. Specific design for other heights and widths are by specific design by MiTek Engineers only.

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MSWB STRAP BRACES

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MSWB STRAP BRACES

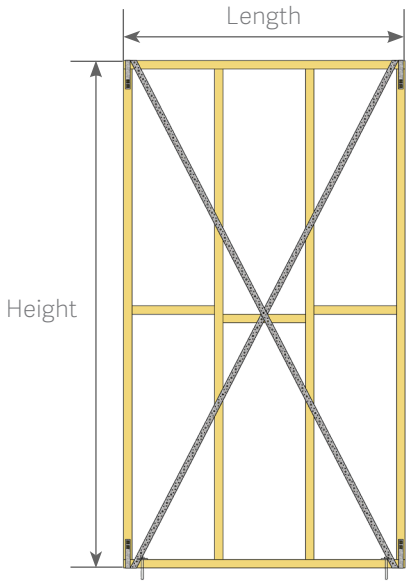
DESIGN NOTES FOR STRAP BRACE MSWB

1. All Strap Braces use MiTek PS2030 Structural Bracing Strap with tensioner and PT409 + SL125 plate ties at end/ critical stud to plate connections. Noggings are required at mid-height of strap brace panels as standard. All straps are to be wrapped around the plate and installed using MiTek 30 x 2.8mmØ reinforced head nails. Refer typical details for strap brace fixing and critical end stud fixing.
2. Size and grade of studs, top plates and bottom plates are as per specific details for walls in up to N3 wind rating builds. Timber grade is MGP10 unless specified otherwise. Gravity loads are not accounted for in strap bracing wall design. As such, design the wall frame plates and common studs for project loading conditions in addition to wall braces.
3. The angle of brace is to be maintained at 45 to 60 degrees to horizontal.

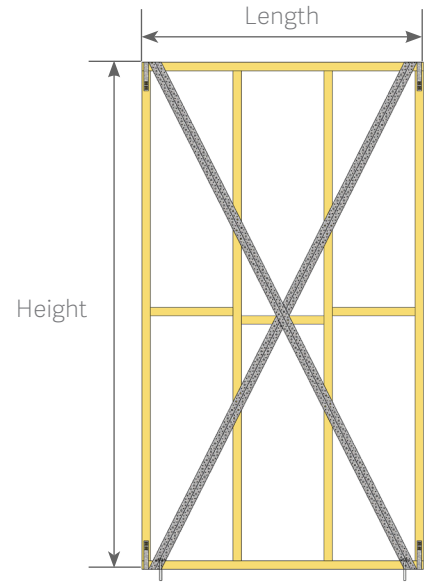
MSWB S

MSWB S is a brace wall with single cross brace on one face of the wall with plasterboard on other face of the wall. The cross formation may comprise single PS2030 strap brace or doubled up PS2030 strap brace. This brace may be installed in an internal or external wall with incremental capacities.

Specification and Connections		Height	Top Plate	Bottom Plate	Critical End Studs
	External Wall	2400	70x45 P10	70x45 P10	70x45 P10
		2700	90x35 P10	90x45 P10	90x45 P10
		3000	90x45 P10	90x45 P10	90x45 P10
	Internal Wall	2400	70x45 P10	70x45 P10	70x45 P10
		2700	70x45 P10	70x45 P10	70x45 P10
		3000	90x45 P10	90x45 P10	90x45 P10



Single Strap



Double Strap

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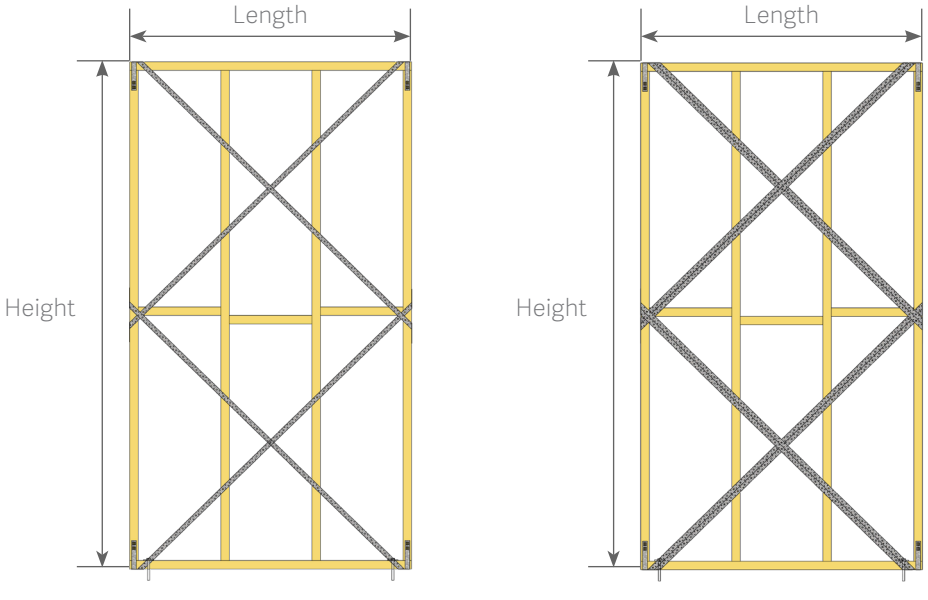
Capacity Table	Single Strap Brace								
Frame Height (mm)	2400			2700			3000		
Brace Length(mm)	1700	1600	1500	1700	1600	1500	1700	1600	1500
External Wall (kN)	3.76	3.61	3.44	3.46	3.31	3.16	3.20	3.06	2.91
Internal Wall (kN)	4.27	4.09	3.89	3.97	3.82	3.67	3.71	3.52	3.42

Capacity Table	Double Strap Brace								
Frame Height (mm)	2400			2700			3000		
Brace Length(mm)	1700	1600	1500	1700	1600	1500	1700	1600	1500
External Wall (kN)	5.11	4.90	4.69	4.71	4.51	4.29	4.36	4.16	3.95
Internal Wall (kN)	5.62	5.38	5.14	5.22	4.99	4.74	4.87	4.64	4.40

MSWB D

MSWB D is a brace wall with strap brace forming a double cross on one face of the wall with plasterboard on other face of the wall. The cross formation may comprise single PS2030 strap brace or doubled up PS2030 strap brace. This brace may be installed in an internal or external wall with incremental capacities.

Specification And Connection		Height	Top Plate	Bottom Plate	Critical End Studs
	External Wall	2400	90x35 P10	90x45 P10	90x35 P10
		2700	90x45 P10	90x45 P10	90x45 P10
		3000	90x45 P10	90x45 P10	90x45 P10
	Internal Wall	2400	70x45 P10	70x45 P10	70x45 P10
		2700	70x45 P10	70x45 P10	70x45 P10
		3000	90x45 P10	90x45 P10	90x45 P10



Single Strap Double Strap

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Capacity Table

Single Strap Brace											
Frame Height (mm)	2400										
Brace Length (mm)	1700	1600	1500	1400	1300	1200	1100	1000	900	800	700
External Wall (kN)	5.16	5.04	4.91	5.16	4.60	4.41	4.20	3.96	3.70	3.41	3.08
Internal Wall (kN)	5.67	5.52	5.36	5.18	4.99	4.77	4.53	4.26	3.91	3.65	3.08

Capacity Table

Double Strap Brace											
Frame Height (mm)	2400										
Brace Length(mm)	1700	1600	1500	1400	1300	1200	1100	1000	900	800	700
External Wall (kN)	7.02	6.86	6.68	7.02	6.25	6.00	-	-	-	-	-
Internal Wall (kN)	7.53	7.34	7.13	6.90	6.25	6.00	-	-	-	-	-

Capacity Table

Single Strap Brace											
Frame Height (mm)	2700										
Brace Length(mm)	1700	1600	1500	1400	1300	1200	1100	1000	900	800	700
External Wall (kN)	4.95	4.82	4.67	4.95	4.34	4.14	3.93	3.69	3.43	3.14	2.83
Internal Wall (kN)	5.46	5.30	5.12	4.93	4.73	4.50	4.26	3.99	3.70	3.14	2.83

Capacity Table

Double Strap Brace											
Frame Height (mm)	2700										
Brace Length(mm)	1700	1600	1500	1400	1300	1200	1100	1000	900	800	700
External Wall (kN)	6.73	6.55	6.36	6.73	-	-	-	-	-	-	-
Internal Wall (kN)	7.23	7.03	6.36	6.73	-	-	-	-	-	-	-

Capacity Table

Single Strap Brace											
Frame Height (mm)	3000										
Brace Length(mm)	1700	1600	1500	1400	1300	1200	1100	1000	900	800	700
External Wall (kN)	4.73	4.60	4.45	4.73	4.10	3.90	3.68	3.44	3.19	2.91	2.62
Internal Wall (kN)	5.24	5.08	4.90	4.70	4.49	4.26	4.01	3.74	3.46	2.91	2.62

Capacity Table

Double Strap Brace											
Frame Height (mm)	3000										
Brace Length(mm)	1700	1600	1500	1400	1300	1200	1100	1000	900	800	700
External Wall (kN)	6.44	6.25	6.05	6.44	-	-	-	-	-	-	-
Internal Wall (kN)	6.44	6.25	6.05	6.44	-	-	-	-	-	-	-

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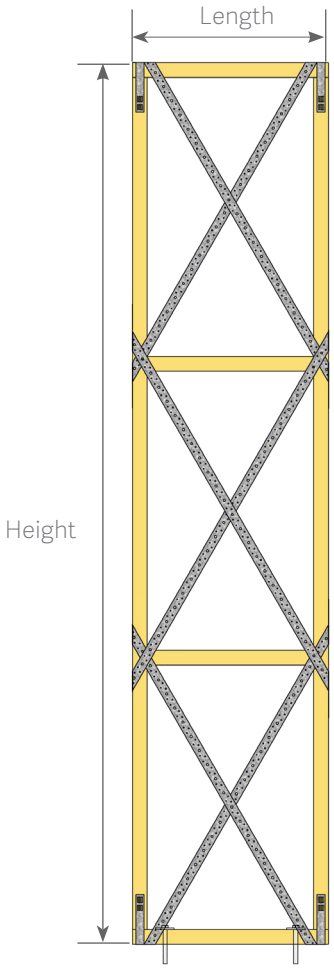
MSWB T

MSWB T is a brace wall with strap brace forming a triple cross on one face of the wall with plasterboard on other face of the wall. The cross formation comprises single PS2030 strap brace. This brace is a high-performance element and can be used in external and internal walls alike.

Specification and Connections		Height	Top Plate	Bottom Plate	Critical End Studs
	External Wall Internal Wall	2400	90x35 P10	90x45 P10	90x35 P10
		2700	90x45 P10	90x45 P10	90x45 P10
		3000	90x45 P10	90x45 P10	90x45 P10



Capacity Table	Single Strap Brace					
Frame Height (mm)	**2400**		**2700**		**3000**	
Brace Length(mm)	700	600	700	600	700	600
Capacity (kN)	2.8	2.6	2.7	2.2	2.6	2.1

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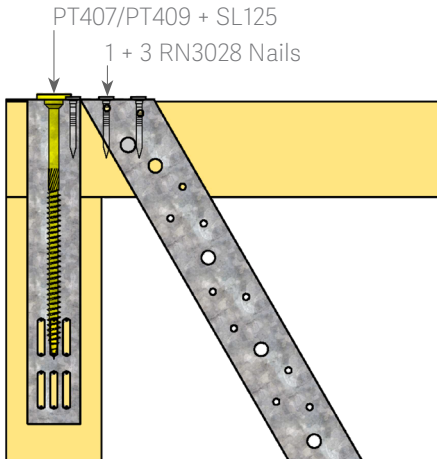
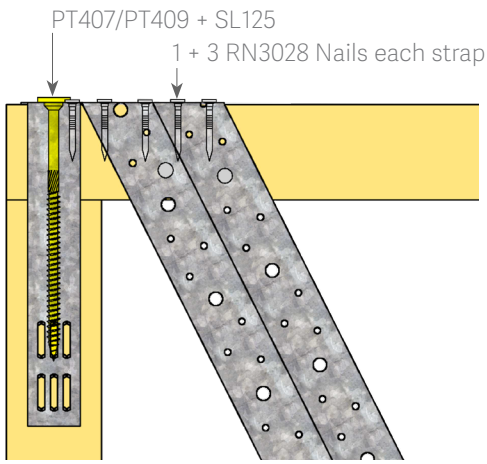
TYPICAL DETAILS

STUD TO TOP PLATE CONNECTION – MSWB S, D, T

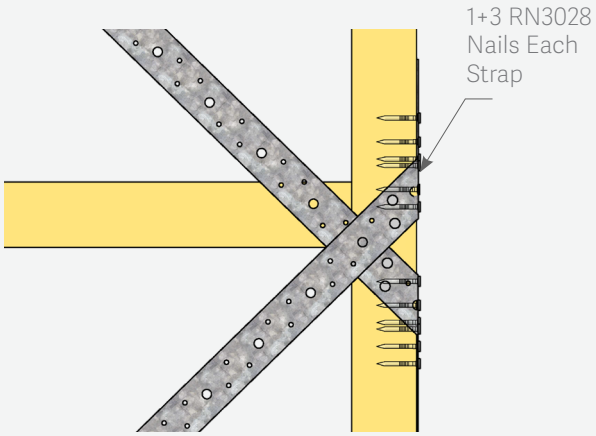


Single Strap

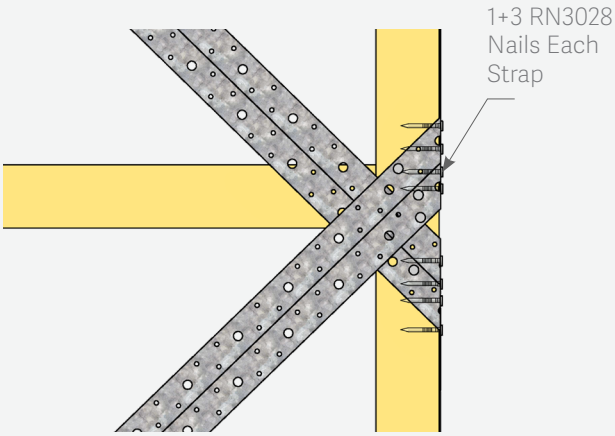


Double Strap

BRACING STRAP WRAP AROUND DETAIL



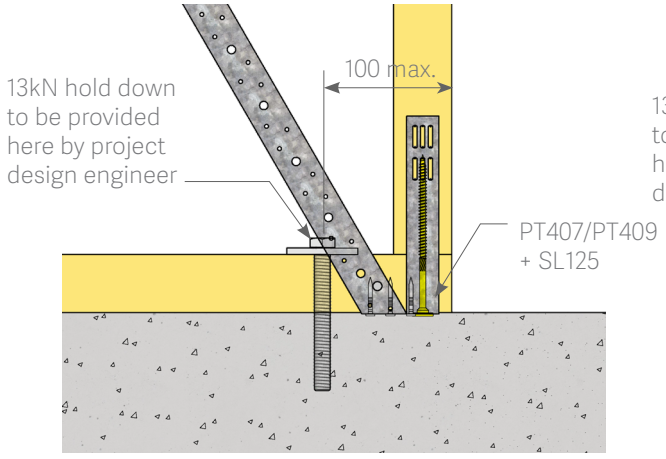
Single Strap



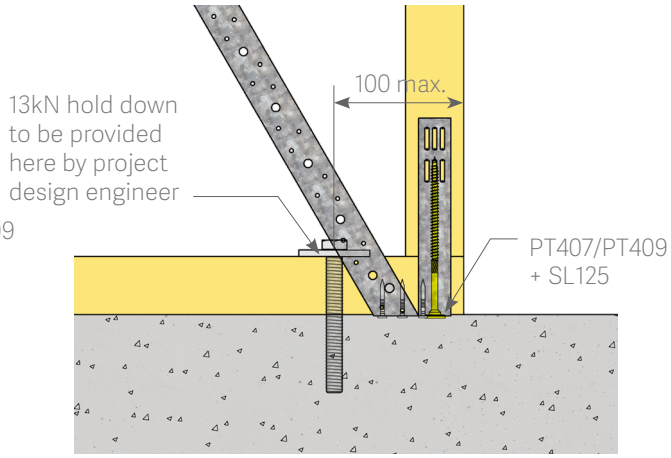
Double Strap

BOTTOM PLATE TO LOWER LEVEL CONECTION

To concrete foundation



Single Strap



Double Strap

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MSWB TRUSS BRACES

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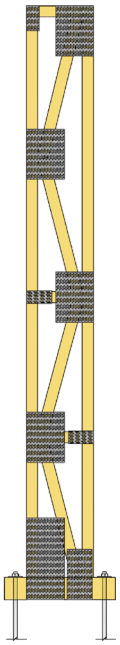
MSWB TRUSS BRACES

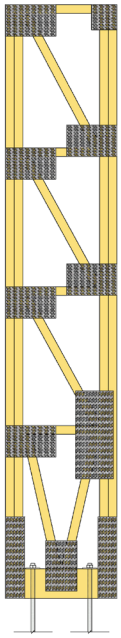
DESIGN NOTES FOR TRUSS MSWB

1. Nominated design capacities include contribution from plasterboard cladding fixed to one face of the brace wall.
2. Use appropriate tiedown requirements as per nomination. Hold Down to be provided by Project Design Engineer while considering lower level design. Refer to Appendix for a chemical anchor solution up to 32kN capacity.

MSWB 13, MSWB 20



MSWB 25, MSWB 30, MSWB 40



Capacity Table (kN)		Connection To Top Plate		Tiedown Capacity	Frame Height	450mm	600mm	750mm	900mm
		Top Plate Timber And Grade	Connection Detail						
	MSWB 13	45 x 90 MGP12	MSA1465 or No 14 x 75mm Type 17 Timber Screws from Top Plate to MSWB-Type 1 at 75mm CTRS	13kN	2400	2.1	2.8	3.8	4.8
					2700	1.9	2.6	3.4	4.3
					3000	1.7	2.3	3.0	3.9
	MSWB 20			20kN	2400	3.4	4.6	5.9	7.5
					2700	3.0	4.1	5.2	6.6
					3000	2.7	3.7	4.7	6.0
	MSWB 25	2- 90 x 35 MGP12	MSA1465 or No 14 x 75mm Type 17 Timber Screws from Top Plate to MSWB-Type 2 at 75mm CTRS	25kN	2400	3.3	4.8	6.4	9.3
					2700	2.9	4.3	5.7	8.3
					3000	2.6	3.9	5.1	7.5
	MSWB 30			30kN	2400	3.9	5.8	7.7	11.2
					2700	3.5	5.2	6.8	10.0
					3000	3.1	4.7	6.1	9.0
	MSWB 40			40kN	2400	5.3	7.8	10.3	-
					2700	4.7	6.9	9.1	-
					3000	4.2	6.2	8.2	-

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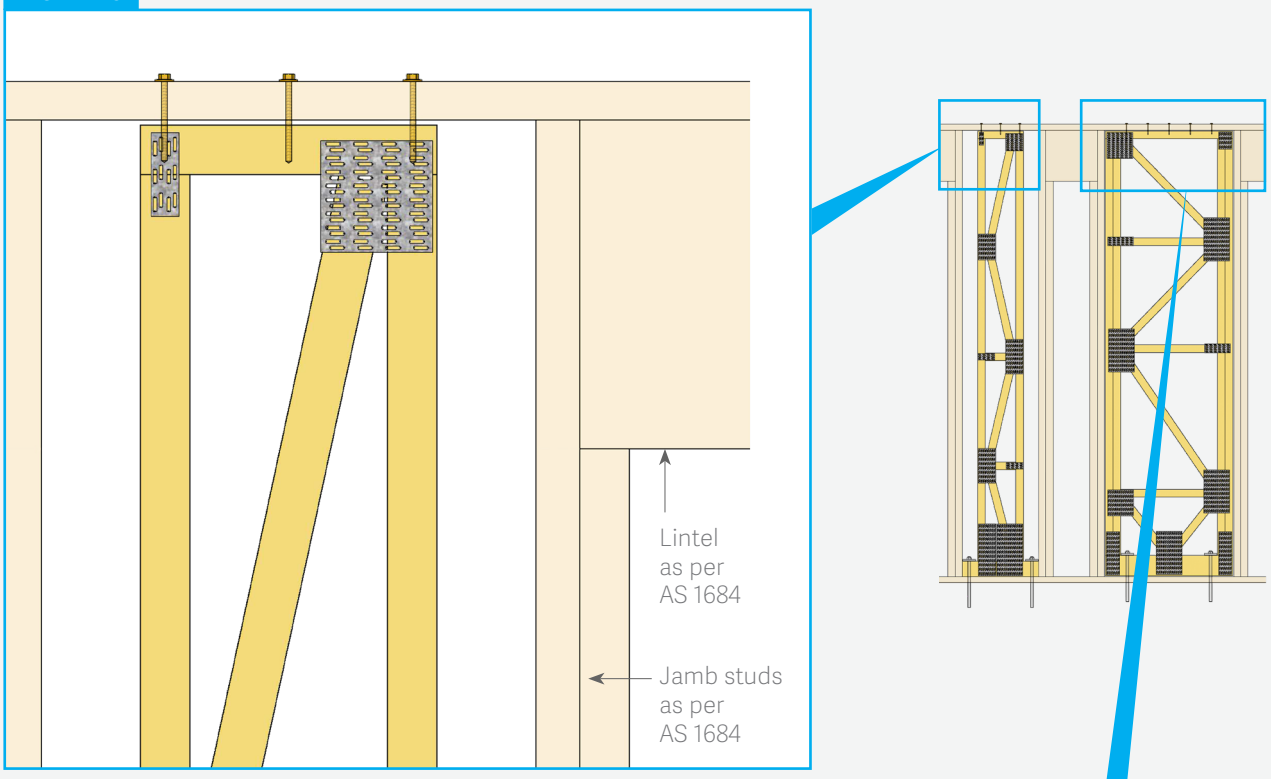
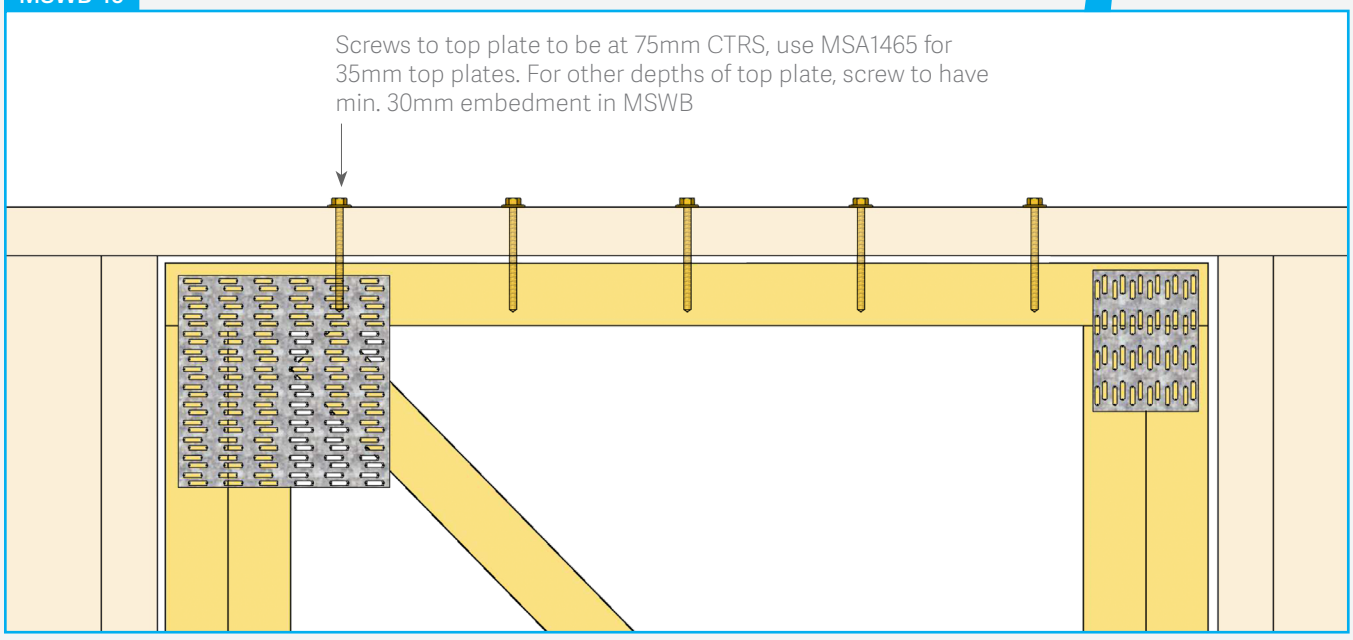
TYPICAL CONNECTION

MSWB TOP PLATE CONNECTION [TYPICAL]

MSWB 13, MSWB 20



MSWB 25, MSWB 30, MSWB 40



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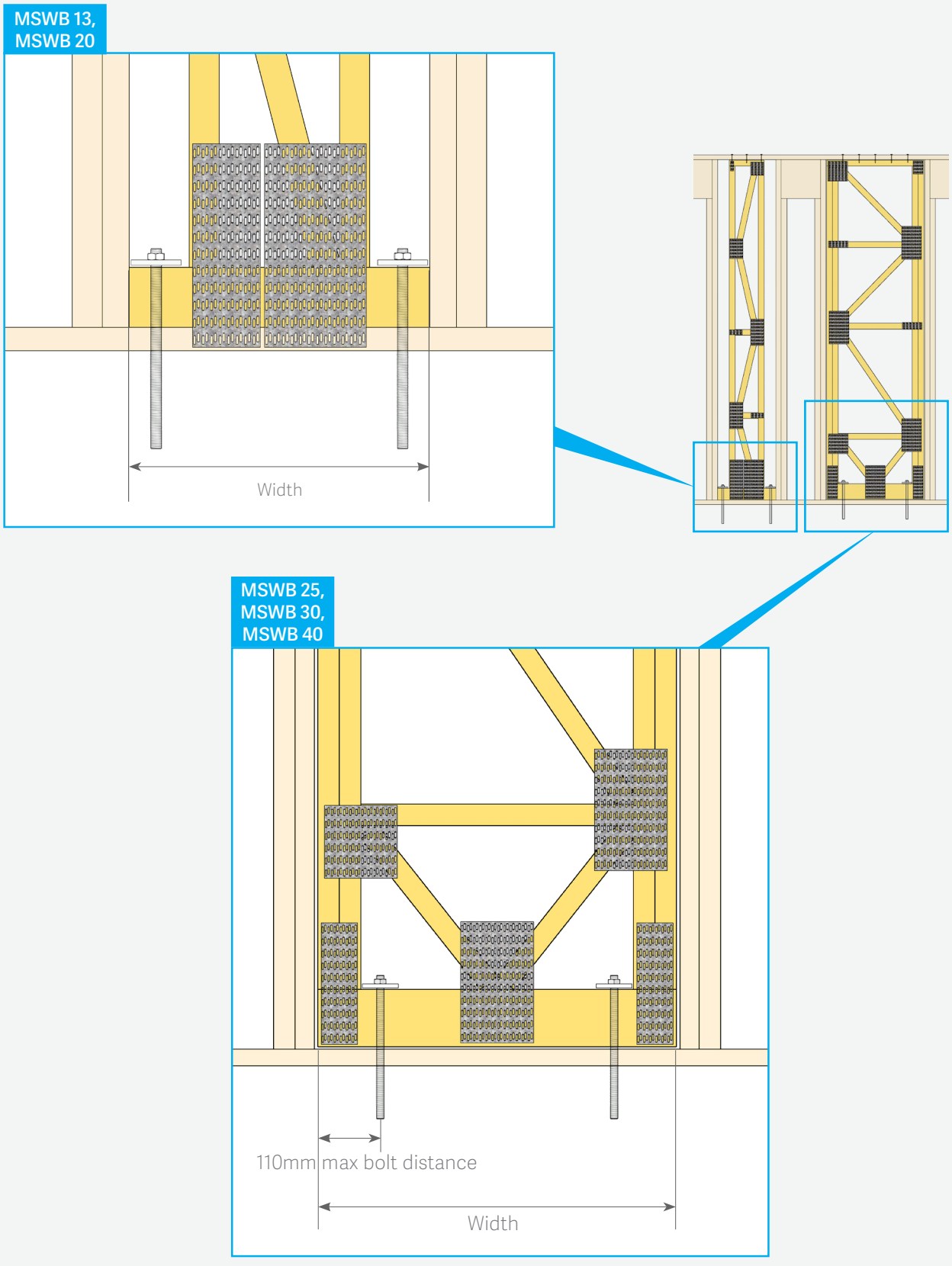
TYPICAL CONNECTION (CONTINUED)

MSWB BOTTOM PLATE CONNECTION [TYPICAL]



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POSI-STRUT SHORT WALL BRACE

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MSWB POSI-STRUT SHORT WALL BRACE

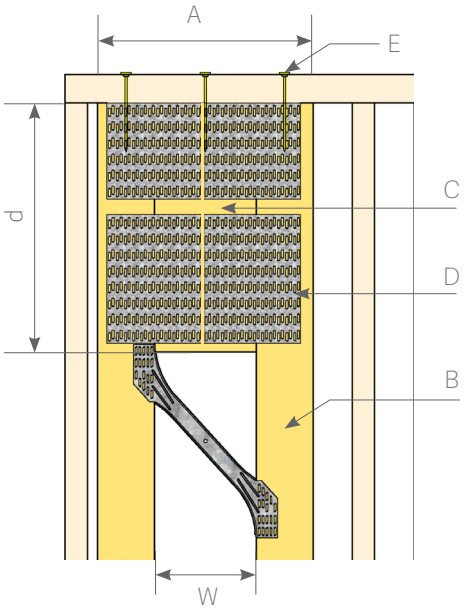
DESIGN NOTES FOR POSI-STRUT SHORT WALL BRACE MSWB

1. Specified wall heights are nominal for brace walls. As such capacity of 2400mm wall height can be used for walls 2200mm – 2500mm height, 2700mm for 2500mm - 2800mm height; 3000mm for 2800mm – 3100mm height.
2. MSWB elements require a hold-down capacity of up to 32kN to the floor below or to concrete foundations. The Brace Boot allows M16 bolts to be used as hold down. Refer to Appendix for more details on chemical anchors and hold downs.
   Please refer to the typical details for guidance on appropriate hold-down fixings. These hold down requirements must be considered in the design of floor bearers and/or foundations. It is the responsibility of the building designer or building contractor to ensure the structural components are designed to meet these performance requirements.
3. Nominated design capacities include contribution from plasterboard cladding fixed to one face of the brace wall for external walls and both faces for internal walls.
4. Laminate all timber plies with framing nails at 150mm c/c staggered.

MANUFACTURING SPECIFICATIONS AND CONNECTIONS

Manufacturing Specification and Connections	MSWB Type Manufacturing Ht 3m	Width of Brace	Min. Chord Sizes and Grades	2 – 45mm Block Size and Joint Group*	Nail Plate Sizes One Face Install Only	StudLok Screws to Top Plate
		A	B	C (W X d)	D	E
	MSWB P25	338mm	2- 90 x 45 [MGP12]	158 x 585 – JD4	GQ200150 + 2-GQ150150	6- SL125/SL170
	MSWB P30	392mm		212 x 585 – JD4	GQ200150 + 2-GQ150150	8- SL125/SL170
	MSWB P36	450mm		270 x 360 – JD4	GQ200150 + GQ150150	8- SL125/SL170
	MSWB P40	502mm		322 x 360 – JD4	GQ200150 + GQ150150	10- SL125/SL170

*End block substitution list: Meyer LVL15, Wesbeam eBeam



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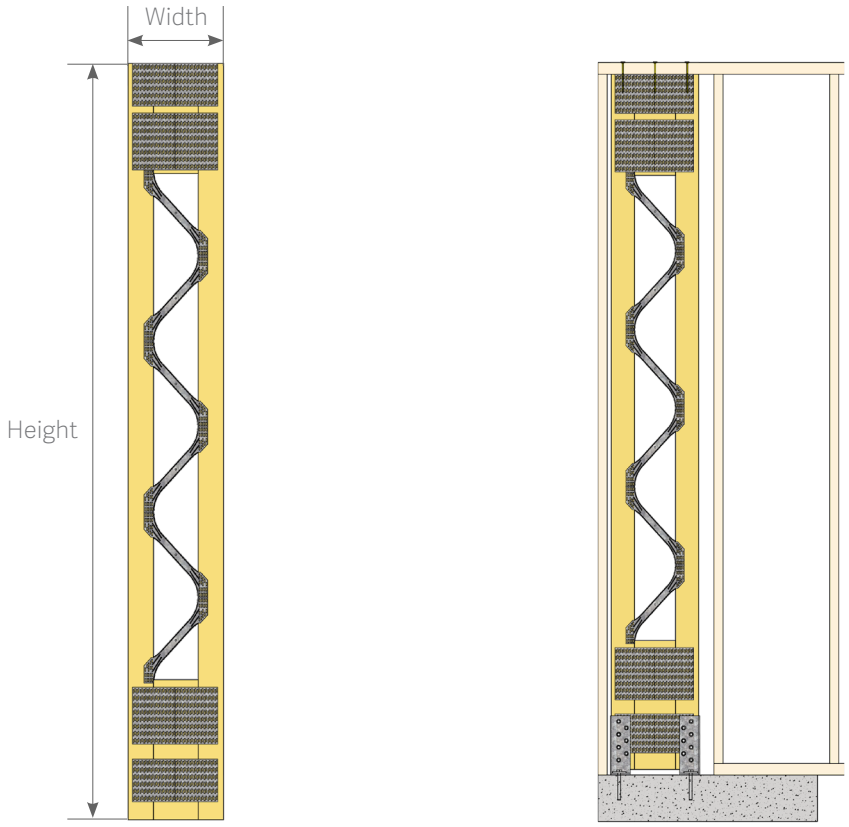

Table 1: Max. Capacity of braces in kN

		Nominal Width of Brace (W)	2400mm (H)	2700mm (H)	3000mm (H)	Hold Down
Capacity Table	MSWB P25	340mm	3.26	2.93	2.57	30kN
	MSWB P30	400mm	4.34	3.92	3.45	30kN
	MSWB P36	450mm	5.42	5.00	4.53	32kN
	MSWB P40	510mm	6.27	5.67	5.01	32kN

Table 2: Capacity of wall braces in kN for max. 15kN hold-down

		Nominal Width of Brace (W)	2400mm (H)	2700mm (H)	3000mm (H)	Hold Down
Capacity Table	MSWB P25	340mm	1.93	1.72	1.55	15kN
	MSWB P30	400mm	2.27	2.02	1.82	15kN
	MSWB P36	450mm	2.63	2.34	2.11	15kN
	MSWB P40	510mm	2.96	2.63	2.37	15kN

Note: Capacity of MSWB if the hold down is capped to 15kN

MiTek Installation Kit	Products	Pcs.
	Hold Down Brace Boots	2
	50mm x 5mm Square Washers	2
	MiTek MSA1430 screws	30
	Posi-Strut Short Wall Brace Installation Template	1

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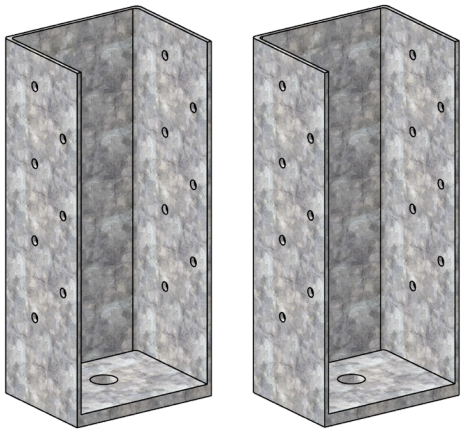
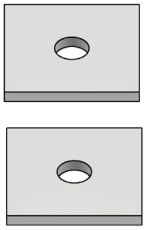




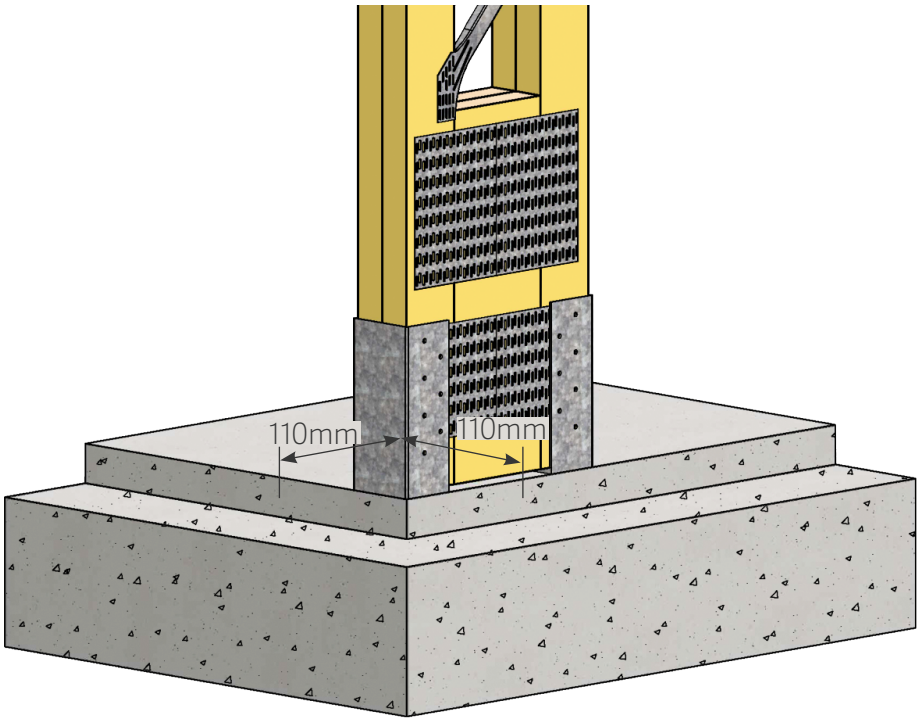
x 30 units per kit

x 1 template per kit

INSTALLATION INSTRUCTIONS

Pre-Install of Braces

1. **Caution: DO NOT trim Posi Short Wall Brace prior to complete installation of Hold Down Brace Boots.**
2. Use provided **Posi-Strut Short Wall Brace Installation Guide** to position the hold down bolts as per Project Design Engineer's recommendations. Allow hold down to season if using Chemical Anchor.



3. Use provided 50mm x 5mm Square washers to install hold down brace boots. Ensure the bolt head/ nut heads/ hold down rods are trimmed to approximately same level to seat Posi Braces

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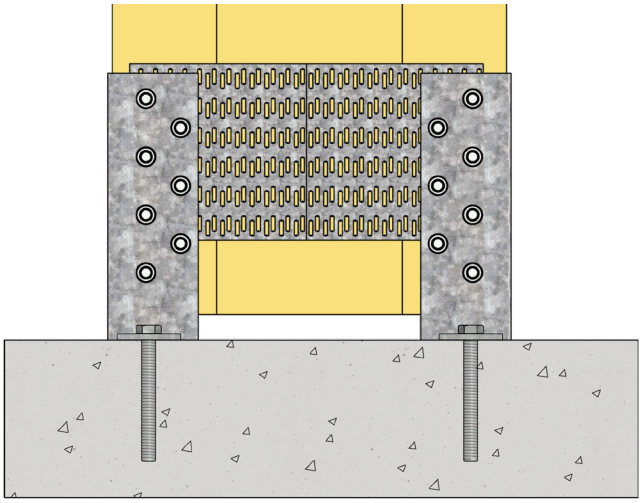
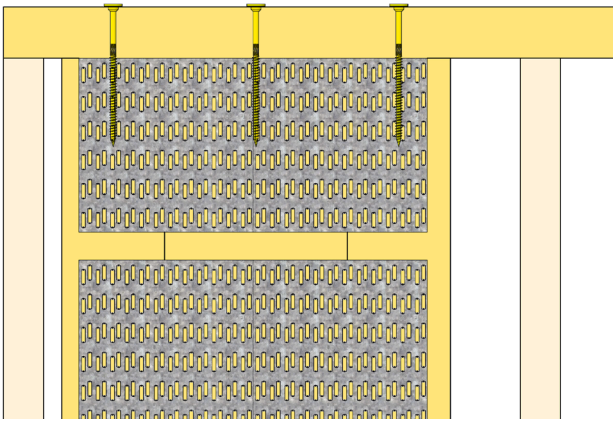


4. Trim Posi-Strut Short Wall Brace **equally from top and bottom** to fit the wall frame (under the top plate). Insert the trimmed Posi-Strut Short Wall Brace in the brace boots. Check plumb, line and level of Posi-Strut Short Wall Brace secure in place using provided MSA screws to all holes. It is acceptable to trim through the nail plate for height adjustment of Posi Wall Brace.
5. Secure the Posi-Strut Short Wall Brace to Top Plate of wall frame using StudLok screws as recommended in connection specification in Table 'Specification and Connections'



RETRO-FITTING BRACES

1. **Caution: DO NOT trim Posi Short Wall Brace prior to complete installation of Hold Down Brace Boots.**
2. Trim the bottom plate of wall frame (if needed) as per the provided **Posi-Strut Short Wall Brace Installation Guide**. Reinforce the bottom plate each end of cut using 6 concrete nails spaced at 50mm c/c staggered.
3. Use provided template to position the hold down bolts as per Project Design Engineer's recommendations. Allow hold down to season if using Chemical Anchors.
4. Use provided 50mm x 5mm square washers to install hold down brace boots.
5. Trim Posi-Strut Short Wall Brace **equally from top and bottom** to fit the wall frame (under the top plate). Insert the trimmed Posi-Strut Short Wall Brace in the brace boots. Check plumb, line and level of Posi-Strut Short Wall Brace secure in place using provided MSA screws to all holes. It is acceptable to trim through the nail plate for height adjustment of Posi Wall Brace.
6. Secure the Posi-Strut Short Wall Brace to Top Plate of wall frame using StudLok screws as recommended in connection specification in Table 'Specification and Connections'.

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APPENDIX

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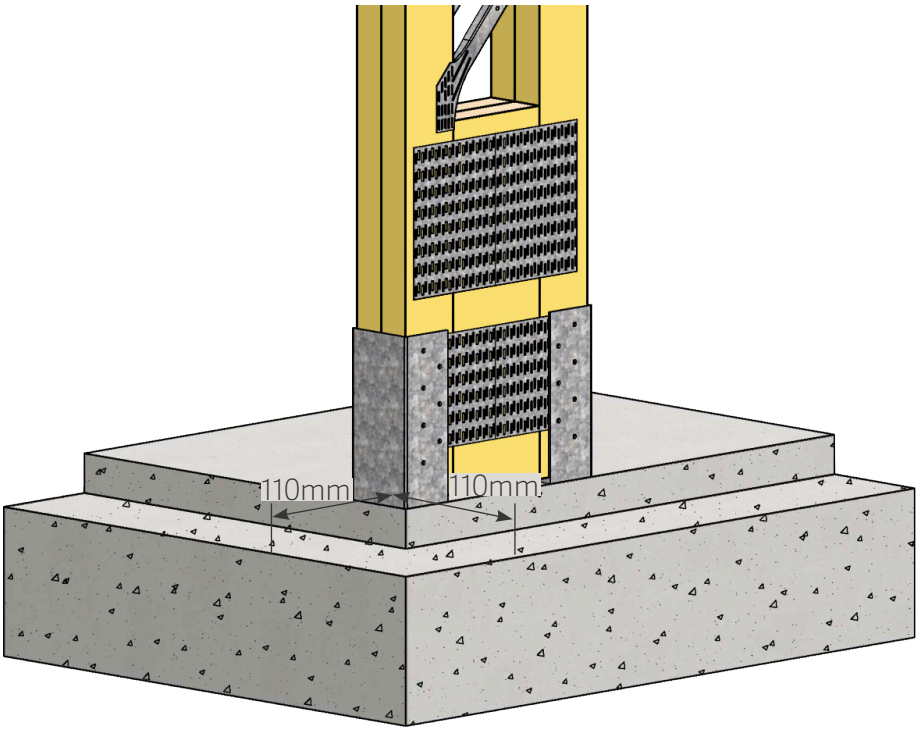
APPENDIX

Installation of Brace Boots using Chemical Anchors for 32kN Hold Down Capacity.



Design Parameters	Concrete Grade	Depth of Concrete
	20MPa	250mm minimum
	25MPa	200mm minimum

1. Edge distance from side and face: 110mm minimum
2. Bolt Size: M16 8.8S minimum (Designed for cracked concrete in accordance with AS 5216)
3. Embedded depth of anchor: 165mm minimum

HILTI – RE 500 V4 or equivalent may be used. Alternatively, consult with an anchor design engineer to achieve better outcomes for your project specific needs.

DESIGN NOTES

1. MSWB is a high-performance element. As such, concrete foundation, steel beam or timber beam supporting MSWB to be designed by the project engineer to withstand required hold down and compression forces.
2. Installation of Chemical Anchors to be done by licensed professionals only.

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