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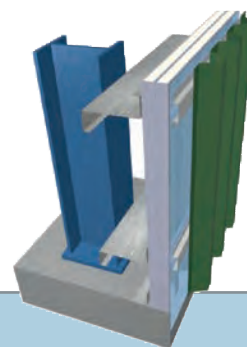
External Structural Walls

Steel framed external structural walls are used in buildings such as car parks, factories and workshops. If these walls are built close to property boundaries, they often require fire protection from the outside.

Systems in this section provide fire protection from the outside for up to 120 minutes. TruRock forms part of the wall, which is covered by a moisture barrier and external cladding to provide protection from the weather.

KSSW1

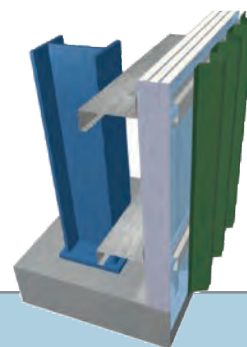
- EXTERNAL WALL CLADDING:** Steel cladding
- EXTERNAL CLADDING FRAME:** Top hats fixed to sub-frame
- MOISTURE BARRIER:** Breathable wall wrap
- EXTERNAL WALL LINING:** 2 layers of 16mm **TruRock**
- FRAME:** Vertical or horizontal steel framing



FRL 60/60/60 rated from the outside only Fire Report FAR 3998	Maximum Frame Spacing (mm)	Plasterboard Thickness (mm)	Sound Insulation Rw (Rw + Ctr)	
	600	32	35 (31)	Acoustic Report Day Design 3094-33

KSSW2

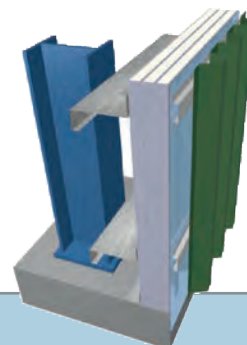
- EXTERNAL WALL CLADDING:** Steel cladding
- EXTERNAL CLADDING FRAME:** Top hats fixed to sub-frame
- MOISTURE BARRIER:** Breathable wall wrap
- EXTERNAL WALL LINING:** 3 layers of 13mm **TruRock**
- FRAME:** Vertical or horizontal steel framing



FRL 90/90/90 rated from the outside only Fire Report FAR 3998	Maximum Frame Spacing (mm)	Plasterboard Thickness (mm)	Sound Insulation Rw (Rw + Ctr)	
	900	39	37 (34)	Acoustic Report Day Design 3094-33

KSSW3

- EXTERNAL WALL CLADDING:** Steel cladding
- EXTERNAL CLADDING FRAME:** Top hats fixed to sub-frame
- MOISTURE BARRIER:** Breathable wall wrap
- EXTERNAL WALL LINING:** 3 layers of 16mm **TruRock**
- FRAME:** Vertical or horizontal steel framing



FRL 120/120/120 rated from the outside only Fire Report FAR 3998	Maximum Frame Spacing (mm)	Plasterboard Thickness (mm)	Sound Insulation Rw (Rw + Ctr)	
	1200	48	38 (35)	Acoustic Report Day Design 3094-33

General Requirements

	Fire Rated
Install control joints in plasterboard walls: <ul style="list-style-type: none"> > At 12m maximum intervals > At all control joints in the structure > At any change in the substrate material. 	✓
Jointing of TruRock is not required due to the overlying breathable wall wrap and external cladding.	✓
Use approved fire rated penetration details. Fire penetrations may require fire collars or other devices to maintain fire performance.	✓
Pack any gaps between the top of the wall and the underside of the roof covering with mineral fibre or other suitable fire resisting material.	✓
Protect plasterboard from water pooling at ground level.	✓
Use fire sealant on all gaps and around perimeter, vermiculite plaster is not permitted.	✓



For acceptable modifications or variations to fire rated systems [Refer to Section 2.3 Fire Resistance].

Framing

	Fire Rated
Fix 50 x 50 x 0.7mm BMT galvanised steel angle to: <ul style="list-style-type: none"> > Concrete at the base to act as skirting > Girts at all corners > Control joints. 	✓
Install an anti-splash board at the base of the external wall to protect the plasterboard from water damage. [Refer to Construction Details Figures 4 – 6]	✓
Use girt support rods or equivalent where required to avoid sagging of girts under the weight of plasterboard.	✓



Plumbing and electrical services must not protrude beyond the face of the stud.

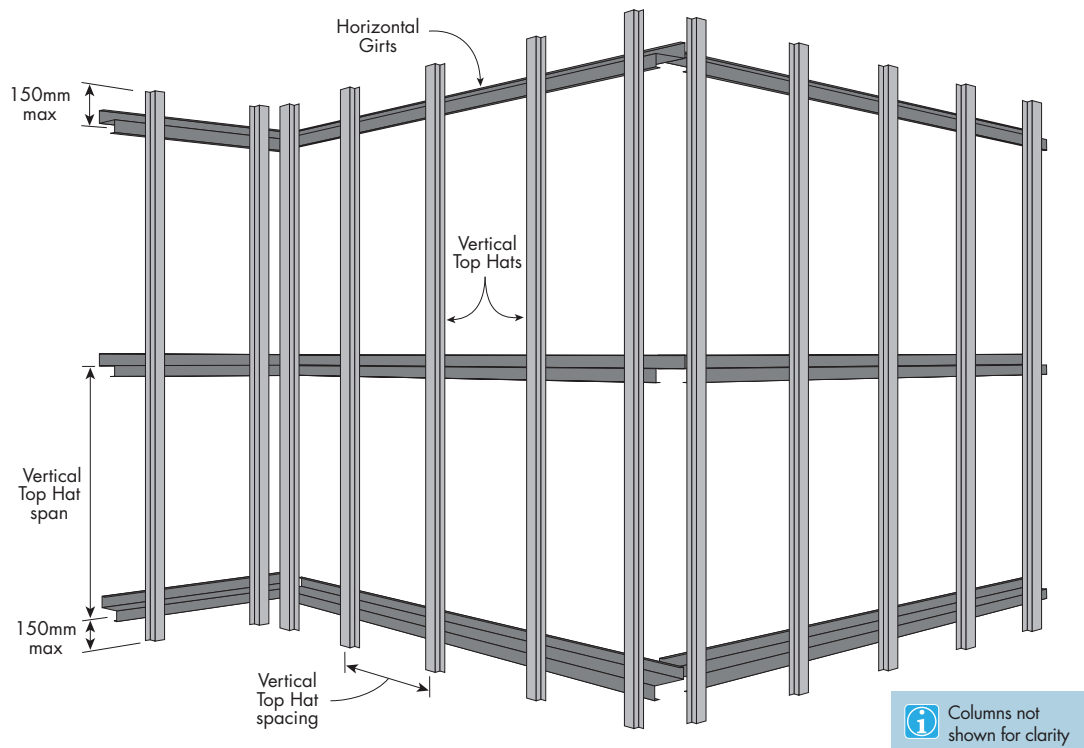
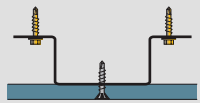


FIGURE 1 Vertical Steel Top Hat Layout

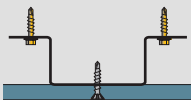
VERTICAL 50x15x1.15 TOP HAT SPAN TABLE (mm)

	Span type	Top Hat spacing (mm)	Ultimate Wind Pressure (kPa)						
			1.0	2.0	3.0	4.0	5.0	6.0	7.0
Serviceability deflection limit Span / 250	Single span	600	880	700	610	550	510	480	460
		450	970	770	670	610	570	530	510
		400	1010	800	700	640	590	550	530
		300	1110	880	770	700	650	610	580
	2 or more spans	600	1000	780	670	600*	480*	400*	340*
		450	1100	870	750	670	620	530*	460*
		400	1150	900	780	700	650	600*	510*
		300	1280	1000	870	780	720	670	630
Serviceability deflection limit Span / 360	Single span	600	780	620	540	490	450	430	410
		450	860	680	600	540	500	470	450
		400	900	710	620	560	520	490	470
		300	990	780	680	620	570	540	510
	2 or more spans	600	970	770	670	600*	480*	400*	340*
		450	1070	840	740	670	620	530*	460*
		400	1110	880	770	700	650	600*	510*
		300	1220	970	840	770	710	670	630

*Limited by 2 x 12g hex-head screw connection capacity into 1.15mm BMT G300 steel. Contact Knauf if fixing to a different substrate for the possibility of spanning further.


1. Check maximum cladding spacing and fastener spacing requirements from the manufacturers literature. Maximum cladding weight 22 kg/m².
2. Tables refer to Top Hats of grade G300 steel with Zinalume™ AM150 corrosion protection.
3. All Top Hats must be supported 150mm maximum from ends.
4. Tables are applicable to self weight and uniformly distributed lateral pressures. Point loads and other loads such as shelf loads, or live loads are not considered.
5. Calculations based upon either single span, or 2-or-more spans, designed in accordance with AS/NZS 4600:2005 Cold Formed Steel Structures.
6. Ultimate Load Case 1.2G + Wu
7. Serviceability Load Case G + Ws, with deflection limited to either span/250 or span/360. Serviceability pressure taken as 65% of ultimate wind pressure.
8. Connections checked using 2 x 12g hex-head screws into minimum 1.15mm thick G300 steel.
9. Splicing of Top Hats is not permitted.
10. Do not use the tables for vertical top hats over horizontal top hat construction.
11. The project engineer must approve the nominated lateral pressures and deflection limits are appropriate for a specific project.

VERTICAL 50x25x1.15 TOP HAT SPAN TABLE (mm)

	Span type	Top Hat spacing (mm)	Ultimate Wind Pressure (kPa)						
			1.0	2.0	3.0	4.0	5.0	6.0	7.0
Serviceability deflection limit Span / 250	Single span	600	1330	1070	940	860	790	740	700
		450	1450	1170	1030	940	880	820	780
		400	1510	1210	1070	980	910	860	810
		300	1660	1330	1170	1070	1000	940	900
	2 or more spans	600	1330	1070	800*	600*	480*	400*	340*
		450	1450	1170	1030	800*	640*	530*	460*
		400	1510	1210	1070	900*	720*	600*	510*
Serviceability deflection limit Span / 360	Single span	600	1210	960	840	760	700	660	630
		450	1330	1050	920	840	780	730	690
		400	1380	1100	960	870	810	760	720
		300	1520	1210	1050	960	890	840	790
	2 or more spans	600	1330	1070	800*	600*	480*	400*	340*
		450	1450	1170	1030	800*	640*	530*	460*
		400	1510	1210	1070	900*	720*	600*	510*
		300	1660	1330	1170	1070	970*	800*	690*

*Limited by 2 x 12g hex-head screw connection capacity into 1.15mm BMT G300 steel. Contact Knauf if fixing to a different substrate for the possibility of spanning further.


VERTICAL 50x35x0.75 TOP HAT SPAN TABLE (mm)

	Span type	Top Hat spacing (mm)	Ultimate Wind Pressure (kPa)						
			1.0	2.0	3.0	4.0	5.0	6.0	7.0
Serviceability deflection limit Span / 250	Single span	600	1320	1080	940	840	770	710	670
		450	1420	1180	1040	940	870	800	760
		400	1470	1220	1080	980	910	840	790
		300	1590	1320	1180	1080	1000	940	890
	2 or more spans	600	1320	1080	800*	600*	480*	400*	340*
		450	1420	1180	1040	800*	640*	530*	460*
		400	1470	1220	1080	900*	720*	600*	510*
		300	1590	1320	1180	1080	970*	800*	690*
Serviceability deflection limit Span / 360	Single span	600	1320	1080	940	840	770	710	670
		450	1420	1180	1040	940	870	800	760
		400	1470	1220	1080	980	910	840	790
		300	1590	1320	1180	1080	1000	940	890
	2 or more spans	600	1320	1080	800*	600*	480*	400*	340*
		450	1420	1180	1040	800*	640*	530*	460*
		400	1470	1220	1080	900*	720*	600*	510*
		300	1590	1320	1180	1080	970*	800*	690*

*Limited by 2 x 12g hex-head screw connection capacity into 1.15mm BMT G300 steel. Contact Knauf if fixing to a different substrate for the possibility of spanning further.


1. Check maximum cladding spacing and fastener spacing requirements from the manufacturers literature. Maximum cladding weight 22 kg/m².
2. Tables refer to Top Hats of grade G300 steel with Zinalume™ AM150 corrosion protection.
3. All Top Hats must be supported 150mm maximum from ends.
4. Tables are applicable to self weight and uniformly distributed lateral pressures. Point loads and other loads such as shelf loads, or live loads are not considered.
5. Calculations based upon either single span, 2-or-more spans, designed in accordance with AS/NZS 4600:2005 Cold Formed Steel Structures.
6. Ultimate Load Case 1.2G + W_u
7. Serviceability Load Case G + W_s, with deflection limited to either span/250 or span/360. Serviceability pressure taken as 65% of ultimate wind pressure.
8. Connections checked using 2 x 12g hex-head screws into minimum 1.15mm thick G300 steel.
9. Splicing of Top Hats is not permitted.
10. Do not use the tables for vertical top hats over horizontal top hat construction.
11. The project engineer must approve the nominated lateral pressures and deflection limits are appropriate for a specific project.

VERTICAL 50x35x1.15 TOP HAT SPAN TABLE (mm)

	Span type	Top Hat spacing (mm)	Ultimate Wind Pressure (kPa)							
			1.0	2.0	3.0	4.0	5.0	6.0	7.0	
Serviceability deflection limit Span / 250	Single span	600	1560	1280	1140	1040	970	910	860	
		450	1700	1390	1230	1140	1060	1000	950	
		400	1760	1430	1280	1180	1100	1040	990	
		300	1930	1560	1390	1280	1200	1140	1080	
	2 or more spans	600	1560	1210*	800*	600*	480*	400*	340*	
		450	1700	1390	1070*	800*	640*	530*	460*	
		400	1760	1430	1210*	900*	720*	600*	510*	
Serviceability deflection limit Span / 360	Single span	600	1560	1250	1090	990	920	870	820	
		450	1700	1380	1200	1090	1010	950	910	
		400	1760	1430	1250	1140	1050	990	940	
		300	1930	1560	1380	1250	1160	1090	1040	
	2 or more spans	600	1560	1210*	800*	600*	480*	400*	340*	
		450	1700	1390	1070*	800*	640*	530*	460*	
		400	1760	1430	1210*	900*	720*	600*	510*	
		300	1930	1560	1390	1210*	970*	800*	690*	

*Limited by 2 x 12g hex-head screw connection capacity into 1.15mm BMT G300 steel. Contact Knauf if fixing to a different substrate for the possibility of spanning further.

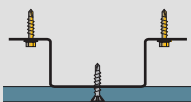
VERTICAL 50x50x1.15 TOP HAT SPAN TABLE (mm)

	Span type	Top Hat spacing (mm)	Ultimate Wind Pressure (kPa)							
			1.0	2.0	3.0	4.0	5.0	6.0	7.0	
Serviceability deflection limit Span / 250	Single span	600	1790	1480	1320	1220	1140	1010	860	
		450	1940	1600	1430	1320	1240	1180	1130	
		400	2010	1650	1480	1360	1280	1220	1170	
		300	2180	1790	1600	1480	1390	1320	1270	
	2 or more spans	600	1790	1210*	800*	600*	480*	400*	340*	
		450	1940	1600	1070*	800*	640*	530*	460*	
		400	2010	1650	1210*	900*	720*	600*	510*	
Serviceability deflection limit Span / 360	Single span	600	1790	1480	1320	1220	1140	1010	860	
		450	1940	1600	1430	1320	1240	1180	1130	
		400	2010	1650	1480	1360	1280	1220	1170	
		300	2180	1790	1600	1480	1390	1320	1270	
	2 or more spans	600	1790	1210*	800*	600*	480*	400*	340*	
		450	1940	1600	1070*	800*	640*	530*	460*	
		400	2010	1650	1210*	900*	720*	600*	510*	
		300	2180	1790	1600	1210*	970*	800*	690*	

*Limited by 2 x 12g hex-head screw connection capacity into 1.15mm BMT G300 steel. Contact Knauf if fixing to a different substrate for the possibility of spanning further.


1. Check maximum cladding spacing and fastener spacing requirements from the manufacturers literature. Maximum cladding weight 22 kg/m².
2. Tables refer to Top Hats of grade G300 steel with Zinalume™ AM150 corrosion protection.
3. All Top Hats must be supported 150mm maximum from ends.
4. Tables are applicable to self weight and uniformly distributed lateral pressures. Point loads and other loads such as shelf loads, or live loads are not considered.
5. Calculations based upon either single span, 2-or-more spans, designed in accordance with AS/NZS 4600:2005 Cold Formed Steel Structures.
6. Ultimate Load Case 1.2G + Wu
7. Serviceability Load Case G + Ws, with deflection limited to either span/250 or span/360. Serviceability pressure taken as 65% of ultimate wind pressure.
8. Connections checked using 2 x 12g hex-head screws into minimum 1.15mm thick G300 steel.
9. Splicing of Top Hats is not permitted.
10. Do not use the tables for vertical top hats over horizontal top hat construction.
11. The project engineer must approve the nominated lateral pressures and deflection limits are appropriate for a specific project.

VERTICAL 75x35x1.15 TOP HAT SPAN TABLE (mm)

	Span type	Top Hat spacing (mm)	Ultimate Wind Pressure (kPa)						
			1.0	2.0	3.0	4.0	5.0	6.0	7.0
Serviceability deflection limit Span / 250	Single span	600	1770	1450	1270	1150	1050	980	860
		450	1920	1580	1400	1270	1170	1100	1030
		400	1980	1630	1450	1320	1220	1150	1080
		300	2160	1770	1580	1450	1350	1270	1200
	2 or more spans	600	1770	1210*	800*	600*	480*	400*	340*
		450	1920	1580	1070*	800*	640*	530*	460*
		400	1980	1630	1210*	900*	720*	600*	510*
		300	2160	1770	1580	1210*	970*	800*	690*
Serviceability deflection limit Span / 360	Single span	600	1640	1300	1140	1030	960	900	860
		450	1810	1440	1250	1140	1060	990	940
		400	1880	1490	1300	1180	1100	1030	980
		300	2070	1640	1440	1300	1210	1140	1080
	2 or more spans	600	1770	1210*	800*	600*	480*	400	340*
		450	1920	1580	1070*	800*	640*	530	460*
		400	1980	1630	1210*	900*	720*	600	510*
		300	2160	1770	1580	1210*	970*	800	690*

*Limited by 2 x 12g hex-head screw connection capacity into 1.15mm BMT G300 steel. Contact Knaf if fixing to a different substrate for the possibility of spanning further.

VERTICAL 120x35x1.15 TOP HAT SPAN TABLE (mm)

	Span type	Top Hat spacing (mm)	Ultimate Wind Pressure (kPa)						
			1.0	2.0	3.0	4.0	5.0	6.0	7.0
Serviceability deflection limit Span / 250	Single span	600	1980	1570	1310	1140	1010	930	860
		450	2180	1730	1510	1310	1170	1070	990
		400	2260	1800	1570	1390	1240	1140	1050
		300	2440	1980	1730	1570	1440	1310	1210
	2 or more spans	600	2020	1210*	800*	600*	480*	400*	340*
		450	2180	1610	1070*	800*	640*	530*	460*
		400	2260	1810	1210*	900*	720*	600*	510*
		300	2440	2020	1610	1210*	970*	800*	690*
Serviceability deflection limit Span / 360	Single span	600	1750	1390	1210	1100	1010	930	860
		450	1930	1530	1330	1210	1130	1060	990
		400	2000	1590	1390	1260	1170	1100	1050
		300	2210	1750	1530	1390	1290	1210	1150
	2 or more spans	600	2020	1210*	800*	600*	480*	400*	340*
		450	2180	1610	1070*	800*	640*	530*	460*
		400	2260	1810	1210*	900*	720*	600*	510*
		300	2440	2020	1610	1210*	970*	800*	690*

*Limited by 2 x 12g hex-head screw connection capacity into 1.15mm BMT G300 steel. Contact Knaf if fixing to a different substrate for the possibility of spanning further.

1. Check maximum cladding spacing and fastener spacing requirements from the manufacturers literature. Maximum cladding weight 22 kg/m².
2. Tables refer to Top Hats of grade G300 steel with Zinalume™ AM150 corrosion protection.
3. All Top Hats must be supported 150mm maximum from ends.
4. Tables are applicable to self weight and uniformly distributed lateral pressures. Point loads and other loads such as shelf loads, or live loads are not considered.
5. Calculations based upon either single span, 2-or-more spans, designed in accordance with AS/NZS 4600:2005 Cold Formed Steel Structures.
6. Ultimate Load Case 1.2G + W_u
7. Serviceability Load Case G + W_s, with deflection limited to either span/250 or span/360. Serviceability pressure taken as 65% of ultimate wind pressure.
8. Connections checked using 2 x 12g hex-head screws into minimum 1.15mm thick G300 steel.
9. Splicing of Top Hats is not permitted.
10. Do not use the tables for vertical top hats over horizontal top hat construction.
11. The project engineer must approve the nominated lateral pressures and deflection limits are appropriate for a specific project.

Plasterboard Layout

	Fire Rated
Install plasterboard sheets perpendicular to framing.	✓
Stagger butt joints by 600mm minimum on adjoining sheets and between layers.	✓
First layer butt joints must be backed by framing.	✓
Stagger recessed edges by 300mm minimum between layers.	✓



If a jointed finish on the interior of the wall is desired, face the first layer inwards.

Plasterboard Fixing

	Fire Rated
Use the 'Screw Only Method'. Stud adhesive is not permitted.	✓
Drive screws to just below the sheet surface, taking care not to break the paper linerboard.	✓
Laminating screws can be used to fix butt joints in the second and third layer.	✓

SCREW TYPE AND MINIMUM SIZE FOR THE INSTALLATION OF PLASTERBOARD TO STEEL

Plasterboard Thickness	1st Layer	2nd Layer	3rd Layer
13mm	25mm screw	40mm screw*	60mm screw*
16mm	30mm screw	45mm screw*	65mm screw*

For steel ≤ 0.75 mm BMT minimum 6g fine thread needle point screws.

For steel ≥ 0.75 mm BMT minimum 6g fine thread drill point screws.

*Minimum 45mm 8g coarse thread screws may be used as detailed in installation diagrams.

Exterior Cladding

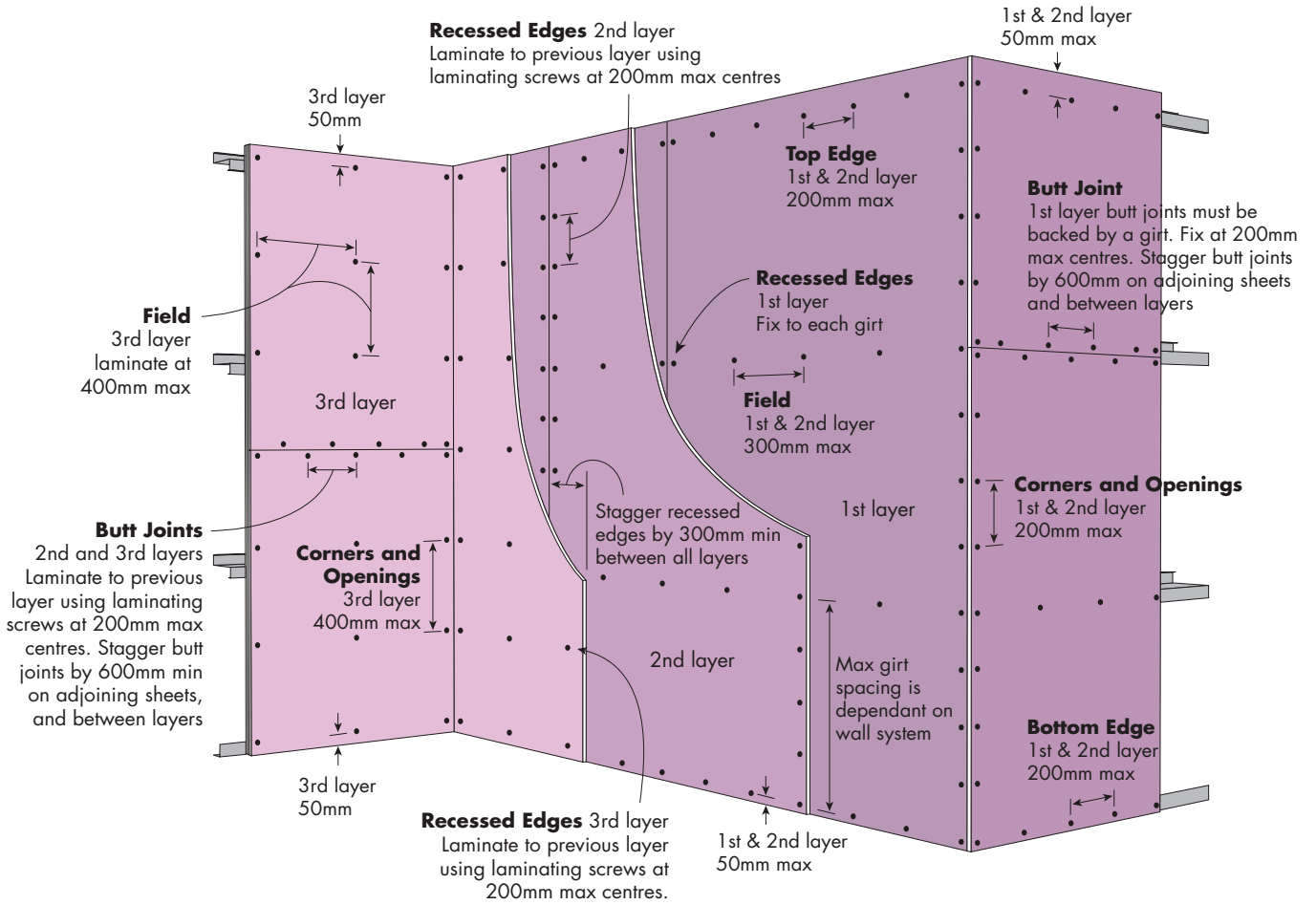
	Fire Rated
Fix cladding battens through plasterboard to sub-frame.	✓
Protect plasterboard from water pooling at ground level.	✓
Extend the external fire rated wall up to the non-combustible roof covering. [Refer to Construction Details]	✓



- > Exterior cladding and moisture barrier must provide protection from the weather.
- > Use construction techniques that direct condensation and rain away from plasterboard.



FIGURE 2 Fire Rated 3 Layers – Vertical + Vertical + Vertical
Screw Only Method



FIRE RATED
HEAD AND BASE DETAILS FOR EXTERNAL STUD WALLS

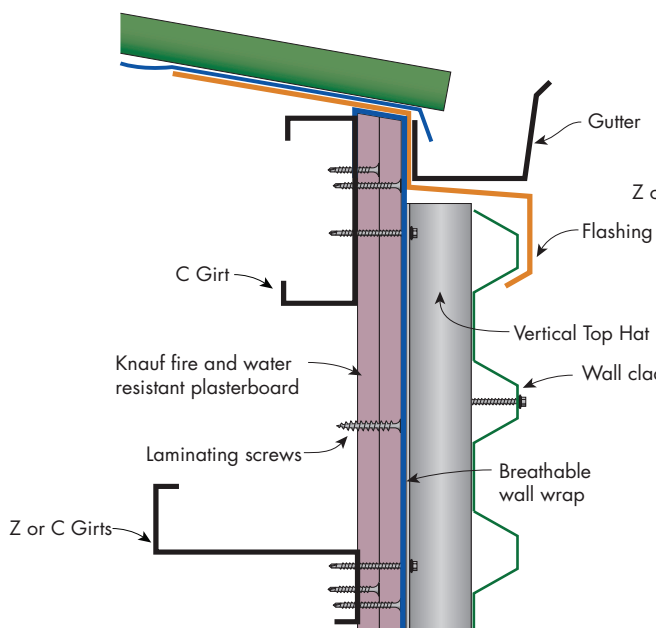


FIGURE 3 Wall Head to Roof
Section

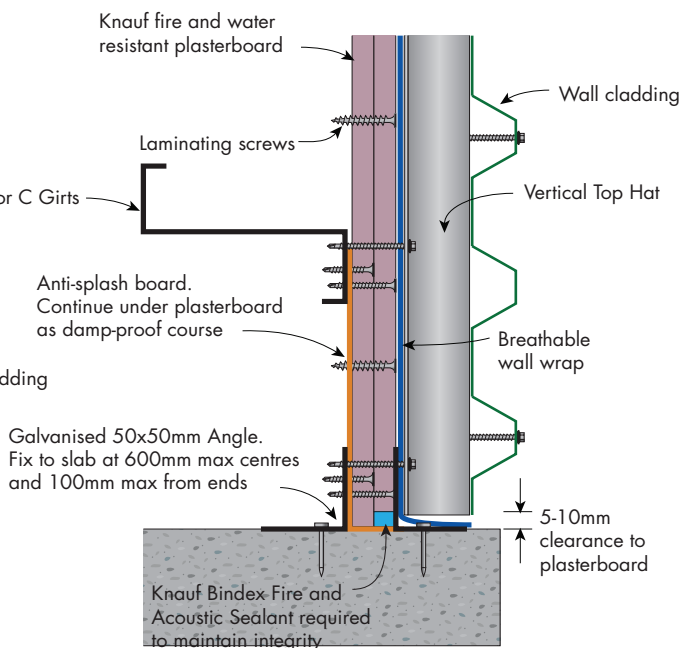


FIGURE 4 Wall Base to Slab
Section

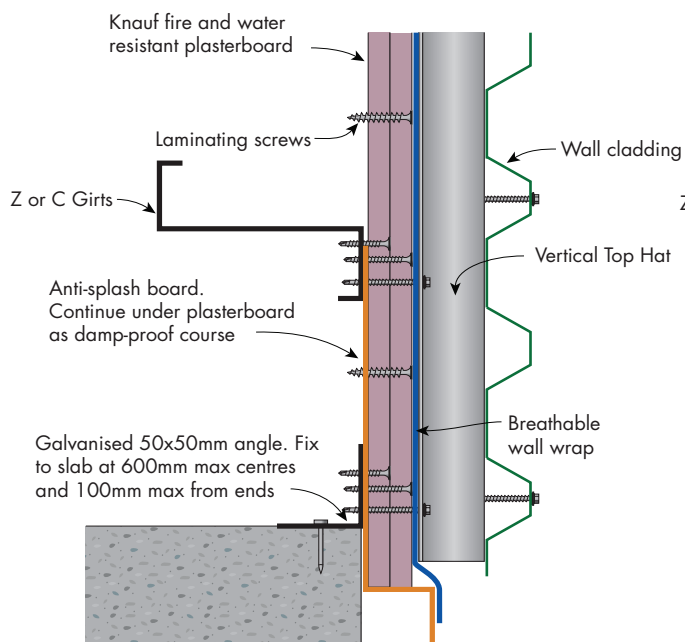


FIGURE 5 Wall Base to Slab
Section

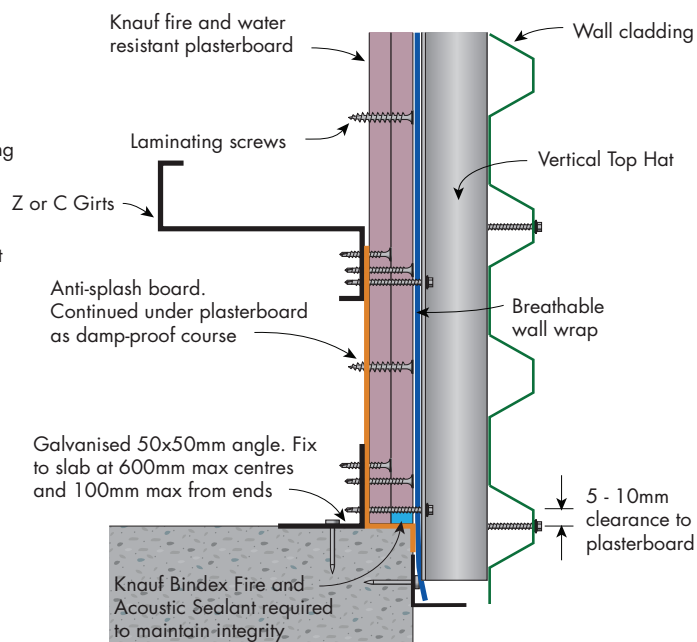


FIGURE 6 Wall Base to Slab
Section