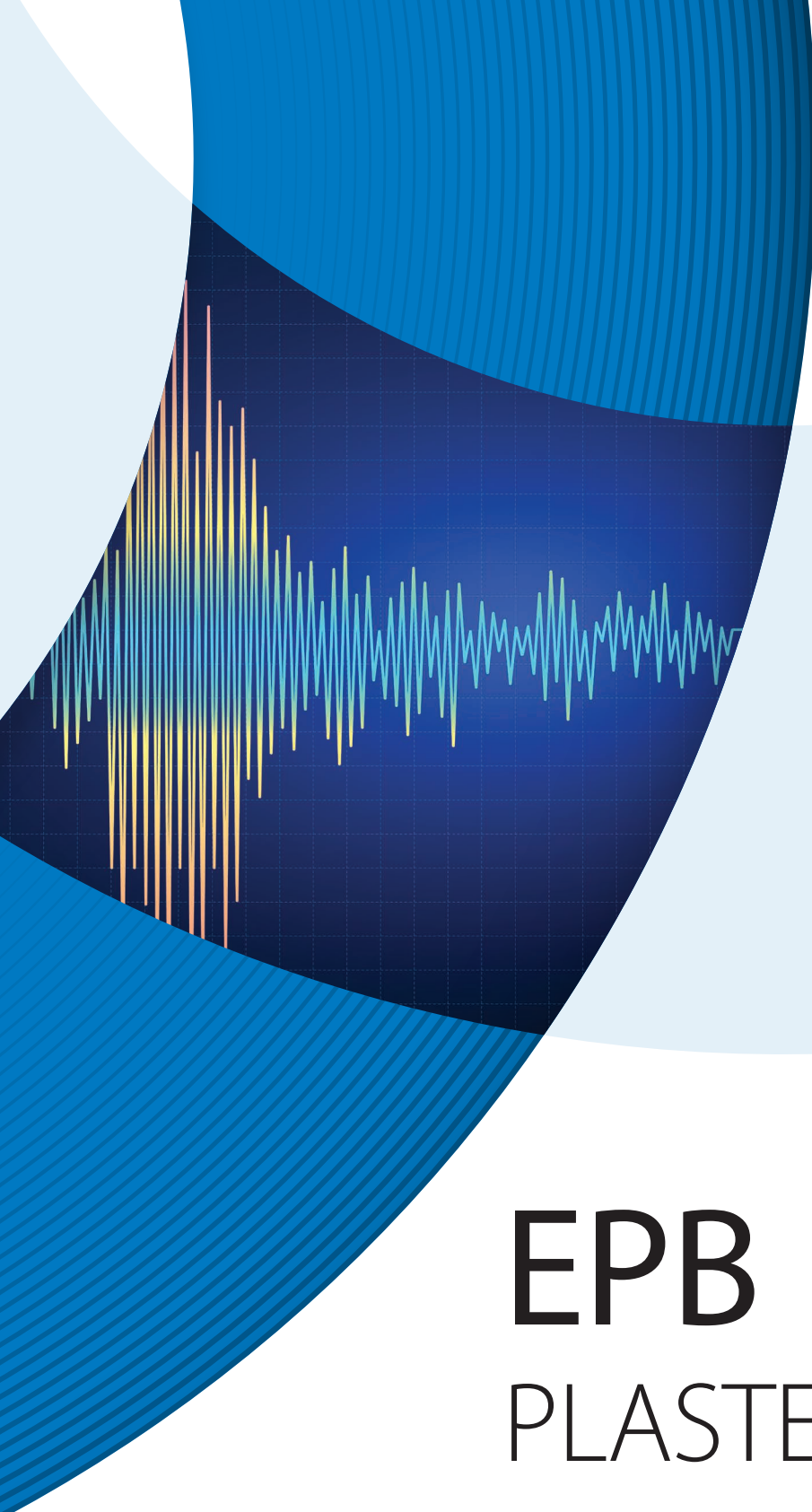




EPB PLASTERBOARD QUICKBRACE SYSTEMS

June 2026

www.epb.co.nz

EPB Plasterboard Bracing Manual

These publications are continuously being updated and superseded.

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INTRODUCTION

EPB Plasterboard QuickBrace® Systems & Regular Fixing Option

Extensive bracing tests have been conducted on EPB Plasterboard. The Bracing ratings published in this document have been obtained by independent testing and opinions sourced from New Zealand organizations with accredited quality assurance. Detailed in this document are some unique design solutions available to the New Zealand Building Industry to satisfy the bracing requirements of the New Zealand Standard NZS 3604:2011 Timber framed buildings.

Recent changes

We have made changes and improvements to the QuickBrace® Systems & introduced Regular Fixing options.

New QuickBrace® Systems Corner Pattern

We have introduced a slightly less concentrated corner pattern which we refer to in this publication as the "Standard Bracing Corner pattern". This applies for all the systems except the special ES-Hc and ES-Mc systems on page 40.

Regular Fixing Performances

After significant research and development the Bracing performances provided by regularly fixed single sided and double sided plasterboard walls can now be incorporated into the bracing design.

The ER1 and ER2 Regular fixing methods do not form a part of the specialised EPB Plasterboard QuickBrace® systems range.

Enhanced QuickBrace® Software

There have been a number of changes and enhancements to the QuickBrace® Software.

These enhanced features will further assist designers and engineers, to comply with the rules of NZS 3604:2011 and also assist in good design and construction. The new software can be downloaded from www.epb.co.nz or by emailing info@epb.co.nz to request a copy.

Revised QuickBrace® Performances

Further on going testing using the new BRANZ P21 (2010) Test Methodology have provided revised performances.

Independently Appraised

All tests, opinions and re-evaluated performances have been fully Appraised by Thurlow Consultants Engineers and Surveyors Ltd. now trading as EFI Global.

Product Name Change: EPB MultiSmart® Range renamed to EPB BraceSmart®/NoiseSmart®

The 10mm & 13mm EPB MultiSmart® range will now be referred to as 10mm & 13mm EPB BraceSmart®/NoiseSmart®, reflecting its dual performance in bracing and noise control applications. In addition this product will feature a new End tape for ease of identification. This change is a part of our ongoing effort to better align product names with their function. Please note that all product specifications, performance characteristics and installation methods remains unchanged. All past and future references of EPB MultiSmart® are interchangeable with EPB BraceSmart®/NoiseSmart® and vice versa.



INTRODUCTION

New Zealand Building Code (NZBC) Compliance

EPB Plasterboard is manufactured to AS/NZS 2588 and has been specifically formulated to meet New Zealand Building Code requirements. EPB Plasterboard has been marketed and distributed in New Zealand since 1988 and the product has established an excellent history of performance for its use in buildings throughout New Zealand and the Asia/Pacific region. EPB Plasterboard meets the durability requirements of the NZBC and is subject to use, installation and maintenance in accordance with the instructions outlined in this manual. The Manufacturing plant is International Standard ISO 9001 and ISO 14001 registered.

- NZBC Clause B1 Structure:**

The EPB QuickBrace® Systems & Regular Fixing Options detailed in this document and the EPB QuickBrace® Software are fully compliant to the requirements of NZS 3604:2011 Timber-framed buildings. Design and installation must be in accordance with this document. Framing material specifications used with EPB Plasterboard Systems must be in accordance with the performance requirements of NZBC Clause B1. Timber framed walls and floors must be installed and meet the requirements of NZS 3604.

- NZBC Clause B2 Durability:**

EPB Plasterboard Bracing Systems have a serviceable life of not less than 50 years and so is in accordance to NZBC B2. EPB Bracing systems are not be specified in wet areas of direct moisture exposure

- NZBC Clause C1-C6 Protection from Fire:**

EPB Plasterboard Fire & Noise Control Systems can meet the requirements of providing passive fire protection as per NZBC Clause C1-C6.

- NZBC Clause E3 Internal Moisture:**

EPB Plasterboard Wet Area Systems can meet the requirements of NZBC Acceptable Solution E3/AS1.

- NZBC Clause F2 Hazardous Building Materials:**

EPB Plasterboard Systems meet this requirement of NZBC Clause F2 and will not present a health hazard to people.

- NZBC Clause G6 -Airborne & Impact Sound:**

EPB Plasterboard Noise Control Systems entitled 'Full Intertency' (STC 55 or greater) systems meet the requirements of NZBC Clause G6.

Product & Component Substitution

When a product specified in a system as per this manual is substituted, the performance of the system could be compromised. Therefore the materials specified in the system must not be substituted. EPNZ does not take any liability if substitution of components are implemented in any EPB Plasterboard Systems without consultation.

EPB Plasterboard Substitution Options

The table below indicates which EPB Plasterboard types are acceptable substitutions to the original EPB Plasterboard type specified.

✓ indicates that the Bracing performance will be maintained

X indicates that the Bracing performance will be lower and so therefore the substitution is not allowed

Original EPB Plasterboard specified	Acceptable EPB Plasterboard Substitution								
	EPB® Standard		EPB FireSmart® (Note 2)			EPB BraceSmart®		EPB AquaSmart®	
	10mm	13mm	10mm	13mm	16mm	10mm	13mm	10mm	13mm
10mm EPB® Standard	–	✓	✓	✓	✓	✓	✓	✓	✓
10mm EPB BraceSmart®	X	X	X	✓	✓	–	✓	Note 1	✓

Note 1 : 10mm EPB AquaSmart® can be substituted for the 10mm EPB BraceSmart in QuickBrace® systems EM-H, EMSH and EMPH provided that the element is 900mm or longer and the perimeter screw pattern is reduced to 100mm centres. Ensure that all other relevant bracing system requirements including the important corner patterns are met.

Note 2 : When a bracing element is also a fire wall, then the screw length required in the fire system must be used. The perimeter pattern is as per the bracing requirements. (This applies to all products)



INTRODUCTION

EPB Plasterboard Regular Fixing Method Solutions

Regular Code	Lining Requirement	Additional Bottom Plate Fixing	Fixing Method
Plasterboard on One side			
ER1	Any EPB Plasterboard on one side	N/A	Regular Fixing
Plasterboard on Both Sides			
ER2	Any EPB Plasterboard on both sides	N/A	Regular Fixing

EPB Plasterboard QuickBrace® Design Solutions

QuickBrace System Number	Lining Requirement	Additional Bottom Plate Fixing	Specialised QuickBrace Corner Pattern
Plasterboard on One side			
ES-N	EPB® Standard on one side	None	Standard QuickBrace Pattern
ES-H	EPB® Standard on one side	Panel End Hold-downs	
EM-H	EPB BraceSmart® on one side		
Plasterboard on Both Sides			
ESSN	EPB® Standard on both sides	None	Standard QuickBrace Pattern
ESSH	EPB® Standard on both sides	Panel End Hold-downs	
EMSH	EPB BraceSmart® on one side, Standard on the other		
Plasterboard One side, Plywood the Other			
ESPH	EPB® Standard on one side, Plywood on the other	Panel End Hold-downs	Standard QuickBrace Pattern
EMPH	EPB BraceSmart® on one side, Plywood on the other		

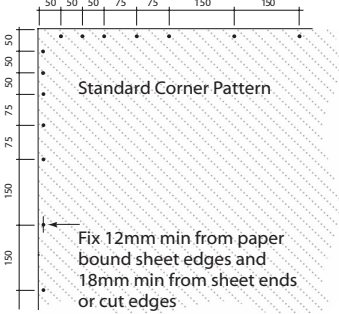
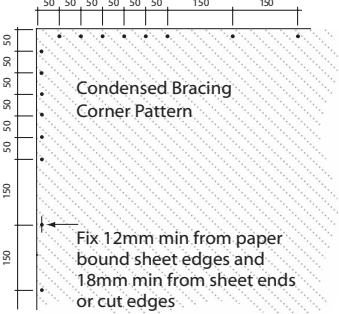
EPB Plasterboard QuickBrace® Design Solutions with Concentrated Pattern

QuickBrace System Number	Lining Requirement	Additional Bottom Plate Fixing	Specialised QuickBrace Corner Pattern
Plasterboard on One side with Concentrated Pattern			
ES-Hc	EPB® Standard on one side	Panel End Hold-downs	Condensed QuickBrace Pattern
EM-Hc	EPB BraceSmart® on one side		



Fastener Layout

Refer to the table below for the bracing corner patterns and perimeter patterns. Fastening the middle of the bracing element is as per the recommended screw and glue methods. Refer to EPB Plasterboard Installation Guide.

QuickBrace® Systems Fastener Layout	
Standard Corner pattern	Condensed Corner Pattern
Corner and Perimeter Pattern: Refer Standard Bracing Corner Pattern below. Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.	Corner Pattern: Refer to the bracing corner pattern below. Perimeter Pattern: Place fasteners at 150mm centres around perimeter of bracing element. Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.
	

DESIGN INSTRUCTIONS

Design Steps

- Step 1** Determine and Record the Project Specifications
- Step 2** Determine and Record the Wind and Earthquake Zones
- Step 3** Calculate the Bracing Demand for Wind and Earthquake
- Step 4** Distribute Bracing Lines and Bracing Elements as evenly as possible
- Step 5** Ensure Individual Bracing Line Totals exceed the Individual Bracing Line Demand
- Step 6** Ensure Total Bracing Achieved exceeds Total Bracing Demand for both Wind & Earthquake

EPB Bracing Design Software

We recommend the use of the EPB Bracing Design Software. This can be downloaded from www.elephantplasterboard.co.nz or requested by emailing info@epb.co.nz. This powerful tool will perform a number of important functions.

1. The determining and recording of the Project Specifications. It will provide numerous warnings and comments to assist with entering correct parameters.
2. The determining of the Wind and the Earthquake Zone and other Earthquake requirements.
3. Once Project specifications have been entered and Wind and Earthquake Zones determined then the software will automatically calculate the Wind Along and Wind Across Demand and the Earthquake Demand.
4. The placing of selected proprietary bracing systems on bracing lines on the plan must be done manually and in conjunction with the recording on the individual solution sheets for the Along and Across direction for each level of the project.
5. Provide warnings if minimum line demand requirements are not met for both External and Internal bracing lines.
6. Provide warnings if total bracing demand has not been achieved for either Wind or Earthquake.

The tool provides many other helpful warnings and suggestions in order to ensure good design and reduce the likelihood of non-compliance with the requirements of NZS 3604:2011.

Elphant_QuickBrace_September_2018_v1_0.xlsx
Project Demand

Page 1 of 1

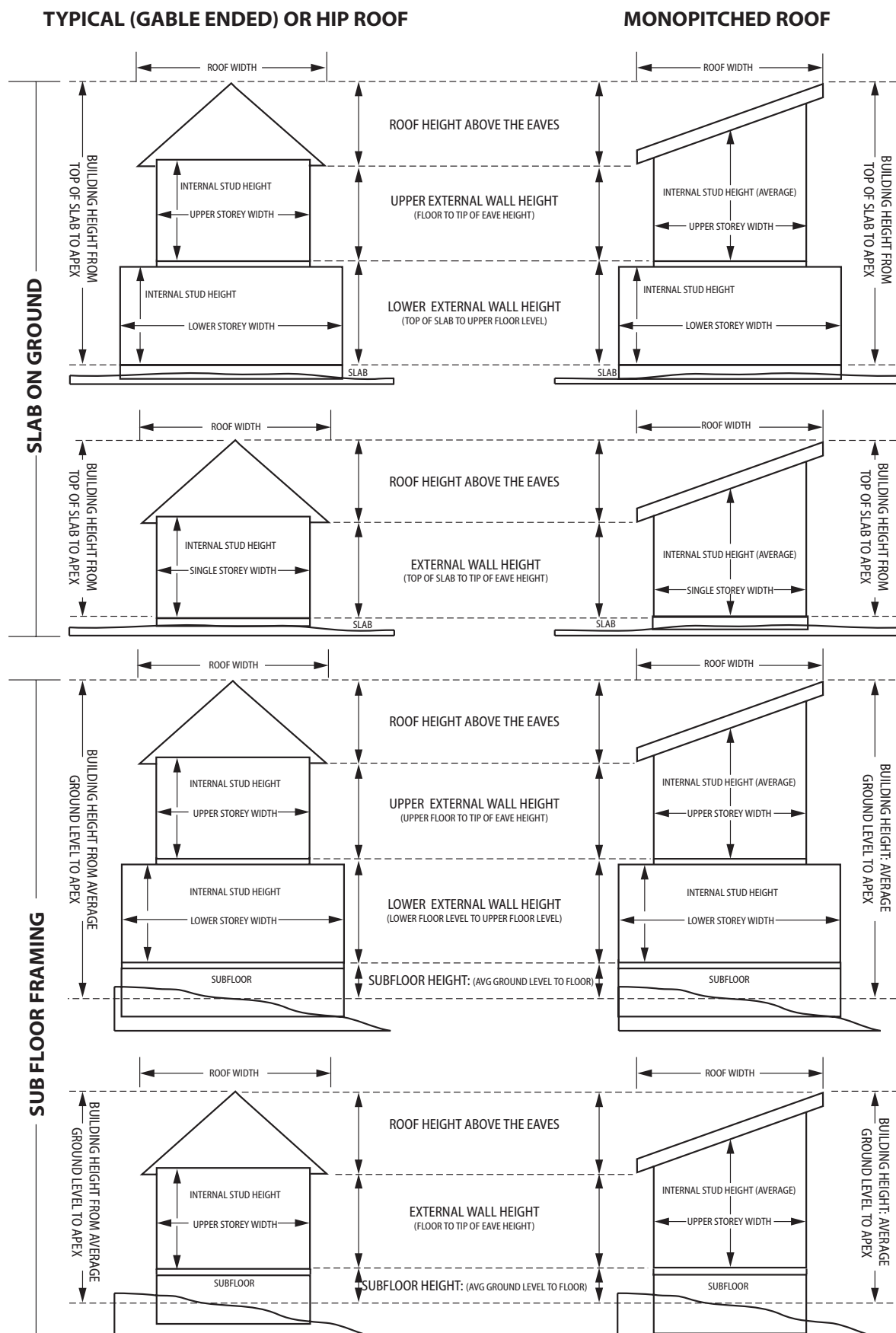
Elphant QuickBrace™ September 2018 V.1.0		Print Date: 28-Nov-19	
Specification Sheet		NZS3604-2011 Compliant	
Project Name: Level, Wing or Block (If applicable) Street and Number Lot and DP Number: City/Town/District:		Designer Name: Design Company Name: Bracing Design Date (dd/mm/yy): 28/11/2019 Engineering Company Name: This form filled out by:	
General Specifications		Select Wind Zone: Determined Wind Zone Not Available Low	
Number of Storeys Double Foundation Type Subfloor Floor Loading 2 kPa Roof Weight: Light Upper Storey Cladding Weight Light Lower Storey Cladding Weight Light Sub Floor Cladding Weight Light		Wind Region: A Ground Roughness (Terrain): Urban Site Exposure: Sheltered Lee Zone: No Topographic Class: T1	
Roof Specifications			
Roof Type: Typical (Gabled End) Roof Pitch: 20.0 degrees 20.9 Upper Storey Roof Length: 8.9 m Upper Storey Roof Width: 6.8 m			
Key Heights			
Upper Height (h) above Eaves 1.30 m Height: Avg Ground to Apex (H) 6.50 m			
Upper Storey Specifications			
Upper External Wall Height 4.60 m Upper Internal Stud Height 2.40 m Upper Storey Building Length 7.2 m Upper Storey Building Width 5.6 m Upper Gross Plan Area (GPA) 38.0 m² Limit Element Resistance to 120 bu/s/m Timber: 120 bu/s/m Upper Level Room in Roof Space? No		Demand Source: QuickBrace (FP) QuickBrace® First Principles Demands (Bu's) Wind Along 36.4 Wind Across 29.2 Earthquake 13.8 204 Bu's 210 Bu's 523 Bu's	
Lower Storey Specifications			
Lower External Wall Height: 2.40 m Lower Storey Internal Stud Height 2.40 m Lower Storey Building Length 12.0 m Lower Storey Building Width 10.0 m Lower Gross Plan Area (GPA) 120.0 m² Limit Element Resistance to 120 bu/s/m Timber: 120 bu/s/m Lower Level Room in Roof Space? No		Demand Source: QuickBrace (FP) QuickBrace® First Principles Demands (Bu's) Wind Along 53.1 Wind Across 48.8 Earthquake 9.7 531 Bu's 586 Bu's 1159 Bu's	
Subfloor Specifications			
Subfloor Height 0.20 m Internal Subfloor Stud Height 0.20 m Subfloor Building Length 12.0 m Subfloor Building Width 10.0 m Subfloor Gross Plan Area 120.0 m² Floor Type & Element Resistance Level No Floor		Demand Source: QuickBrace (FP) QuickBrace® First Principles Demands (Bu's) Wind Along 68.5 Wind Across 64.2 Earthquake 10.1 685 Bu's 770 Bu's 1206 Bu's	

Shepard QuickBlast™ September 2018 V.1.0								Wind		Earthquake			
Wall Across				Demand Source: QuickBlast® Fast Functions		Achieved =		0%	0	0%	0		
Lower Storey				Total Demand =		Bu's	586	Bu's	586	Bu's	1159		
				Min. Bu's per either External side of Project =		150	150						
Don't Show Element Numbers for Regular Plasticboard Pacing				Minimum Bu's Req. on each Bracing Line =		0	0						
Line	Element #	Left Right On Internal	Single or Double Sided	Available Wall Lengths	Wall Angle *	Element Height	Support Conditions (Suspension, Rigid, etc.)	Supplier	Element Restrictions Limitations	Wind		Earthquake	
										Built	Achieved Bu's	Built	Achieved Bu's
M		Left External											
N													
O													
P													
Q													
R													
S													
T													
U													
V													
User Comments:										Wind		Earthquake	
Print Date: 2/26/18				Lower Storey		Wall Across		Achieved BU's =		0%	0	0%	0
Shepard QuickBlast™ September 2018 V.1.0								Total Demand =		Bu's	586	Bu's	1159
Warnings & Comments: (Printed)										NOT Enough		NOT Enough	

Design Step One: Determine and Record the Project Specifications

Wall Heights

To assist in determining wall heights and project dimensions refer to the figures below



Building Widths and Lengths

Use actual building width and building length regardless of roof pitch.

External Cladding and Roof Cladding Weights

Specific Cladding Weights can also be entered.

Wall and Sub floor Cladding Weights			
Wall Cladding Class	Light	Medium	Heavy
Weight (Kg/m ²)	≤30	>30 to 80	>80 to 220

Roof Cladding Weights		
Roof Cladding Class	Light	Heavy
Weight (Kg/m ²)	≤20	>20 to 60

Design Step Two: Determine and Record The Wind and Earthquake Zones

For detailed information consult NZS 3604:2011. Section 5

Determine Wind Zone

Consult your local Building Consent Authority as they may have prepared Wind Zone Maps. These should be used as a guide only.

For a more accurate determination of Wind Zone follow the steps in NZS 3604:2011 Table 5.1 and the guidelines detailed below.

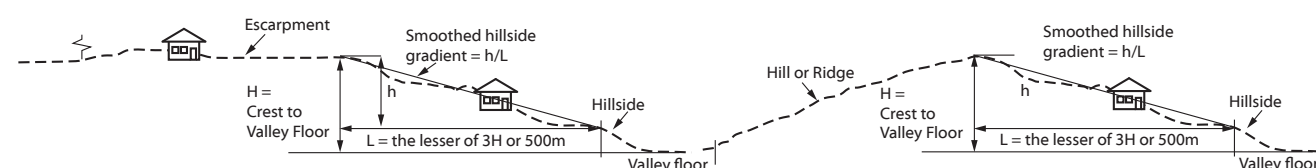
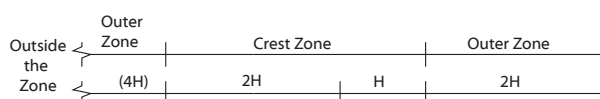
Wind Steps	Determine	Select One of the following	Reference
1	Topographic Class	T1, T2, T3 or T4	See Topographic Class Table on page 11
2	Site Exposure	Sheltered or Exposed	Refer page 11
3	Ground Roughness	Urban or Open	Refer page 11
4	Wind Region	A or W	Refer Wind Region & Lee Zone Map on page 12
5	Lee Zone	Yes or No	Refer Wind Region & Lee Zone Map on page 12
6	Wind Zone	Low, Medium, High, Very High, Extra High or SD	Refer Wind Zone table on page 12

Wind Step 1: Determine Topographic Class:

To determine the topographic class for the site. Refer to clause 5.2.5 in NZS 3604:2011 and the following guide notes and tables.

Topo Steps	Determine	Select from the following	Reference
1	Determine Topography	Hill or Escarpment	Refer Topography figure below
2	Hill Height	H	Refer Topography figure below
3	Smoothed gradient value and slope	Gentle, Low, Mild, Moderate or Steep	Refer Topography figure below
4	Topographic Zone	Crest Zone, Outer Zone or Outside the Zone	Refer Topography figure below
5	Topographic Class	T1, T2, T3 or T4	Refer Topographic Class table on page 11

Escarpment Topography



Topographic Class Table

	Gentle	Low	Mild	Moderate	Steep	Undulations Under 10m on any Slope (Gradient)
Smoothed Hillside Gradient (h/L)=	≤ 0.05	> 0.05 to 0.1	> 0.1 to 0.15	>0.15 to 0.2	>0.2	
Slope =	≤1:20	>1:20 to 1:10	>1:10 to 1:6.7	>1:6.7 to 1:5	>1:5	
TOPOGRAPHY						
Outside the Zones	T1	T1	T1	T1	T1	T1
Outer Zone	T1	T1	T2	T2	T3	T1
Crest Zone	T1	T2	T3	T4	T4	T1
Known Accelerated Wind Flow	T4	T4	T4	T4	T4	T4

Wind Step 2: Determine Site Exposure

When determining the site exposure, consider the wind shielding effects of objects around the site.

Exposed:

Sites are deemed Exposed if they have **any** of the following conditions:

- Steep sites as defined in table 5.2 and Section 5.2.3 in NZS 3604:2011
- Sites adjacent to open spaces. For example, beach fronts, motorways, large rivers, or playing fields etc
- Sites adjacent to wind channels whose width is greater than 100m
- Sites that do not have at least 2 rows of permanent structures (of similar size) all around and at the same ground level

Sheltered:

Sites can only be deemed Sheltered if they have **both** of the following conditions:

- The site does not have any of the conditions described above
- The site has at least 2 rows of permanent structures (of similar size) all around & at the same ground level

Wind Step 3: Determine Ground Roughness

If the building site is on Open Terrain (as described below) or within 500m in any direction of an area determined to be Open Terrain, then the Ground Roughness is determined to be OPEN.

If the building site is on Urban terrain (as described below) or NOT within 500m in any direction of an area determined as Open Terrain, then the Ground Roughness is determined to be URBAN.

Open Terrain:

Terrain is deemed "Open" if it has **any** of the following conditions;

- Areas that are open farmland (grazed pastures or croplands).
- Areas with isolated trees or shelter.
- Areas Adjacent to Coastlines or Large Lakes.
- Areas Adjacent to Airfields etc.

Urban Terrain:

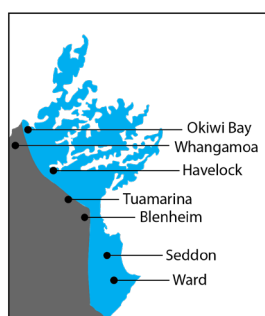
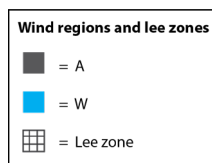
Terrain is deemed "Urban" if it has **both** of the following conditions;

- It has more than 10 obstructions, houses, trees etc (3m high) per hectare.
- AND NOT Adjacent to Coastlines Large Lakes or Airfields etc.



Wind Step 4 and 5: Determine Wind Region & Lee Zones

Refer to Wind Region & Lee zone map below or figure 5.1 from NZS 3601:2011. Lee zones are shaded and attract higher wind speeds resulting in a higher design wind zone as given in Table 5.4.

**Wind Step 6: Determination of Wind Zone**

The EPB QuickBrace® software determines the Wind Zone automatically once these parameters have been entered. Furthermore a specific wind speed can be entered if known.

Once Wind Steps 1 to 5 have been completed, the Wind Zone can also be determined from referring to table below.

Wind Zone Table		TOPOGRAPHIC CLASS							
Wind Region	Ground Roughness	T1 (Gentle)		T2 (Moderate)		T3 (Significant)		T4 (Extreme)	
		-----SITE EXPOSURE-----							
		Sheltered	Exposed	Sheltered	Exposed	Sheltered	Exposed	Sheltered	Exposed
A	Urban	L	M	M	H	H	H	H	VH
	Open	M	H	H	VH	H	VH	VH	EH
W	Urban	M	H	H	VH	H	VH	EH	EH
	Open	H	VH	VH	EH	VH	EH	SD	SD

Note: Projects in Lee Zones shall have their Wind Zones increased as follows:

Low wind becomes High,
Medium wind becomes Very High
High wind or above becomes Specific Design

Wind Zone	L = Low	M = Medium	H = High	VH = Very High	EH = Extra High	SD = Specific Engineering Design
Maximum ultimate limit state Wind Speed	≤32 m/s	≤37 m/s	≤44 m/s	≤50 m/s	≤55 m/s	Speeds > 55 m/s are not covered by NZS 3604:2011

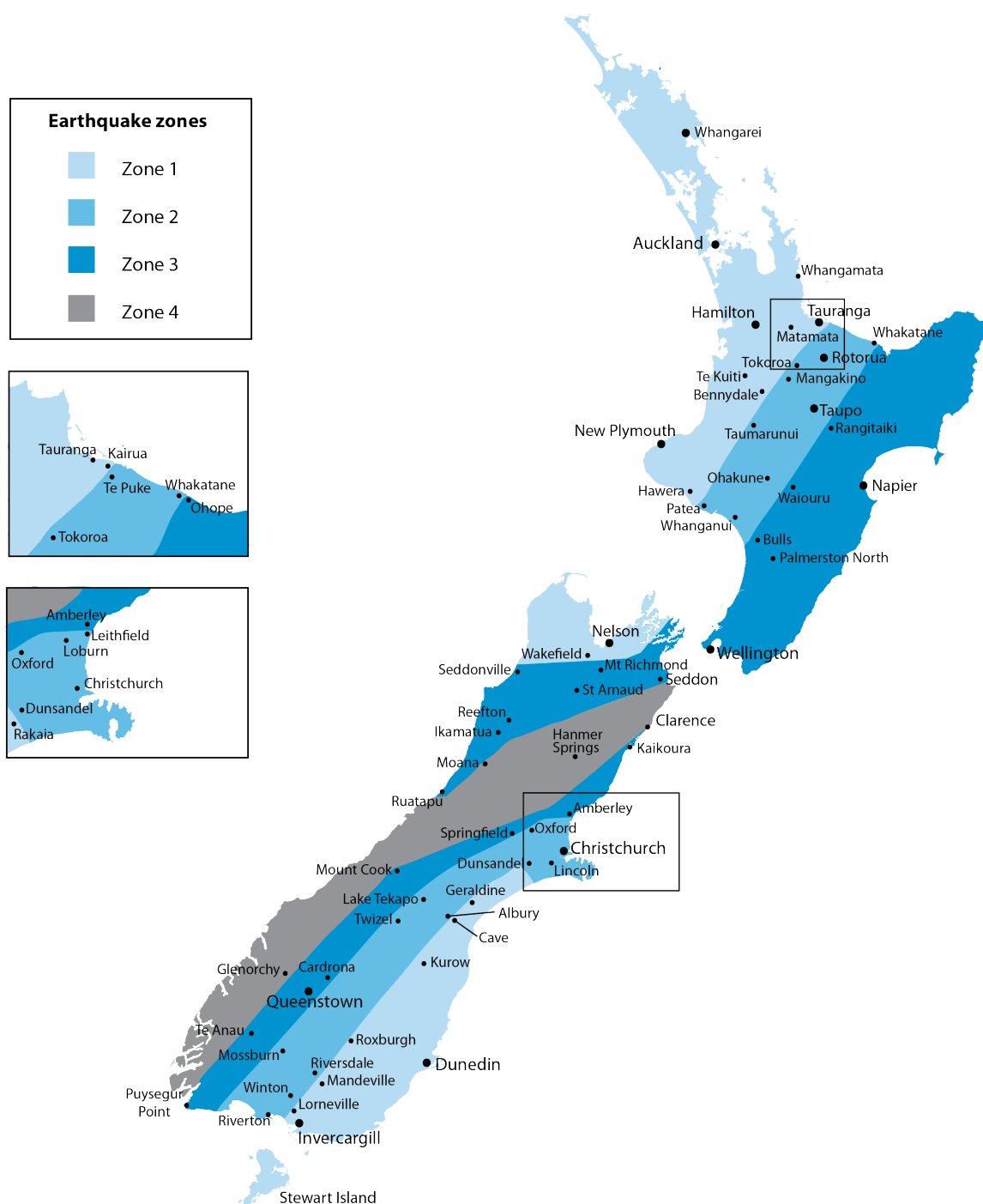


Determine Earthquake Zones and other additional Earthquake multipliers

Earthquake Steps	Determine	Select one of the following	Reference
1	Earthquake Zone	1,2,3 or 4	Refer Earthquake Zone Map below
2	Site Subsoil Classification	A,B,C,D or E	Territorial Authorities or SED
3	Floor Loads	2 kPa, 3 kPa or other	
4	Room in Roof space	Yes or No	Building Plan
5	Annual Exceedance Probability	1/500 yrs, 1/1000 yrs or 1/2500 yrs	

Earthquake Step 1: Determine Earthquake Zone

Earthquake Zones are 1, 2, 3 or 4. Refer to Earthquake Zone Map below or figure 5.4 NZS 3604:2011 section 5.



Earthquake Step 2: Determine Site Subsoil Classification

Site subsoil classifications can be obtained from your local territorial authority or GNS science QMAPS available from their GNS website and can be one of the following:

- Class A -Strong Rock
- Class B- Rock
- Class C- Shallow soil
- Class D- Deep or soft soil
- Class E- Very soft soil

If subsoil information is not available then determine the subsoil class as Class E (very soft soil) unless specific engineering design is conducted.

Earthquake Step 3: Determine Floor Loads

These are commonly either 2 kPa or 3 kPa. (NB. Specific floor loads can be entered in the QuickBrace® Software.)

Earthquake Step 4: Determine if Room in Roof Space

Refer to building plan.

Bracing demands for Earthquake increase as a factor of the room area in the roof space. If the floor area of the room in roof space exceeds 50% of the floor area of the storey below it, then it should be regarded as another storey.

Earthquake Step 5: Determine Annual Exceedance Probability

The NZS 3604:2011 default annual exceedance probability for Earthquake is 1 in 500 years (factor 1.0) however designers may wish to increase the annual exceedance probability to 1 in 1000 years (factor 1.3) or 1 in 2500 years (factor 1.8) depending on building use or client requirements.

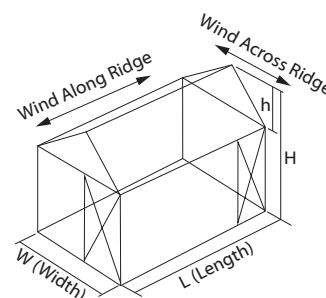
Design Step Three: Calculate the Bracing Demand for Wind and Earthquake

Calculating Wind Demand Across and Wind Demand Along

The EPB QuickBrace® software will automatically calculate the Wind Demand for the Along and Across direction for each level of the project.

If calculating manually, Refer to tables 5.5, 5.6 and 5.7 of NZS 3604:2011 section 5 to obtain the Wind Across values and Wind Along values (demands per lineal meter of wall length). The table is based on projects in a High Wind Zone. These values will need to have a factor applied to them for projects in other Wind Zones as follows;

Wind Zone	Factor
Low	0.5
Medium	0.7
High	1.0
Very High	1.3
Extra High	1.6



Once the Wind Across values and the Wind Along values have been obtained from the relevant tables in NZS 3604:2011 for each floor level;

- The Wind Demand Across is calculated by multiplying the Wind Across values by the building Length (BL) of that floor level.
- The Wind Demand Along is calculated by multiplying the Wind Along values by the building Width (BW) of that floor level.
- For projects with Mono pitched roofs use the higher of the Wind Across value or the Wind Along value (from the tables) when multiplying by the building Length or building Width (as is appropriate).
- For projects with a Hip roof use only the Wind Across values from the table when calculating the Wind Demand Across and Wind Demand Along.

Calculate Earthquake Demand

Electronic Method:

The EPB QuickBrace® software will automatically calculate the Earthquake Demand for each level of the Project.

Manual Method:

Refer to NZS 3604:2011 tables 5.8, 5.9, 5.10, section 5. (If floor load 3kPa refer to tables 14.1, 14.2, 14.3 section 14)

Once the Earthquake values (per square meter of floor area) has been obtained from the relevant tables for each floor level;

- The Earthquake Demand is calculated by multiplying that value (from the relevant table) by the Gross Plan Area (GPA) of that floor level.
- For structures with a Room in the roof space, add 4 BUs to the Earthquake value (from the relevant table) before multiplying that value by the GPA of that floor level.



Design Step Four: Distribute Bracing Lines and Bracing Elements as evenly as possible

Bracing Lines should be distributed as evenly possible throughout the building.

Individual bracing lines shall be no closer than 1m apart and no more than 6m apart. Bracing lines may be 7.5m apart where dragon ties are used as per figure 8.1 in NZS 3601:2011.

Walls more than 2m apart should be on separate bracing lines.

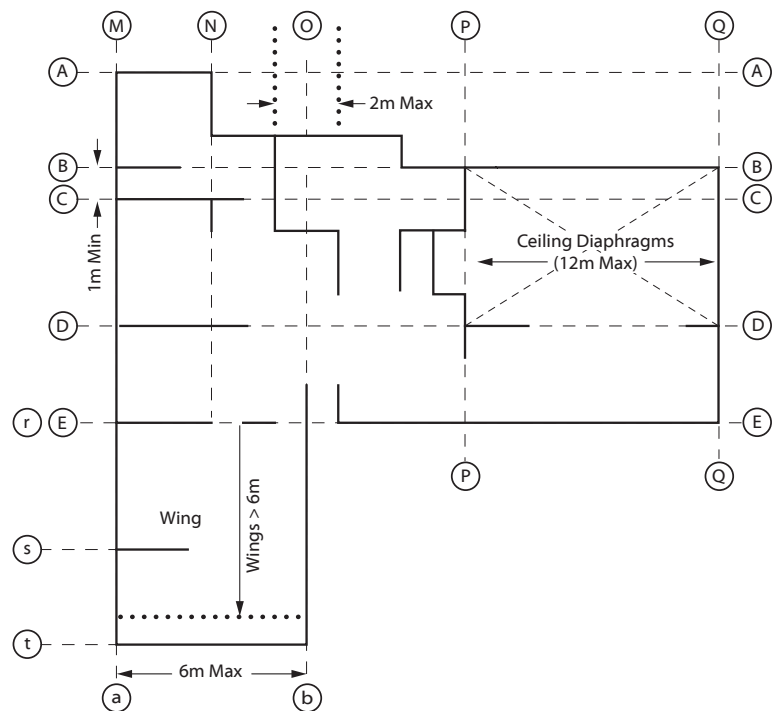
Locate Bracing Elements as close as possible to the corners of external walls and as evenly as possible throughout the building. It is also important to distribute bracing elements on each individual bracing line as evenly as possible.

Wings extending more than 6m from the main building shall have their bracing requirements calculated and designed separately.

Wall Bracing Layout

It is recommended to use the full length of the wall where possible, this avoids concentrated screw patterns appearing in the middle of the wall and so therefore improves the final finish. It also increases the bracing units provided and so therefore possible reducing the total number of individual bracing elements needed.

The construction of ceiling diaphragms is described in detail on p.24–27.



Design Step Five: Ensure Individual Bracing Line Totals exceed the Individual Bracing Line Demand

Choose the QuickBrace® systems from the QuickBrace® performance table (Page 17-18) in order to achieve the number of bracing units required in total and per External and Internal Line demand.

Note: It is important to complete both Wind and Earthquake columns because the Minimum Bracing Units required in each individual line label must be met by both the Wind and Earthquake performance totals achieved for that line label.

Brace units achieved on any line, shall not have a rating less than the greater of:

Either 50% of the total bracing demand, divided by the number of bracing lines;
Or 100 BUs.

For example, if the demand for bracing for the project is 900 BUs (Wind) and 600 BUs (Earthquake) in the Along direction and there are three bracing lines (A, B and C) then each line minimum is $50\% \times 900 / 3 = 150$ BUs (Wind) and $50\% \times 600 / 3 = 100$ BUs (Earthquake).

Additionally all External Walls must have at least a bracing capacity of 15 BUs per metre of external wall length or 100 BUs which ever is the greater.

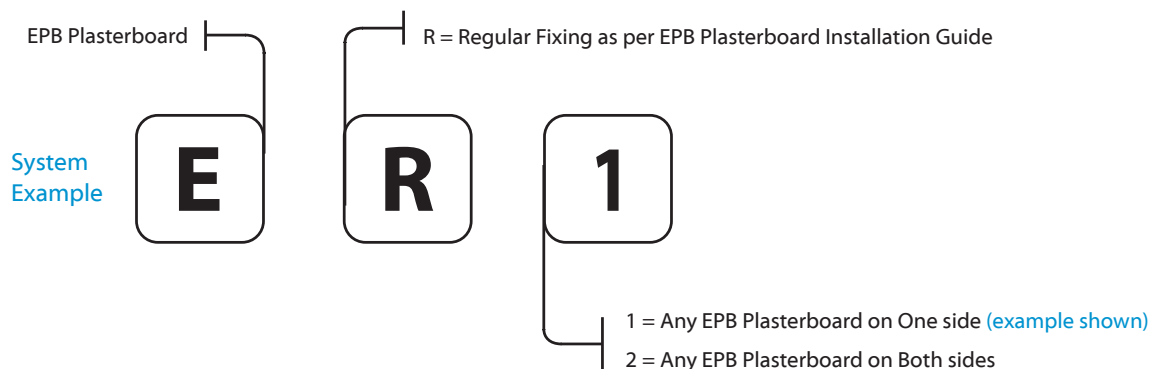
Design Step Six: Ensure Total Bracing Achieved exceeds Total Bracing Demand for both Wind & Earthquake

Once all individual bracing element performances have been calculated on each individual bracing line, add up the total Wind and Earthquake achieved (for both the Along and Across directions) and ensure they exceed the total bracing demand for both Wind and Earthquake for each relevant level.



EPB Regular Fixing Method

Nomenclature



Regular Fixing Method Performance Table

Regular Code	Lining Requirement	Panel Hold downs	Min. Length (m)	BU/m		Fixing Method
				Wind	Earth-quake	
Plasterboard on One Side						
ER1	Any EPB Plasterboard on One Side	n/a	0.4	40	30	Regular
Plasterboard on Both Sides						
ER2	Any EPB Plasterboard on Both Sides	n/a	0.4	50	50	Regular
			1.2	55	55	

Note: The Regular Fixing Numbering System and the sub components thereof are protected by copyright.

Key Points of the Regular Fixing Method

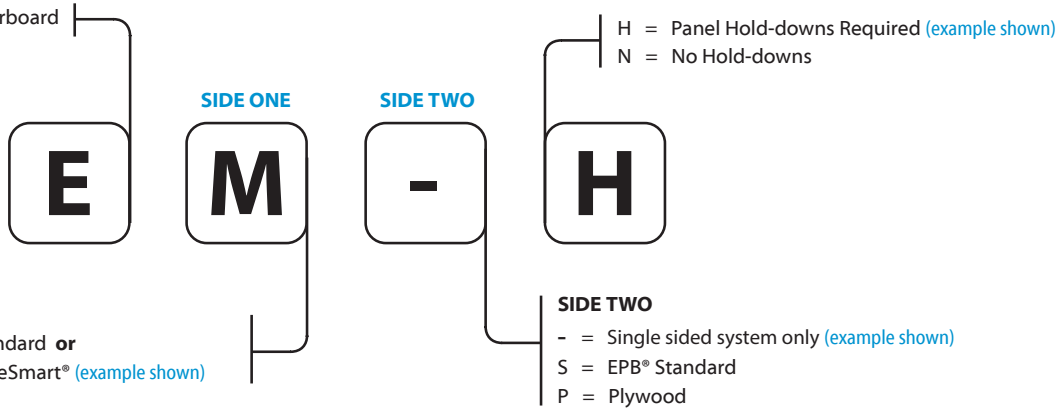
- The EPB Regular Fixing method allows for internal and external walls to contribute to the bracing design when regularly fixed as per the method described in the EPB Plasterboard Installation Guide.
- Regular Fixing significantly reduces the number of screw fixings, resulting in a better overall finish.
- ER1 & ER2 elements do not have to be specifically checked off in a post-line inspection. The building official only needs to ensure that the overall fixing of the plasterboard has been fixed generally as per the EPB Plasterboard Installation Guide.
- Adding the ER1 & ER2 systems into the initial bracing design, often results in the total bracing resistance well exceeding the bracing demand. It is recommended to exceed the bracing demand by a margin of approximately 10%.
- ER1 & ER2 published bracing performances are conservative.
- When inspecting plasterboard in the post-line inspection, consideration should be made for the overall design margin.
- If the design margin is tight and some elements are found to be narrower than initially designed, or some elements need to be eliminated, then converting adjacent ER1 & ER2 to ES-N & ESSN systems (by using the QuickBrace screw pattern) would significantly increase the bracing performance of those elements.
- ER1 & ER2 require fixing to be at 300mm centres on top and bottom plates (screws only) and up each end stud (screw or glue daubs). Closer fixing is permitted.

QuickBrace® Numbering System

Nomenclature

E = EPB Plasterboard

System
Example



SIDE ONE

S = EPB® Standard or

M = EPB BraceSmart® (example shown)

SIDE TWO

- = Single sided system only (example shown)

S = EPB® Standard

P = Plywood

QuickBrace® Systems & Performance Table

System Number	Lining Requirement	Panel Hold downs	Min. Length (m)	BU/m		Bracing Corner Pattern	
				Wind	Earth-quake		
Plasterboard on One Side							
ES-N	EPB® Standard on One Side	No	0.4	65	60		
			1.2	70	60		
			1.8	75	60		
ES-H	EPB® Standard on One Side	Yes	0.4	75	70		
			0.8	90	75		
			1.8	105	85		
EM-H	EPB BraceSmart® on One Side		0.4	100	90		
			0.8	110	100		
			1.2	125	105		
Plasterboard on Both Sides							
ESSN	EPB® Standard on Both Sides	No	0.4	75	70		
			0.8	90	80		
			1.2	95	85		
ESSH	EPB® Standard on Both Sides	Yes	0.4	90	105		
			0.8	130	125		
			1.2	150	135		
EMSH	EPB BraceSmart® on One Side EPB® Standard on the Other		0.4	110	115		
			0.8	140	130		
			1.2	150	145		
Plasterboard One Side, Plywood the Other							
ESPH	EPB® Standard on One Side Plywood on the Other	Yes	0.4	100	115		
			0.8	140	140		
			1.2	150	150		
EMPH	EPB BraceSmart® on One Side Plywood on the Other		0.4	120	135		
			0.8	145	150		
			1.2	150	150		

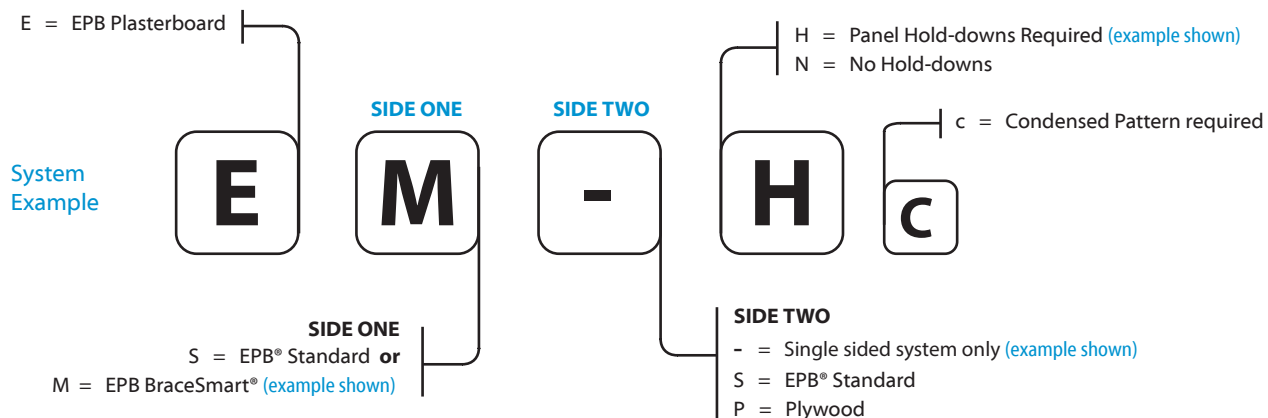
* Timber Floors - It is required by NZS 3604:2011 to limit BU ratings to 120 BU/m for timber floors. For a higher floor frame uplift, a specifically engineered design will be required.

Note- The QuickBrace® Numbering System and the sub components thereof are protected by copyright.

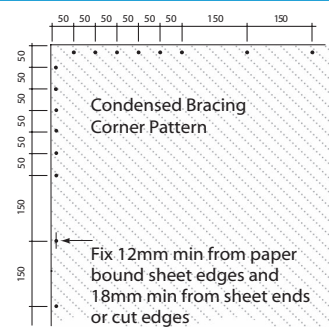


QuickBrace® Design Solutions with Condensed Corner Pattern

Nomenclature



QuickBrace® Systems & Performance Table

System Number	Lining Requirement	Panel Hold downs	Min. Length (m)	BU/m		Bracing Corner Pattern
				Wind	Earth-quake	
Plasterboard on One Side with Condensed Corner Pattern						
ES-Hc	EPB® Standard on One Side	Yes	0.4	80	75	
			0.8	100	85	
			1.8	115	85	
EM-Hc	EPB BraceSmart® on One Side	Yes	0.4	105	100	
			0.8	120	110	
			1.2	140	115	



WALL & CEILING CONSTRUCTION DETAILS

Wall Framing

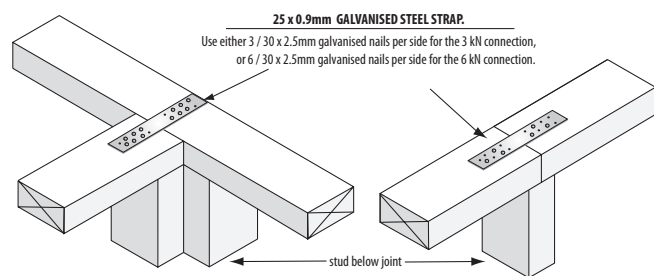
Framing is to comply to NZS 3604:2011 and must be a minimum of 70 x 45mm for internal walls and 90 x 35mm for external walls. Nogs or dwangs are not a requirement in order to achieve the bracing ratings published in this document.

Fastening Bracing Elements to Floors

Brace type	Bottom Plate Fixing Requirements			Additional Requirements
	Concrete Slabs		Timber Floors	Concrete or Timber
	External Walls	Internal Walls	External or Internal Walls	External or Internal
ER1	Fix as per NZS 3604:2011	Fix as per NZS 3604:2011. Alternatively use Min 75 x 3.8mm shot-fired fasteners with 16mm discs at 150mm & 300mm from bracing element end studs and thereafter at 600mm centres.	Pairs of 100 x 3.75mm hand driven flat head nails or three 90 x 3.15mm power driven nails at 600mm centres all in accordance with NZS 3604:2011	None
ES-N				
ER2	Not applicable			
ESSN				
ESSH	Not applicable			
EMSH				
ES-H	Fix as per NZS 3604:2011	Fix as per NZS 3604:2011	Pairs of 100 x 3.75mm hand driven flat head nails or three 90 x 3.15mm power driven nails at 600mm centres all in accordance with NZS 3604:2011	Panel End Hold downs at each end of the bracing element.
EM-H				
ES-Hc				
EM-Hc				
ESPH				
EMPH				

Top Plate Connections

Top plate connections detailed on the right meet the requirements of NZS 3604:2011 clause 8.7.3 Joints in Plates. The joints must be over a stud or solid blocking. A 6kN connection is required if any bracing element in the wall exceeds 100 bracing units. Otherwise a 3kN connection is adequate.



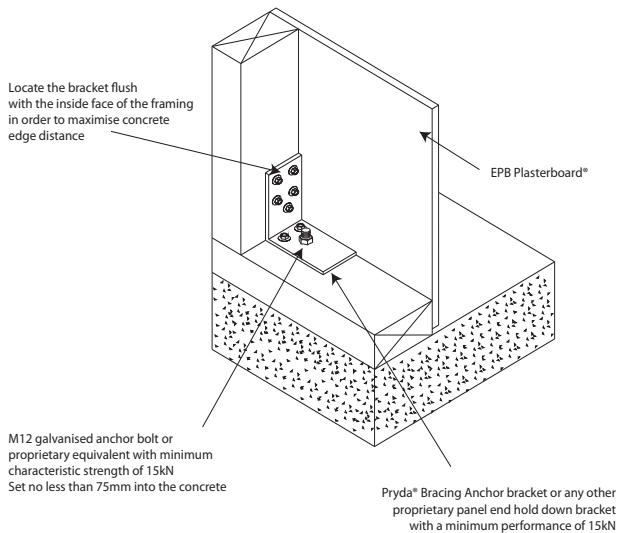
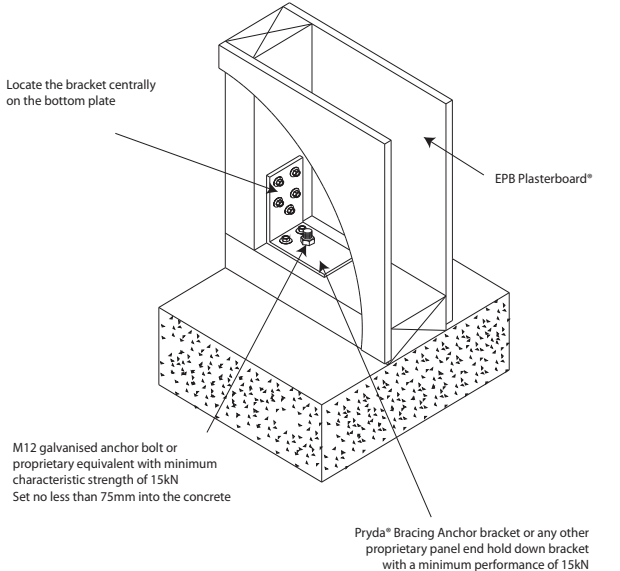
Panel End Hold down Details - Bracing Anchor Brackets

Either Pryda® Bracing Anchor or any other proprietary panel end hold down bracket with a minimum performance of 15kN.

Concrete Floors

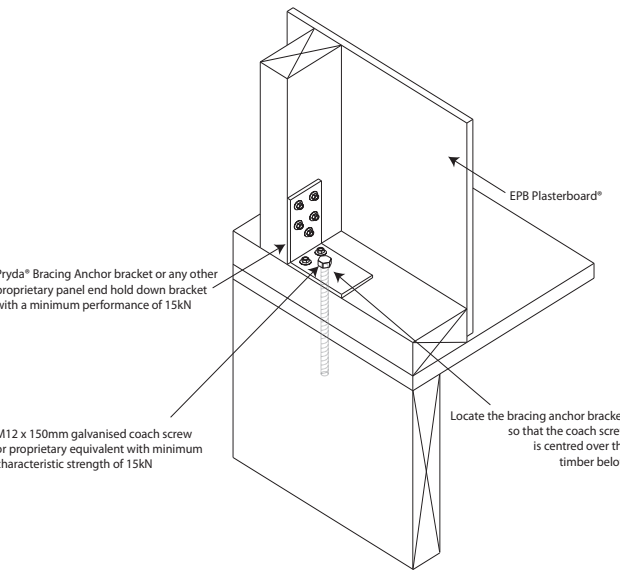
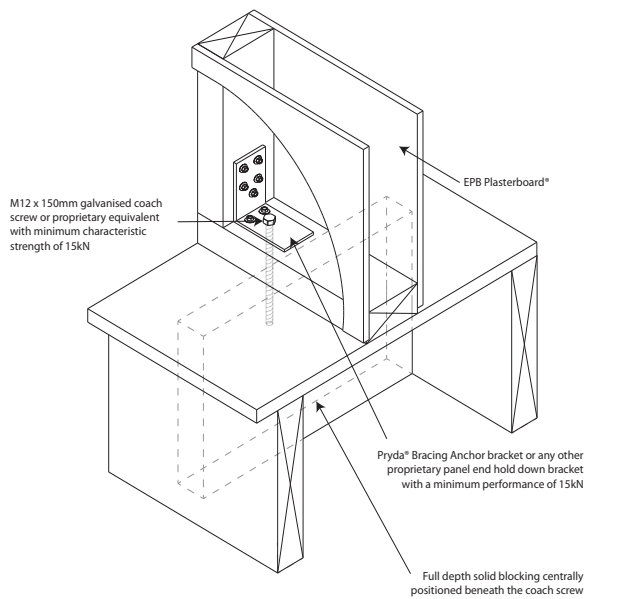
M12 galvanised anchor bolt or proprietary equivalent with minimum characteristic strength of 15kN.

Set no less than 75mm into the concrete.

External	Internal
 Locate the bracket flush with the inside face of the framing in order to maximise concrete edge distance EPB Plasterboard® M12 galvanised anchor bolt or proprietary equivalent with minimum characteristic strength of 15kN Set no less than 75mm into the concrete Pryda® Bracing Anchor bracket or any other proprietary panel end hold down bracket with a minimum performance of 15kN	 Locate the bracket centrally on the bottom plate EPB Plasterboard® M12 galvanised anchor bolt or proprietary equivalent with minimum characteristic strength of 15kN Set no less than 75mm into the concrete Pryda® Bracing Anchor bracket or any other proprietary panel end hold down bracket with a minimum performance of 15kN
Locate the bracket flush with the inside face of the framing in order to maximise concrete edge distance.	Locate the bracket centrally on the bottom plate.

Timber Floors

M12 x 150mm galvanised coach screw or proprietary equivalent with minimum characteristic strength of 12kN.

External	Internal
 EPB Plasterboard® Pryda® Bracing Anchor bracket or any other proprietary panel end hold down bracket with a minimum performance of 15kN M12 x 150mm galvanised coach screw or proprietary equivalent with minimum characteristic strength of 15kN Locate the bracing anchor bracket so that the coach screw is centred over the timber below	 EPB Plasterboard® M12 x 150mm galvanised coach screw or proprietary equivalent with minimum characteristic strength of 15kN Pryda® Bracing Anchor bracket or any other proprietary panel end hold down bracket with a minimum performance of 15kN Full depth solid blocking centrally positioned beneath the coach screw
Locate the bracing anchor bracket so that the coach screw is centred over the timber below.	Full depth solid blocking centrally positioned beneath the coach screw.

Panel End Hold down Details - Bracing Strap & Bolt Detail

N.B. Bottom plate anchor placements have been reduced to 80mm from the end of the bracing element. This is to be consistent with the bolt location when using bracing anchor brackets and represents industry best practise. This does not affect previous designs or installations

Bracing Strap:

400 x 25 x 0.9mm galvanised strap passing under the bottom plate. Six 30 x 2.5mm galvanised flat head nails to each side of the stud and three 30 x 2.5mm galvanised flat head nails to each side of the bottom plate.

The bracing strap should be checked into the framing in order to make the substrate flush when receiving the plasterboard lining.

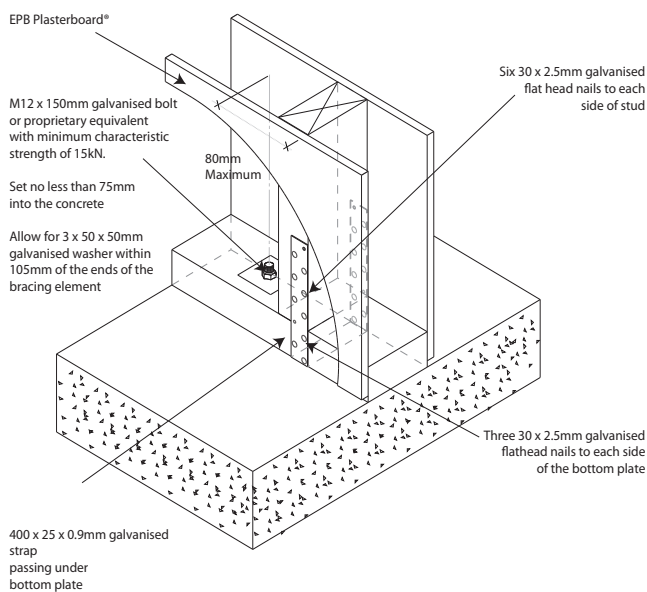
Position it in such a way that the important corner fastenings of the bracing element are not affected by it. Keeping the strap to the edge of the end stud as shown below will ensure the important corner fastenings won't penetrate the bracing strap.

Extra thickness and/or corrosion protection may be required on exposed and unexposed sites as per requirements of NZS 3604:2011

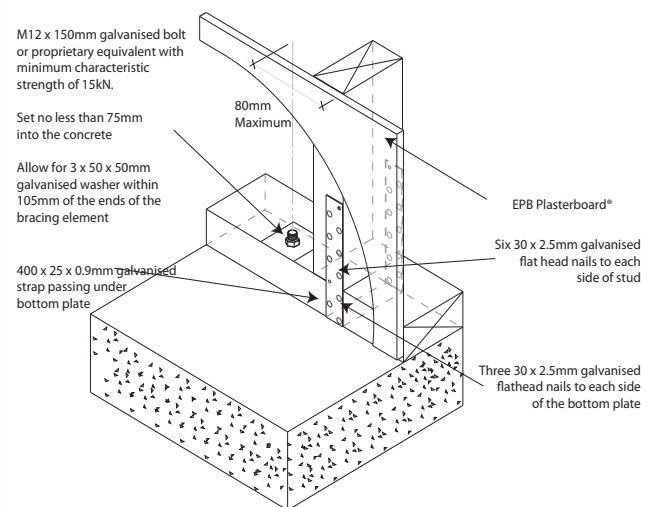
Concrete Floors

M12 x 150mm galvanised bolt or proprietary equivalent with minimum characteristic strength of 15kN. Set no less than 75mm into the concrete. Allow for a 3 x 50 x 50mm galvanised washer within 105mm of the ends of the bracing element.

Internal



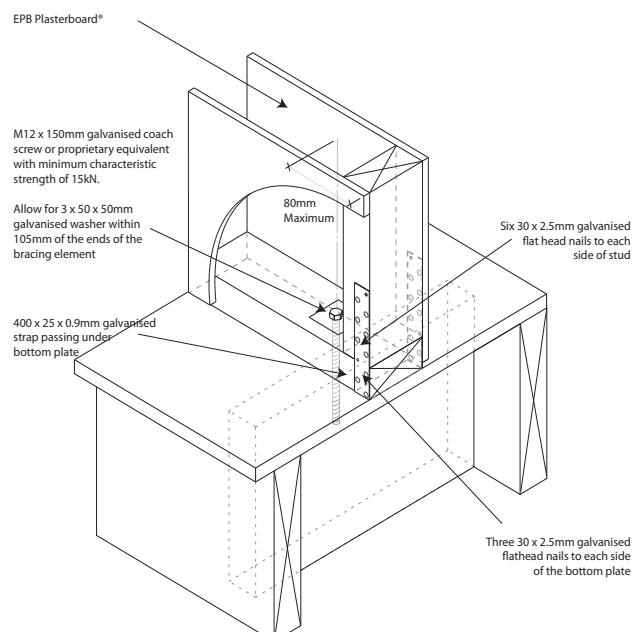
External



Timber Floors

M12 x 150mm galvanised coach screw or proprietary equivalent with minimum characteristic strength of 12kN. Allow for a 3 x 50 x 50mm galvanised washer within 105mm of the ends of the bracing element.

Internal

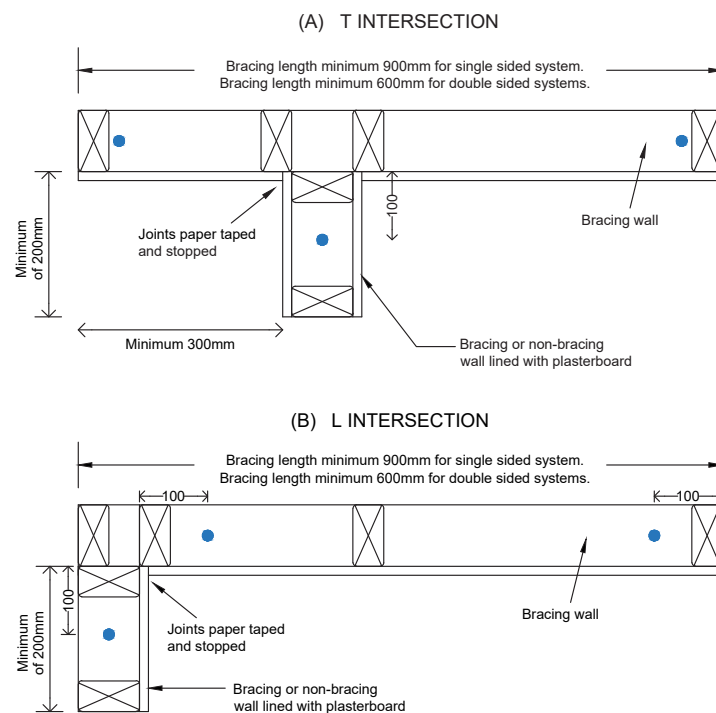


External (Option A)	External (Option B)
EPB Plasterboard® 80mm Maximum M12 x 150mm galvanised coach screw with minimum characteristic strength of 15kN. Allow for 3 x 50 x 50mm galvanised washer within 105mm of the ends of the bracing element 400 x 25 x 0.9mm galvanised strap passing under bottom plate Six 30 x 2.5mm galvanised flat head nails to each side of stud Three 30 x 2.5mm galvanised flat head nails to each side of the bottom plate	Block up to the first nog to allow for double strapping using three 100 x 3.75mm nails. Two 300 x 25 x 0.9mm galvanised straps pass down onto the floor joist. Six 30 x 2.5mm galvanised flat head nails to each stud and the floor joist and three to the bottom plate. Six 30 x 2.5mm galvanised flat head nails to each stud Three 30 x 2.5mm galvanised flat head nails to bottom plate Six 30 x 2.5mm galvanised flat head nails to floor joist 300 x 25 x 0.9mm Galvanised straps

Intersecting Walls

Provided the minimum wall lengths are complied with and walls are constructed as described in this manual, bracing elements may be interrupted by intersecting walls as detailed below. Fasteners layout at the corners and around the perimeter of the bracing elements are as per The Fastener Layout figures on page 31. Joints between sheets shall be paper taped and stopped in accordance with the EPB Plasterboard Installation Guide. Panel end hold-downs must also comply except that the location of bottom plate anchors is modified for L and T intersections as defined below.

The minimum bracing element length is 900mm for single sided bracing systems (ES-N, ES-H, EM-H, ES-Hc, EM-Hc and ER1) and 600mm for double sided bracing systems, (ESSN, ESSH, ESPH, EMSH, EMPH and ER2.)



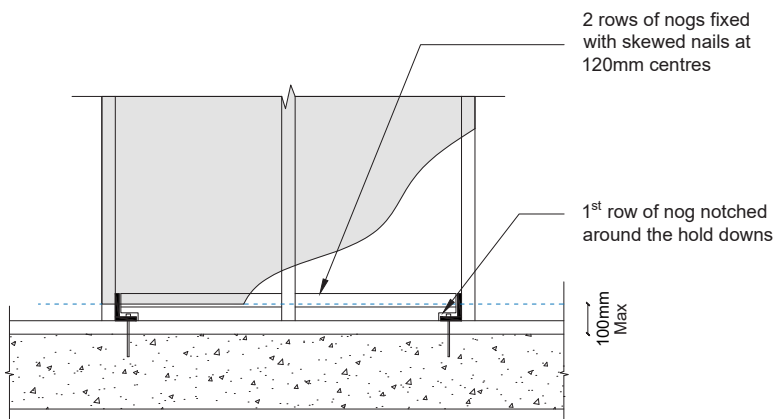
● Bottom plate fixing as required for bracing element or NZS 3604:2011 (as appropriate)

Top & Bottom plate packing of Bracing elements

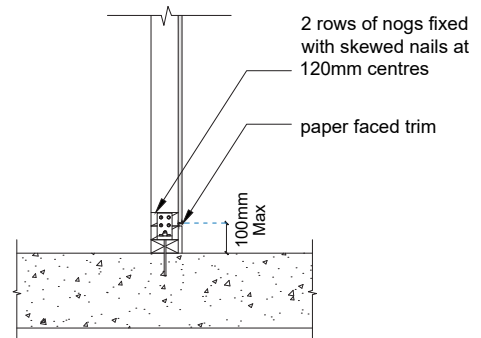
Key Points of Packing Bottom Plate

- The edge of the bracing sheet should be no more than 100mm from the floor level
- Bottom plate to be fastened to the floor as per normal methods and as specified for the relevant EPB QuickBrace system.
- One or two rows of nogs of 45mm x width of the plate are to be added on top of the bottom plate.
- The first nog to be notched over the hold downs if applicable.
- Each layer of nogs to be fastened using 90mm gun nails, in a skewed angle at 120mm centers.

Where Bottom plate cannot be reached or a negative detail is required



Front Elevation

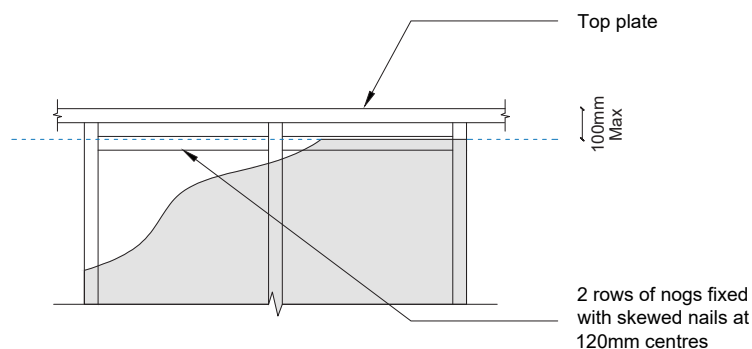


Side Elevation

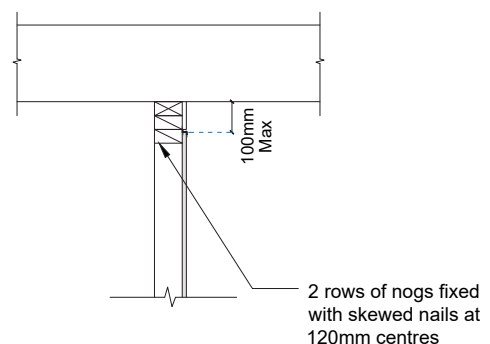
Key Points of Packing Top Plate

- The edge of the bracing sheet should be no more than 100mm from the top plate.
- One or two rows of nogs of 45mm x width of the plate are to be added below the top plate.
- Each layer of nogs to be fastened using 90mm gun nails, in a skewed angle at 120mm centers.

Where Top plate cannot be reached or a negative detail is required



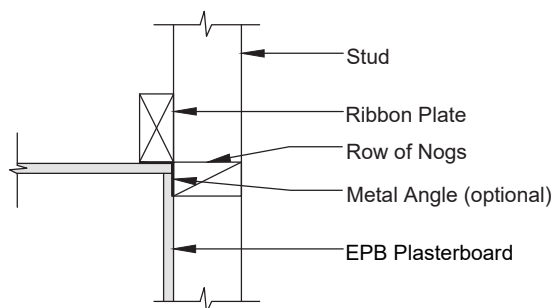
Front Elevation



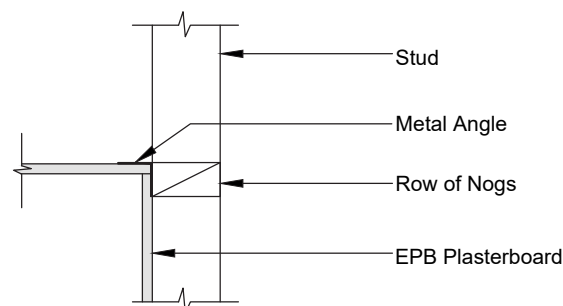
Side Elevation

Parapets, Gable End Walls or Dropped or Suspended Ceilings

Sheeting material used in bracing elements must connect to both the top and bottom plates. Where the top plate is not accessible, fixing to a row of nogs is not an acceptable solution. Detail below are two possible solutions.



A continuous length of 90mm x 45mm timber or ribbon plate is fixed across the face of the studs just above the row of nogs and at the ceiling line.



A metal angle of minimum of 45 x 45 x 0.55mm fixed to the row of nogs at the ceiling line. Use minimum 30 x 2.5mm FH galv nails at 300mm centres.

Ceiling Diaphragms

Diaphragms are used to distribute horizontal loads.

Ceiling diaphragms are required to comply with Section 5.6 and 13.5 of NZS 3604:2011. Ceiling diaphragms are required when distances between bracing lines exceed 6m (when dragon ties not used) or 7.5m if dragon ties used as per figure 8.1 in NZS 3604:2011.

Ceiling diaphragms shall not exceed 12m in length and the length shall not exceed twice the width (both length and width being measured between supporting walls). The ceiling lining shall cover the entire area of the ceiling diaphragm.

Each Wall surrounding the Ceiling Diaphragm shall have a minimum bracing capacity of 15 BUs /Lm of wall length or 100 BUs whichever is the greater. Refer to the figure on the right.

Limitations for Ceiling Diaphragm Systems

Ceiling diaphragm requirements are dependent on the length of the room and/or the roof pitch.

C1: Not steeper than 15 degrees and not longer than 7.5m

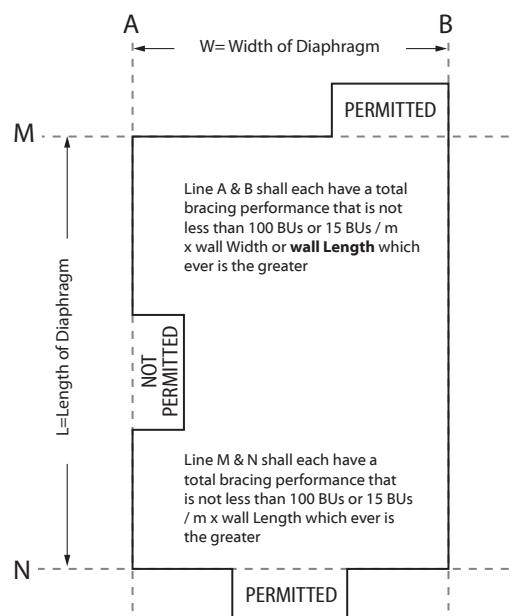
C2: Not steeper than 25 degrees and not longer than 12m
or Not steeper than 45 degrees and not longer than 7.5m

Plasterboard Lining Requirement:

Minimum 10mm EPB® Standard Plasterboard

Framing Members:

Ceiling battens shall be spaced at maximum; 450mm centres for 10mm EPB® Standard or 600 centres for 10mm EPB CeilingSmart® or 13mm EPB® Standard Plasterboard.



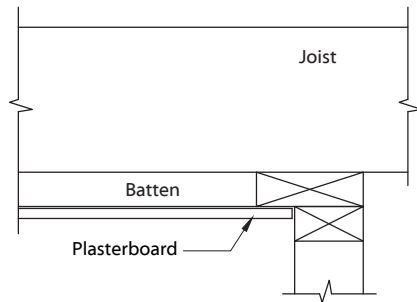
Timber or Metal Battens

Timber battens: Must be fixed according to NZS 3604:2011.

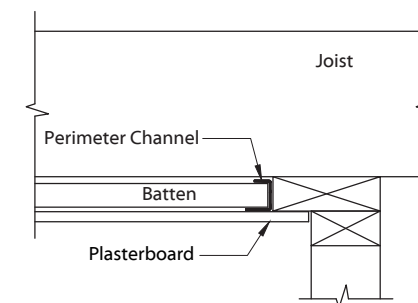
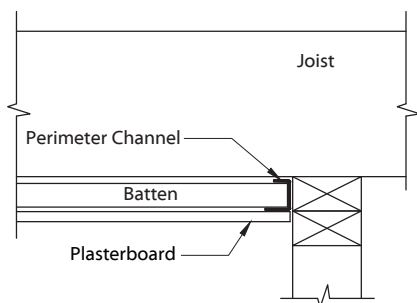
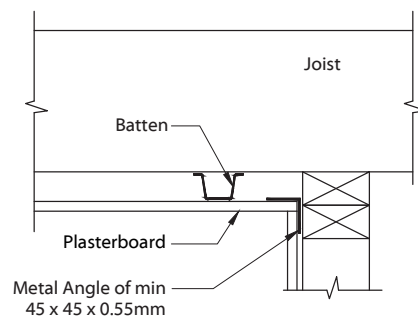
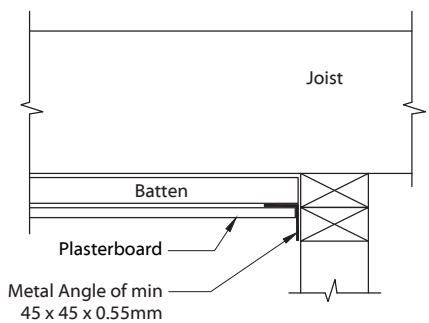
Metal battens: Minimum 0.55 BMT thickness with flanges not less than 8mm in order to allow the direct screwing, using 2/32mm x 8g wafer head self tapping screws, to the ceiling framing members.

A steel perimeter channel or metal angle is required to receive the ends of the steel battens. The linings must be fastened to solid continuous timber member at the perimeter of the ceiling diaphragms. This is achieved with either at 140mm double top plate or by fixing continuous timber member to the original top plate using fixing requirements for built up members and nailed together according to NZS 3604:2011 clause 2.4.4.7.

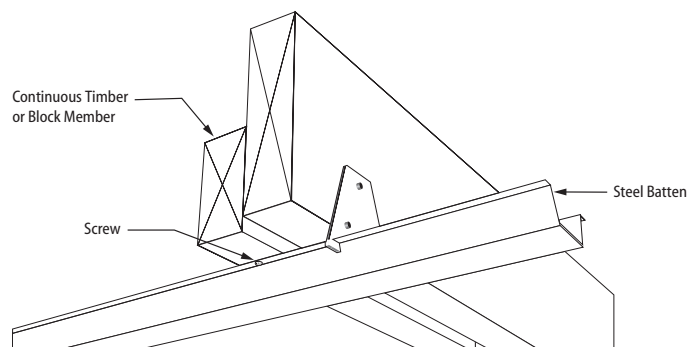
Timber Ceiling Batten Detail



Metal Ceiling Battens with corner angle Details



If a clip system is used then a solid timber block or continuous timber member must be fixed to the framing member.

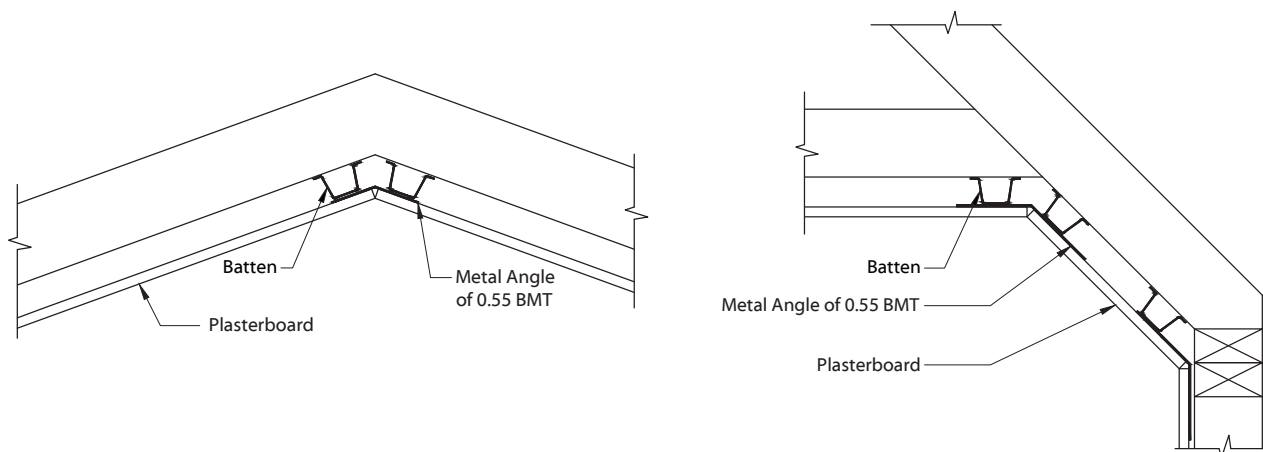


CEILING DIAPHRAGMS

Coved Ceilings

Ceilings diaphragms with more than one gradient are allowable, by using metal folded angles with a minimum gauge of 0.55 BMT at the junctions. Use 32mm x 6g coarse thread drywall screws when fixing to timber battens and use 32mm x 8g drywall self tapping screws or similar when fixing to metal battens.

The plasterboard is fixed to these folded metal angles at 75mm or 100mm or 150mm centres depending on conditions detailed below. Use 25mm x 6g drywall self tapping screws.



Minimum sheet size requirements:

Minimum sheet size shall be 900mm wide by 1800mm long where possible except where building dimensions prevent their use. Sheets between 600mm wide and 900mm wide by between 1200mm long and 1800mm long can be used provided they are back blocked with adjacent sheets.

Fasteners:

Timber battens & Timber perimeters:

32mm x 6g High thread Drywall screws

Steel battens and Steel perimeter:

25mm x 6g Self Tapping Drywall screws

Fastener Brands Allowable

Fortress®, Grabber® or Senco®.

(Other fastener brands need to demonstrate equal or better performance).

Fastening Centres:

The corner pattern fastening centres are as follows;

For ceiling diaphragms not steeper than 15 degrees and not longer than 7.5m

Place fasteners 50mm, 50mm, 50mm, 75mm, 75mm from all corners of the diaphragm. Then place fasteners at maximum 150mm centres to the boundary members and around the perimeter of the diaphragm as per ceiling diaphragm pattern C1 shown below.

For ceiling diaphragms that are:

- either not steeper than 25 degrees and not longer than 12.0m

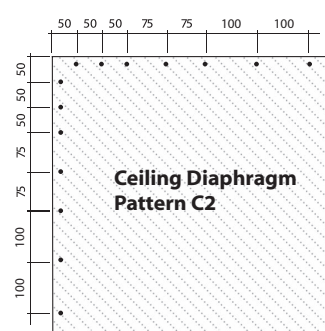
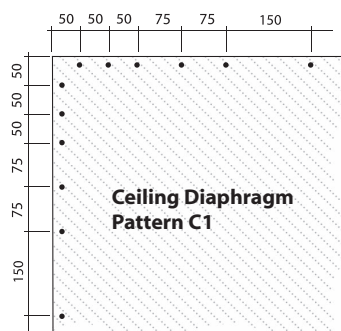
- or not steeper than 45 degrees and not longer than 7.5m

Place fasteners 50mm, 50mm, 50mm, 75mm, 75mm from all corners of the diaphragm.

Then place fasteners at maximum 100mm centres to the boundary members and around the perimeter of the diaphragm as per ceiling diaphragm pattern C2 shown below.

Fix all fasteners at no less than 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.

Fastening requirements within the ceiling diaphragm are conventional. All in accordance with the EPB Installation Guide.



CEILING DIAPHRAGMS

Openings in Ceiling Diaphragms:

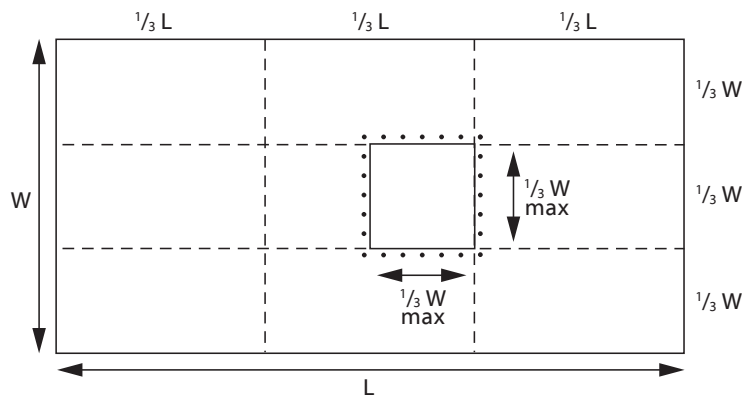
Openings are allowable and must be within the middle third of the diaphragms length and width and no opening dimension shall be greater than the ceiling diaphragm width.

Small Opening

Openings of 90mm x 90mm or less are not to be placed closer than 90mm to the edge of the ceiling diaphragm

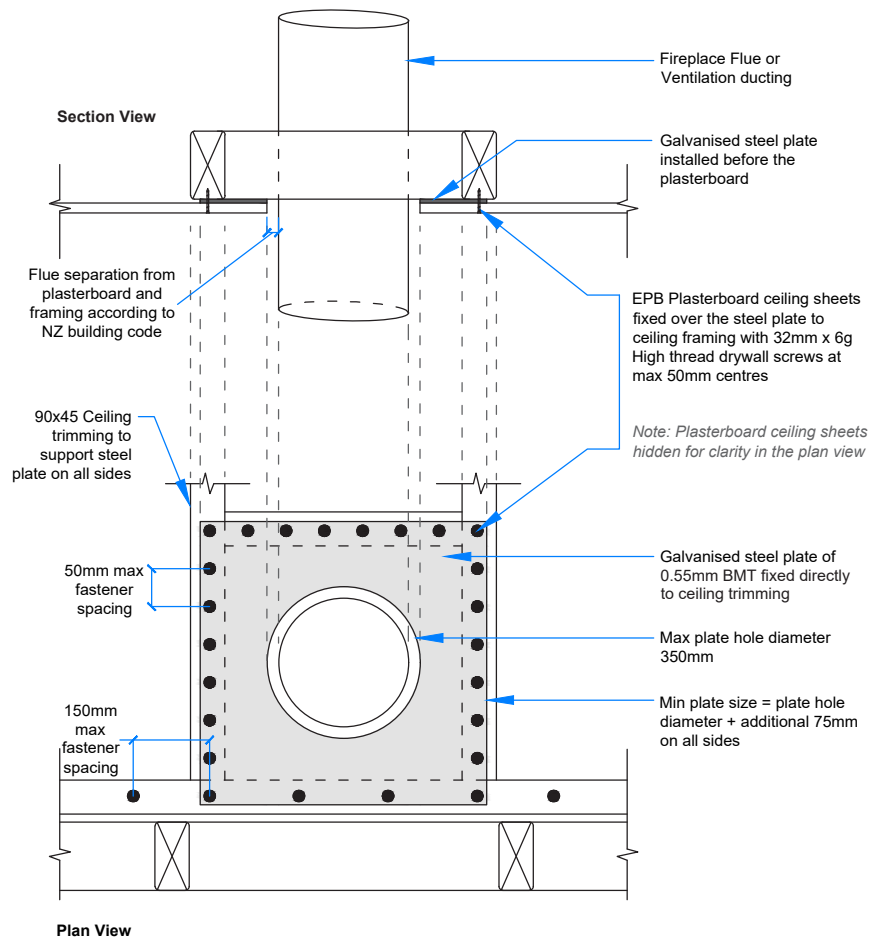
Large Opening

- Openings are allowable and must be within the middle third of the diaphragms length and width.
- Neither opening dimension can exceed a third of the diaphragm width.
- Fix sheets at 150mm centres minimum to opening trimmers.
- For openings at different locations and larger openings, specific engineering design is required.



OPENINGS IN WALL BRACING ELEMENTS OR CEILING DIAPHRAGMS

For Ceiling diaphragms with Fireplace flues or ceiling diaphragms and walls with Ventilation ducting, use a galvanised metal backing plate of 0.55mm BMT, with a maximum hole diameter of 350mm. Install the plate, trimmers and plasterboard as shown in the figure below.

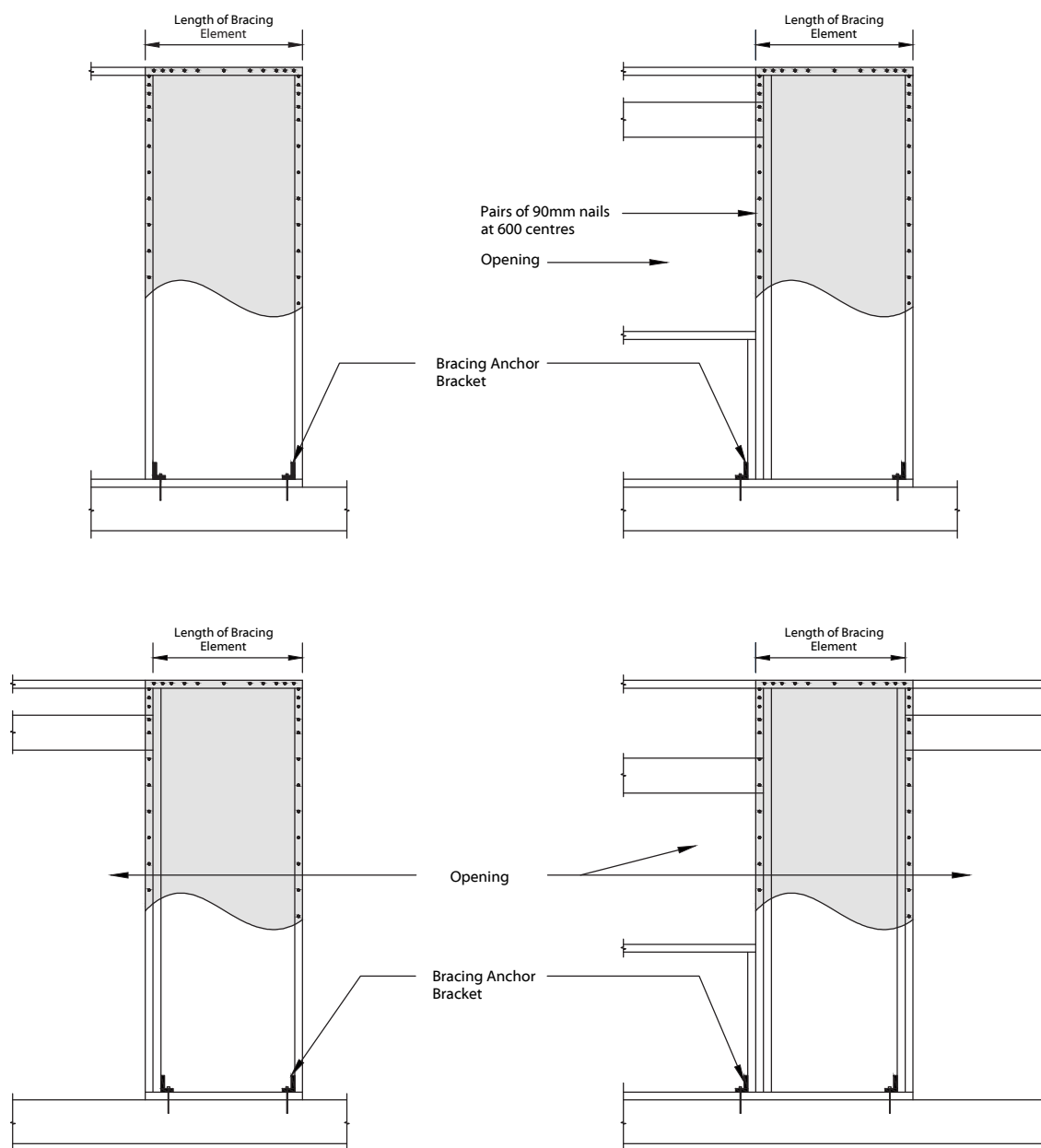


LENGTH OF BRACING ELEMENTS

With Panel End Hold Downs

EPB QuickBrace elements requiring panel end hold downs (EM-H, EMSH, EMPH, ESPH, ES-Hc and EM-Hc) can be used when the length of the bracing element is 400mm or more as shown in the images below.

The Fastener spacing and drawing scale shown in the images below are for illustrative purposes only. Refer to a particular element's Spec sheet for construction details.



LENGTH OF BRACING ELEMENTS

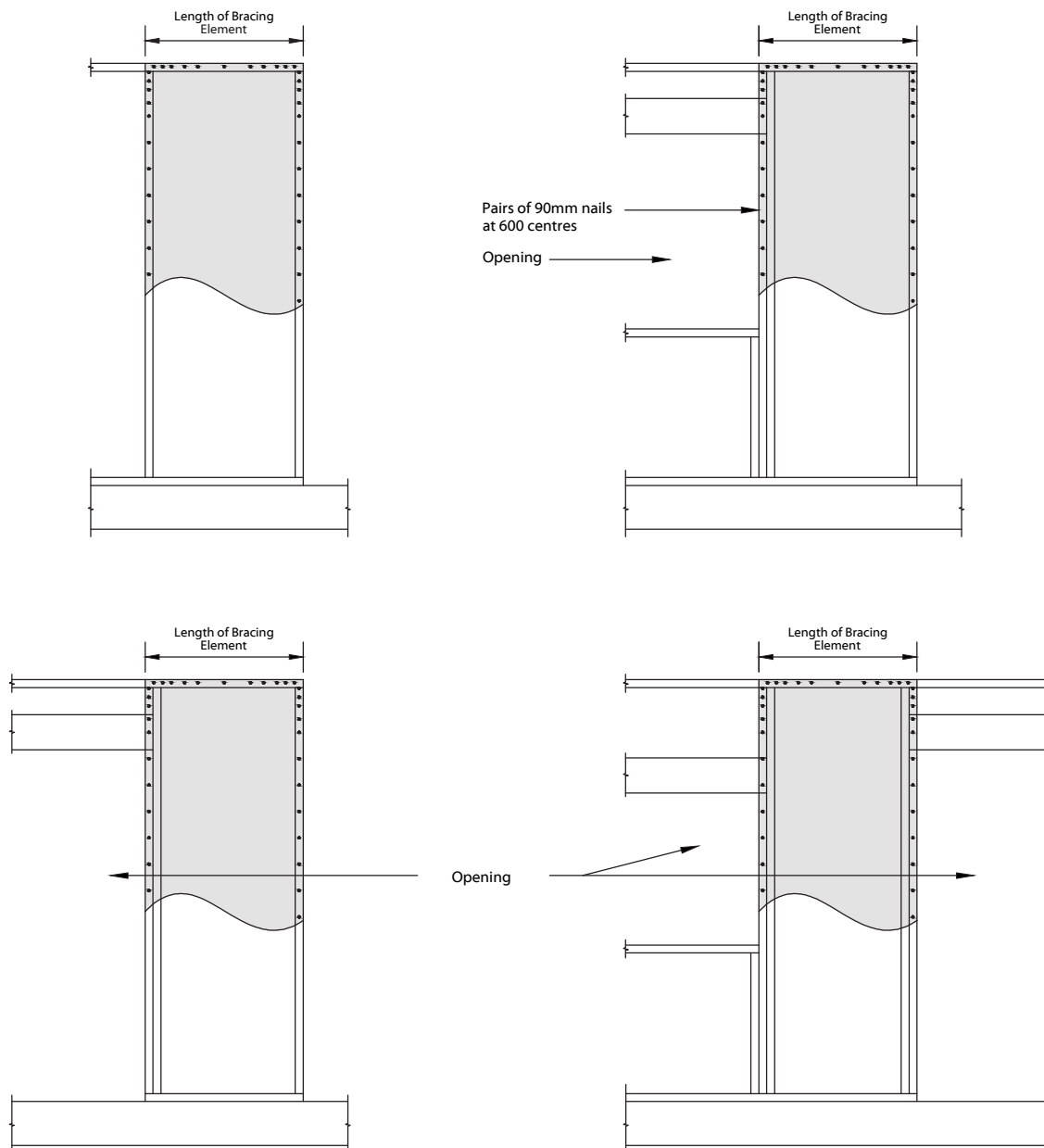
Without Panel End Hold Downs

EPB QuickBrace elements without panel end hold downs, require standard NZS3604:2011 plate connections that can be taken as the full frame length measured from outside of the end stud to the opening face as shown in the images below.

Quickbrace elements that do not require panel end hold downs are ES-N, ESSN, ER1, and ER2.

The length of the bracing element must not be less than 400mm.

The Fastener spacing and drawing scale shown in the images below are for illustrative purposes only. Refer to a particular element's Spec sheet for construction details.

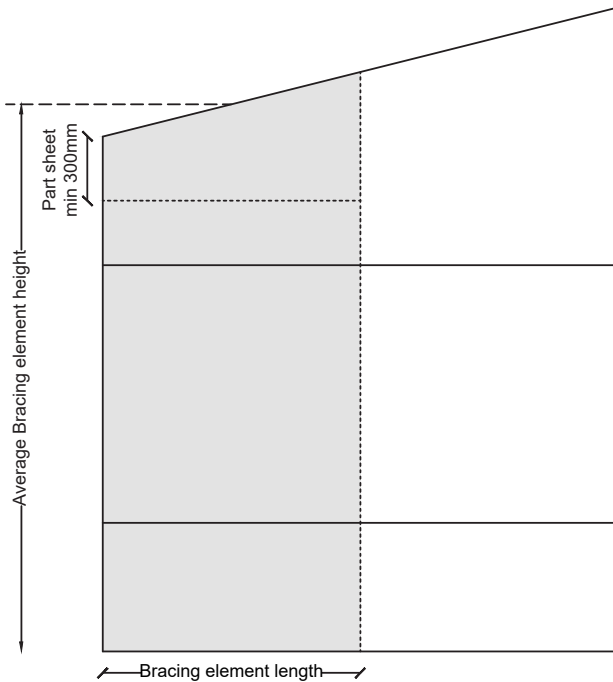


BRACING ELEMENTS WITH VARYING WALL HEIGHTS

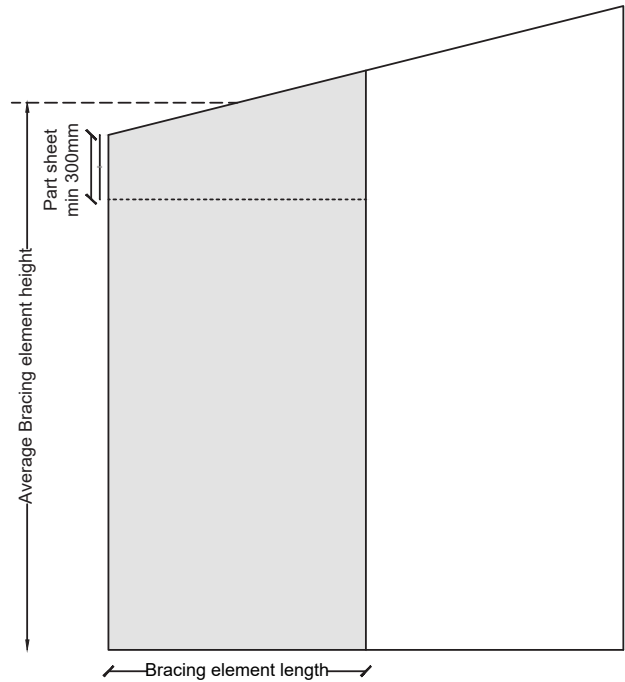
Walls of varying heights, shall have the bracing capacity adjusted in accordance with NZS3604:2021 clause 8.3.1.4(a), using the average height. This often occurs with rake ceilings and sloping top plates.

The minimum part sheet width must be 300mm. Including at the top of the raking bracing element.

Horizontal Fix

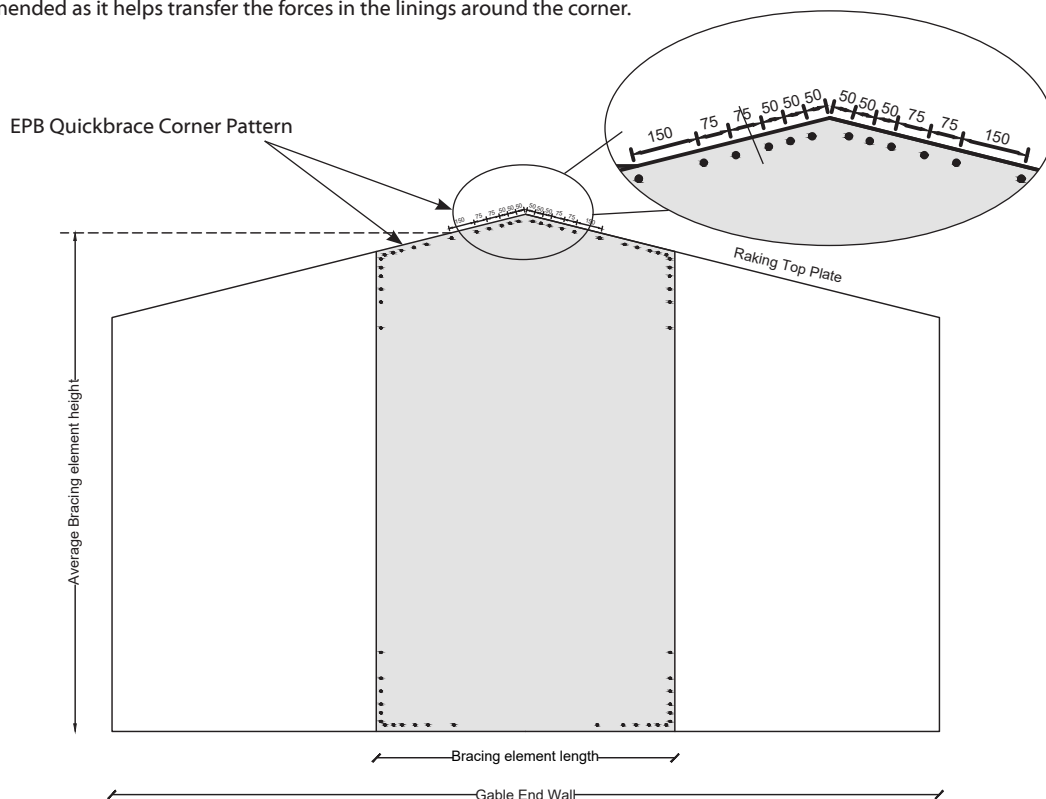


Vertical Fix



FIXING A BRACING ELEMENT THAT SPANS A CEILING APEX

When a bracing element follows a raking wall and spans the apex of a gable end, using EPB Quickbrace Standard corner pattern is recommended as it helps transfer the forces in the linings around the corner.



WALL BRACING CONSTRUCTION DETAILS - QUICKBRACE SYSTEMS

Fastening the Plasterboard Linings

EPB Plasterboard QuickBrace® systems must be constructed with specified fasteners and fastener patterns. The corner and perimeter screw pattern detail for the QuickBrace® systems require specific increased fastening. See figures below.

Specialised panel end hold downs may also be required as they are essential for obtaining the bracing unit ratings.

NB: Regularly fixed plasterboard as per the EPB Installation Guide, provides its own set of bracing performances. Refer EPB Regular Fixing method Pg. 34-36.

Fasteners:

Timber battens & Timber perimeters: 32mm x 6g High thread Drywall screws

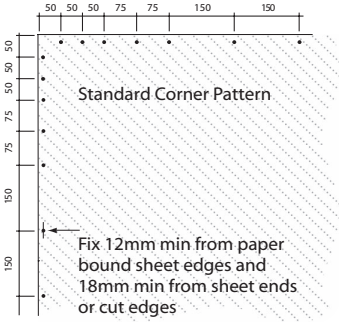
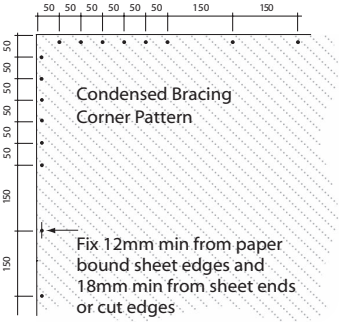
Steel battens and Steel perimeter: 25mm x 6g self tapping screws

Fastener Brands Allowable

Fortress®, Grabber® or Senco®. (Other fastener brands need to demonstrate equal or better performance).

Fastener Layout

Refer to the table below for the bracing corner patterns and perimeter patterns. Fastening the middle of the bracing element is as per the recommended screw and glue methods. Refer to EPB Plasterboard Installation Guide.

QuickBrace® Systems Fastener Layout	
Standard Corner pattern	Condensed Corner Pattern
Corner and Perimeter Pattern: Refer Standard Bracing Corner Pattern below. Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.	Corner Pattern: Refer to the bracing corner pattern below. Perimeter Pattern: Place fasteners at 150mm centres around perimeter of bracing element. Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.
	

Minimum Sheet Size

Sheets less than 300mm wide are allowable provided that the joints form over solid framing or the sheet is back blocked. All joints must be paper taped and stopped.

Butt Joints

All butt joints should be either fitted over nogs or studs and fastened at 200mm centres or back-blocked. All joints must be paper taped and stopped. Refer to EPB Plasterboard Installation Guide.

Horizontal Fixing

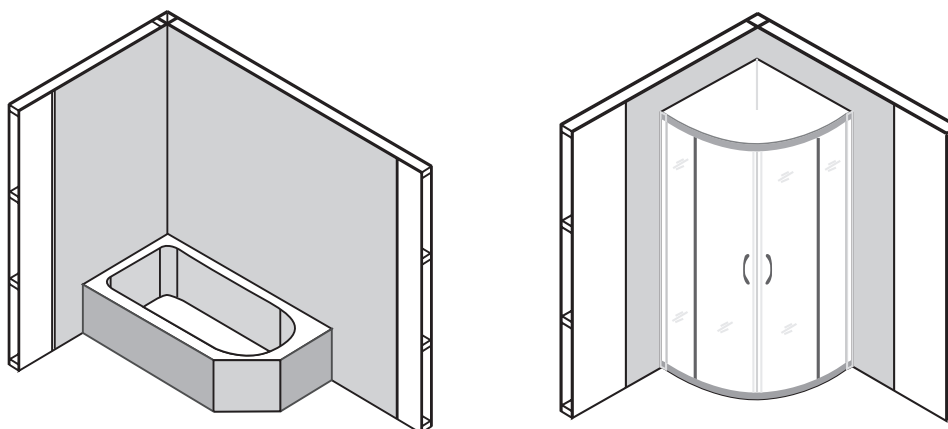
QuickBrace® systems may be fixed horizontally. The specialised corner and perimeter bracing pattern need only to be placed over the length and width of the bracing element. Fastening in the field of the bracing element is as per the recommended glue and screw method.

Note- Care should be taken during the installation of the plasterboard, as often the studs that require the special mechanical fixing pattern are in the field of the sheet. It is important to insure that the adhesive is not placed on or near the studs that require these special perimeter fasteners as this can be a cause of screw popping.



Wet Areas

Do not place bracing elements in areas such as behind showers and baths. Placing bracing elements in water splash areas is acceptable provided that these areas are maintained impervious for the life of the building. Bracing elements require a 50 year durability.



Shaded area must not have Plasterboard Bracing Systems

Allowable Substitutions

EPB AquaSmart can be substituted for the EPB® Standard in QuickBrace® systems ES-N, ESSN, ES-H, ESSH, ESPH and EMSh. EPB AquaSmart can be substituted for the EPB BraceSmart in QuickBrace® systems EM-H, EMSh and EMPH provided that the element is 900mm or longer and the perimeter screw pattern is reduced to 100mm centres. Ensure that all other relevant bracing system requirements including the important corner patterns are met.

Plywood

For systems ESPH and EMPH plywood is required. This must be Grade D-D 7mm construction plywood at a minimum. The plywood must be manufactured as per Australian/New Zealand Standard AS/NZS 2269:2012. The nailing pattern is at 150mm centres around the perimeter of the bracing element or each plywood sheet, whichever is the lesser width, using 50 x 2.8mm Flat head galvanised or stainless steel annular grooved nails. Sheet edges must be supported by framing or blocking. The corner pattern fastening is conventional and there is no need for the specialised corner patterns as is required on the plasterboard side of the brace.

OPENINGS IN BRACING ELEMENTS

Small openings	Large openings
Smaller openings of 90 x 90mm or less are allowable but cannot be placed closer than 90mm from the edge of the bracing element.	Openings larger than 90x90mm must be placed outside the bracing element.

Small Openings in Bracing Elements

Sheet linings used in bracing elements often need to be cut to allow for penetrations such as light switches, power points, or service pipes. The number, size, and location of these openings directly influence how the bracing element performs.

Positioning of Openings and critical strength zones

Penetrations such as power points, light switches, plumbing pipes, or cabling require placement suited to their function. However, their location within the bracing element is critical to maintaining bracing performance.

The strongest part of a bracing element is along its perimeter, where the unique fastener pattern is installed. Openings are not permitted within 90 mm of the bracing element perimeter, however they may be positioned within 90 mm of sheet joints within the element.

While the entire surface of the linings contributes to overall strength, the bottom 300 mm of the element carries the highest demand. It is best to minimise openings in this area. In addition, clustering several penetrations close together can create a “perforated” effect — therefore, avoid grouping too many openings in one area.

Round vs Square Cutouts

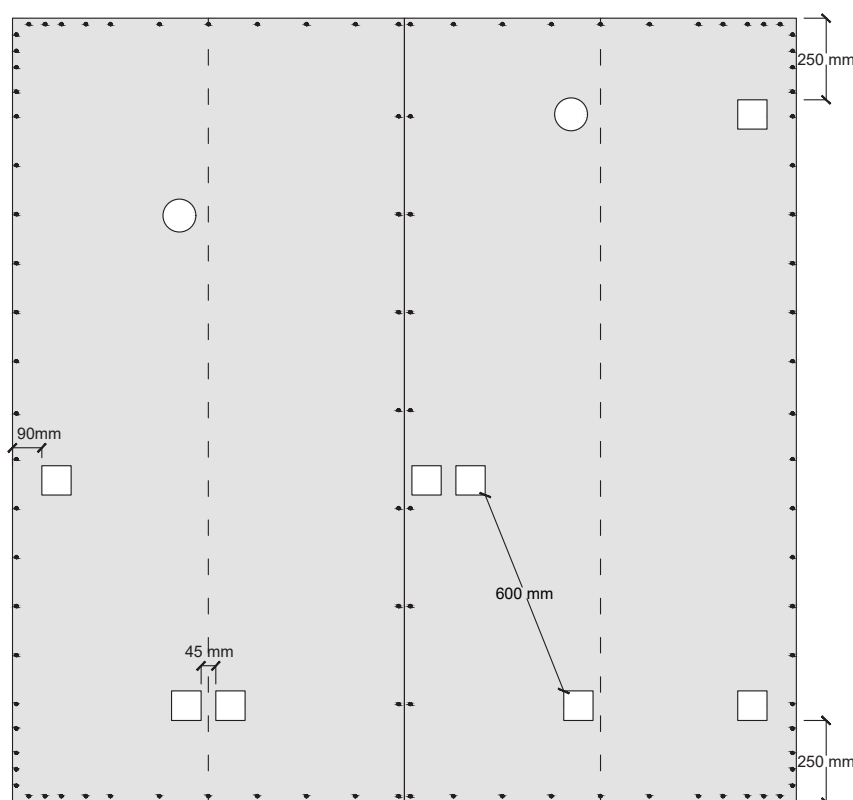
Round holes are preferred over square or rectangular ones as curved openings distribute forces smoothly, while sharp corners create weak points where cracks can form. Holes drilled with a hole saw provide the best performance. The acceptable number of penetrations may vary depending on their shape.

Installation Guidance

The following recommendations are provided to support the correct use of EPB bracing systems as a guidance to help maintain strength. If openings outside these parameters are required, contact EPB Technical Support (0800 353 742) for advice.

For more than one small penetration in an EPB bracing element, follow these guidelines:

- Openings must not exceed 90 x 90 mm or 100 mm diameter.
- Openings must be at least 250 mm from the top and bottom of the element.
- Openings must be at least 90 mm from the edge of the bracing element.
- Limit to maximum two openings per group, with a minimum of 45mm gap with timber between them.
- Maximum of 4 opening per stud bay.
- Openings to be minimum 600mm apart between group in a single stud bay.



Regular Code	Lining Requirement	Panel Hold-downs	Min Length (m)	BU/m		Fixing Method
				Wind	Earth-quake	
ER1	Any EPB Plasterboard on One Side	n/a	0.4	40	30	Regular fixing
ER2	Any EPB Plasterboard on Both Sides	n/a	0.4	50	50	Regular fixing
			1.2	55	55	

Framing

Framing heights and dimensions to comply with NZS 3604:2011 stud and top plate tables for load bearing and non load bearing walls.

Refer to relevant sections and clauses of

NZBC B1 – Structure: AS1 Clause 3 – Timber (NZS 3604)

NZBC B2 – Durability: AS1 Clause 3.2 – Timber (NZS 3602)

Bottom Plate Fixing

There are no specialised bottom plate fixings beyond the requirements of NZS 3604:2011

Timber Floor:

Fastening within the bracing element must be done in accordance with NZS 3604:2011. i.e. Either pairs of 100 x 3.75mm hand driven nails or three 90 x 3.15mm power driven nails at 600mm centres.

Concrete Floors:

External walls: Within the bracing element fix the bottom plate as per NZS 3604:2011.

Internal Walls: Within the bracing element fix the bottom plate as per NZS 3604:2011.

Note: Alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs at 150mm & 300mm from end studs and thereafter at 600mm centres. Ensure a minimum penetration of 30mm into the concrete foundation.

Wall Lining (As per System Code above)

ER1: One layer to One side of frame

ER2: One layer to Each side of frame

The Plasterboard sheets can be fixed vertically or horizontally. Use full height or full length sheets when fixing vertically or horizontally where possible. Sheets shall be touch fitted.

Fixing of Plasterboard Linings

Fastening: (Corners and Perimeters)

25mm x 6g High thread Drywall screws. (See page 34 for adhesive fixing options)

Fastening Centres: (Corners and Perimeters)

Corner and Perimeter Pattern: Refer to the regular corner fixing pattern below.

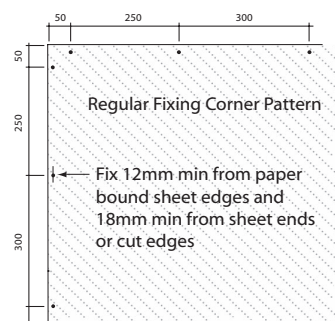
Place all fasteners no less than 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.

Fasteners and Fastening Centres in the Field of the lining

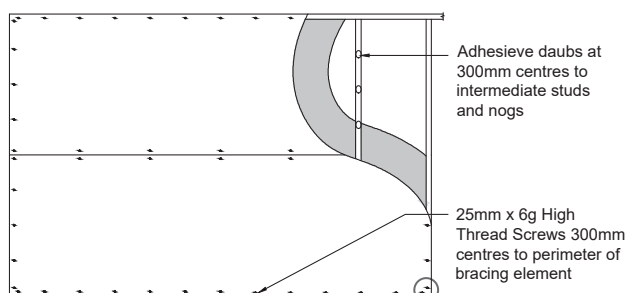
For vertically fixed sheets place fasteners (screws or adhesive daubs) at 300mm centres to the intermediate sheet joints. For Horizontally fixed sheets place screws at the sheet edge that crosses the studs. Place daubs of Drywall adhesives at 300mm centres to intermediate studs.

Jointing of Finishing of Plasterboard Linings

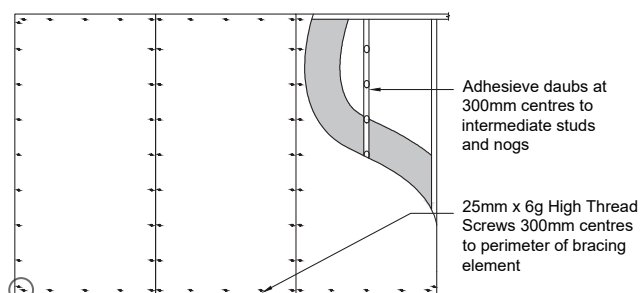
All fasteners stopped and all sheet joints reinforced with paper jointing tape. All in accordance with the EPB Plasterboard Installation Guide.



Horizontal Fixing



Vertical Fixing



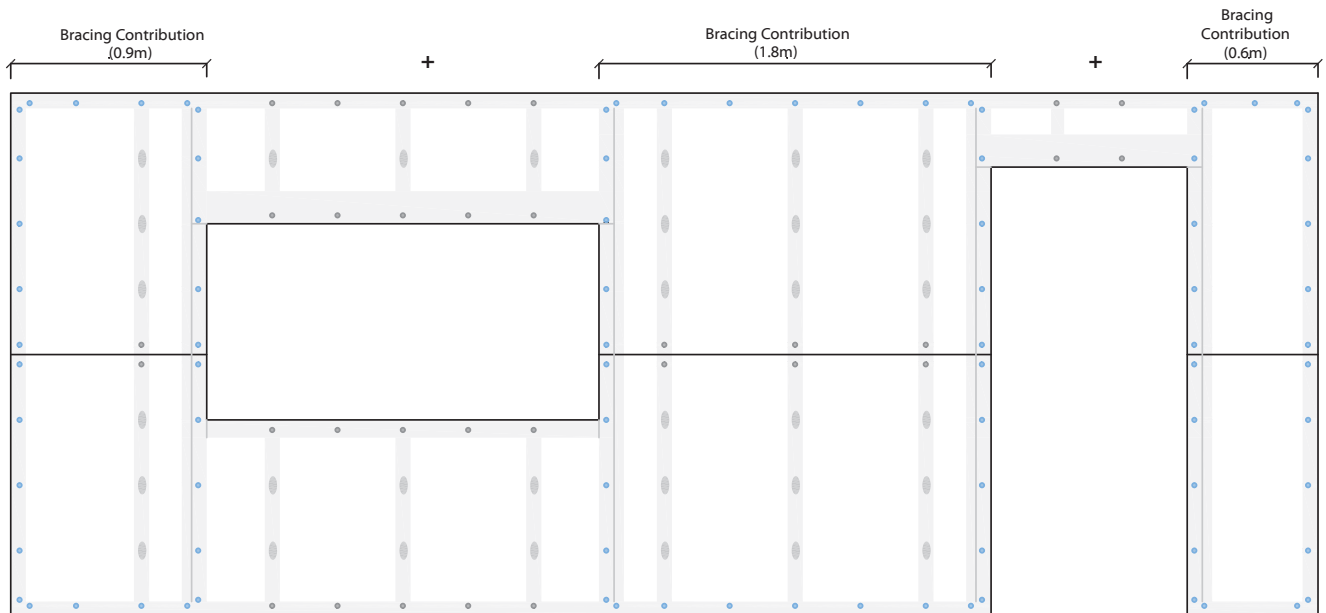
Note Corner Fastener requirement



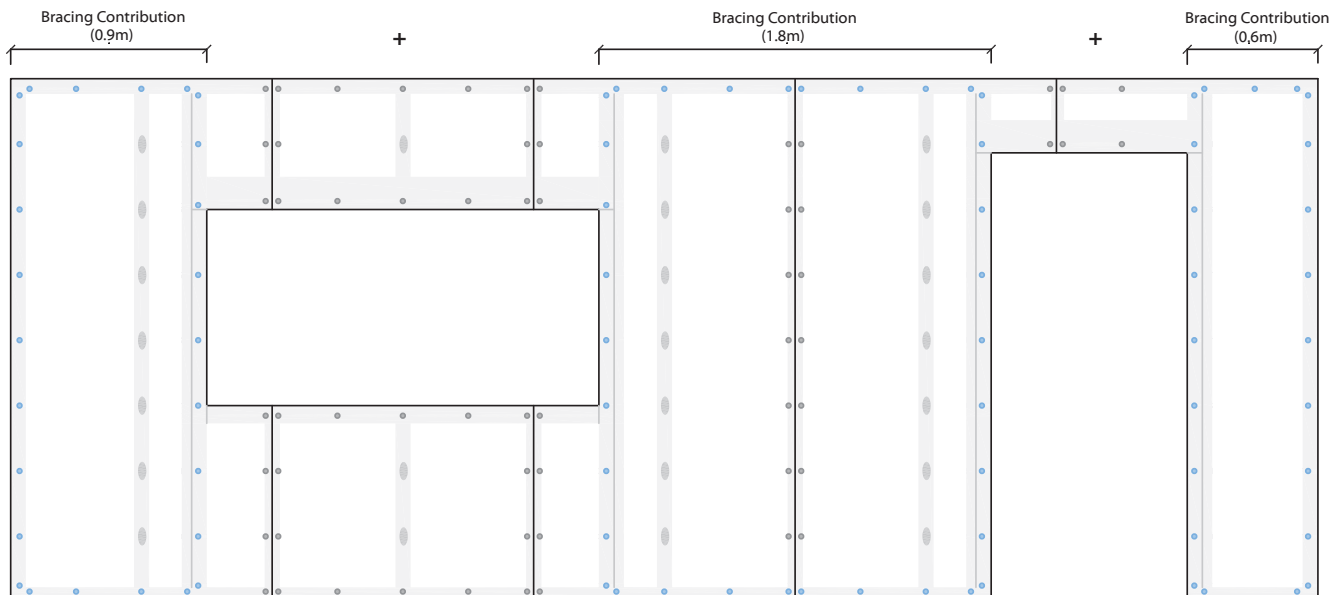
ER1 & ER2 Regular Fixing Method

N.B. The screws colored blue in the diagrams below are forming part of the bracing element. The screws and adhesive daubs colored grey are inconsequential for bracing purposes and are only shown for overall regular fixing methodology

Horizontal Fixing Method



Vertical Fixing Method



ER1 & ER2 Alternate Fixing Option - Adhesive & Screw Method

Where the bracing element does not end at a corner wall junction and is adjacent to a window or door, the screws can be replaced by daubs of adhesive. This will further reduce the number of screws required. There is still a requirement to have screws on the top and bottom plates.

Replacing screws with daubs of adhesive is especially preferred where the element is adjacent to a window or a door as these areas can have a higher degree of screw popping, as it is difficult to dry out multiple jack studs. Only adhesives with a 50 year durability are acceptable as replacements for the screws at either end of the bracing element. E.g. GIBFix® All-Bond solvent-based adhesive. Keep evidence of the adhesive used to show the building official if necessary. This adhesive fixing method only applies to the EPB

Regular Fixing Bracing Systems. The EPB QuickBrace Systems cannot utilise the adhesive option as described above.

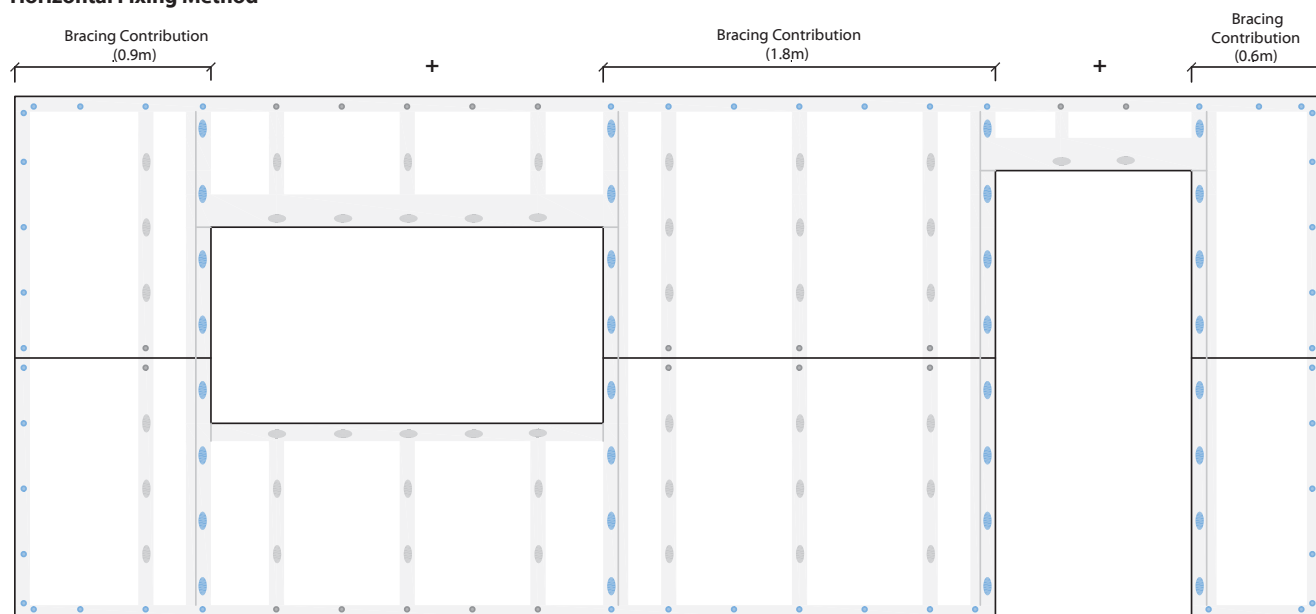
If the building official has doubts about the adhesive application, a number of small core holes can be drilled with a small hole-saw in areas that are likely to have the adhesive daubs and as agreed between building official and installer. If adhesive is evident, it is up to the building official to accept, on reasonable grounds, that the ends of the bracing elements have been glue fixed.

If the building official rejects the adhesive method then the regular screw pattern can be applied. However it is important to remember to leave at least 7 days from the time the adhesive was applied to allow the adhesive to set before applying screws. This will reduce the likelihood of screws pops.

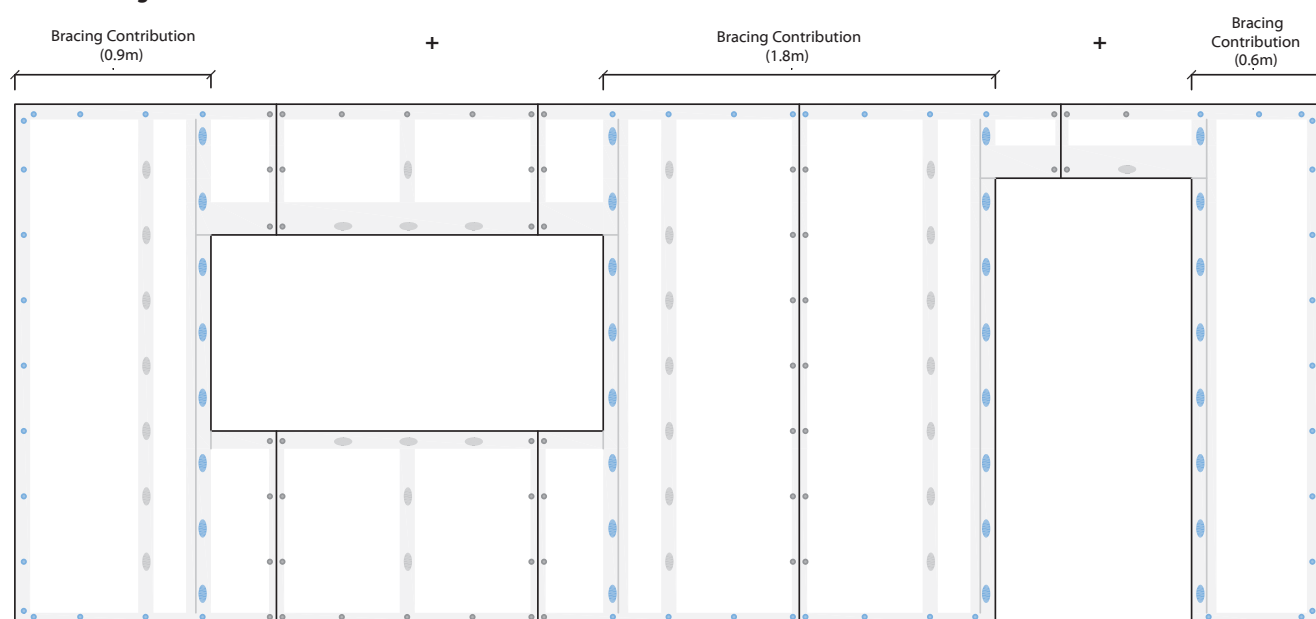
ER1 & ER2 Regular Fixing Method (with adhesive)

N.B. The screws and adhesive daubs colored blue in the diagrams below are forming part of the bracing element. The screws and adhesive daubs colored grey are inconsequential for bracing purposes and are only shown for overall regular fixing methodology

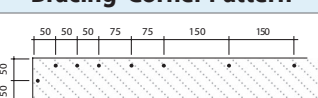
Horizontal Fixing Method



Vertical Fixing Method



PLASTERBOARD ON ONE SIDE

System Number	Lining Requirement	Panel Hold-downs	Min Length (m)	BU/m		Bracing Corner Pattern	
				Wind	Earth-quake		
ES-N	EPB® Standard on one side	No	0.4	65	60		
			1.2	70	60		
			1.8	75	60		
ES-H	EPB® Standard on one side	Yes	0.4	75	70		
			0.8	90	75		
			1.8	105	85		
EM-H	EPB BraceSmart® on one side		0.4	100	90		
			0.8	110	100		
			1.2	125	105		

Framing

Framing heights and dimensions to comply with NZS 3604:2011 and must be a minimum of 70 x 45mm for internal walls and 90 x 35mm for external walls. Nogs and Dwargs are not a requirement in order to achieve the bracing ratings in this document.

Refer to relevant sections and clauses of

NZBC B1: Structure; AS1 Clause 3 Timber - NZS 3604

NZBC B2: Durability; AS1 Clause 3.2 Timber - NZS 3602

Fastening Bracing Elements to Floor

Timber Floor:

Fastening within the bracing element must be done in accordance with NZS 3604:2011.

i.e. Either pairs of 100 x 3.75mm hand driven nails or three 90 x 3.15mm power driven nails at 600mm centres.

For **ES-H** and **EM-H**: Use the panel hold downs at each end of the bracing element.

Concrete Floors:

External or Internal walls: Within the bracing element fix the bottom plate as per NZS 3604:2011.

For **ES-N**: On Internal Walls alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs at 150mm & 300mm from end studs and thereafter at 600mm centres. Ensure a minimum penetration of 30mm into the concrete foundation.

For **ES-H** and **EM-H**: Use the panel hold downs at each end of the bracing element.

Wall Lining (As per Specified System Above)

One layer of Plasterboard lining type as per specified system above to ONE side of frame.

The Plasterboard sheets can be fixed vertically or horizontally. Use full height or full length sheets when fixing vertically or horizontally where possible. All sheet end butt joints must be fixed over solid timber framing and fastened at 200mm centres. Alternatively the sheet end butt joints may be back blocked. Sheets shall be touch fitted.

Fixing of Plasterboard Linings

Fastening: (Corners and Perimeters of the bracing element)

32mm x 6g High thread Drywall screws (Fortress® or Grabber® or Senco®)

Fastening Centres: (Corners and Perimeters of the bracing element)

Corner Pattern: Refer to the bracing corner pattern above.

Perimeter Pattern: Place fasteners at 150mm centres around perimeter of bracing element.

Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.

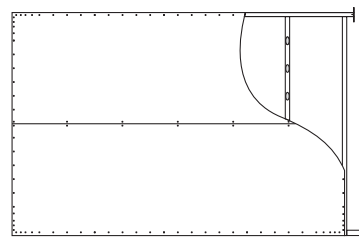
Fasteners and Fastening Centres in the Field of the bracing element

For vertically fixed sheets place fasteners at 300mm centres to the intermediate sheet joints. For Horizontally fixed sheets place fasteners at the sheet edge that crosses the studs. Place daubs of Drywall adhesives at 300mm centres to intermediate studs. Take extra care to ensure that screws or clouts are not placed closer than 200mm from any daubs of adhesive.

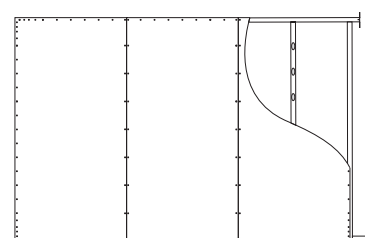
Jointing of Finishing of Plasterboard Linings

All fasteners stopped and all sheet joints reinforced with paper jointing tape. All in accordance with the EPB Plasterboard Installation Guide.

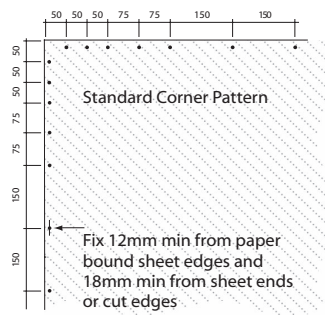
Horizontal Fixing



Vertical Fixing



PLASTERBOARD ON BOTH SIDES

System Number	Lining Requirement	Panel Hold-downs	Min Length (m)	BU/m		Bracing Corner Pattern	
				Wind	Earth-quake		
ESSN	EPB® Standard on Both sides	No	0.4	75	70	 Standard Corner Pattern Fix 12mm min from paper bound sheet edges and 18mm min from sheet ends or cut edges	
			0.8	90	80		
			1.2	95	85		
ESSH	EPB® Standard on Both sides	Yes	0.4	90	105		
			0.8	130	125		
			1.2	150	135		
EMSH	EPB BraceSmart® on one side, EPB® Standard on the other		0.4	110	115		
			0.8	140	130		
			1.2	150	145		

Framing

Framing heights and dimensions to comply with NZS 3604:2011 and must be a minimum of 70 x 45mm for internal walls and 90 x 35mm for external walls. Nogs and Dwangs are not a requirement in order to achieve the bracing ratings in this document.

Refer to relevant sections and clauses of

NZBC B1: Structure; AS1 Clause 3 Timber -NZS 3604

NZBC B2: Durability; AS1 Clause 3.2 Timber -NZS 3602

Fastening Bracing Elements to Floor

Timber Floor:

Fastening within the bracing element must be done in accordance with NZS 3604:2011.

i.e. Either pairs of 100 x 3.75mm hand driven nails Or three 90 x 3.15mm power driven nails at 600mm centres.

For **ESSH** and **EMSH**: Use panel hold downs at each end of the bracing element.

Concrete Floors:

Within the bracing element fix the bottom plate as per NZS 3604:2011.

For **ESSN**: For Internal Walls alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs at 150mm & 300mm from end studs and thereafter at 600mm centres. Ensure a minimum penetration of 30mm into the concrete foundation.

For **ESSH** and **EMSH**: Use panel hold downs at each end of the bracing element.

Wall Lining (As per Specified System Above)

One layer of Plasterboard lining type as per specified system above to BOTH sides of frame.

The Plasterboard sheets can be fixed vertically or horizontally. Use full height or full length sheets when fixing vertically or horizontally where possible. All sheet end butt joints must be fixed over solid timber framing and fastened at 200mm centres. Alternatively the sheet end butt joints may be back blocked. Sheets shall be touch fitted.

Fixing of Plasterboard Linings

Fastening: (Corners and Perimeters of the bracing element)

32mm x 6g High thread Drywall screws (Fortress® or Grabber® or Senco®)

Fastening Centres: (Corners and Perimeters of the bracing element)

Corner Pattern: Refer to the bracing corner pattern above.

Perimeter Pattern: Place fasteners at 150mm centres around perimeter of bracing element.

Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.

Fasteners and Fastening Centres in the Field of the bracing element

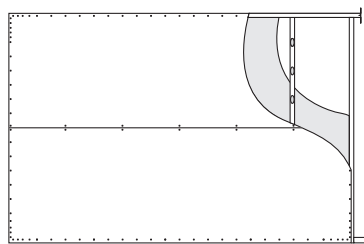
For vertically fixed sheets place fasteners at 300mm centres to the intermediate sheet joints.

For Horizontally fixed sheets place fasteners at the sheet edge that crosses the studs. Place daubs of Drywall adhesives at 300mm centres to intermediate studs. Take extra care to ensure that screws or clouts are not placed closer than 200mm from any daubs of adhesive

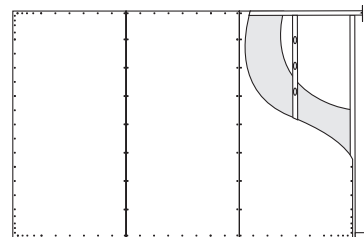
Jointing of Finishing of Plasterboard Linings

All fasteners stopped and all sheet joints reinforced with paper jointing tape. All in accordance with the EPB Plasterboard Installation Guide.

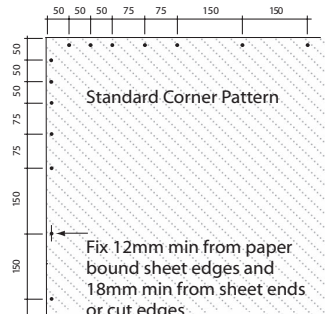
Horizontal Fixing



Vertical Fixing



PLASTERBOARD ON ONE SIDE, PLYWOOD THE OTHER

System Number	Lining Requirement	Panel Hold-downs	Min Length (m)	BU/m		Bracing Corner Pattern	
				Wind	Earth-quake		
ESPH	EPB® Standard on One Side 7mm Structural Plywood on the Other Side	Yes	0.4	100	115		
			0.8	140	140		
			1.2	150	150		
EMPH	EPB BraceSmart® on One Side 7mm Structural Plywood on the Other Side		0.4	120	135		
			0.8	145	150		
			1.2	150	150		

Framing

Framing heights and dimensions to comply with NZS 3604:2011 and must be a minimum of 70 x 45mm for internal walls and 90 x 35mm for external walls. Nogs and Dwangs are not a requirement in order to achieve the bracing ratings in this document.

Refer to relevant sections and clauses of
 NZBC B1: Structure; AS1 Clause 3 Timber -NZS 3604
 NZBC B2: Durability; AS1 Clause 3.2 Timber -NZS 3602

Fastening Bracing Elements to Floor

Timber Floor:

Fastening within the bracing element must be done in accordance with NZS 3604:2011.

i.e. Either pairs of 100 x 3.75mm hand driven nails or three 90 x 3.15 power driven nails at 600mm centres.

For **ESPH** and **EMPH**: Use the panel hold downs at each end of the bracing element.

Concrete Floors:

Within the bracing element fix the bottom plate as per NZS 3604:2011.

For **ESPH** and **EMPH**: Use the panel hold downs at each end of the bracing element

Wall Lining (As per Specified System Above)

One layer of Plasterboard lining type as per specified system above to ONE side of frame. One layer of 7mm Structural Plywood as per specified system above to OTHER side of frame. The Plasterboard sheets can be fixed vertically or horizontally. Use full height or full length sheets when fixing vertically or horizontally where possible. All sheet end butt joints must be fixed over solid timber framing and fastened at 200mm centres. Alternatively the sheet end butt joints may be back blocked. Plywood sheets must be fixed vertically with edges supported by framing or blocking. Sheets shall be touch fitted.

Fixing of Plasterboard Linings

Fasteners: (Corners and Perimeters of the bracing element)

32mm x 6g High thread Drywall screws (Fortress® or Grabber® or Senco®)

Fastening Centres: (Corners and Perimeters of the bracing element)

Corner Pattern: Refer to the bracing corner pattern above.

Perimeter Pattern: Place fasteners at 150mm centres around perimeter of bracing element.

Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.

Fasteners and Fastening Centres in the Field of the bracing element

For vertically fixed sheets place fasteners at 300mm centres to the intermediate sheet joints. For horizontally fixed sheets place fasteners at the sheet edge that crosses the studs. Place daubs of Drywall adhesives at 300mm centres to intermediate studs. Take extra care to ensure that screws or clouts are not placed closer than 200mm from any daubs of adhesive.

Fixing of Plywood Linings

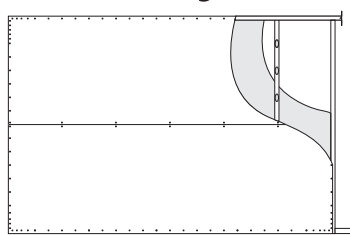
Fasteners: (Corners and Perimeters of the bracing element)

50 x 2.8mm Flat head Galvanized or Stainless Steel annular grooved Nails. Fix at 150mm centres around perimeter of the bracing element and the perimeter of each sheet. Fix at 300mm centres to intermediate studs that are not at the end of a bracing element. The corner pattern fastening is conventional and there is no need for the specialized corner pattern as is required on the plasterboard side of the brace.

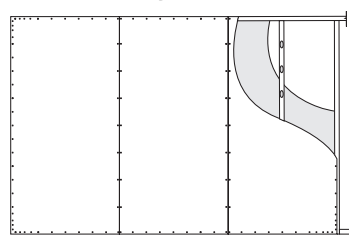
Jointing of Finishing of Plasterboard Linings

All fasteners stopped and all sheet joints reinforced with paper jointing tape. All in accordance with the EPB Plasterboard Installation Guide.

Horizontal Fixing



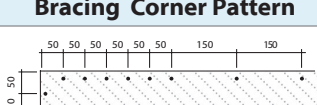
Vertical Fixing



Plasterboard side shown



PLASTERBOARD ON ONE SIDE - CONDENSED PATTERN

System Number	Lining Requirement	Panel Hold-downs	Min Length (m)	BU/m		Bracing Corner Pattern
				Wind	Earth-quake	
ES-Hc	EPB® Standard on one side	Yes	0.4	80	75	
			0.8	100	85	
			1.8	115	85	
EM-Hc	EPB BraceSmart® on one side		0.4	105	100	
			0.8	120	110	
			1.2	140	115	

Framing

Framing heights and dimensions to comply with NZS 3604:2011 and must be a minimum of 70 x 45mm for internal walls and 90 x 35mm for external walls. Nogs and Dwargs are not a requirement in order to achieve the bracing ratings in this document.

Refer to relevant sections and clauses of

NZBC B1: Structure; AS1 Clause 3 Timber -NZS 3604

NZBC B2: Durability; AS1 Clause 3.2 Timber -NZS 3602

Fastening Bracing Elements to Floor

Timber Floor:

Fastening within the bracing element must be done in accordance with NZS 3604:2011.

i.e. Either pairs of 100 x 3.75mm hand driven nails or three 90 x 3.15mm power driven nails at 600mm centres.

For **ES-H** and **EM-H**: Use the panel hold downs at each end of the bracing element.

Concrete Floors:

External or Internal walls: Within the bracing element fix the bottom plate as per NZS 3604:2011.

For **ES-N**: On Internal Walls alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs at 150mm & 300mm from end studs and thereafter at 600mm centres. Ensure a minimum penetration of 30mm into the concrete foundation.

For **ES-H** and **EM-H**: Use the panel hold downs at each end of the bracing element.

Wall Lining (As per Specified System Above)

One layer of Plasterboard lining type as per specified system above to ONE side of frame. The Plasterboard sheets can be fixed vertically or horizontally. Use full height or full length sheets when fixing vertically or horizontally where possible. All sheet end butt joints must be fixed over solid timber framing and fastened at 200mm centres. Alternatively the sheet end butt joints may be back blocked. Sheets shall be touch fitted.

Fixing of Plasterboard Linings

Fastening: (Corners and Perimeters of the bracing element)

32mm x 6g High thread Drywall screws (Fortress® or Grabber® or Senco®)

Fastening Centres: (Corners and Perimeters of the bracing element)

Corner Pattern: Refer to the bracing corner pattern above.

Perimeter Pattern: Place fasteners at 150mm centres around perimeter of bracing element.

Place all fasteners 12mm from paper bound sheet edges and 18mm from sheet ends or cut edges.

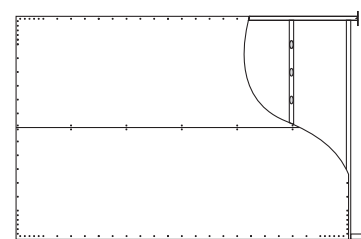
Fasteners and Fastening Centres in the Field of the bracing element

For vertically fixed sheets place fasteners at 300mm centres to the intermediate sheet joints. For Horizontally fixed sheets place fasteners at the sheet edge that crosses the studs. Place daubs of Drywall adhesives at 300mm centres to intermediate studs. Take extra care to ensure that screws or clouts are not placed closer than 200mm from any daubs of adhesive.

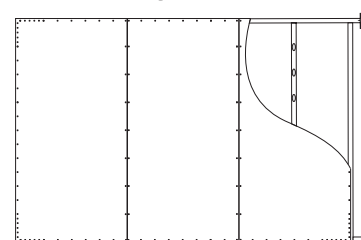
Jointing of Finishing of Plasterboard Linings

All fasteners stopped and all sheet joints reinforced with paper jointing tape. All in accordance with the EPB Plasterboard Installation Guide.

Horizontal Fixing

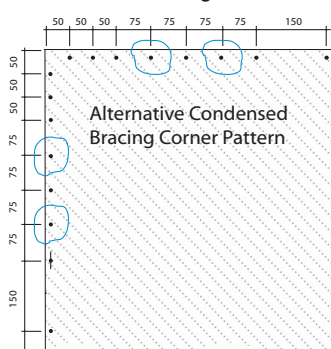


Vertical Fixing



Alternative Corner Fastener Layout

If the installer has used the 50, 50, 50, 75, 75, 150 corner screw pattern then this can easily be remedied by simply placing an extra screw between the first 150mm (where possible). Refer to the Alternative Condensed Bracing Corner Pattern below.



EPB Plasterboard Product Range

EPB PLASTERBOARD PRODUCT RANGE				EDGE TYPE	WIDTH (mm)	AVERAGE WEIGHT (Kg/m ²)	LENGTH (m)							PRIMARY FUNCTIONS						
														Span 600 Centres on Ceilings	Bracing	Fire Resistance	Noise Control	Impact Resistant	Water Resistant	
							2.4	2.7	3.0	3.3	3.6	4.2	4.8							6.0
10mm EPB® Standard				TE/TE	1200	6.9	✓	✓	✓	✓	✓	✓	✓	✓						
10mm EPB® Standard				TE/SE	1200	6.9	✓		✓		✓	✓	✓	✓						
10mm EPB® Standard - WIDE				TE/SE	1350	6.9					✓			✓	✓					
13mm EPB® Standard				TE/TE	1200	8.8	✓	✓	✓	✓	✓	✓	✓	✓		✓				
10mm EPB CeilingSmart®				TE/TE	1200	7.4	✓	✓	✓	✓	✓	✓	✓	✓		✓				
10mm EPB FireSmart®				TE/TE	1200	7.4	✓	✓	✓	✓	✓	✓	✓	✓		✓				
13mm EPB FireSmart®				TE/TE	1200	11.7	✓	✓	✓	✓	✓	✓	✓	✓		✓				
16mm EPB FireSmart®				TE/TE	1200	14.7	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		
10mm EPB BraceSmart®/NoiseSmart®*				TE/TE	1200	8.9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
10mm EPB BraceSmart®/NoiseSmart®*				TE/SE	1200	8.9								✓	✓	✓	✓	✓	✓	
10mm EPB BraceSmart®/NoiseSmart® - WIDE *				TE/SE	1350	8.9								✓	✓	✓	✓	✓	✓	
13mm EPB BraceSmart®/NoiseSmart®*				TE/TE	1200	12.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
10mm EPB AquaSmart®				TE/TE	1200	8.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10mm EPB AquaSmart®				TE/SE	1200	8.3	✓							✓					✓	
13mm EPB AquaSmart®				TE/TE	1200	11.7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

TE/TE = Tapered Both Edges TE/SE = Tapered One Edge, Square the Other

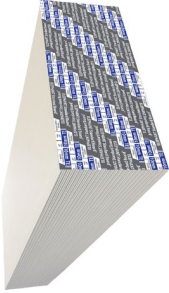
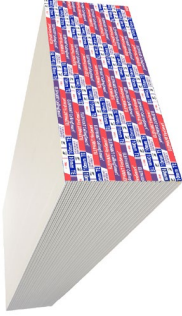
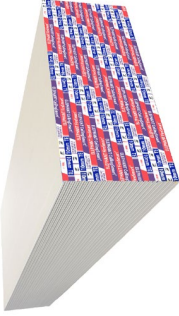
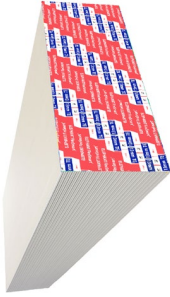
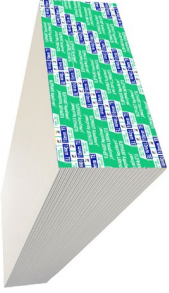
***Product Name Change : EPB MultiSmart® Range renamed to EPB BraceSmart®/NoiseSmart®**

The 10mm & 13mm EPB MultiSmart® range will now be referred to as 10mm & 13mm EPB BraceSmart®/NoiseSmart®, reflecting its dual performance in bracing and noise control applications. Please note that all product specifications, performance characteristics and installation methods remain unchanged.

The above table details the product's Primary functions.
Some products may perform more than the functions indicated



EPB Plasterboard Product Range

EPB® Standard	 10mm TE/TE	 10mm TE/SE	 10mm WIDE TE/SE	 13mm TE/TE
	EPB CeilingSmart®			
	 10mm TE/TE	EPB FireSmart®		
EPB Bracesmart®	 10mm TE/TE	 13mm TE/TE	 16mm TE/TE	 13mm TE/TE
	EPB Noisesmart®			
	 10mm TE/TE	 10mm TE/SE	 10mm WIDE TE/SE	 13mm TE/TE
EPB AquaSmart®				
 10mm TE/TE	 10mm TE/SE	 13mm TE/TE		





FOR MORE INFORMATION

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