GENERAL INFORMATION

PREFACE
USG Boral Building Products is a plasterboard and ceilings joint venture between USG Corporation and Boral Limited and is one of the leading manufacturers in this field.

Operating throughout Asia, Australia, the Middle East and New Zealand USG Boral Building Products combines innovative building products and superior technology for the construction sector and provides products and systems that exceed the compliance requirements of each market.

USG Boral Building Products is well positioned to service the Australian and New Zealand markets with manufacturing facilities in New South Wales, Queensland, Victoria and New Zealand, (Suspended ceilings and Steel Studs).

For more information on USG Boral Building Products refer to www.usgboral.com or phone 0800 USGBORAL (0800 874-467).

INTRODUCTION
USG Boral Bracing Systems technology has been specifically designed and rigorously tested in New Zealand to provide structural bracing for both residential and light commercial buildings within the scope and limitations of the current NZS3604:2011 Standard. The USG Boral Bracing System has been tested in accordance with the BRANZ P21 (2010) A wall bracing test and evaluation procedure; cited in NZS3604:2011 Timber Framed Buildings to determine wind and earthquake ratings of bracing elements. This aligns with the new loadings standard AS/NZS 1170.

TEC ASSIST
For technical assistance please refer to www.usgboral.com or phone 0800 USGBORAL (0800 874-467)

WARRANTY
For more information on USG Boral Building Products warranty please refer to www.usgboral.com or phone 0800 USGBORAL (0800 874-467)

LIABILITY
USG Boral will not accept any liability for its bracing products and systems which are not correctly installed as stipulated in this manual.

ISO 9000 QUALITY ASSURANCE
USG Boral Building Products Pty Ltd is a certified ISO 9001 - 2008 manufacturer No. QEC 0400 by SAI Global

BENEFITS OF USING USG BORAL BRACING SYSTEMS
USG Boral Bracing Systems use superior lightweight plasterboard technology to provide structural performance to panel bracing systems.

Lightweight plasterboard technology is the future of plasterboard providing quick and simple installation, durability and quality finish.

LIMITATIONS OF USE
For use:
• To be used within the scope and limitations of the current NZS3604:2011 Standard
• For interior use only
• USG Boral Bracing Systems are not permitted for use in wet areas behind showers and baths.

WHO MAY INSTALL USG BORAL BRACING SYSTEMS
Installation of the USG Boral Bracing Systems must be undertaken by or supervised by a Licensed Building Practitioner with the appropriate license category where the building work has been identified as Restricted Building Work.

HEALTH & SAFETY
It is important to follow good site practice at all times and to ensure appropriate safety precautions are taken when installing the USG Boral Bracing Systems and all supporting components.

COMPATIBILITY WITH ASSOCIATED PRODUCTS
The USG Boral Bracing Systems and their components are compatible with most associated building products, however it is recommended that the installer seeks advice if in doubt.

PERFORMANCE
The performance of the USG Boral Bracing Systems is detailed in Table 1. The values for wind and earthquake are obtained from testing and evaluation that has been carried out in accordance with the P21 (2010) test and evaluation procedures.

BRANZ APPRAISAL
USG Boral Bracing has been assessed by BRANZ as meeting the relevant NZBC performance clauses.
The bracing values detailed within Table 1 below have been determined from testing carried out on the USG Boral Bracing Systems and is in accordance with the current NZS3604:2011 Standard and the P21 [2010] test and evaluation method.

<table>
<thead>
<tr>
<th>USG BORAL WALL BRACING SYSTEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRACING SYSTEM REFERENCE</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>UB1S</td>
</tr>
<tr>
<td>UB2S</td>
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<tr>
<td>UB1M</td>
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<tr>
<td>UBSM</td>
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<tr>
<td>UBMP</td>
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<tr>
<td></td>
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<tr>
<td>UB1FR</td>
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<tr>
<td></td>
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<tr>
<td>UB2FR</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>UBFRP</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

USG Boral have additional bracing systems available, please contact USG Boral for further information.

1. Maximum hold down rating for NZS3604:2011 timber floors is 120BU’s/m
2. Maximum hold down rating for NZS3604:2011 concrete floors is 150BU’s/m

Where wind and earthquake values exceed the floor ratings (refer items 1 & 2 above) ratings must be reduced to the required maximum permitted ratings for timber or concrete floors.

Refer to the USG Boral software calculator to calculate the wind and earthquake demand requirements and to calculate the achieved values using the USG Boral Bracings Systems detailed within this manual. Contact USG Boral for a copy of the bracing calculator software. 0800 USG BORAL (0800 874-267)
USG BORAL WALL BRACING SYSTEM UB1S

USG Boral Bracing Systems have been tested in accordance with the P21[2010] racking test procedure and the current NZS3604:2011 Standard. Detailed in the tables below are the performance values of the USG Boral UB1S bracing system that apply to both timber and concrete floor constructions. To achieve the required performances of the USG Boral Bracing System the correct components must be used and installed in accordance with the installation instructions and diagrams.

### USG BORAL BRACING SYSTEM UB1S - PERFORMANCE

<table>
<thead>
<tr>
<th>UB1S</th>
<th>10mm Sheetrock plasterboard installed vertically or horizontally on one side</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bracing Element Wall Lengths</td>
</tr>
<tr>
<td></td>
<td>Bracing Units/meter – Wind</td>
</tr>
<tr>
<td></td>
<td>Bracing Units/meter – Earthquake</td>
</tr>
</tbody>
</table>

### USG BORAL SYSTEM UB1S - COMPONENTS

- **USG Boral Lining Type**: 10mm Sheetrock Ceiling & Wall Plasterboard on one side
- **Fasteners**: 6g x 32mm coarse threaded Gypsum Screws for timber substrate
- **Hold – Down Anchors**: N/A
- **Hold – Down Brackets**: N/A
- **Hold – Down Straps**: N/A
- **Adhesive**: Suitable drywall stud adhesive that complies with AS 2753
- **Framing**: Minimum framing grade of SG8. Refer current NZS3604 Standard, Section 8
- **Jointing Plaster**: USG Boral range of plaster compounds

Note: It is not permitted to use nails or use adhesive to replace fasteners.

### USG BORAL SYSTEM UB1S – SPECIFICATIONS

- **USG Boral Plasterboard Lining Types**: The following USG Boral plasterboard linings are permitted for use with the USG Boral UB1S bracing system:
  - 10mm Sheetrock Ceiling & Wall Plasterboard
- **Fasteners**: 6g x 32mm Coarse threaded Gypsum Screws to be installed at 150mm centres to the perimeter of the bracing element. (For corner fixing details refer to Fig 3)
- **Hold – Down Anchors**: Not applicable for this system
- **Hold – Down Brackets**: Not applicable for this system
- **Hold – Down Straps**: Not applicable for this system
- **Adhesive**: A Suitable Drywall Adhesive is permitted to intermediate studs only. Place daubs of adhesive at 300mm centres. It is not permitted to use nails or drywall stud adhesive to replace fasteners. Ensure fasteners do not pass through adhesive.
- **Framing**: Framing is to be determined from the current NZS3604 standard. Minimum framing grade of SG8. Maximum stud centres 600mm.
- **Jointing Plaster**: USG Boral range or suitable drywall plaster compounds are to be applied to all joints and fastener heads within the bracing element. Application of the paper tape and plaster compounds to be in accordance with the current AS/NZS 2589 Standard. Minimum plaster joint finish to be Level 4.
- **Minimum bracing Wall Length**: 400mm. The minimum permitted wall length of the UB1S Bracing system must not be less than 400mm.
- **Maximum bracing Wall Length**: 6000mm. The maximum permitted wall length must not exceed 6000mm.
- **Wall Height other than 2.4m**: Wall heights as determined by the current NZS3604 Standard. Bracing rating to be determined by the following calculation.
  \[
  \text{Adjusted rating} = \left( \frac{2.4 \text{m}}{\text{Actual wall height}} \right) \times \text{the bracing value}
  \]
- **Timber floors**: Install 2 x 100 x 3.75mm nails or use 3 x 90 x 3.15 gun nails at 600mm centres as per NZS3604:2011
- **Concrete floors**: Refer to masonry nail manufacturers specifications or contact USG Boral on 0800 USG BORAL (0800 874-267)
FIG 1: UB1S BRACING SYSTEM WITH SHEETS INSTALLED VERTICALLY
2.4m long bracing element detailed

Sheets to be fixed to framing with 6g x 32mm Gypsum Drywall Screws at 300mm centres

Drywall Adhesive to intermediate studs

USG Boral Sheetrock ceiling and wall plasterboard to one side

Using 6g x 32mm Gypsum Drywall Screws fix at 150mm centres to the perimeter of the USG Boral bracing element

Refer Fig 3 for Corner fixing details

Position 6g x 32mm Drywall Gypsum Screws where the sheets intersect with the framing

FIG 2: UB1S BRACING SYSTEM WITH SHEETS INSTALLED HORIZONTALLY
2.4m long bracing element detailed

FIG 3: UB1S CORNER FIXING DETAILS
Each corner of the bracing element

Corner Fastener Centres are
A = 50mm
B = 100mm
C = 150mm
D = 75mm

The remainder of Perimeter Fastener Centres = 150mm

Fasteners to be placed not less than 18mm from sheet ends and cut edges and not less than 12mm from sheet edges.
USG BORAL WALL BRACING SYSTEM UB2S

USG Boral Bracing Systems have been tested in accordance with the P21[2010] racking test procedure and the current NZS3604:2011 Standard. Detailed in the tables below are the performance values of the USG Boral UB2S bracing system that apply to both timber and concrete floor constructions. To achieve the required performances of the USG Boral Bracing System the correct components must be used and installed in accordance with the installation instructions and diagrams.

<table>
<thead>
<tr>
<th>USG BORAL BRACING SYSTEM UB2S - PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UB2S</strong></td>
</tr>
<tr>
<td>10mm Sheetrock Ceiling &amp; Wall Plasterboard installed vertically or horizontally on both sides</td>
</tr>
<tr>
<td>Bracing Element Wall Lengths</td>
</tr>
<tr>
<td>0.4 to 4.8m</td>
</tr>
<tr>
<td>Bracing Units/meter – Wind</td>
</tr>
<tr>
<td>65</td>
</tr>
<tr>
<td>Bracing Units/meter – Earthquake</td>
</tr>
<tr>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>USG BORAL SYSTEM UB2S - COMPONENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>USG Boral Lining Type</td>
</tr>
<tr>
<td>10mm Sheetrock Ceiling &amp; Wall Plasterboard on both sides</td>
</tr>
<tr>
<td>Fasteners</td>
</tr>
<tr>
<td>6g x 32mm coarse threaded Gypsum Screws for timber substrate</td>
</tr>
<tr>
<td>Hold – Down Anchors</td>
</tr>
<tr>
<td>N/A</td>
</tr>
<tr>
<td>Hold – Down Brackets</td>
</tr>
<tr>
<td>N/A</td>
</tr>
<tr>
<td>Hold – Down Straps</td>
</tr>
<tr>
<td>N/A</td>
</tr>
<tr>
<td>Adhesive</td>
</tr>
<tr>
<td>Suitable drywall stud adhesive that complies with AS 2753</td>
</tr>
<tr>
<td>Framing</td>
</tr>
<tr>
<td>Minimum framing grade of SG8. Refer current NZS3604 Standard, Section 8.</td>
</tr>
<tr>
<td>Joining Plaster</td>
</tr>
<tr>
<td>USG Boral range of plaster compounds</td>
</tr>
</tbody>
</table>

Note: It is not permitted to use nails or use adhesive to replace fasteners

<table>
<thead>
<tr>
<th>USG BORAL SYSTEM UB2S – SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>USG Boral Plasterboard Lining Types</td>
</tr>
<tr>
<td>The following USG Boral plasterboard linings are permitted for use with the USG Boral UB2S bracing system</td>
</tr>
<tr>
<td>• 10mm Sheetrock Ceiling &amp; Wall Plasterboard</td>
</tr>
<tr>
<td>Fasteners</td>
</tr>
<tr>
<td>6g x 32mm Coarse threaded Gypsum Screws to be installed at 150mm centres to the perimeter of the bracing element. (For corner fixing details refer to Fig 3)</td>
</tr>
<tr>
<td>Hold – Down Anchors</td>
</tr>
<tr>
<td>Not applicable for this system</td>
</tr>
<tr>
<td>Hold – Down Brackets</td>
</tr>
<tr>
<td>Not applicable for this system</td>
</tr>
<tr>
<td>Hold – Down Straps</td>
</tr>
<tr>
<td>Not applicable for this system</td>
</tr>
<tr>
<td>Adhesive</td>
</tr>
<tr>
<td>A Suitable Drywall Adhesive is permitted to intermediate studs only. Place daubs of adhesive at 300mm centres. It is not permitted to use nails or drywall stud adhesive to replace fasteners. Ensure fasteners do not pass through adhesive.</td>
</tr>
<tr>
<td>Framing</td>
</tr>
<tr>
<td>Framing is to be determined from the current NZS3604 standard. Minimum framing grade of SG8. Maximum stud centres 600mm.</td>
</tr>
<tr>
<td>Jointing Plaster</td>
</tr>
<tr>
<td>USG Boral range or suitable drywall plaster compounds are to be applied to all joints and fastener heads within the bracing element. Application of the paper tape and plaster compounds to be in accordance with the current AS/NZS 2589 Standard. Minimum plaster joint finish to be level 4.</td>
</tr>
<tr>
<td>Minimum Wall Length 400mm</td>
</tr>
<tr>
<td>400mm. The minimum permitted wall length of the UB2S Bracing system must not be less than 400mm.</td>
</tr>
<tr>
<td>Maximum Wall Length 4800mm</td>
</tr>
<tr>
<td>The maximum permitted wall length of the UB2S Bracing system must not exceed 4800mm</td>
</tr>
</tbody>
</table>

| Wall Height other than 2.4m              |
| Wall heights as determined by the current NZS3604 Standard. Bracing rating to be determined by the following calculation. |
| Adjusted rating = \( \frac{2.4m}{\text{Actual wall height}} \) x the bracing value |

| Bottom plate fixing                     |
| Timber floors: Install 2 x 100 x 3.75mm nails or use 3 x 90 x 3.15mm gun nails at 600mm centres as per NZS3604:2011 |
| Concrete floors: Refer to masonry nail manufacturers specifications or contact USG Boral on 0800 USG BORAL (0800 874-267) |
**FIG 1: UB2S BRACING SYSTEM WITH SHEETS INSTALLED VERTICALLY**  
2.4m long bracing element detailed

*USG Boral Sheetrock plasterboard to each side of the framing*

Drywall Adhesive to intermediate studs

*Sheets to be fixed to framing with 6g x 32mm Gypsum Drywall Screws at 300mm centres on each side*

*Using 6g x 32mm Gypsum Drywall Screws fix at 150mm centres to the perimeter of the USG Boral bracing element on each side*

Refer Fig 3 for Corner fixing details

**FIG 2: UB2S BRACING SYSTEM WITH SHEETS INSTALLED HORIZONTALLY**  
2.4m long bracing element detailed

*Position 6g x 32mm Drywall Gypsum Screws where the sheets intersect with the framing*

**FIG 3: UB2S CORNER FIXING DETAILS**  
Each corner of the bracing element

Corner Fastener Centres are  
A = 50mm  
B = 100mm  
C = 150mm  
D = 75mm

The remainder of  
Perimeter Fastener Centres = 150mm

Fasteners to be placed not less than 18mm from sheet ends and cut edges and not less than 12mm from sheet edges.
USG BORAL WALL BRACING SYSTEM UB1M

USG Boral bracing systems have been tested in accordance with the P21[2010] racking test procedure and the current NZS3604:2011 Standard. Detailed in the tables below are the performance values of the USG Boral UB1M bracing system that apply to both timber and concrete floor constructions. To achieve the required performances of the USG Boral bracing system the correct components must be used and installed in strict accordance with the installation instructions and diagrams.

### USG BORAL BRACING SYSTEM UB1M - PERFORMANCE

<table>
<thead>
<tr>
<th>Bracing Element Wall Lengths</th>
<th>0.4 to 1.2m</th>
<th>1.2 to 2.4m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracing Units/meter - Wind</td>
<td>85</td>
<td>100</td>
</tr>
<tr>
<td>Bracing Units/meter - Earthquake</td>
<td>85</td>
<td>85</td>
</tr>
</tbody>
</table>

### USG BORAL SYSTEM UB1SS - COMPONENTS

- **USG Boral Lining Type**: 10mm or 13mm USG Boral Multistop Plasterboard on one side
- **Fasteners**: 6g x 32mm coarse threaded Gypsum Screws for timber substrate.
- **Hold – Down Anchors**: Yes
- **Hold – Down Brackets**: Yes
- **Adhesive**: Suitable drywall stud adhesive that complies with AS 2753
- **Framing**: Minimum framing grade of SG8. Refer current NZS3604 Standard, Section 8.
- **Jointing Plaster**: USG Boral range of plaster compounds

Note: It is not permitted to use nails or use adhesive to replace fasteners.

### USG BORAL SYSTEM UB1SS - SPECIFICATIONS

- **USG Boral Plasterboard Lining Types**: The following USG Boral plasterboard linings are permitted for use with the USG Boral UB1M bracing system.
  - 10mm Multistop Plasterboard
- **Fasteners**: 6g x 32mm Coarse threaded Gypsum Screws to be installed at 150mm centres to the perimeter of the bracing element. (For corner fixing details refer to Fig 3)
- **Hold – Down Anchors**: Concrete Floor – Install masonry anchors (minimum 15kN characteristic uplift strength) with 50 x 50 x 3.0mm washers or “J Bolt” set into concrete at a minimum depth of 75mm. Timber Floor – Install M12 x 200mm Galvanised coach screws with 50 x 50 x 3mm washers. (Ensure bolts are secured into solid blocking).
- **Hold – Down Brackets**: Install either hold down brackets or 400 x 25 x 0.9mm galvanised or stainless steel straps
- **Adhesive**: A Suitable Drywall Adhesive is permitted to intermediate studs only at. Place daubs of adhesive at 300mm centres. It is not permitted to use nails or drywall stud adhesive to replace fasteners. Ensure fasteners do not pass through adhesive.
- **Framing**: Framing is to be determined from the current NZS3604:2011 standard. Minimum framing grade of SG8. Maximum stud centres 600mm.
- **Jointing Plaster**: USG Boral range or suitable drywall plaster compounds are to be applied to all joints and fastener heads within the bracing element. Application of the paper tape and plaster compounds to be in accordance with the current AS/NZS 2589 Standard. Minimum plaster joint finish to be level 4.
- **Minimum Wall Length 400mm.** The minimum permitted wall length of the UB1M Bracing system must not be less than 400mm.
- **Maximum Wall Length 2400mm.** The maximum permitted wall length of the UB1M Bracing system must not exceed 2400mm
- **Wall Height other than 2.4m**: Wall as determined by the current NZS3604:2011 Standard. Bracing rating to be determined by the following calculation.
  
  \[
  \text{Adjusted rating} = \left( \frac{2.4m}{\text{Actual wall height}} \right) \times \text{the bracing value}
  \]
FIG 1: UB1M BRACING SYSTEM WITH SHEETS INSTALLED VERTICALLY
2.4m long bracing element detailed

Sheets to be fixed to framing with 6g x 32mm Gypsum Drywall Screws at 300mm centres

Hold-Downs to be positioned at each end of the USG Boral bracing element

USG Boral Multistop plasterboard to one side

Drywall Adhesive to intermediate studs

Refer Fig 3 for Corner fixing details

FIG 2: UB1M BRACING SYSTEM WITH SHEETS INSTALLED HORIZONTALLY
2.4m long bracing element detailed

Hold-Downs to be positioned at each end of the USG Boral bracing element

Position 6g x 32mm Drywall Gypsum Screws where the sheets intersect with the framing

Using 6g x 32mm Gypsum Drywall Screws where the sheets intersect with the framing

Corner Fastener Centres are
A = 50mm
B = 100mm
C = 150mm
D = 75mm

The remainder of Perimeter Fastener Centres = 150mm

Fasteners to be placed not less than 18mm from sheet ends and cut edges and not less than 12mm from sheet edges.
USG BORAL WALL BRACING SYSTEM UBSM

USG Boral bracing systems have been tested in accordance with the P21(2010) racking test procedure and the current NZS3604 : 2011 Standard. Detailed in the tables below are the performance values of the USG Boral UBSM bracing system that apply to both timber and concrete floor constructions. To achieve the required performances of the USG Boral bracing system the correct components must be used and installed in strict accordance with the installation instructions and diagrams.

### USG BORAL BRACING SYSTEM UBSM - PERFORMANCE

**10mm Multistop plasterboard installed vertically or horizontally to one side and 10mm Sheetrock to the other side.**

<table>
<thead>
<tr>
<th>Bracing Element Wall Lengths</th>
<th>0.6 to 2.4m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracing Units/meter – Wind</td>
<td>130</td>
</tr>
<tr>
<td>Bracing Units/meter – Earthquake</td>
<td>125</td>
</tr>
</tbody>
</table>

Refer to maximum ratings for concrete and timber floors Table 1

### USG BORAL SYSTEM UBSM - COMPONENTS

**USG Boral Lining Type**

- 10mm Multistop Plasterboard on one side.
- 10mm Sheetrock Plasterboard other side.

**Fasteners**

- 6g x 32mm coarse threaded Gypsum Screws for timber substrate.

**Hold – Down Anchors**

- Yes

**Hold – Down Brackets**

- Yes

**Adhesive**

- Suitable drywall stud adhesive

**Framing**

- Minimum framing grade of SG8. Refer current NZS3604 Standard, Section 8

**Jointing Plaster**

- USG Boral range of plaster compounds

*Note: It is not permitted to use nails or use adhesive to replace fasteners.*

### USG BORAL SYSTEM UB1SS - SPECIFICATIONS

**USG Boral Plasterboard Lining Types**

The following USG Boral plasterboard linings are permitted for use with the USG Boral UBSM bracing system.

- 10mm Multistop.
- 10mm Sheetrock Ceiling & wall plasterboard.

**Fasteners**

- 6g x 32mm Coarse threaded Gypsum Screws to be installed at 150mm centres to the perimeter of the bracing element. (For corner fixing details refer to Fig 3)

**Hold – Down Anchors**

- Concrete Floor – Install M12 masonry anchors (minimum 15kN characteristic uplift strength) with 50 x 50 x 3.0mm washer or “J Bolt” set into concrete at a minimum depth of 75mm.
- Timber Floor – Install M12 x 200mm Galvanised coach screws with 50 x 50 x 3.0mm washer. (Ensure bolts are secured into solid block)

**Hold – Down Brackets**

- Install either hold down brackets or 400 x 25 x 0.9mm strap

**Adhesive**

- A Suitable Drywall Adhesive is permitted to intermediate studs only at. Place daubs of adhesive at 300mm centres. It is not permitted to use nails or drywall stud adhesive to replace fasteners.

**Framing**

- Framing is to be determined from the current NZS3604 standard. Minimum framing grade of SG8. Maximum stud centres 600mm.

**Jointing Plaster**

- USG Boral range or suitable drywall plaster compounds are to be applied to all joints and fastener heads within the bracing element. Application of the paper tape and plaster compounds to be in accordance with the current AS/NZS 2589 Standard. Minimum plaster joint finish to be level 4.

**Minimum Wall Length 600mm.**

The minimum permitted wall length of the UBSM Bracing system must not be less than 600mm.

**Maximum Wall Length 2400mm.**

The maximum permitted wall length of the UBSM Bracing system must not exceed 2400mm

**Wall Height other than 2.4m**

Wall as determined by the current NZS3604:2011 Standard. 
Bracing rating height to be determined by the following calculation.

\[ \text{Adjusted rating} = \left( \frac{2.4}{\text{Actual wall height}} \right) \times \text{the bracing value} \]
FIG 1: UBSM BRACING SYSTEM WITH SHEETS INSTALLED VERTICALLY
1.2m long bracing element detailed

Hold-Down positions

Drywall Adhesive to intermediate studs

10mm Sheetrock or any other USG Boral Plasterboard type

10mm Multistop sheets to be fixed to framing with 6g x 32mm Gypsum Drywall Screws at 300mm centres

Using 6g x 32mm Gypsum Drywall Screws fix at 150mm centres to the perimeter of the bracing element

Refer Fig 3 for corner and perimeter fixing details fixing details

FIG 2: UBSM BRACING SYSTEM WITH SHEETS INSTALLED HORIZONTALLY
2.4m long bracing element detailed

Position 6g x 32mm Drywall Gypsum Screws where the sheets intersect with the framing

Hold-Downs to be positioned at each end of the USG Boral bracing element

FIG 3: UBSM CORNER FIXING DETAILS FOR THE USG BORAL MULTISTOP PLASTERBOARD LINING
Each corner of the bracing element

Corner Fastener Centres are
A = 50mm
B = 100mm
C = 150mm
D = 75mm

The remainder of Perimeter Fastener Centres = 150mm

Fasteners to be placed not less than 18mm from sheet ends and cut edges and not less than 12mm from sheet edges.
USG BORAL WALL BRACING SYSTEM UBMP

USG Boral bracing systems have been tested in accordance with the P21(2010) racking test procedure and the current NZS3604:2011 Standard. Detailed in the tables below are the performance values of the USG Boral UBMP bracing system that apply to both timber and concrete floor constructions. To achieve the required performances of the USG Boral bracing system the correct components must be used and installed in strict accordance with the installation instructions and diagrams.

### USG BORAL BRACING SYSTEM UBMP - PERFORMANCE

<table>
<thead>
<tr>
<th>Bracing Element Wall Lengths</th>
<th>0.4 to 0.6m</th>
<th>0.6 to 1.2m</th>
<th>1.2 to 2.4m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracing Units/m Wind</td>
<td>90</td>
<td>120</td>
<td>150*</td>
</tr>
<tr>
<td>Bracing Units/m Earthquake</td>
<td>110</td>
<td>130*</td>
<td>150*</td>
</tr>
</tbody>
</table>

*Refer to maximum ratings for concrete and timber floors Table 1

### USG BORAL SYSTEM UBMP - COMPONENTS

- **USG Boral Lining Type**: 10mm Multistop Plasterboard on one side.
- **Plywood**: 7mm DD Structural Plywood on the other side.
- **Fasteners**: 6g x 32mm coarse threaded Gypsum Screws for timber substrate.
- **Hold - Down Anchors**: Yes
- **Hold – Down Brackets or Straps**: Yes
- **Adhesive**: Suitable drywall stud adhesive that complies with AS2753
- **Framing**: Minimum framing grade of SG8. Refer current NZS3604 Standard, Section 8
- **Jointing Plaster**: USG Boral range

**Note**: It is not permitted to use nails or use adhesive to replace fasteners.

### USG BORAL SYSTEM UBMP - SPECIFICATIONS

- **USG Boral Plasterboard Lining Types**: The following USG Boral plasterboard linings are permitted for use with the USG Boral UBMP bracing system.
  - 10mm Multistop

- **Plywood**: 7mm DD Structural Plywood on the other side. Install Plywood with 50 x 2.8mm galvanised nails at 150mm centres to the perimeter and at 300mm centres to the intermediate studs of each plywood sheet.

- **Fasteners**: 6g x 32mm Coarse threaded Gypsum Screws to be installed at 150mm centres to the perimeter of the bracing element. (For corner fixing details refer to Fig 3)

- **Hold – Down Anchors**: Concrete Floor – Install M12 masonry anchors (minimum 15kN characteristic uplift strength) with 50 x 50 x 3.0mm washer or “J Bolt” set into concrete at a minimum depth of 75mm. Timber Floor – Install M12 x 200mm Galvanised coach screws with 50 x 50 x 3mm washer. (Ensure bolts are secured into solid blocking).

- **Hold – Down Brackets**: Install either hold down brackets or 400 x 25 0.9mm galvanised or stainless steel straps

- **Adhesive**: A Suitable Drywall Adhesive is permitted to intermediate studs only at. Place daubs of adhesive at 300mm centres. It is not permitted to use nails or drywall stud adhesive to replace fasteners.

- **Framing**: Framing is to be determined from the current NZS3604 standard. Minimum framing grade of SG8. Maximum stud centres 600mm.

- **Jointing Plaster**: USG Boral range or suitable drywall plaster compounds are to be applied to all joints and fastener heads within the bracing element. Application of the paper tape and plaster compounds to be in accordance with the current AS/NZS 2589 Standard. Minimum plaster joint finish to be level 4.

- **Minimum Wall Length 400mm.** The minimum permitted wall length of the UBMP Bracing system must not be less than 400mm.

- **Maximum Wall Length 2400mm.** The maximum permitted wall length of the UBMP Bracing system must not exceed 2400mm.

- **Wall Height other than 2.4m** Wall as determined by the current NZS3604:2011 Standard. Bracing rating to be determined by the following calculation.

  \[
  \text{Adjusted rating} = \left( \frac{2.4}{\text{Actual wall height}} \right) \times \text{the bracing value}
  \]
FIG 1: UBMP BRACING SYSTEM WITH SHEETS INSTALLED VERTICALLY
1.2m long bracing element detailed

Drywall Adhesive to intermediate studs

7mm DD Structural Plywood fixed at 150mm centre to the perimeter of each sheet and 300mm centres to intermediate studs within the bracing element using 50mm x 2.8mm galvanised clouts

USG Boral Multistop sheets to be fixed to framing with 6g x 32mm Gypsum Drywall screws at 300mm centres

Using 6g x 32mm Gypsum Drywall Screws fix at 150mm centres to the perimeter of the USG Boral bracing element

Refer Fig 2 for corner and perimeter fixing details fixing details

Hold-Down to be positioned at each end of the USG Boral bracing element

FIG 2: UBMP BRACING SYSTEM WITH SHEETS INSTALLED HORIZONTALLY
2.4m long bracing element detailed

Position 6g x 32mm Drywall Gypsum Screws where the sheets intersect with the framing

Hold-Downs to be positioned at each end of the USG Boral bracing element

FIG 3: UBMP
Each corner of the bracing element

Corner Fastener Centres are
A = 50mm
B = 100mm
C = 150mm
D = 75mm

The remainder of Perimeter Fastener Centres = 150mm

Fasteners to be placed not less than 18mm from sheet ends and cut edges and not less than 12mm from sheet edges.

Galvanised clouts to be placed not less than 7mm from plywood sheet edges.
USG BORAL WALL BRACING SYSTEM UB1FR

USG Boral Bracing Systems have been tested in accordance with the P21[2010] racking test procedure and the current NZS3604:2011 Standard. Detailed in the tables below are the performance values of the USG Boral UB1FR bracing system that apply to both timber and concrete floor constructions. To achieve the required performances of the USG Boral Bracing System the correct components must be used and installed in accordance with the installation instructions and diagrams.

USG BORAL BRACING SYSTEM UB1FR - PERFORMANCE

<table>
<thead>
<tr>
<th>UB1FR</th>
<th>13mm Fiberock Aqua-Tough installed vertically on one side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracing Element Wall Lengths</td>
<td>0.4 to 1.2m</td>
</tr>
<tr>
<td>Bracing Units/meter – Wind</td>
<td>105</td>
</tr>
<tr>
<td>Bracing Units/meter – Earthquake</td>
<td>125*</td>
</tr>
</tbody>
</table>

*Refer to maximum ratings for concrete and timber floors Table 1

USG BORAL SYSTEM UB1FR - COMPONENTS

- USG Boral Lining Type: 13mm USG Boral Fiberock Aqua-Tough on one side
- Fasteners: 6g x 41mm coarse threaded Gypsum Screws for timber substrate
- Hold-Down Anchors: Yes
- Hold-Down Brackets or Straps: Yes
- Adhesive: Suitable drywall stud adhesive that complies with AS 2753
- Framing: Minimum framing grade of SG8. Refer current NZS3604 Standard, Section 8.
- Jointing Plaster: USG Boral range of plaster compounds

Note: It is not permitted to use nails or use adhesive to replace fasteners

USG BORAL SYSTEM UB1FR - SPECIFICATIONS

- USG Boral Lining Types: The following USG Boral linings are permitted for use with the USG Boral UB1FR bracing system.
  - 13mm Fiberock Aqua Tough
- Fasteners: 6g x 41mm Coarse threaded Gypsum Screws to be installed at 150mm centres to the perimeter of the bracing element. For corner fixing details (Refer to Fig 2).
- Hold-Down Anchors (Minimum 15kN Characteristic uplift strength):
  - Concrete floors: Install masonry anchors (minimum 15kN characteristic uplift strength) with 50x50x3mm washers or ‘J’ bolts set into the concrete at a minimum depth of 75mm.
  - Timber Floors: Install M12 x 200mm Galvanized Coach Screws with 50 x 50 x 3mm washer. (Ensure bolts are secured into solid blocking).
- Hold – Down Brackets or Straps: Install either Hold-Down brackets or 400 x 25 x 0.9mm galvanised or stainless steel straps.
- Adhesive: A Suitable Drywall Adhesive is permitted to intermediate studs only. Place daubs of adhesive at 300mm centres. It is not permitted to use nails or drywall stud adhesive to replace fasteners. Ensure fasteners do not pass through adhesive.
- Framing: Framing is to be determined from the current NZS3604 standard. Minimum framing grade of MSG8. Maximum stud centres 600mm.
- Jointing Plaster: USG Boral range or suitable drywall plaster compounds are to be applied to all joints and fastener heads within the bracing element. Application of the paper tape and plaster compounds to be in accordance with the current AS/NZS 2589 Standard. Minimum plaster joint finish to be Level 4.
- Minimum Wall Length 400mm: The minimum permitted wall length of the UB1FR Bracing system must not be less than 400mm.
- Maximum Wall Length 4800mm: The maximum permitted wall length of the UB1FR Bracing system must not exceed 4800mm.
- Wall Height other than 2.4m: Wall heights as determined by the current NZS3604 Standard. Bracing rating to be determined by the following calculation.
  
  \[
  \text{Adjusted rating} = \left( \frac{2.4}{\text{Actual wall height}} \right) \times \text{the bracing value}
  \]
FIG 1: UB1FR BRACING SYSTEM WITH SHEETS INSTALLED VERTICALLY
2.4m long bracing element detailed

- Hold-Down to be positioned at each end of the USG Boral bracing element
- Drywall Adhesive to intermediate studs
- Using 6g x 41mm Gypsum Drywall Screws fix at 150mm centres to the perimeter of the USG Boral bracing element
- Sheets to be fixed to framing with 6g x 41mm Gypsum Drywall Screws at 150mm centres

FIG 2: UB1FR CORNER FIXING DETAILS
Each corner of the bracing element

- Corner Fastener Centres are:
  - A = 50mm
  - B = 100mm
  - C = 150mm
  - D = 75mm

- The remainder of Perimeter Fastener Centres = 150mm

- Fasteners to be placed not less than 18mm from sheet ends and cut edges and not less than 12mm from sheet edges.

Refer Fig 2 for Corner fixing details.
USG BORAL WALL BRACING SYSTEM UB2FR

USG Boral Bracing Systems have been tested in accordance with the P21[2010] racking test procedure and the current NZS3604:2011 Standard. Detailed in the tables below are the performance values of the USG Boral UB2FR bracing system that apply to both timber and concrete floor constructions. To achieve the required performances of the USG Boral Bracing System the correct components must be used and installed in strict accordance with the installation instructions and diagrams.

USG BORAL BRACING SYSTEM UB2FR - PERFORMANCE

<table>
<thead>
<tr>
<th>UB2FR</th>
<th>13mm Fiberock Aqua-Tough installed vertically on both sides.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracing Element Wall Lengths</td>
<td>0.4 to 1.2m</td>
</tr>
<tr>
<td>Bracing Units/meter – Wind</td>
<td>115</td>
</tr>
<tr>
<td>Bracing Units/meter – Earthquake</td>
<td>130</td>
</tr>
</tbody>
</table>

Refer to maximum ratings for concrete and timber floors Table 1

USG BORAL SYSTEM UB2FR - COMPONENTS

- USG Boral Lining Type: 13mm Fiberock Aqua-Tough on both sides
- Fasteners: 6g x 41mm coarse threaded Gypsum Screws for timber substrate.
- Hold – Down Anchors: Yes
- Hold – Down Brackets or Straps: Yes
- Adhesive: Suitable drywall stud adhesive that complies with AS 2753
- Framing: Minimum framing grade of SG8. Refer current NZS3604 Standard, Section 8
- Jointing Plaster: USG Boral range

Note: It is not permitted to use nails or use adhesive to replace fasteners

USG BORAL SYSTEM UB2FR - SPECIFICATIONS

- USG Boral Lining Types: The following USG Boral linings are permitted for use with the USG Boral UB2FR bracing system.
  - 13mm Fiberock Aqua-Tough
- Fasteners: 6g x 41mm Coarse threaded Gypsum Screws to be installed at 150mm centres to the perimeter of the bracing element. For corner fixing details (Refer to Fig 2).
- Hold-Down Anchors (Minimum 15kN Characteristic uplift strength): Concrete floors: Install masonry anchors (minimum 15kN characteristic uplift strength) with 50x50x3mm washers or ‘J’ bolts set into the concrete at a minimum depth of 75mm.
- Timber Floors: Install M12 x 200mm Galvanized Coach Screws with 50 x 50 x 3mm washer. (Ensure bolts are secured into solid blocking).
- Hold – Down Brackets or straps: Install either Hold-Down brackets or 400 x 25 x 0.9mm galvanised or stainless steel straps..
- Adhesive: A Suitable Drywall Adhesive is permitted to intermediate studs only. Place daubs of adhesive at 300mm centres. It is not permitted to use nails or drywall stud adhesive to replace fasteners. Ensure fasteners do not pass through adhesive.
- Framing: Framing is to be determined from the current NZS3604 standard. Minimum framing grade of SG8. Maximum stud centres 600mm.
- Jointing Plaster: USG Boral range or suitable drywall plaster compounds are to be applied to all joints and fastener heads within the bracing element. Application of the paper tape and plaster compounds to be in accordance with the current AS/NZS 2589 Standard. Minimum plaster joint finish to be Level 4.
- Minimum Wall Length 400mm: The minimum permitted wall length of the UB2FR Bracing system must not be less than 400mm.
- Maximum Wall Length 2400mm: The maximum permitted wall length of the UB2FR Bracing system must not exceed 2400mm.
- Wall Height other than 2.4m: Wall heights as determined by the current NZS3604 Standard. Bracing rating to be determined by the following calculation.
  \[
  \text{Adjusted rating} = \left( \frac{2.4\text{m}}{\text{Actual wall height}} \right) \times \text{the bracing value}
  \]
FIG 1: UB2FR BRACING SYSTEM WITH SHEETS INSTALLED VERTICALLY
2.4m long bracing element detailed

Refer Fig 2 for Corner fixing details
Sheets to be fixed to framing with 6g x 41mm Gypsum Drywall Screws at 150mm centres
Drywall Adhesive to intermediate studs
USG Boral Fiberock Aqua-Tough plasterboard installed on each side of the bracing element
Hold-Down to be positioned at each end of the USG Boral bracing element

USG Boral Fiberock Aqua-Tough plasterboard installed on each side of the bracing element

FIG 2: UB2FR
Each corner of the bracing element

Corner Fastener Centres are
A = 50mm
B = 100mm
C = 150mm
D = 75mm

The remainder of Perimeter Fastener Centres = 150mm

Fasteners to be placed not less than 18mm from sheet ends and cut edges and not less than 12mm from sheet edges.
USG BORAL WALL BRACING SYSTEM UBFRP

USG Boral Bracing Systems have been tested in accordance with the P21[2010] racking test procedure and the current NZS3604:2011 Standard. Detailed in the tables below are the performance values of the USG Boral UBFRP bracing system that apply to both timber and concrete floor constructions. To achieve the required performances of the USG Boral Bracing System the correct components must be used and installed in strict accordance with the installation instructions and diagrams.

**USG BORAL BRACING SYSTEM UBFRP - PERFORMANCE**

<table>
<thead>
<tr>
<th>UBFRP</th>
<th>Bracing Element Wall Lengths</th>
<th>0.4 to 1.2m</th>
<th>1.2m to 2.4m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracing Units/meter - Wind</td>
<td>105</td>
<td>*150</td>
<td></td>
</tr>
<tr>
<td>Bracing Units/meter - Earthquake</td>
<td>*150</td>
<td>*150</td>
<td></td>
</tr>
</tbody>
</table>

*Refer to maximum ratings for concrete and timber floors Table 1

**USG BORAL SYSTEM UBFRP - COMPONENTS**

- **USG Boral Lining Type**: 13mm Fiberock Aqua-Tough on one side
- **Plywood**: 7mm DD Structural Plywood on other side
- **Fasteners - Fiberock**: 6g x 41mm coarse threaded Gypsum Screws for timber substrate
- **Fasteners - Plywood**: 50mm x 2.8mm Galvanised flat head nails
- **Hold – Down Anchors**: Yes
- **Hold – Down Brackets or Straps**: Yes
- **Adhesive**: Suitable drywall stud adhesive that complies with AS 2753
- **Framing**: Minimum framing grade of SG8. Refer current NZS3604 Standard, Section 8
- **Jointing Plaster**: USG Boral range

Note: It is not permitted to use nails or use adhesive to replace fasteners

**USG BORAL SYSTEM UBFRP - SPECIFICATIONS**

- **USG Boral Lining Types**: The following USG Boral linings are permitted for use with the USG Boral UBFRP bracing system.
  - 13mm Fiberock Aqua-Tough
  - 7mm DD Structural Plywood on the other side. Install Plywood with 50 x 2.8mm galvanised nails at 150mm centres to the perimeter of each plywood sheet.
- **Fasteners - Fiberock**: 6g x 41mm Coarse threaded Gypsum Screws to be installed at 150mm centres to the perimeter of the bracing element. For corner fixing details (Refer to Fig 2)
- **Hold-Down Anchors (Minimum 15kN Characteristic uplift strength)**: Concrete floors: Install masonry anchors (minimum 15kN characteristic uplift strength) with 50x50x3mm washers or ‘J’ bolts set into the concrete at a minimum depth of 75mm.
  - Timber Floors: Install M12 x 200mm Galvanized Coach Screws with 50 x 50 x 3mm washer. (Ensure bolts are secured into solid blocking).
- **Hold – Down Brackets or Straps**: Install either Hold-Down brackets or 400 x 25 x 0.9mm galvanised or stainless steel straps.
- **Adhesive**: A Suitable Drywall Adhesive is permitted to intermediate studs only. Place daubs of adhesive at 300mm centres. It is not permitted to use nails or drywall stud adhesive to replace fasteners. Ensure fasteners do not pass through adhesive.
- **Framing**: Framing is to be determined from the current NZS3604 standard. Minimum framing grade of MSG8. Maximum stud centres 600m
- **Jointing Plaster**: USG Boral range or suitable drywall plaster compounds are to be applied to all joints and fastener heads within the bracing element. Application of the paper tape and plaster compounds to be in accordance with the current AS/NZS 2589 Standard. Minimum plaster joint finish to be Level 4.
- **Minimum Wall Length 400mm**: The minimum permitted wall length of the UBFRP Bracing system must not be less than 400mm.
- **Maximum Wall Length 2400mm**: The maximum permitted wall length of the UBFRP Bracing system must not exceed 2400mm.
- **Wall Height other than 2.4m**: Wall heights as determined by the current NZS3604 Standard. Bracing rating to be determined by the following calculation.
  
  \[
  \text{Adjusted rating} = \left(\frac{2.4\text{m}}{\text{Actual wall height}}\right) \times \text{the bracing value}
  \]


**FIG 1: UBFRP BRACING SYSTEM WITH SHEETS INSTALLED VERTICALLY**

2.4m long bracing element detailed

Sheets to be fixed to framing with 6g x 41mm Gypsum Drywall Screws at 150mm centres

Drywall Adhesive to intermediate studs

7mm DD Structural Plywood fixed at 150mm centres to the perimeter of the bracing element and fix at 300mm centres to the intermediate studs. Using 50mm x 2.8mm galvanised clouts

Using 6g x 41mm Gypsum Drywall Screws fix at 150mm centres to the perimeter of the bracing element

Refer Fig 2 for Corner fixing details

Corner Fastener Centres are

A = 50mm
B = 100mm
C = 150mm
D = 75mm

The remainder of Perimeter Fastener Centres = 150mm

Fasteners to be placed not less than 18mm from sheet ends and cut edges and not less than 12mm from sheet edges.

Galvanised clouts to be placed not less than 7mm from plywood sheet edges.

**FIG 2: UBFRP**

Each corner of the bracing element

Hold down to be positioned at each end

Refer Fig 2 for Corner fixing details
USG BORAL BRACING HOLD DOWN CONSTRUCTION DETAILS FOR CONCRETE AND TIMBER FLOORS

The USG Boral bracing hold down construction details described in this section are required for USG Boral Bracing Systems UBIFR, UB2FR, UBFRP, UBIM, UBSM, UBMP. However, Multistop systems must only use Pryda brackets.

<table>
<thead>
<tr>
<th>COMPONENT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masonry Hold Down Anchor (Minimum 15kN Characteristic Uplift strength)</td>
</tr>
<tr>
<td>50 x 50 x 3.0mm Galvanised Washer</td>
</tr>
<tr>
<td>400 x 25 x 0.9mm Galvanised or Stainless Steel Strap</td>
</tr>
<tr>
<td>30 x 2.5mm Galvanised Flat Head Nails. Install six nails to each side of the stud and 3 nails to each side of the bottom plate</td>
</tr>
<tr>
<td>Pryda Bracing Anchor Bracket (can be used in the replacement of the strap)</td>
</tr>
</tbody>
</table>

FIG 1: INTERNAL WALL ON CONCRETE FLOOR
Detailed with Strap

Install 400 x 25 x 0.9mm Strap underneath bottom plate and on either side of stud using six 30 x 2.5mm galvanised flat head nails on each side of the stud and 3 nails on each side of the bottom plate.

FIG 2: EXTERNAL WALL ON CONCRETE FLOOR
Detailed with Strap

400 x 25 x 0.9mm galvanised strap installed under the bottom plate. Use six 30 x 2.5mm galvanised flat head nails to secure the strap on each side of stud. 3 nails installed to each side of bottom plate.
USG BORAL BRACING HOLD DOWN CONSTRUCTION DETAILS

FIG 3: EXTERNAL WALL ON CONCRETE FLOOR
Detailed with the Pryda bracing anchor bracket.

- USG Boral lining
- Exterior cladding
- Concrete flooring
- Bottom plate
- Pryda bracing anchor bracket must be on the inside face of the framing.
- Install Masonry Anchor (15kN Characteristic Uplift strength) or J bolt set 75mm into concrete

FIG 4: INTERNAL WALL ON CONCRETE FLOOR
Detailed with the Pryda bracing anchor bracket.

- Concrete Flooring
- Pryda bracing anchor bracket installed to the centre of the framing.
- Install Masonry Anchor (Minimum 15kN Characteristic Uplift strength) or J bolt set 75mm into concrete
BRACING HOLD DOWN CONSTRUCTION DETAILS

FIG 5: EXTERNAL WALL ON TIMBER FLOOR
Detailed with Pryda bracing anchor bracket.

The Pryda bracing anchor has been developed for both timber floor and concrete floor connections. (Timber floor shown below). Hold down straps are not required when using the Pryda bracing anchor system. Each bracing element requires 2 Pryda bracing anchor brackets and 14 screws (7 screws per anchor). The Pryda bracing anchor brackets are supplied as pairs including 14 screws.

FIG 6: INTERNAL TIMBER FLOOR
Detailed with Pryda bracing anchor bracket.

Pryda bracing anchor requires 7 timber hex head screws 12g x 30mm. 5 screws are to be fastened through the anchor into the vertical stud, and 2 screws are to be fastened through the anchor into the bottom plate.

Galvanised strap not required when using the Pryda bracing anchor.

M12 galvanised coach screw with a minimum thread length of 145mm into solid timber sub floor framing to provide 12 kN resistance.

Slotted hole for easy location of bolt or coach screw.

Pryda bracing anchor bracket positioned centrally within framing.

Install M12 galvanised coach screw into solid timber floor sub framing. Minimum thread length to be not less than 145mm.
USG BORAL BRACING HOLD DOWN CONSTRUCTION DETAILS FOR CONCRETE AND TIMBER FLOORS AND TOP PLATE CONNECTIONS

**COMPONENT DESCRIPTION**

<table>
<thead>
<tr>
<th>Component Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hold Down Bolts, M12 x 190mm Galvanised Coach Screw (12kN Uplift characteristic)</td>
</tr>
<tr>
<td>50 x 50 x 3.0mm Galvanised Washer</td>
</tr>
<tr>
<td>400 x 25 x 0.9mm Galvanised Strap</td>
</tr>
<tr>
<td>30 x 2.5mm Galvanised Flat Head Nails. Install six nails to each side of the stud and 3 nails to each side of the bottom plate</td>
</tr>
<tr>
<td>Bracing Anchor Bracket (can be used in the replacement of the strap)</td>
</tr>
</tbody>
</table>

**FIG 7: INTERNAL TIMBER FLOOR**

Detailed with Strap

- Install 400 x 25 x 0.9mm Strap underneath bottom plate and on either side of stud using six 30 x 2.5mm galvanised flat head nails on each side of stud and three on each side of bottom plate.

**FIG 8: EXTERNAL TIMBER FLOOR**

Detailed with Strap

- Install M12 galvanised coach screw into solid timber floor sub framing. Minimum thread length to be not less than 145mm.

**FIG 9: TIMBER FLOOR EXTERNAL WALL**

Detailed with double studs and double straps

- Install two 400 x 25 x 0.9mm galvanised straps with twelve 30 x 2.5mm galvanised nails.
- Secure the secondary and primary studs together with 75 x 3.75mm nails at 300mm centres along the full height of the studs.

**FIG 10: TOP PLATE CONNECTIONS IN BRACING ELEMENTS**

The installation of all top plate connections for bracing elements must be in accordance with NZS 3604 Section 8.7.3. Joints must be made over blocking or studs with a 6 kN connection if the bracing values are greater than 100 BU. If the rating is less than 100 BU, a 3 kN connection strap can be used.
USG BORAL BRACING SYSTEMS CEILING DIAPHRAGMS

CEILING DIAPHRAGMS – INSTALLATION INSTRUCTIONS

Ceiling diaphragms are required to produce a horizontal bracing element to distribute lateral loads to bracing walls where the distance between bracing walls is greater than 5.0m with a single top plate and 6.0m with two top plates.

Construction of the ceiling diaphragm is to be in accordance with NZS3604:2011 Standard Sections 5.6 and 13.5 and the instructions detailed within this document.

As per the NZS3604:2011 Standard a ceiling diaphragm shall be square or rectangular in shape and its length must not be greater than twice its width.

Protrusions from ceiling diaphragms are permitted but cut outs within ceiling diaphragms are not permitted.

The ceiling diaphragm must have fixings positioned at 150mm centres to its perimeter and 300mm centres to intermediate battens. Fixings are to be no less than 12mm from the sheet edge.

The minimum sheet size permitted is to be no less than 1800mm x 900mm. Refer to ceiling diaphragm corner fixing details on page 26.

The entire area of the ceiling diaphragm must be covered with sheet linings. The installation of the sheet linings is to be carried out as described in the USG Boral Plasterboard Installation Manual.

THE MINIMUM PLASTERBOARD FASTENER TYPES PERMITTED

The information detailed within this table is in accordance with NZS3604:2011 and is applicable for single and two level timber framed structures.

<table>
<thead>
<tr>
<th>USG BORAL LINING TYPE</th>
<th>LINING THICKNESS</th>
<th>WEIGHT kg/m²</th>
<th>DENSITY kg/m³</th>
<th>MAXIMUM LENGTH</th>
<th>FASTENER CENTRES</th>
<th>BATTEN CENTRES</th>
<th>MAX PITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multistop</td>
<td>10.0mm</td>
<td>9.7*</td>
<td>970</td>
<td>7.5m</td>
<td>150mm</td>
<td>600mm</td>
<td>15°</td>
</tr>
<tr>
<td>Multistop</td>
<td>13.0mm</td>
<td>11.8*</td>
<td>907</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiberock Aqua-Tough</td>
<td>13.0mm</td>
<td>12.0*</td>
<td>923</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Weights indicated are nominal.

Ceiling diaphragms must be directly connected to bracing lines that have a capacity of not less than 15BU/m. This table details the minimum fasteners permitted for installing USG Boral Plasterboard sheets to ceiling diaphragms.

<table>
<thead>
<tr>
<th>USG BORAL LINING TYPE</th>
<th>LINING THICKNESS</th>
<th>WEIGHT kg/m²</th>
<th>FASTENER TYPE &amp; SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multistop</td>
<td>10.0mm</td>
<td>9.7*</td>
<td>Timber Batten</td>
</tr>
<tr>
<td>Multistop</td>
<td>13.0mm</td>
<td>11.8*</td>
<td>Steel Batten</td>
</tr>
<tr>
<td>Fiberock Aqua-Tough</td>
<td>13.0mm</td>
<td>12.0*</td>
<td>Gypsum 32 x 6g coarse thread</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gypsum 25 x 6g fine thread</td>
</tr>
</tbody>
</table>

It is not permitted to use nails or use adhesive to replace fasteners.

Where a second layer of plasterboard is to be installed the first layer is to be installed as the ceiling diaphragm

CEILING DIAPHRAGMS

Plasterboard linings that are not less than 10mm in thickness and have a density of not less 600 kg/m³ can be used in ceiling diaphragms that do not exceed 7.5m in length and do not have roof pitch greater than 15° to the horizontal.
CEILING DIAPHRAGM CONSTRUCTION DETAILS

CEILING DIAPHRAGM/WALL CONNECTION CONSTRUCTION – TIMBER BATTEN

Timber ceiling batten wall connection – continuous 150 x 35mm ribbon plate.

DIRECT FIX BRACKET INSTALLATION FOR CEILING DIAPHRAGMS.

For ceiling diaphragm installations that use steel battens and direct fix brackets a solid fixing at a maximum 600mm centres to the floor or ceiling framing is required. Refer to the following construction details.

TIMBER SUPPORT BLOCKING

DF37-S Direct Fix Bracket.
DF37-L Direct Fix Bracket.
FC37 - Ceiling Batten.

STEEL SUPPORT BLOCKING

Install additional 40 x 40 x DJ4040 of a minimum length of 300mm to the primary timber support with 6 x 6g x 40mm screws.

Install additional timber support blocking of a minimum length of 300mm to the primary timber support with 4 x 75mm x 3.15mm nails.

Install steel ceiling battens to suit lining at a maximum of 600mm centres

Install DF37 Brackets using 8g 12 x 25mm wafer head screw or 30mm clout (3 minimum)

Install additional timber support blocking

Install 10g x 30mm drill point wafer head screws suitable for timber to each side of the steel batten

Install 10g x 16mm drill point wafer head screws suitable for steel to each side of the steel batten

CEILING DIAPHRAGM WALL CONNECTION – USG BORAL SHEETROCK CEILING BATTEN

PC24 - Perimeter Channel.
FC37 - Ceiling Batten.

Install DC24 Perimeter Channel using 8g 12 x 25mm wafer head screws

Install DF37 Brackets using 8g 12 x 25mm wafer head screw or 30mm clout (3 minimum)
CEILING DIAPHRAGM CORNER FIXING DETAIL

Corner Fastener Centres are
A = 50mm
B = 150mm
C = 150mm
The remainder of Perimeter Fastener Centres = 150mm
Fasteners to be placed at 300mm centres within the field of the tile ceiling diaphragm.
Fasteners to be placed not less than 18mm from sheet ends and not less than 12mm from sheet edges.

RENOVATION & REFURBISHMENT
With any renovation involving the removal of the interior linings of existing dwellings it is important to ensure that the bracing elements are correctly reinstated as per the original design.

PLASTERBOARD ALLOWABLE SUBSTITUTIONS

<table>
<thead>
<tr>
<th>USG BORAL PLASTERBOARD ALLOWABLE SUBSTITUTIONS</th>
<th>FIBEROCK</th>
<th>FIRESTOP</th>
<th>SOUNDSTOP</th>
<th>MULTISTOP</th>
<th>WETSTOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>10mm Sheetrock</td>
<td>✔️ ✔️ ✔️ ✔️ ✔️ ✔️ ✔️ ✔️ ✔️ ✔️</td>
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<tr>
<td>10mm MultiStop</td>
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<tr>
<td>13mm Fiberock</td>
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1 use 41 x 6g screws
2 use 51 x 7g screws

PENETRATIONS IN BRACING ELEMENTS
The following penetrations are permitted within the field of all USG Boral Bracing Element systems
- Socket outlets – 90 x 90mm (Maximum) Socket outlet penetrations are to be positioned not less than 90mm from the perimeter of the bracing element
- Switch outlets – 90 x 90mm (Maximum) Switch outlet penetrations are to be positioned not less than 90mm from the perimeter of the bracing element
- Penetration holes - 125mmØ (Maximum) hole penetrations are to be positioned not less than 300mm from the perimeter of the bracing element
For larger penetrations within bracing elements seek professional advice on Specific Engineering Design (SED) or contact USG Boral.

Socket/Switch Position

Hole Size and Position

125mmØ

300mm
SUSTAINABILITY
USG Boral aims to minimise the environmental impact of its operations and to make a positive difference to the environment and communities in which it operates.

Plasterboard is manufactured from abundant natural gypsum resources and 100% recycled paper liner.

HEALTH AND SAFETY
For information regarding the safe use of USG Boral products and accessories please refer to instructions on the product packaging or contact your local USG Boral Sales Office or TecASSIST for a current copy of the Material Safety Data Sheet.

TECHNICAL ENQUIRIES
USG Boral provides free technical advice to builders, architects, contractors, engineers, regulators and home owners throughout New Zealand & Australia.

USG Boral can be contacted on weekdays 8.30am — 5.00pm on 0800 USG BORAL (0800 874-267) or www.usgboral.com

SALES ENQUIRIES
Auckland (09) 270-2595
Wellington (04) 560-4528
Christchurch (03) 365-4245

This Technical Information Guide is intended to provide general information and should not be used as a substitute for professional advice. There are many variables that can influence construction projects which affect whether a particular construction technique is appropriate. Before proceeding with any project we recommend you obtain professional advice to ascertain the appropriate construction techniques to suit the particular circumstances of your project having regard to the contents of this Installation Manual. We recommend you use qualified tradespersons to install this system.

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