ALUMINIUM MODULAR CEILING SYSTEM

Technical Manual (Installation Guide)

USG BORAL
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CEILING SYSTEM

Introduction

USG Boral's Aluminium Modular Grid System comes in a top hat profile; this suspended ceiling system is suitable for premium office developments (commonly known as 'A Grade' office buildings) or general offices.

The suspension system is composed of a grid of structural components, that provides support for the ceiling tiles and comes in three module sizes of:

- 1200mm x 1200mm (1200 module)
- 1350mm x 1350mm (1350 module)
- 1500mm x 1500mm (1500 module)

Each module can accommodate up to 3, 4 or 5 tiles depending on the configuration specified by the Architect (Figure 1). The centre profile of the Main and Cross Runners appear continuous in both directions in this ceiling system. The Main Runners are the primary support. Abutting sections of Main Runners are joined with connector plates to ensure the members continuity. The Cross Runners have interlocking tab ends that simplify installation and allow it to be removed and replaced without damage to the components. The ceiling tiles used may need to be removed for access to ventilating systems or other services such as electrical or fire sprinkler systems within the plenum space. Any one or more tiles in the module may be readily removed without use of special tools for access to the plenum area, and may, thereafter, just as readily be replaced.

The modules can be fitted with either Mineral Fibre or Metal Ceiling Tiles. Light fittings are commonly fitted in the centre of the module. USG Boral offer a range of Mineral Fibre and Metal Ceiling Tiles in various sizes, face patterns and perforations to suit project specific designs. Metal Tiles can be manufactured with penetrations to fit service requirements. Contact USG Boral for more information*.

*Lead times may apply

Applications

- A Grade Office Buildings
- General Offices
- Banks
- Reception / Lobbies
- Board Rooms
- Education Facilities
- Conference Centres

Features and Benefits

- Very clean appearance, unobtrusive with minimal exposed grid
- Grid sections are demountable to install full height partitions
- Tiles are independent of each other and can easily be removed without the use of tools
- Installation is fast, easy and neat with a range of interlocking accessories
- Can be disassembled, ensuring re-use of components
- This system has been tested to ASTM C635/ C635M-17 and ASTM E3090/E3090M-17: Ensures appropriate load carrying capabilities for USG Boral's ceiling tiles
- Compliance: Grid system can be designed to comply with earthquake requirements of AS 1170.4, NZS 1170.5 and comply with AS/NZS 2785 Suspended Ceilings – Design and Installation
- Warranty: Available for all products when installed in accordance with USG Boral specifications

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BVT has been engaged by USG Boral to conduct a compliance assessment of USG Boral's Aluminium Modular Ceiling System and associated documentation to AS/NZS 2785:2020. BVT has completed a review on the following:

- USG Boral testing of Aluminium Modular Ceiling
- Generic layout of Aluminium Modular Ceiling
- Aluminium Modular Ceiling Installation Guide
- USG Boral Aluminium Modular Ceiling Seismic Design

Based on our review of the documentation provided by USG Boral the ceiling system fully complies with AS/NZS 2785:2020. (Subject to specific project design and installation in accordance with AS/NZS 2785:2020)

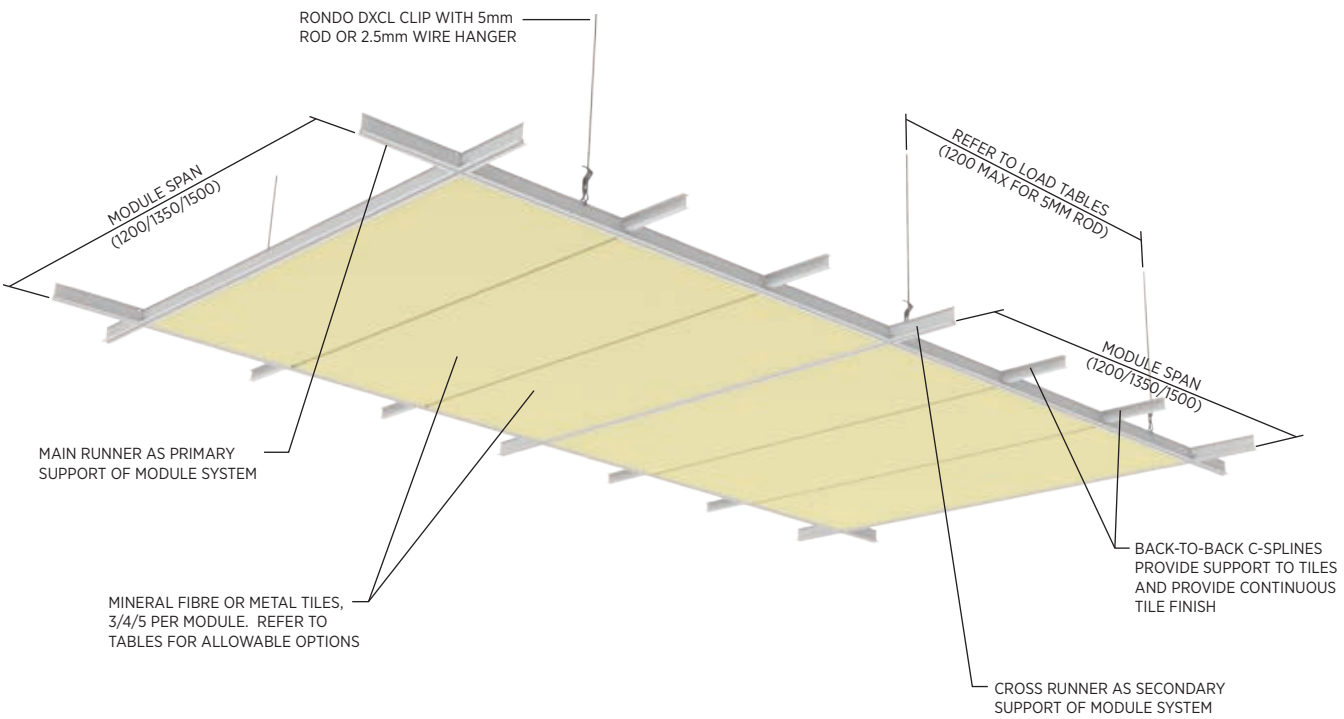
17-September-2019

BVT Engineering Professional Services

BVT ENGINEERING PROFESSIONAL SERVICES

CEILING SYSTEM

Figure 1: Typical layout of Modular Aluminium Grid Ceiling System



*General detail is indicative only. Refer to tables for allowable options.

LOAD TABLES

Load tables are for static loading and do not accommodate for seismic forces and wind loads – Contact USG Boral for project specific design.

Load Tables Instructions

Step 1)

Choose Tile Type:

- Impressions Plank Tiles
- Highlands Metal Tiles
- Mars Plank Tiles
- Olympus Max Plank Tiles

Step 2)

Are Tiles spanning between Main Runners or Cross Runners?

- If Main Runners refer to Table 1
- If Cross Runners refer to Table 2

Step 3)

How many tiles are there per module: refer to the respective column.

Step 4)

What is the Module Size? Refer to the respective row.

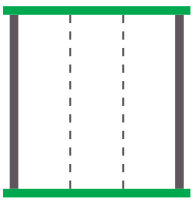
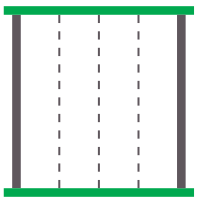
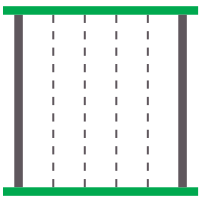
Step 5)

Determine the Suspension hanger spacing.

CEILING SYSTEM

Configuration A

LOAD TABLE 1: PREFERRED METHOD

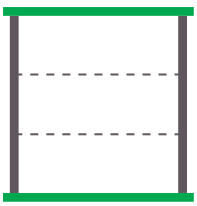
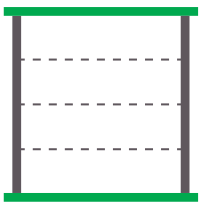
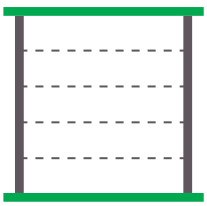
Tile Type†	Module Size	Maximum Suspension Hanger spacing (mm)* — Additional services (Lighting, insulation etc.) = 3.0 kg/m² or less — No. of Panels / Configuration**		
				
		3 Tiles per Module	4 Tiles per Module	5 Tiles per Module
Impressions Plank Tiles Highlands Metal Tiles Mars Plank Tiles Olympus Max Plank Tiles	1200mm x 1200mm	≤1200	≤1200	≤1200
	1350mm x 1350mm	≤1200	≤1200	≤1200
	1500mm x 1500mm	≤900	≤900	≤900

Main Runner Cross Runner Spline

* This table is only applicable for 5mm rod hangers. If using 2.5mm wire hanger, contact USG Boral.
** Configuration A, as shown, spans tiles between Main Runners (spline perpendicular to Main Runners)
† For tile weights greater than 5.6 kg/m² refer to USG Boral

Configuration B

LOAD TABLE 2

Tile Type†	Module Size	Maximum Suspension Hanger spacing (mm) — Additional services (Lighting, insulation etc.) = 3.0 kg/m² or less — No. of Panels / Configuration**		
				
		3 Tiles per Module	4 Tiles per Module	5 Tiles per Module
Impressions Plank Tiles Highlands Metal Tiles Mars Plank Tiles Olympus Max Plank Tiles	1200mm x 1200mm	≤1200	≤1200	≤1200
	1350mm x 1350mm	NA	NA	≤1200
	1500mm x 1500mm	NA	NA	≤900

Main Runner Cross Runner Spline

* Configuration B, as shown, spans tiles between Cross Runners (spline perpendicular to Cross Runners)
** For Tiles greater than 5.6 kg/m² refer to USG Boral
† For tile weights greater than 5.6 kg/m² refer to USG Boral

Load tables are for static loading and do not accommodate for seismic forces

SEISMIC DESIGN

Introduction

Seismic compliance refers to the use of approved systems and designs that meet the seismic design requirements of a building project to provide life safety to occupants and maintain building function during and after an earthquake. Non-structural components often represent a high percentage of a project's capital investment. Failure of these components in an earthquake has the potential to cause harm, block egress, impede rescue efforts and can disrupt the building's function. The basic objectives of seismic design for non-structural components are to provide life safety, minimise property loss and prevent functional loss.

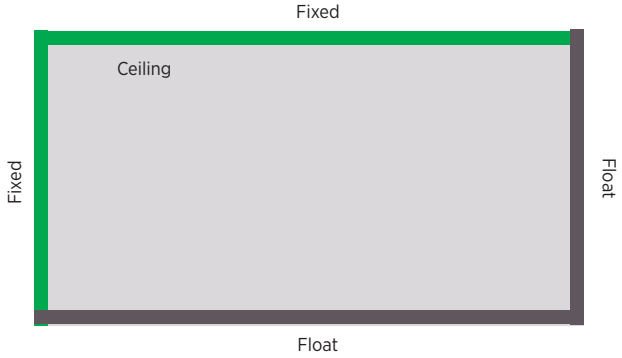
Seismic design solutions include:

Method 1: Perimeter Restrained Ceilings

a) Perimeter fixing on adjacent edges

Ceiling is fixed to the perimeter on two adjacent sides and a seismic sliding joint is used on the opposite sides. Lateral loads are transferred from the ceiling to the perimeter support (wall/bulkhead/partition) through the perimeter fixing (Figure 2).

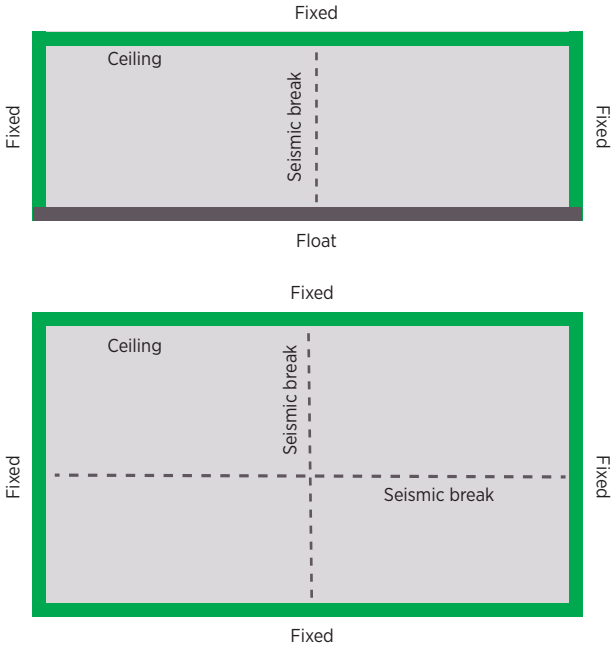
Figure 2: Perimeter fixing on adjacent edges



b) Perimeter fixing on more than two edges (with seismic breaks)

To accommodate installation of ceilings with longer spans, the ceiling is split up into smaller sections by means of seismic breaks. The ceiling can then be fixed to the perimeter on opposite sides. Lateral loads are transferred through perimeter fixings to the main structure. Seismic breaks can be constructed in one or two directions (Figure 3). Seismic breaks in ceilings may also be required at the location of movement joints or seismic breaks in the main structure.

Figure 3: Perimeter fixing on more than two edges



Method 2: Back Braced Ceilings

a) Back Bracing in two directions

In this method, the ceiling is restrained to the structure above with a series of back braces. Floating connections are required around the entire perimeter, as the ceiling may not be braced to both the structure above and the perimeter. Bracing shall be placed at 45° (nominal) angles in both directions as shown in Figure 4 and in accordance with manufacturers specifications.

b) Back Bracing in one direction

Bracing in one direction is used in long corridors and rooms. In this method, the ceiling is restrained to the structure above with a series of back braces only in one direction. A floating connection is required on perimeters as shown in Figure 5, as the ceiling may not be braced to both the structure above and the perimeter. Bracing shall be placed at 45° (nominal) angles in one direction as shown in Figure 5 and in accordance with manufacturers specifications.

SEISMIC DESIGN

Figure 4: Back bracing in two directions

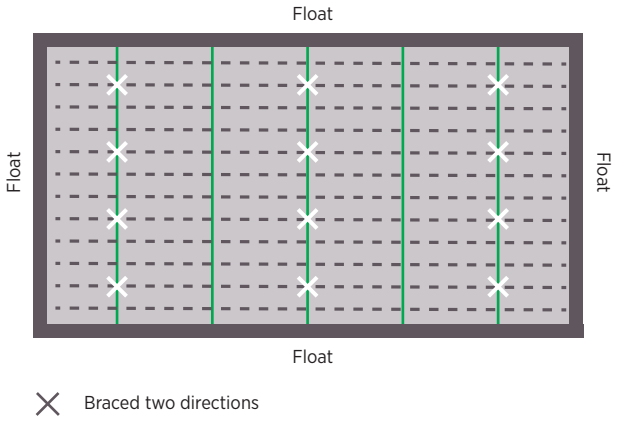
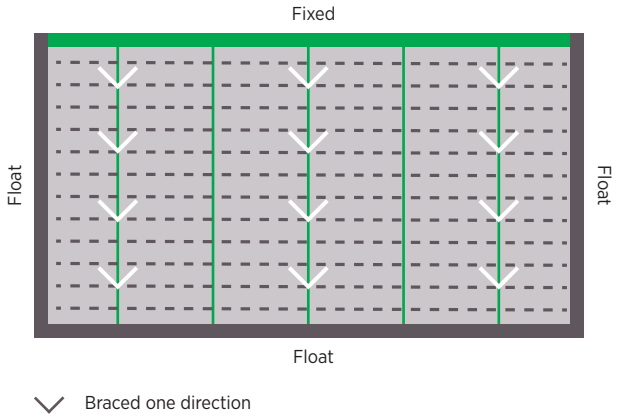


Figure 5: Back bracing in one direction



General Layout

A general layout of the ceiling system is shown in Figure 6, Figure 12 and Figure 13.

Figure 6: General layout

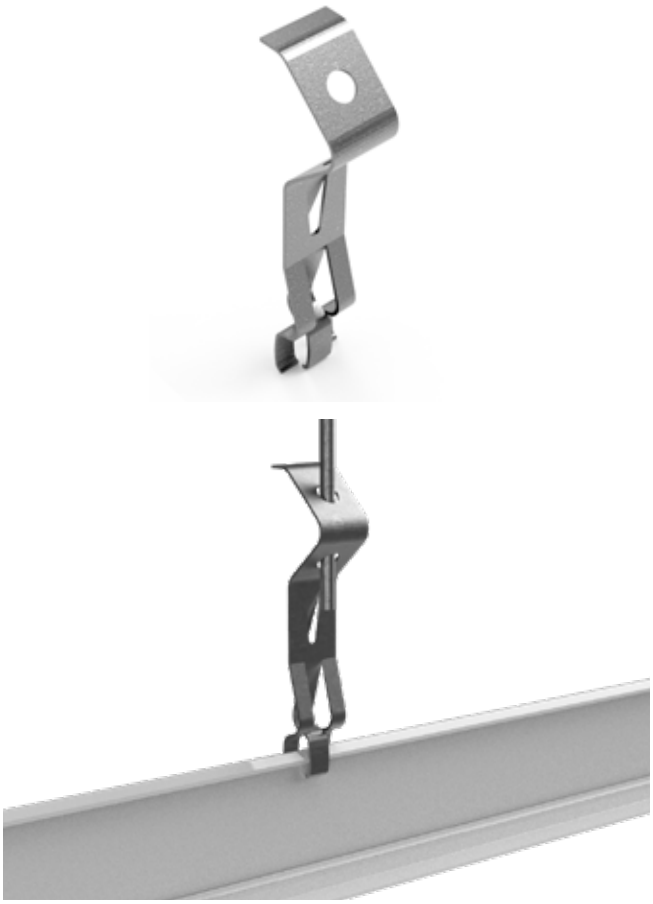
SEISMIC DESIGN

Suspension Hangers

Suspension Hangers are the primary supports that carry the suspended ceiling. In this system 5mm galvanised rod (PN121) with RONDO DXCL Suspension Clip (Figure 7) – shall be used. Suspension Hangers are spaced 900mm or 1200mm nominally along the Main Runners depending on the loading requirements and module sizes. Additional Suspension Hangers may be used on Cross Runners where advised by the Structural/Project Engineer. Suspension Hanger type and position may be dependent on load requirements. Refer to load capacities for hanger spacings (Table 1 and Table 2). Hangers are not to be bent or kinked as a means of levelling the grid or for any other reason. Hangers should be level and evenly installed to result in a level ceiling.

If using the 2.5mm wire in lieu of 5mm rod with RONDO DXCL Suspension Clip contact USG Boral for design and details. Suspension hangers are not suitable for carrying uplift forces. Anchors and fixings to concrete and steel must be in accordance with AS2785 and Project Engineer's recommendation.

Figure 7: Rondo DXCL suspension clip to be utilised at the spacings specified



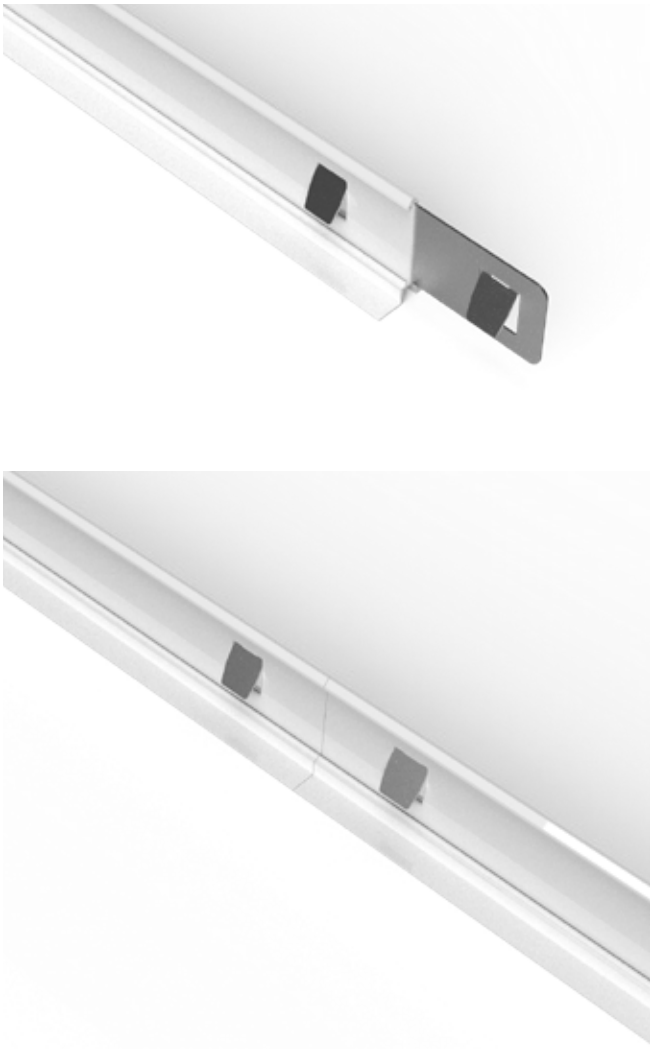
Main Runners

The Main Runners are the primary support of the suspended ceiling grid. Slots and flange cuts are provided along the Main Runner for convenience to install Cross Runners for 1200, 1350 or 1500mm modules. The Main Runner lengths are as follows:

- 1200mm module; Main Runner length= 3600mm
- 1350mm module; Main Runner length= 4050mm
- 1500mm module; Main Runner length= 4500mm

Connector plates have been designed and tested to facilitate Main Runner to Main Runner connection as shown in Figure 8.

Figure 8: Main Runner joined with connector plate, with connection tabs pushed through at min 45° to max 60°



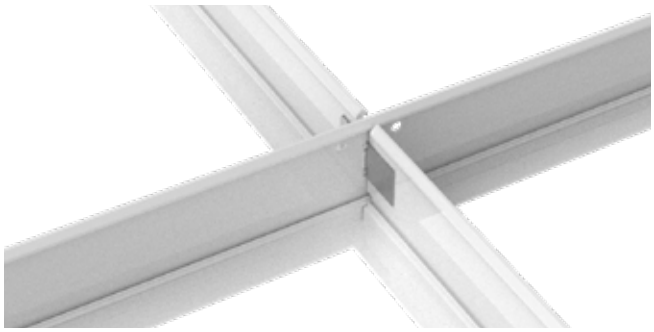
SEISMIC DESIGN

Cross Runners

The Cross Runners (Figure 9) act as the secondary support of the suspended ceiling grid and connect through the Main Runners. The lengths of the Cross Runners are as below:

- 1200mm in the 1200 module
- 1350mm in the 1350 module
- 1500mm in the 1500 module

Figure 9: Cross Runners intersecting through Main Runner slot



Perimeter Wall Angles

Wall angles (Figure 10) are typically installed around the perimeter of suspended ceilings. There are three wall angle options available for the Modular grid system:

- L-shaped wall angle
- Shadowline wall angle
- Seismic Shadowline wall angle

The Seismic Shadowline wall angle is designed and tested for seismic applications. It must be used in conjunction with the ASC8 clip.

Figure 10:

a) Shadowline Wall Angle

b) Generic Wall Angle

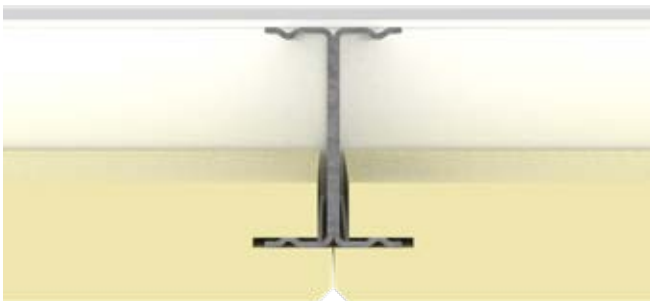
c) Seismic Shadowline Wall Angle

C-Splines

C-Splines provide support to the Mineral Fibre Tiles. They are inserted into the BESK profiled edge of the Mineral Fibre Tiles (Figure 11). C-Splines sit back to back of each other spanning between Main Runners (Preferred method; Configuration A; Table 1) or span between Cross Runners (Configuration B; Table 2). C-Splines come in the following lengths to suit varying module sizes:

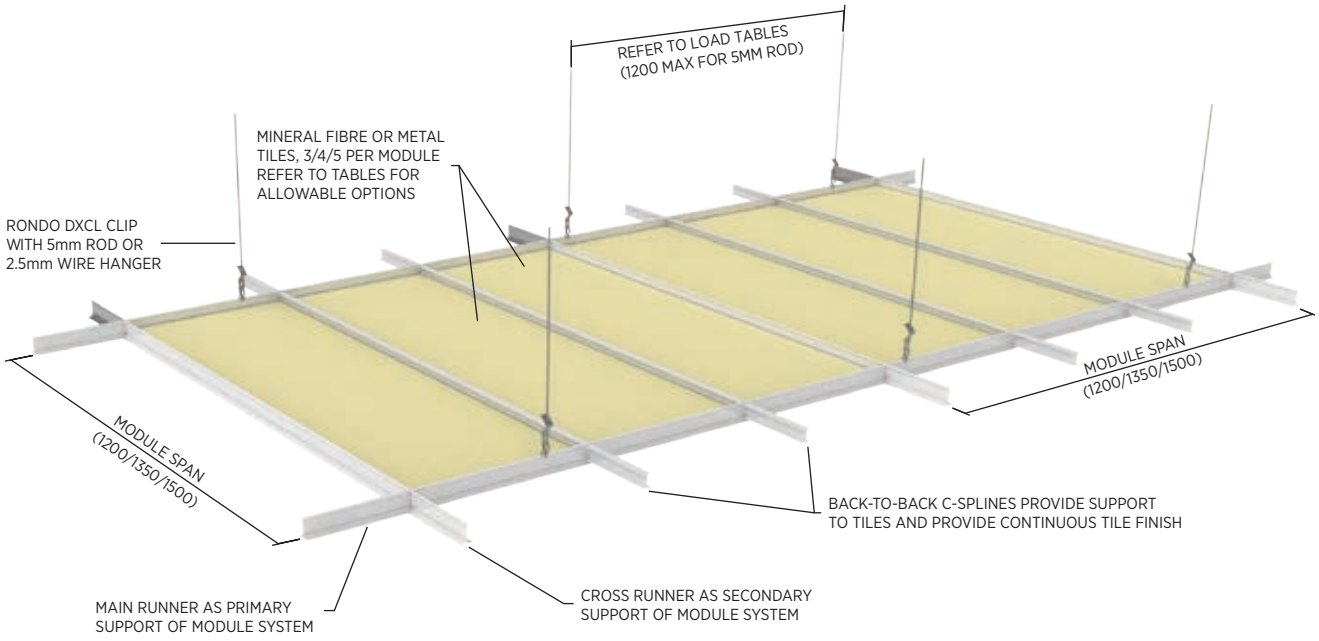
- 1200mm module system; Spline length= 1185mm
- 1350mm module system; Spline length= 1385mm
- 1500mm module system; Spline length= 1485mm

Figure 11: Steel C-Spline (Shown back-to-back in Tile)



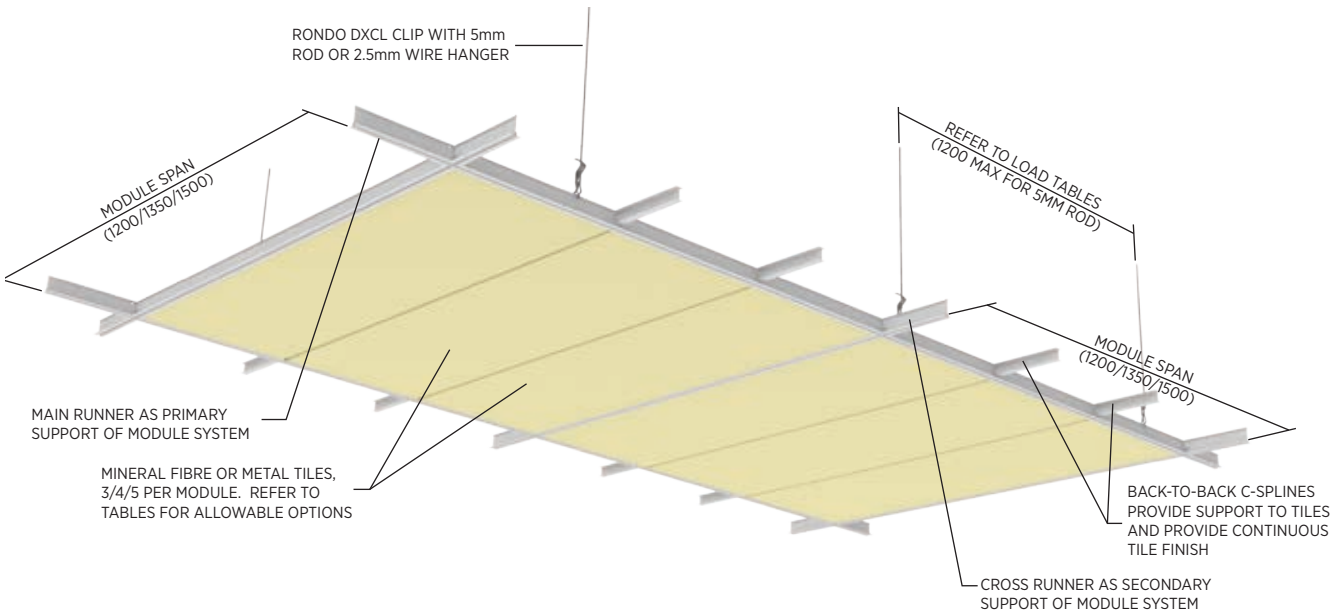
SEISMIC DESIGN

Figure 12: Above ceiling view of module with USG Boral Mineral Fibre Tiles and C-Splines



*General detail is indicative only. Refer to tables for allowable options.

Figure 13: Below ceiling view of module with USG Boral Mineral Fibre Tiles and C-Splines



*General detail is indicative only. Refer to tables for allowable options.

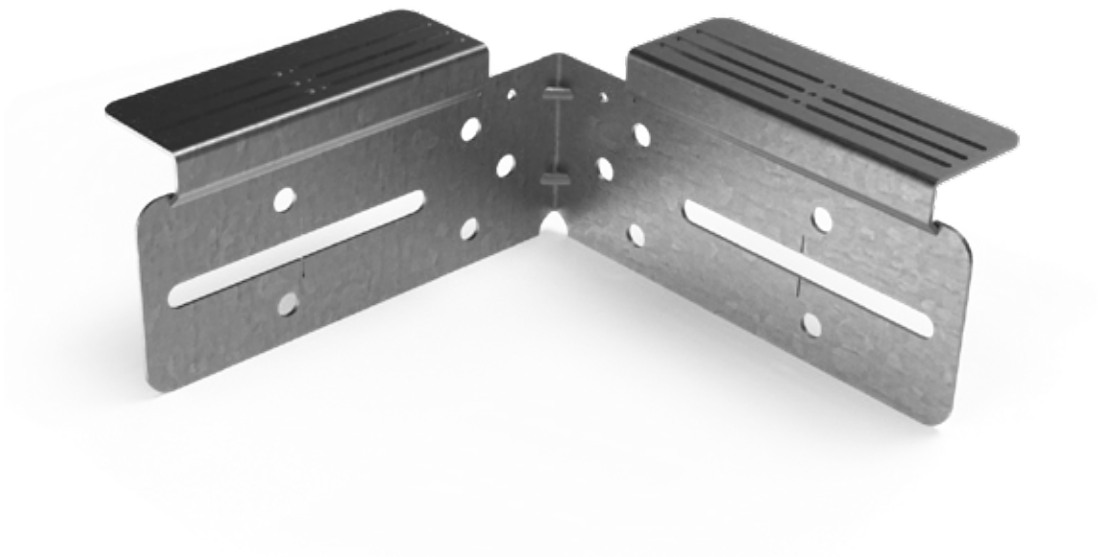
SEISMIC ACCESSORIES AND INSTALLATION DETAILS

ASC8 Seismic Clip

For seismic applications, the ASC8 (Figure 14) has been specially designed by USG Boral to accommodate the various seismic bracing methods. When used in conjunction with the Seismic Shadowline wall angle, the ASC8 clip is to be utilised in either the Fixed or Floating connection. The ASC8 clip is also designed for creating separations or Seismic Breaks in the ceiling as required.

- The ASC8 Seismic Connector is used in conjunction with an appropriate perimeter wall angle
- The ASC8 Seismic Connector is to be installed on both Main and Cross Runners at the perimeter in a fix/float system design as described in this guide and approved by the Structural/Project Engineer.

Figure 14: ASC8 Seismic Connector



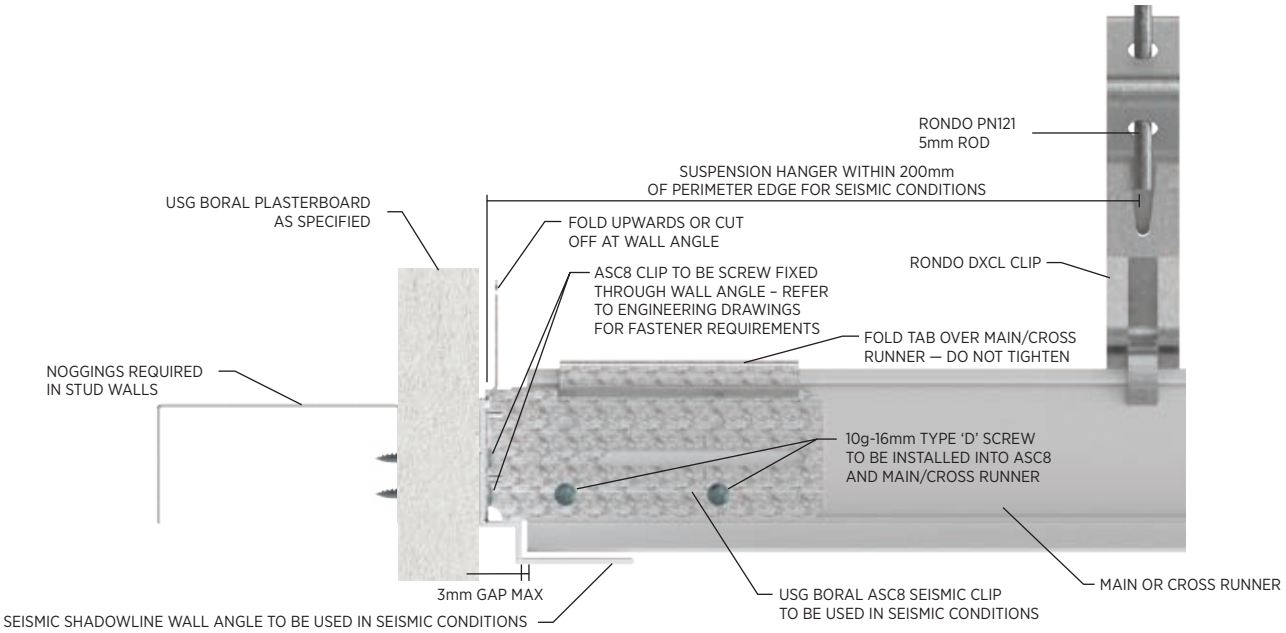
Perimeter Fixing

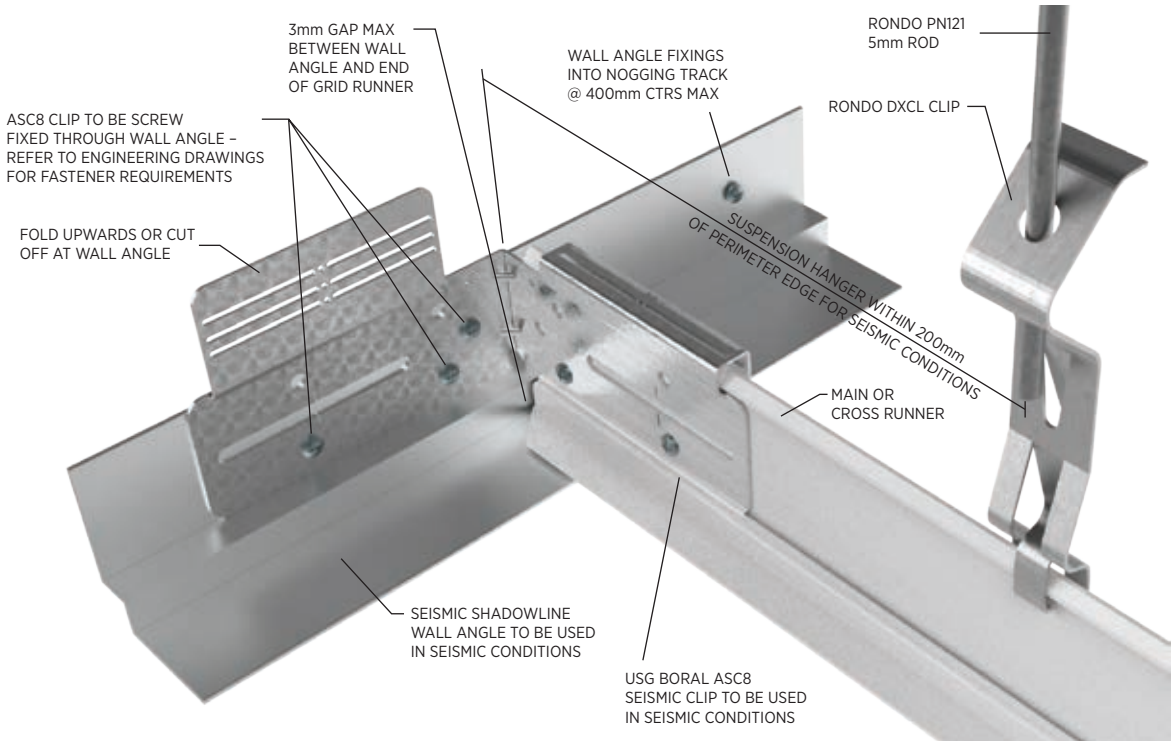
Fixed Connection

When fixing to the perimeter, it is required that the perimeter support (wall/bulkhead/partition) that the ceiling is fixed to, be designed to withstand the lateral loads exerted from the ceiling. If the ceiling is fixed to a wall, a nogging must be installed at the ceiling height to connect the perimeter wall angle (refer to Figure 15 and Method 1 (a) on page 4 for more information).

SEISMIC ACCESSORIES AND INSTALLATION DETAILS

Figure 15: Seismic Perimeter Fixed (Fasteners position as shown in detail)





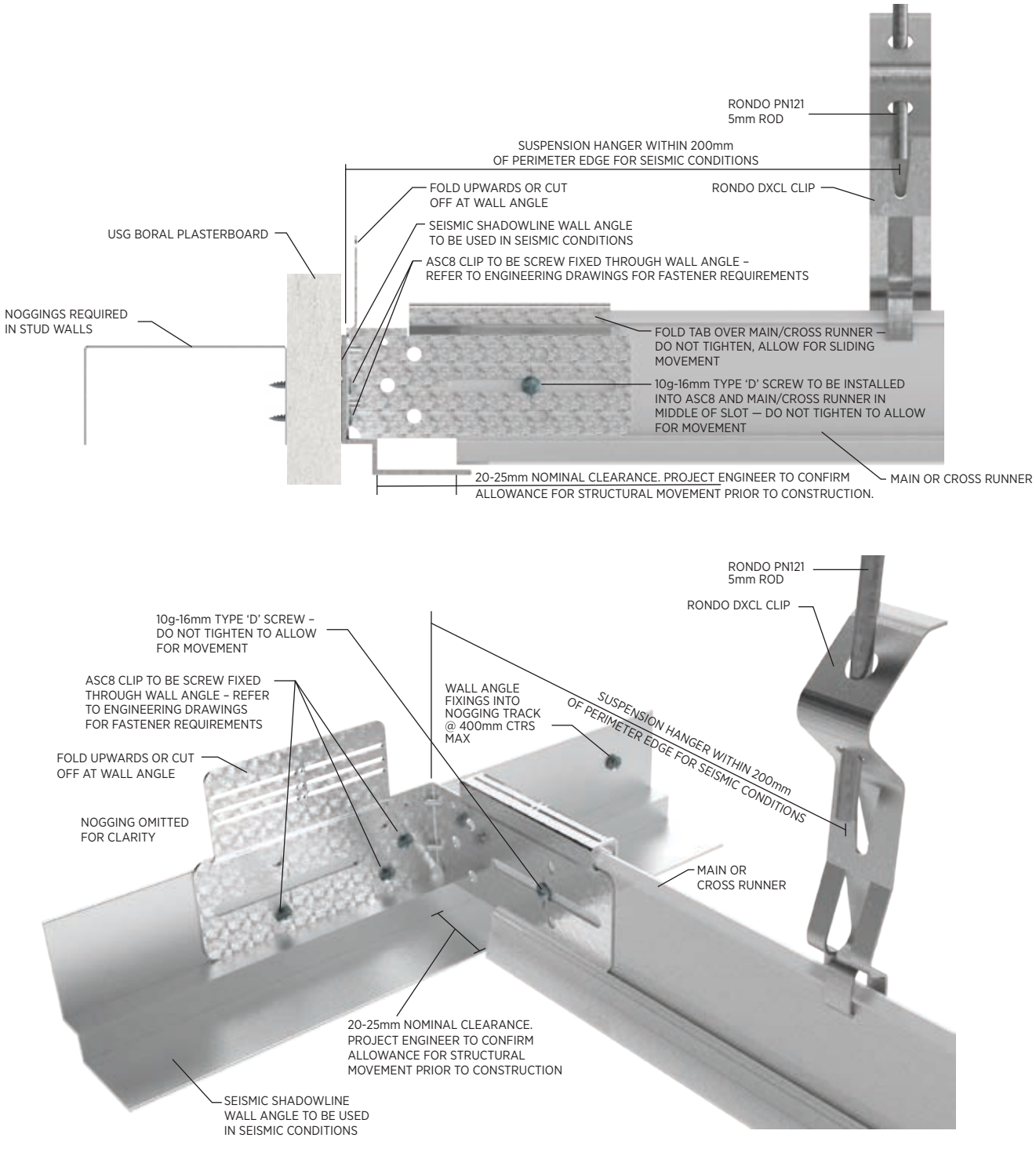
*Refer to engineering drawings for fastener requirements

SEISMIC ACCESSORIES AND INSTALLATION DETAILS

Free/Floating Connection

When floating at the perimeter, there needs to be adequate space (minimum 20mm; refer to Engineers design) between the Main/Cross Runner and the wall angle to accommodate for lateral seismic movement in the ceiling (refer to Figure 16 and Method 1 (a) on page 4 for more information).

Figure 16: Seismic Perimeter Float (Fasteners position as shown in detail)



*Refer to engineering drawings for fastener requirements

SEISMIC ACCESSORIES AND INSTALLATION DETAILS

Seismic Breaks

For Seismic breaks, the ASC8 Seismic Connector can be used to create a seismic joint within the suspended ceiling as explained in the next sections. Refer to Method 1 (b) on page 4 for more information on Seismic Breaks.

Main Runner direction:

In this type of seismic break, a 20–25mm portion of the Main Runner is cut out (refer to Project Engineer for design and details), 15mm past the Cross Runner intersection. The remaining Main Runner is installed with a hanger located within 150mm from the intersection break. Then an ASC8 clip and a sleeve are installed as shown in Figure 17. Screw configuration must match the details specified. Contractor to ensure grid module sizes remain unchanged during this process.

Cross Runner direction

In this type of seismic break a 20–25mm portion of the Cross Runner is cut (refer to Project Engineer for design and details), 15mm past the Main Runner intersection as shown in Figure 18. Then the remaining Cross Runner is installed with a hanger located within 150mm from the break on the Main Runner and the Cross Runner. ASC8 clip and a sleeve are installed as shown in Figure 18. Screw configuration must match the details specified. Contractor to ensure grid module sizes remain unchanged during this process.

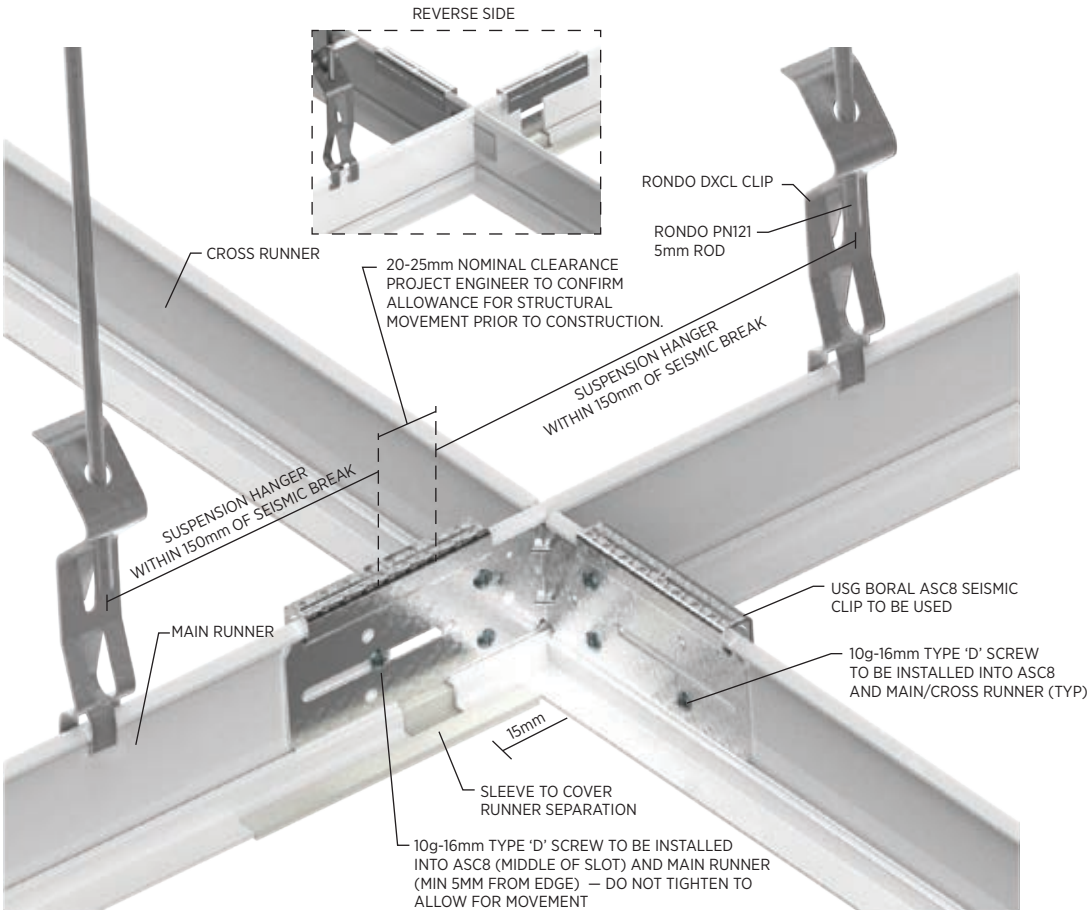
Two-way seismic break

In this type of seismic break, both the Main Runner and Cross Runner are cut as shown in Figure 18. Two sets of ASC8 clip and sleeve are then installed as shown in Figure 19. Screw configuration must match the details specified. Contractor to ensure grid module sizes remain unchanged during this process.

Installation Notes

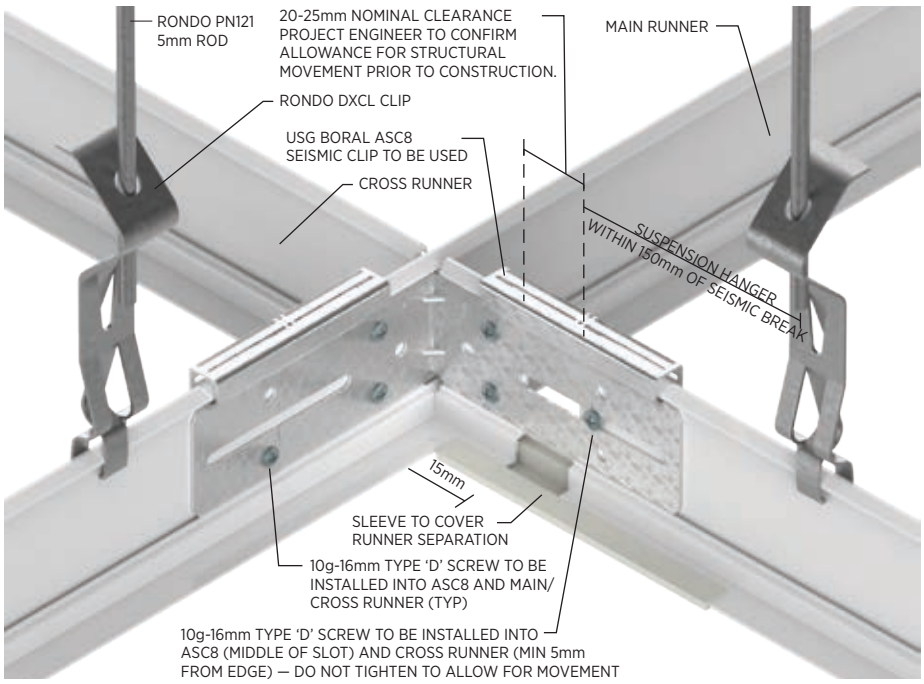
- The ceiling grid on both sides of the seismic break must be installed in the same level (plane).
- Alternatively, remove tabs in cross runner connection and install ASC8 on alternate sides

Figure 17: Main Runner Seismic Junction (one-way)



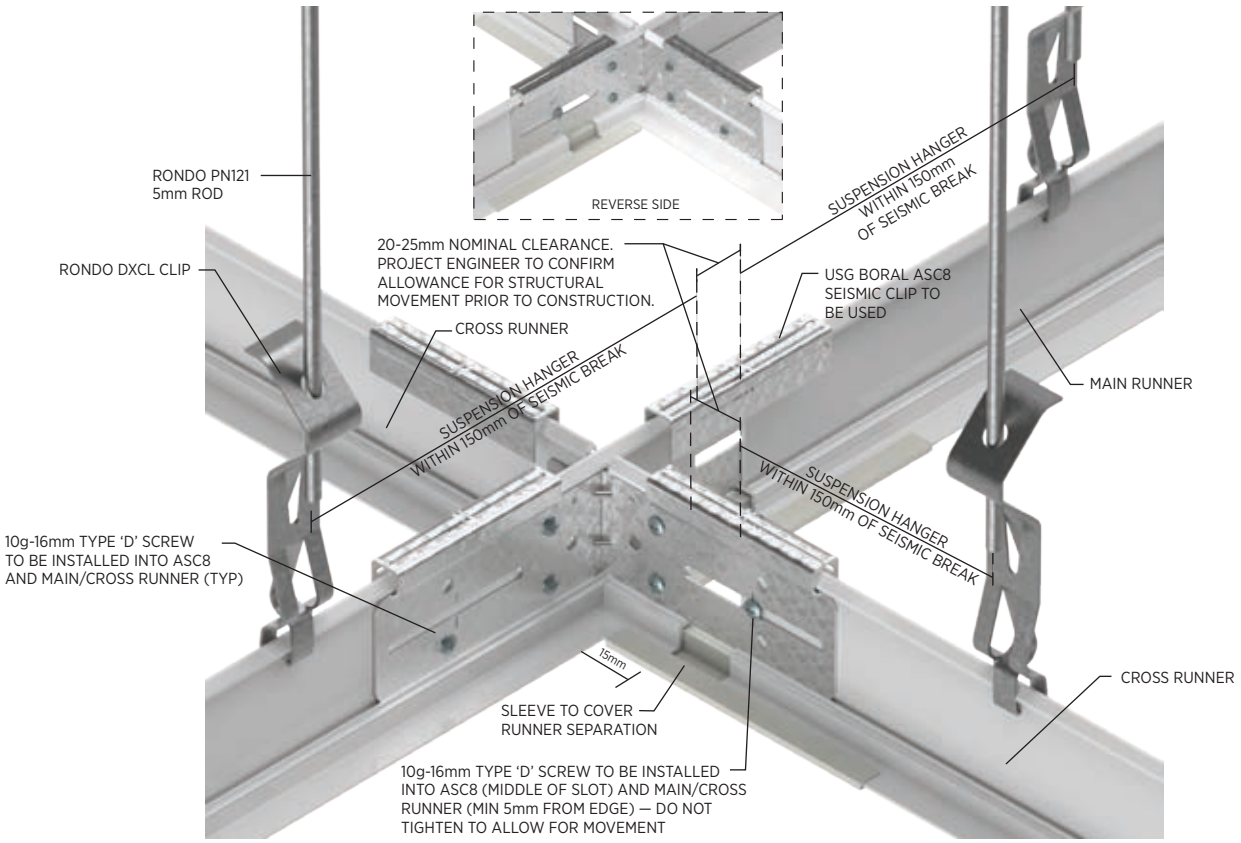
SEISMIC ACCESSORIES AND INSTALLATION DETAILS

Figure 18: Cross Runner Seismic Junction (one-way)



NOTE: Additional hanger may be required at cut Cross Runner. Project Engineer to advise.

Figure 19: Two-way Seismic Junction



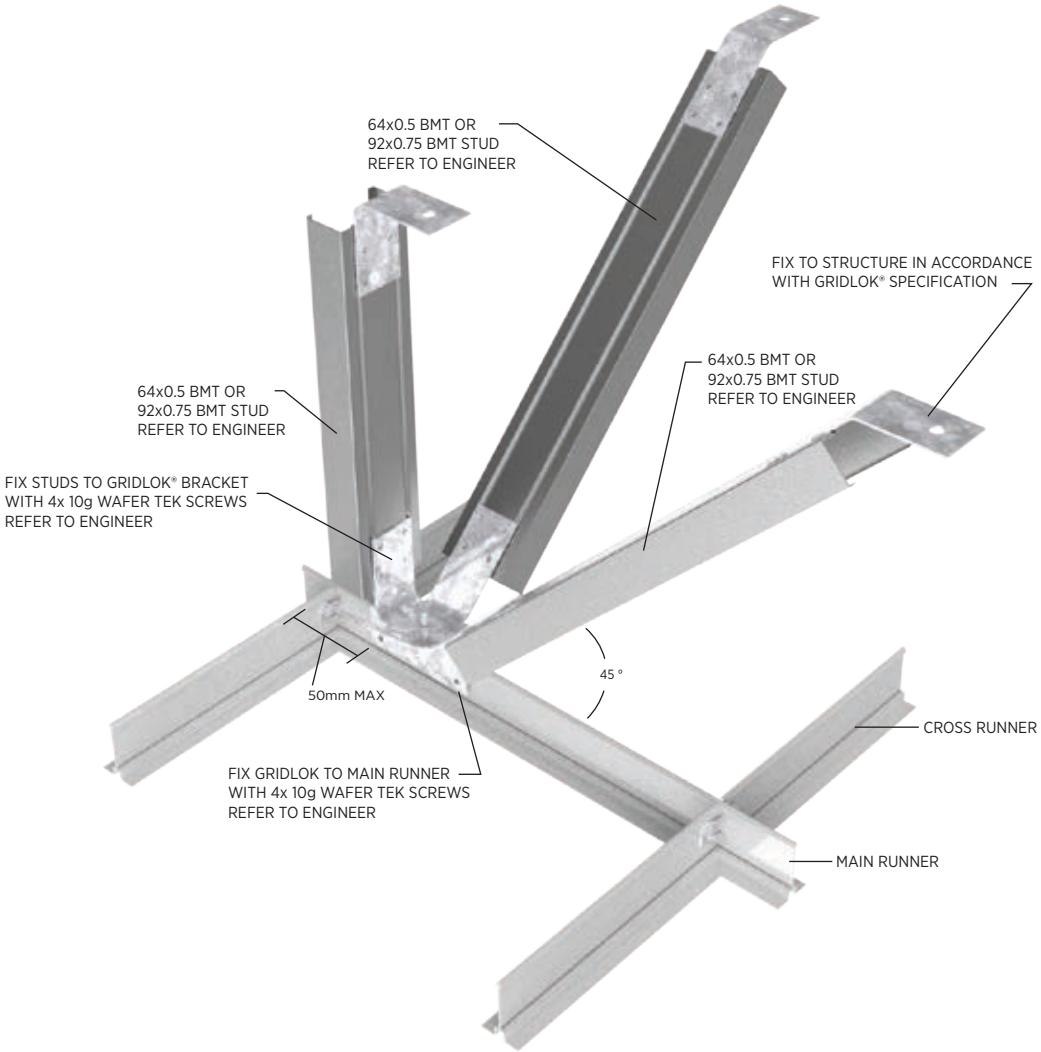
SEISMIC ACCESSORIES AND INSTALLATION DETAILS

Back Bracing

To back brace the ceiling to the structure above, Tracklok® Gridlok®; Stock code: GRD-10K (Figure 20) shall be used. The floating detail (Figure 16) must be constructed on perimeters as shown in Figure 4 and Figure 5. Stud bracing shall be placed at 45° angles as shown in Figure 21 and in accordance with manufacturers' specifications. Refer to Structural/Project Engineer's design for stud-brace specification. Anchors and fixings to concrete and steel must be in accordance with AS2785 and Project Engineer's recommendation.

Figure 20: GRIDLOK® – Stock code: GRD-10K

Figure 21: Bracing installation detail

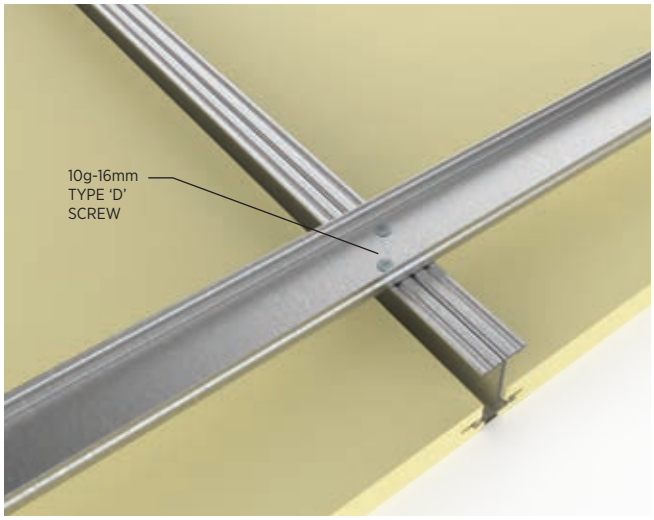


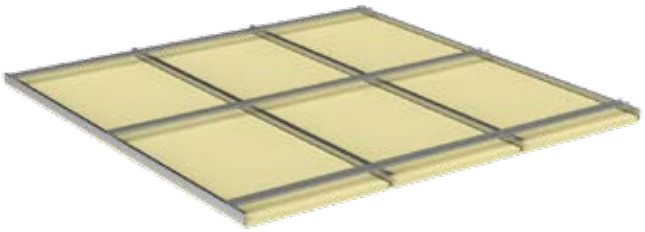
SEISMIC ACCESSORIES AND INSTALLATION DETAILS

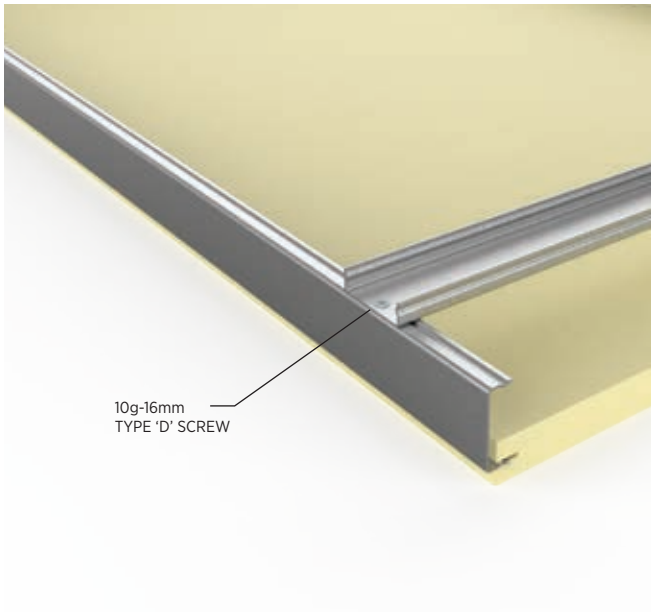
Installation of Perimeter Tiles

Where recommended the perimeter tiles may require additional restraint to stop the tiles from dislodging under seismic action. To achieve this a minimum of 3 splines are used to connect the back to back splines and form a full panel. The additional splines run perpendicular to the back to back splines and connect from their web (rotated 90 degrees). The details are provided in Figure 22.

Figure 22: Additional restraint on perimeter tiles where specified







SEISMIC CEILING INSTALLATION ORDER PROCESS

Installation Notes

- Refer to AS/NZS 2785 and NZS 4219 for service clearance guidelines
- Individual services that are greater than 7.5kg or outside of the 3kg/m² allowance presented in the load tables (pages 3) are to be suspended and braced independently of the modular grid system.
- Refer to Structural /Project Engineer for back bracing distances. For maximum back bracing distances refer to AS/NZS 2785

1 **Contact USG Boral for seismic design and details.**

2 **Check the length and width of the ceiling area with architectural drawings.**

3 **Determine the plenum depth and map access locations (approved by Architect).**

4 **Determine the fixity status at the perimeter along with any bracing methods based on engineering drawings (approved by Engineer).**

5 **Determine the location of any seismic gaps (joints) within the main structure (approved by Engineer and Architect).**

6 **Determine the location of seismic gaps within the ceiling, based on seismic design (approved by Engineer).**

7 **Plan the layout of the grid to ensure the module sizes adjacent to perimeter are almost equal and within a satisfactory size range in terms of aesthetics (approved by Architect).**

8 **Install nogging tracks at ceiling height to the fixed perimeters of the ceiling. Refer to steel framing supplier for details.**

9 **Install the perimeter wall angle.**

- Wall angles require a nogging located at ceiling level of the suspended ceiling system (as mentioned in Step 8, this is to assist in transferring the loads back into the structure). The seismic wall angle should be fixed through the plasterboard into the nogging at 400mm max centres. Screws to be specified by the Structural /Project Engineer.

10 **Install the suspension hangers as required (Figure 7).**

- Fixing of the hanger to the structure above with proprietary fasteners shall be installed in accordance with the manufacturer's recommendations, fasteners shall be fully compliant with AS/NZS 2785.
- Hangers using the RONDO DXCL clip shall not vary from the vertical by more than 5°.
- Hangers are not to be bent or kinked.
- Main Runner hangers are suspended depending on module size chosen; refer to Table 1 and 2 for hanger spacing. Additional hangers may be required.
  - 1200 x 1200mm module
  - 1350 x 1350mm module
  - 1500 x 1500mm module
- Suspension hangers are required to be placed within 150mm of all Main Runners connector plates. Depending on module size and hanger starting positions this may require additional hangers to be installed to meet this requirement.
- Suspension hangers in seismically designed ceilings will need to be located within 200mm around the perimeter on all sides, suspending both Main and Cross Runners (Figure 15, Figure 16).
- Additional suspension hangers are required at seismic breaks (Figure 17, Figure 18, Figure 19).

SEISMIC CEILING INSTALLATION ORDER PROCESS

11 **Install the Main Runners and Cross Runners.**

- Main Runners:
  - Main Runners are to be installed straight and level as per AS/NZS 2785. The Main Runners are not symmetric. When installing, the start and end pattern must be repeated sequentially to result in equal spacing between the web slots and result in equal modules (utilised to interlock the Cross Runners).
  - Main Runner connections should be staggered on every adjacent main runner throughout the suspended ceiling system
  - The Main Runners are to be connected end to end using the Main Runner Connector (Figure 8) with tabs pushed in 45° to 60°.
- Cross Runners:
  - Each Cross Runner interlocks with the consecutive Cross Runner by inserting the interlocking tab through the Main Runner web slots which are repeated at equal intervals depending on the module size (Figure 9).
  - To form a module, Main Runners are fixed in place by Cross Runners. Cross Runners are installed square to the Main Runner.

12 **Install ASC8 clip at perimeter based on fix/float details provided in this document (Figure 15 and Figure 16).**

13 **Install seismic breaks in accordance with details of this document and in conjunction with seismic design (Figure 17, Figure 18 and Figure 19).**

14 **For back braced ceilings, the bracing must be installed in accordance with bracing Manufacturer's details and Engineer's design. (Figure 21).**

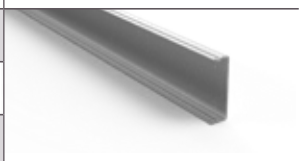
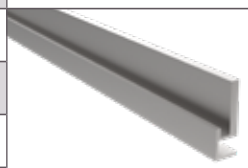
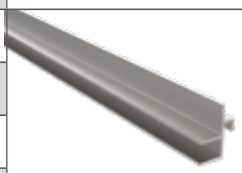
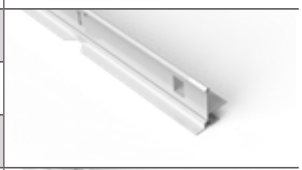
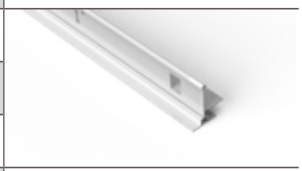
15 **Install the splines within tiles.**

16 **Install the tiles based on:**

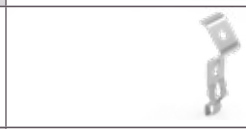
- Configuration A: splines spanning between Main Runners (preferred method); or
- Configuration B: splines spanning between Cross Runners.

17 **Install the perimeter tiles and tiles near seismic breaks in accordance with details of this document and in conjunction with Engineer's design (Figure 22).**

COMPONENTS LIST

Item #	Description	Dimensions (mm)			Image
		Length	Height	Width	
40003568	Main Runner Top Hat Alum Grid (Colour RAL 9003)	3600	50	32	
40004195	Main Runner Top Hat Alum Grid (Colour RAL 9003)	4050	50	32	
40003553	Main Runner Top Hat Alum Grid (Colour RAL 9003)	4500	50	32	
40003633	Cross Runner Top Hat Alum Grid (Colour RAL 9003)	1200	50	32	
40004196	Cross Runner Top Hat Alum Grid (Colour RAL 9003)	1350	50	32	
40003552	Cross Runner Top Hat Alum Grid (Colour RAL 9003)	1500	50	32	
40004223	C Spline Galv Steel (5 tile module only)	1185	25	10.9	
40004222	C Spline Galv Steel (5 tile module only)	1335	25	10.9	
40004221	C Spline Galv Steel (5 tile module only)	1485	25	10.9	
40004238	C Spline Galv Steel (3 or 4 tile module)	1185	35	10.9	
40004237	C Spline Galv Steel (3 or 4 tile module)	1335	35	10.9	
40004236	C Spline Galv Steel (3 or 4 tile module)	1485	35	10.9	
40004239	Support Spline HD Suits 19mm Tile (Mill Finish)	1185			
40004240	Support Spline HD Suits 19mm Tile (Mill Finish)	1335			
40004241	Support Spline HD Suits 19mm Tile (Mill Finish)	1485			
40004242	Support Spline LD Suits 19mm Tile (Mill Finish)	1485			
40004243	Support Spline LD Suits 19mm Tile (Mill Finish)	592			
40004244	Support Spline LD Suits 19mm Tile (Mill Finish)	667			
40004245	Support Spline LD Suits 19mm Tile (Mill Finish)	742			
40004246	Support Spline LD Suits 19mm Tile (Mill Finish)	890			
40004197	Perimeter Top Hat Alum No Face Notch (Colour RAL 9003)	3600	50	32	
40004198	Perimeter Top Hat Alum No Face Notch (Colour RAL 9003)	4050	50	32	
40004199	Perimeter Top Hat Alum No Face Notch (Colour RAL 9003)	4500	50	32	
40004200	Perimeter Top Hat Alum PB Leg 13mm Punched 1-Side (Colour RAL 9003)	3600	50	32	
40004201	Perimeter Top Hat Alum PB Leg 13mm Punched 1-Side (Colour RAL 9003)	4050	50	32	
40004202	Perimeter Top Hat Alum PB Leg 13mm Punched 1-Side (Colour RAL 9003)	4500	50	32	
40004203	Perimeter Top Hat Alum PB Leg 13mm No Face Notch (Colour RAL 9003)	3600	50	32	
40004204	Perimeter Top Hat Alum PB Leg 13mm No Face Notch (Colour RAL 9003)	4050	50	32	
40004205	Perimeter Top Hat Alum PB Leg 13mm No Face Notch (Colour RAL 9003)	4500	50	32	
40004206	Perimeter Top Hat Alum Punched 1-Side (Colour RAL 9003)	3600	50	32	
40004207	Perimeter Top Hat Alum Punched 1-Side (Colour RAL 9003)	4050	50	32	
40004208	Perimeter Top Hat Alum Punched 1-Side (Colour RAL 9003)	4500	50	32	

ACCESSORIES LIST

Item #	Description	
40003567	Shadowline Wall Angle Aluminium 10mm, 3600mm (Colour RAL 9003)	
–	Seismic Shadowline Wall Angle Aluminium 10mm, 3600mm (Colour RAL 9003)	
–	Wall Angle 'L Shape' Aluminium, 3600mm (Colour RAL 9003)	
40004209	Trim Aluminium Bulkhead Top Hat PB Vertical 13mm, 3600mm (Colour RAL 9003)	
–	Top Hat Sleeve Alum Grid 100mm (Colour RAL 9003)	
40003554	Joiner 38.2mm Flat (Galv Steel)	
40004226	Joiner 38.2mm 90 Deg (Galv Steel)	
40003573	Connector Top Hat Main Runner 38.2mm (Galv Steel)	
40004220	Roll-In Clip Top Hat 38.2mm (Galv Steel)	
40004218	Roll-In Clip Wall Angle 16.8mm (Galv Steel)	
40003572	90 Deg Cross Runner Locking Plug (Mill Finish)	
–	Seismic Connector ASC8 (Galv Steel)	
40000925	Rondo DXCL Spring Adjustable Clip for 5mm Soft Galv Suspension Rod or 2.5mm Soft Galv Wire	
40000024	5mm Soft Galv Suspension Rod	

NOTES

STANDARDS AND BUILDING CODES

USG Boral uses the following standards in its testing for compliance with the Building Codes of Australia and New Zealand:

AS/NZ 2785	Suspended Ceilings, Design and Installation
AS/NZ 1170.0	Structural Design Actions
AS 1170.4	Earthquake Loads (Australia)
NZS 1170.5	Structural Design Actions (New Zealand) Part 5
NZS 4219	Seismic performance of engineering systems in buildings
AS2946 – 1991	Suspended ceilings, recessed luminaires and air diffusers — Interface requirements for physical compatibility

USG Boral recommends that all Suspended Grid Ceiling Systems be installed in accordance with 'AS/NZS 2785 Suspended ceilings – Design and Installation' for information and guidance and Project Engineers design documents.

Ceiling layout should be planned prior to installation to determine grid configuration, direction etc. and to ensure that all fixing points are compatible with structural members and/or other services. Installation of grid and ceiling tiles shall not begin until the building is closed in, fully glazed, roof watertight and residual moisture from wet trades such as plaster, concrete and terrazzo has dissipated.

REQUIREMENTS
Suspended ceilings are finished products intended for interior use and should be treated accordingly.

DELIVERY, STORAGE AND HANDLING
All materials shall be delivered in their original, unopened packages and stored for as short a time as possible, in an enclosed shelter providing protection from exposure to the elements and damage by/to other trades. Damaged, deteriorated or obviously faulty material is not to be installed and shall be removed from the premises. Materials should be handled in such a manner as to prevent racking distortion or physical damage.

MATERIALS
Main Runners, Cross Runners, Wall Trims and Supporting Splines are made from extruded aluminium, C-Splines and other connection clips are from steel. Fasteners to be as specified in detail.

CUTTING
We recommend protective equipment (eye, hand, ear protective equipment etc.) be worn when handling and cutting metal products (AS 2161) and that hands are washed pre and post contact. Suitable tools shall be used for cutting aluminium parts for safety and to maintain smooth finishes.

PRODUCT INFORMATION

See USGBoral.com for the most up-to-date product information.

SALES ENQUIRIES

1800 003 377

TECHNICAL ASSISTANCE

TecASSIST™ – 1800 811 222
TECASSIST@USGBORAL.COM

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. We recommend you use qualified tradespersons to install this system.

The technical information contained in this manual was correct at the time of printing. Building systems, details and product availability are, however, subject to change. To ensure the information you are using is current, USG Boral recommends you review the latest building information available on the USG Boral website.

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New Zealand

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