FRICKER
CEILING SYSTEMS

Seismic Design Guide

FRICKER ALUMINIUM GRID SYSTEM

HIMMEL™
INTERIOR SYSTEMS

CSR

Contents

Introduction

Introducing the Himmel Fricker Aluminium ceiling grid

The premium ceiling grid solution for high-end commercial spaces
The Himmel Fricker aluminium ceiling grid is the ultimate solution for commercial applications. Combining style and strength, there are a variety of profiles to suit all projects, including top hat, flush face and slimline.

Transform your space. From offices, educational institutions and healthcare facilities to retail and industrial developments, there's a Fricker ceiling grid solution to meet the demands of any commercial project.

Backed by CSR Himmel's expertise, our aluminium grid system is fully customizable, ensuring the perfect fit for your project.

The Fricker range can be tailored to any commercial project's specific needs with module sizes of 1200 x 1200mm, 1350 × 1350mm, and 1500 × 1500mm, offering flexibility with two to five tiles per module.

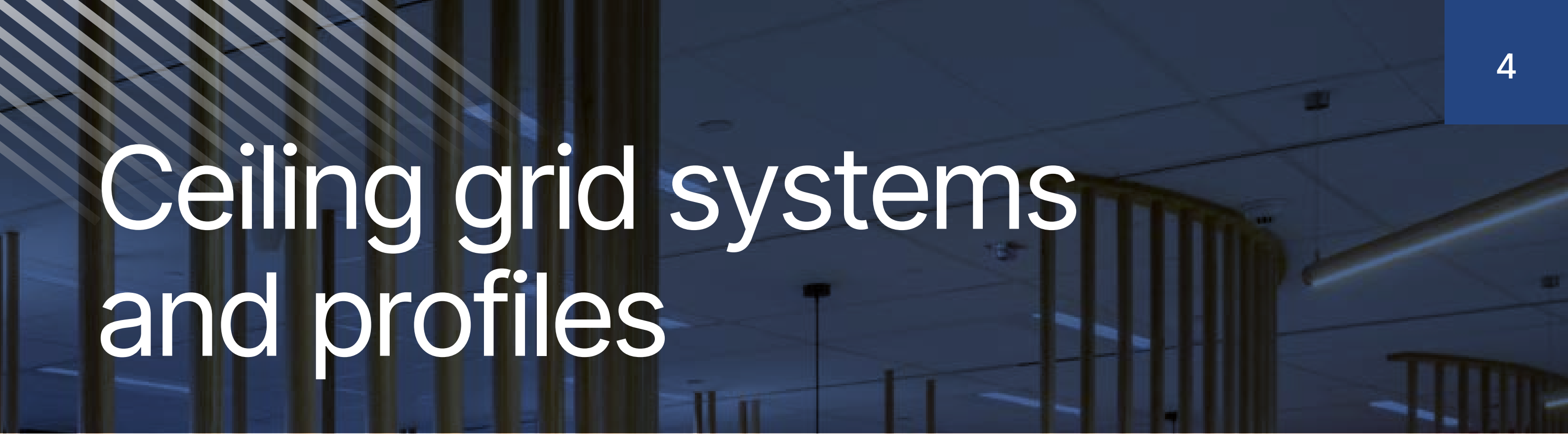
Proudly Australian made, Fricker combines durability, flexibility and design excellence to elevate any space.

Safe seismic design

At CSR, we recognise the unique challenges that architects and builders face when designing and constructing buildings that are strong, visually striking and built to last. Our products are backed by extensive expertise and craftsmanship.

With an in-depth understanding of Australia's seismic conditions, this guide showcases Fricker ceiling grid solutions and demonstrates their role in creating safe and resilient seismic building designs for commercial applications across Australia.

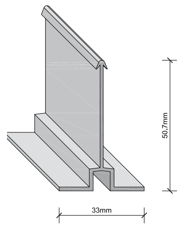
The Fricker ceiling grid product range is meticulously developed to meet both local and national construction standards, with a design and performance that reflects CSR's unwavering commitment to excellence in quality and innovation.



Ceiling grid systems and profiles

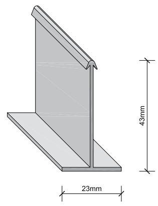
Systems overview

Fricker top hat aluminium



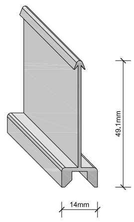
ORDER CODE	PRODUCT DESCRIPTION	SIZE	Each/carton
90729	Main runner - mitred	33 (face) x 50.7 (h) x 3600mm (l)	24
91307	Cross runner - mitred	33 (face) x 50.7 (h) x 1200mm (l)	24
90721	Main runner - mitred	33 (face) x 50.7 (h) x 4050mm (l)	24
91301	Cross runner - mitred	33 (face) x 50.7 (h) x 1350mm (l)	24
90741	Main runner - mitred	33 (face) x 50.7 (h) x 4500mm (l)	24
90522	Cross runner - mitred	33 (face) x 50.7 (h) x 1500mm (l)	24

Fricker flush face aluminium



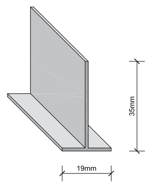
ORDER CODE	PRODUCT DESCRIPTION	SIZE	Each/carton
90107	Main runner	23 (face) x 43 (h) x 3600mm (l)	40
90340	Cross runner	23 (face) x 43 (h) x 1200mm (l)	40
90343	Cross runner	23 (face) x 43 (h) x 600mm (l)	40

Fricker inverted u/slimline aluminium



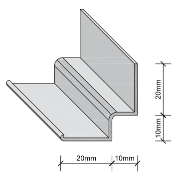
ORDER CODE	PRODUCT DESCRIPTION	SIZE	Each/carton
90617	Main runner	14 (face) x 49 (h) x 3600mm (l)	40
90500	Cross runner	14 (face) x 49 (h) x 1200mm (l)	40
90501	Cross runner	14 (face) x 43 (h) x 600mm (l)	40

Fricker inverted u/slimline aluminium - 1350 x 450mm



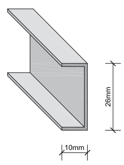
ORDER CODE	PRODUCT DESCRIPTION	SIZE	Each/carton
90616	Main runner	14 (face) x 49 (h) x 4050mm (l)	40
90499	Cross runner	1350 (l) x 49 (h) x 14mm (face)	40

Fricker aluminium wall angle



ORDER CODE	PRODUCT DESCRIPTION	SIZE	Each/carton
93320	Wall angle shadowline	3660 x 10 x 10mm	30
89948	Wall angle 20mm	3250 x 25 x 20mm	10

Fricker C splines



ORDER CODE	PRODUCT DESCRIPTION	SIZE	Each/carton
128241	C spline	1185 x 25 x 10mm	EA
133327	C spline	1333 x 11 x 23mm	EA
89953	C spline	1485 x 35 x 10mm	20

Fricker clips and accessories

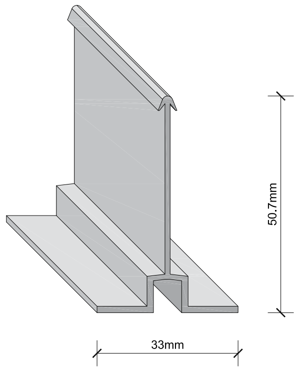
ORDER CODE	PRODUCT DESCRIPTION	Ea/carton
90614	Main runner joiner clip 39.5mm	100
90283	Suspension clip	100

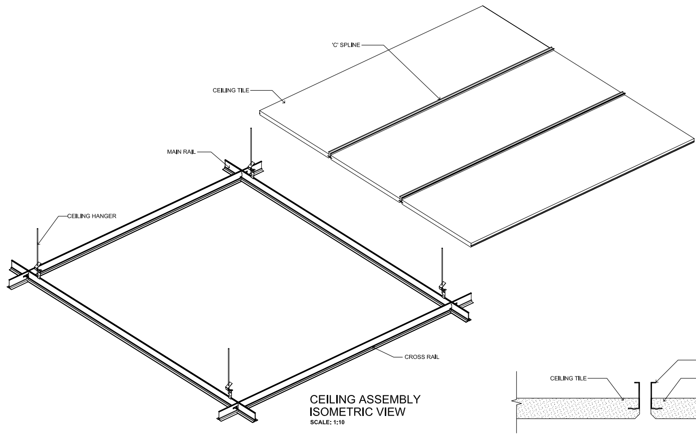
ORDER CODE	PRODUCT DESCRIPTION	Ea/carton
89941	Bulkhead trim 3660 x 27 x 50mm white	EA

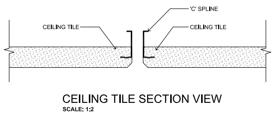
FRICKER
CEILING SYSTEMS

Profiles overview

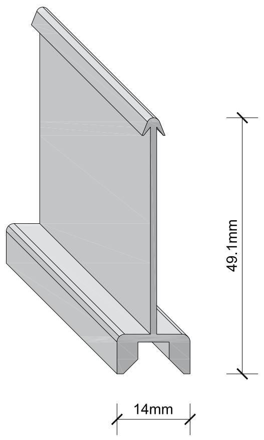
Fricker top hat aluminium profile

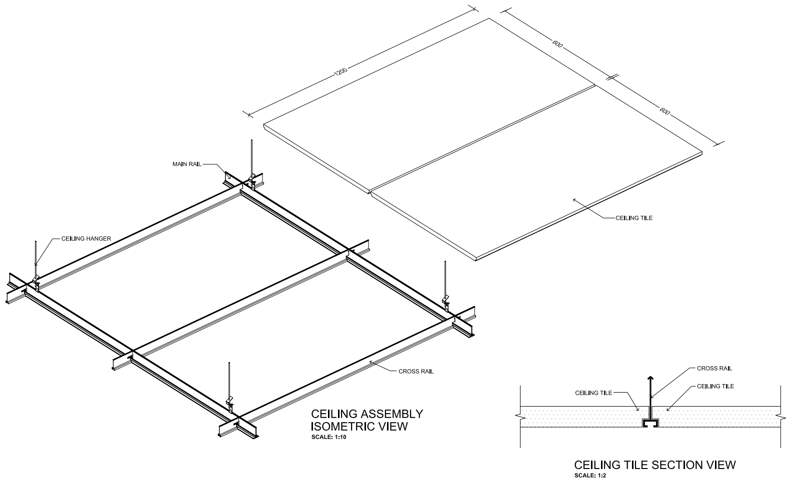




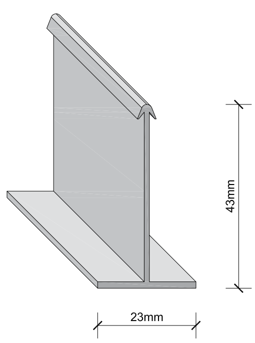


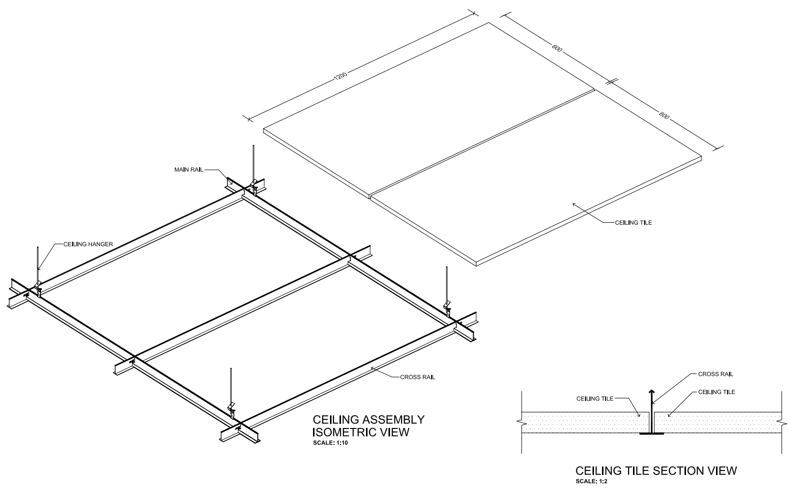
Fricker flush face aluminium profile





Fricker slimline profile





The Australian seismic landscape

Scope of application

The Himmel Fricker Aluminium Grid System is compliant with the National Construction Code (NCC) when designed for environments including commercial spaces, offices, retail outlets, and industrial facilities.

The system configurations assessed include the Top Hat, 23mm Flush Face Grid, and Inverted Slimline Grid. Seismic design requirements have been incorporated, including seismic clip test results and section capacities, ensuring robust performance under varying seismic conditions.

Design tables developed for representative design parameters provide guidance on grid sizes, tile weights, and installation heights to ensure compliance across different facility types.

Seismic risk in Australia

Although the seismic risk in Australia is lower compared to regions like Japan, California, and New Zealand, it’s still a present danger. This is acknowledged in the National Construction Code, Volume 1, section B1D3, which explicitly includes “earthquake actions on ceilings” within its provisions.

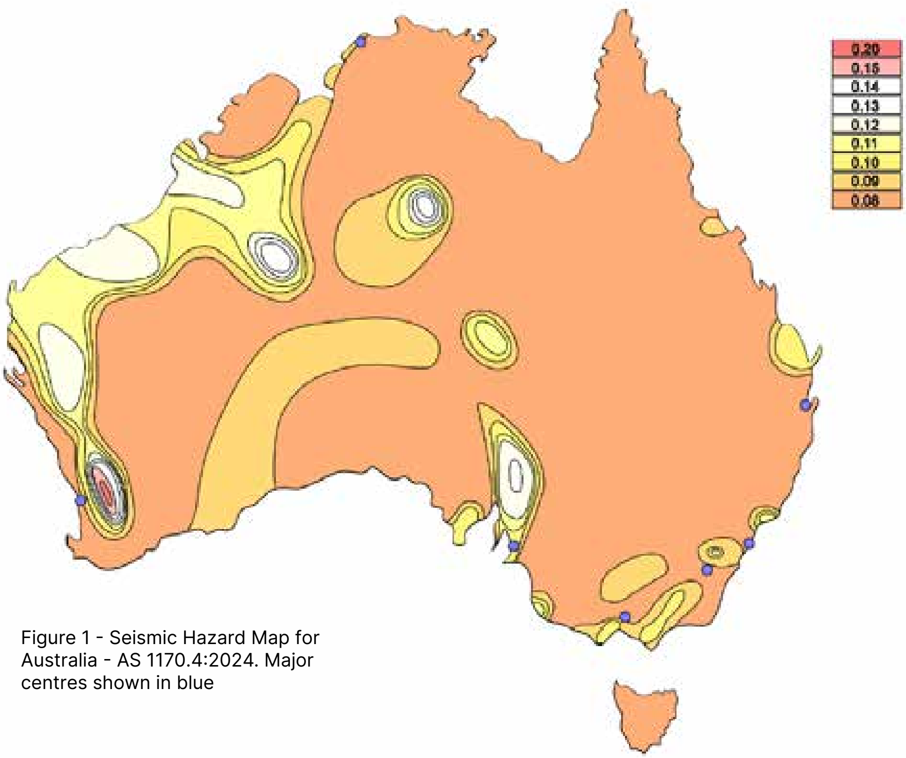


Figure 1 - Seismic Hazard Map for Australia - AS 1170.4:2024. Major centres shown in blue

Impact of seismic actions on suspended ceilings

The types of damage that can occur to suspended ceiling systems during an earthquake can include:

Grid component failures: Main runners and cross tees can become dislodged or bent, compromising the structural integrity of the entire ceiling system.

Tile displacement: Ceiling tiles may become dislodged and fall, leading to safety hazards for building occupants below.

Bracing and clip failures: Failure of bracing elements or seismic clips can cause significant portions of the ceiling grid to collapse.

Perimeter damage: The perimeter trim may pull away from the walls, especially if seismic joints are not properly installed, causing partial ceiling collapse.

Figure 2 - Examples of damage to suspended ceilings1

Consequences of ceiling system damage

During an earthquake, damaged ceiling systems can cause falling debris, posing serious risks of injury or fatalities, while also obstructing evacuation routes and delaying the safe exit of occupants. Additionally, post-event downtime is increased as ceiling systems may require repair or complete replacement, leading to costly interruptions in building use.

Seismic performance objectives

The goals of seismic design are to ensure life safety, asset protection and continued building function. Life safety is the primary objective, focusing on minimising the risk of injury or fatalities during an earthquake by preventing structural failures and falling debris.

Asset protection aims to safeguard both the structural components and internal systems of a building, reducing the financial costs associated with repair and replacement. Continued building function is critical for minimising disruptions to operations, particularly in facilities such as hospitals, emergency response centres and commercial enterprises such as data centres.

[1] https://doi.org/10.5459/bnzsee.44.4.377-387

Aluminium ceiling grid system overview

The Himmel Fricker aluminium ceiling grid system is composed of components such as main runners, cross tees, seismic clips, perimeter trims and bracing elements. Main runners and cross tees are designed to interlock, providing a stable framework for the ceiling tiles. Seismic clips ensure that the grid remains securely fastened during seismic events at the perimeter, while perimeter trims provide tile support along the perimeter. Ceiling braces are required for higher seismic demands and they are installed directly from the main runners to the structure above.

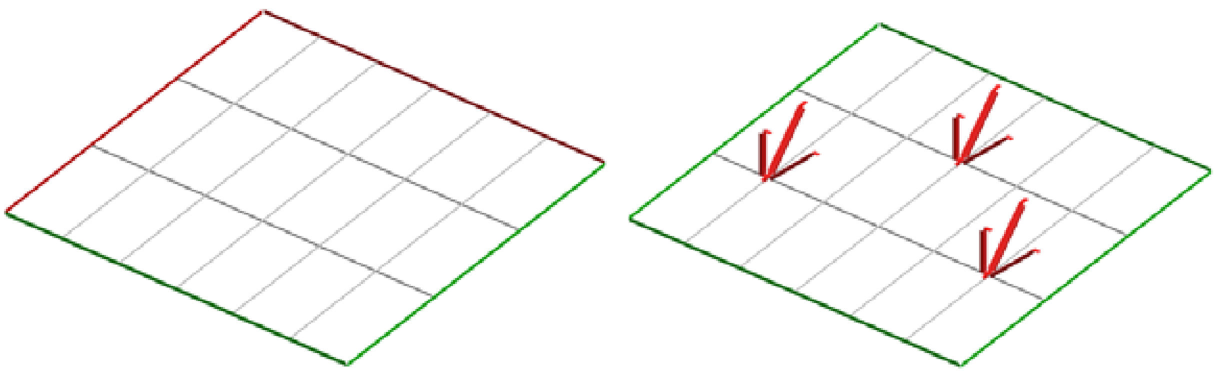


Figure 1 - Typical systems; LHS - Perimeter restrained system, RHS - Braced system

Technical highlights

Material specifications: The Himmel Fricker aluminium ceiling grid system is constructed from lightweight but strong aluminium alloys, providing a balance between ease of installation and structural resilience. The profiles are designed to meet the specific load-bearing requirements for seismic compliance.

Performance characteristics: Testing has demonstrated that the grid components can withstand both vertical and horizontal seismic forces. The main runners, cross tees, seismic clips and bracing elements have been assessed for their load-bearing capacities, ensuring they meet the thresholds outlined in Australian standards AS 1170.4 - Earthquake actions in Australia and AS/NZS 2785 - Suspended ceilings - Design and installation.

Perimeter restrained systems

Perimeter restrained systems are ceiling grid solutions that rely on attachment to surrounding structural walls and/or bulkheads to maintain stability during a seismic event. By anchoring the ceiling grid to perimeter walls, these systems minimise the need for internal bracing, providing an efficient solution for ceiling safety. This is the simplest way to restrain a ceiling, but is limited in size of application by the strength of the grid. Large areas or heavy tile configurations can be challenging for perimeter restrained systems due to the load that is required to be transferred to the walls. Special consideration must be taken to ensure the restraining wall systems have capacity to resist the ceiling seismic loads. These loads must be considered during the wall design phase and approved by the project engineer.

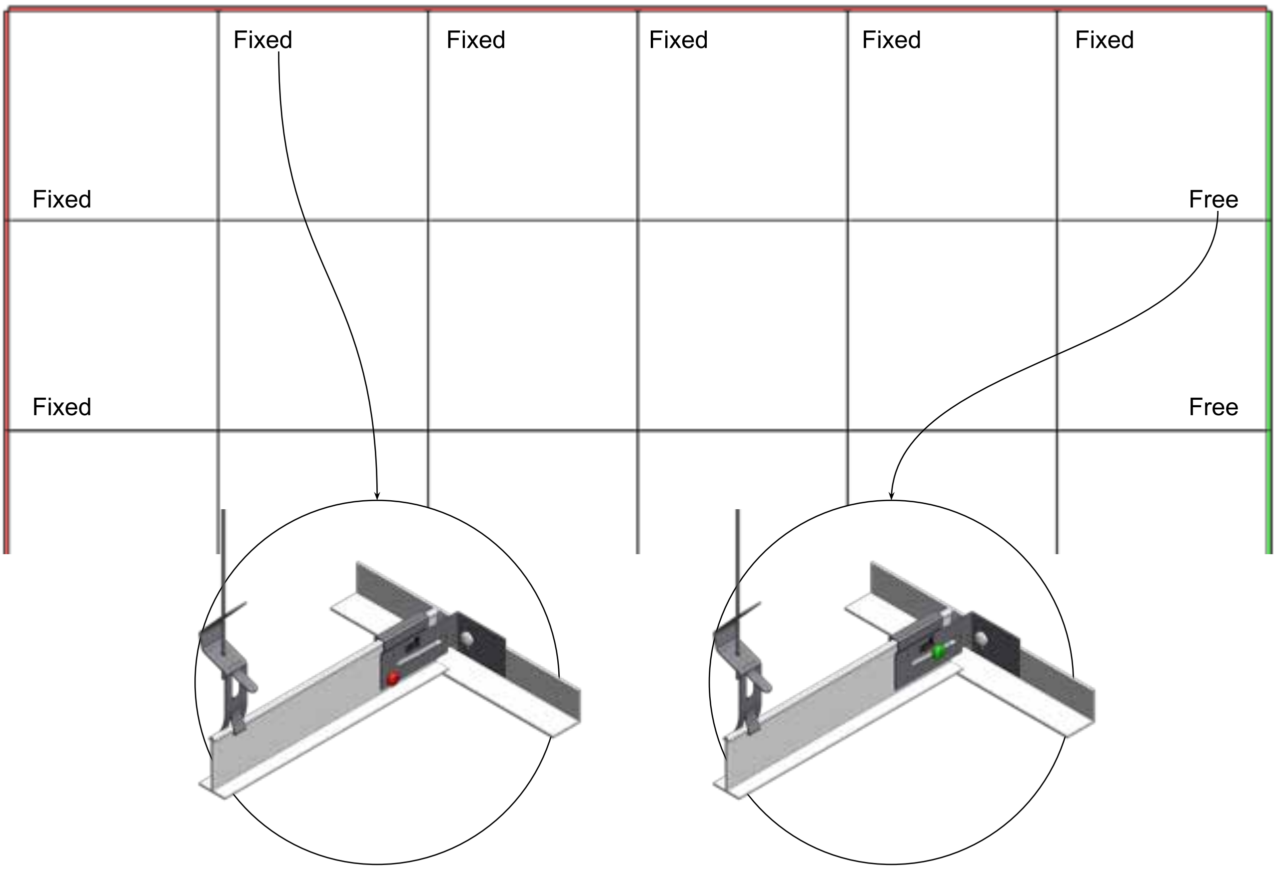


Figure 2 - Perimeter Restrained System Diagram

Perimeter restrained design details

Fixed and free-end seismic clips

Seismic clips are used to attach the ceiling grid to the wall angles. These clips are designed to allow for controlled movement, ensuring that the ceiling can accommodate minor shifts without becoming dislodged or damaged. Seismic clips have both fixed and free end configurations, which play an important role in allowing displacement at the grid perimeter and providing shear resistance to support the cross tees.

Installation instructions

If main runners and cross tees are fixed to the seismic clips during installation, care must be taken to release or float the required sides of the grid (the green edges) before tiles are installed and the ceiling completed.

Perimeter trim or wall angles

The perimeter trim forms the boundary framework of the ceiling grid, attaching directly to the walls. They support the tile edges at the boundary, and provide vertical positioning for the main runners and cross tees during installation.

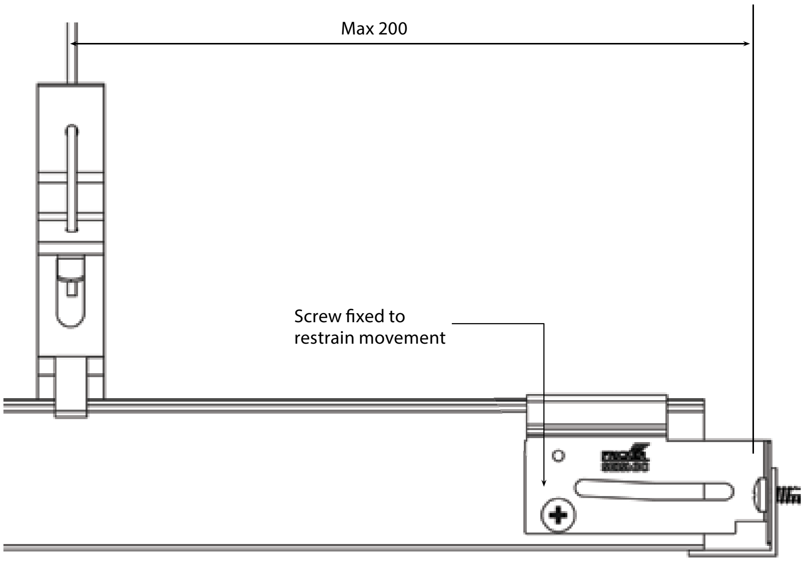


Figure 3: Fixed installation of the seismic clip

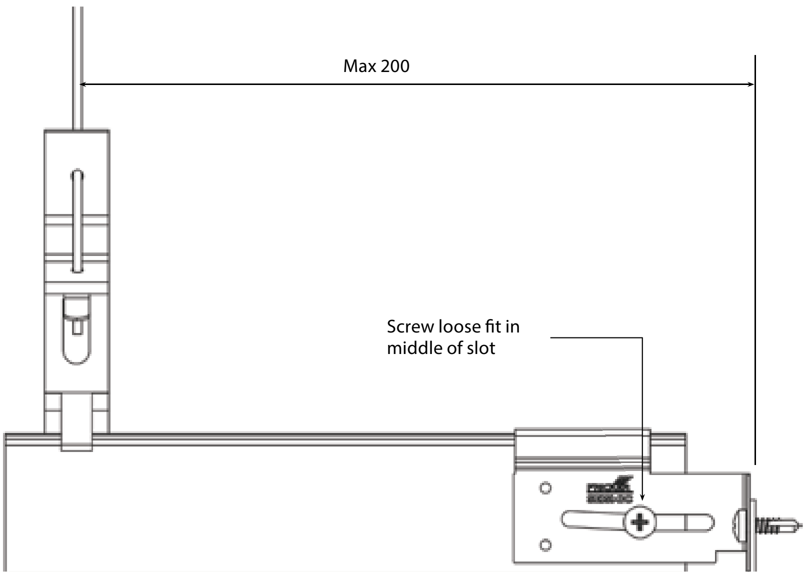


Figure 4: Floating configuration of the seismic clip

Braced systems

Braced systems are ceiling grid solutions that incorporate internal bracing elements to provide enhanced stability, especially in areas subject to significant seismic activity. Unlike perimeter restrained systems, braced systems utilise additional components such as rigid or diagonal braces to manage seismic forces more effectively within larger spaces or where wall attachment alone is insufficient. This makes braced systems suitable for larger rooms, areas with heavy tile configurations or where the ceiling will carry additional loads from integrated services.

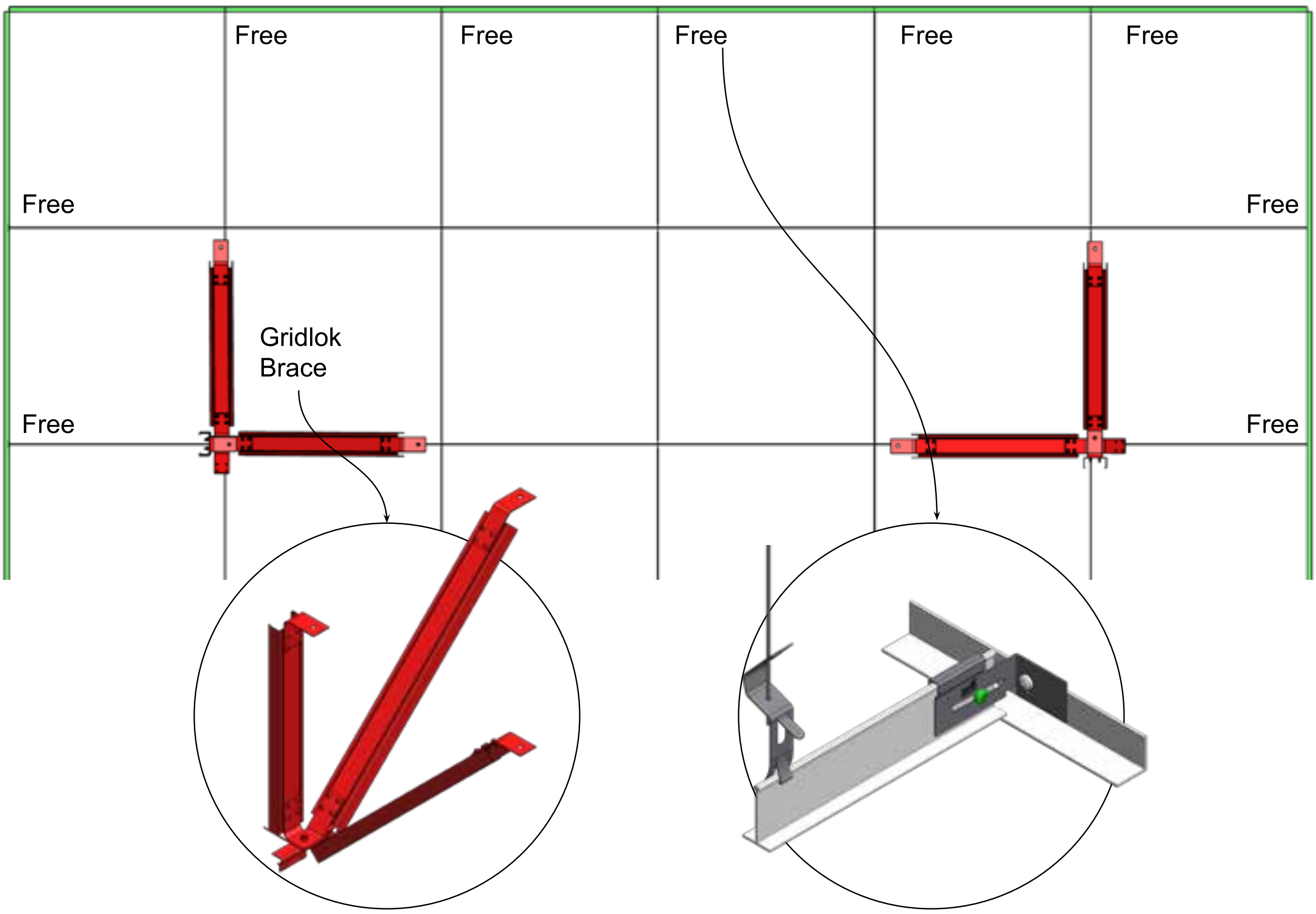


Figure 5 - Braced System Diagram

Braced system design details

Free end seismic clips

In a braced system, the ceiling must float on all sides of the grid since it is rigidly attached to the structure above. This flexibility reduces the risk of damage and helps maintain the ceiling's structural integrity. The same seismic clips are used as for a perimeter restrained system, however all clips are set to the free end configuration.

Installation instructions: *If main runners and cross tees are fixed to the seismic clips during installation, care must be taken to release or float all sides of the grid (the green edges) before tiles are installed and the ceiling completed.*

Seismic braces

Braced systems use seismic braces to secure the ceiling grid and provide additional structural stability. These braces are typically connected to the building structure above the ceiling, helping to manage both vertical and lateral forces. Rigid braces provide resistance against movement, ensuring the ceiling remains stable during seismic events.

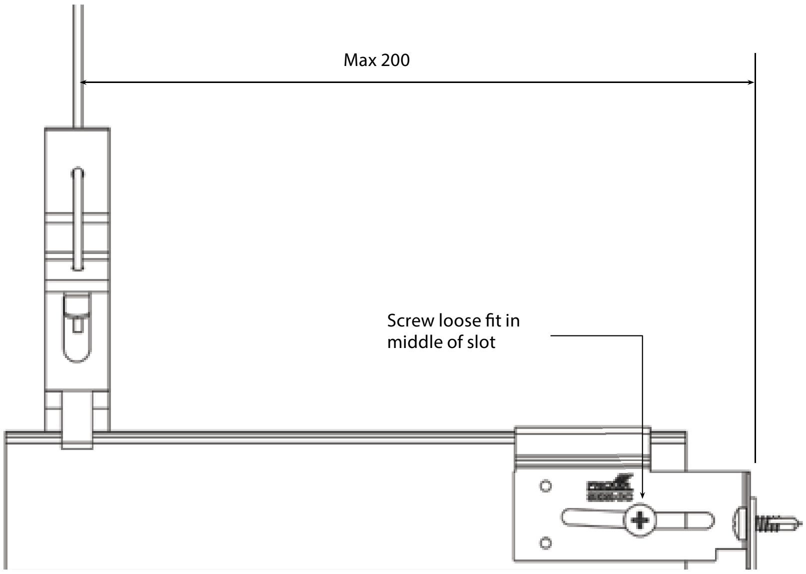


Figure 6: Floating configuration of the seismic clip

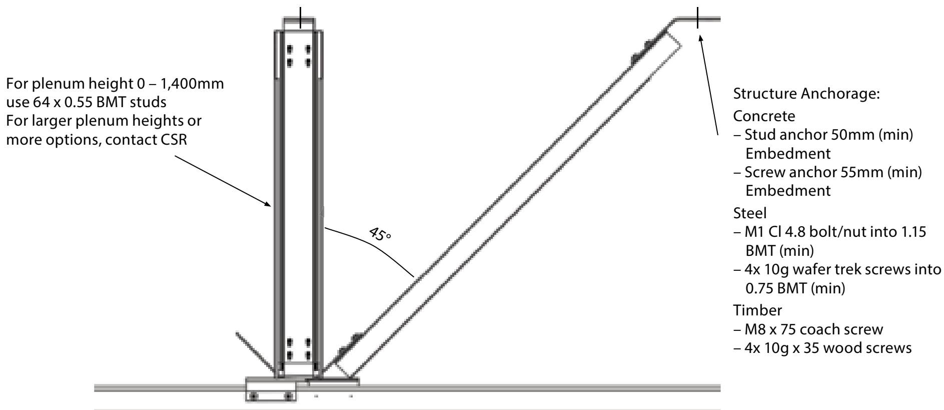


Figure 7
Tracklok Gridlok
GRD-10 seismic brace

Bespoke installations

While perimeter restrained and braced systems work effectively for most standard ceiling installations, there are many situations where more bespoke designs are required. These bespoke installations address unique architectural needs or specific functional requirements that go beyond the capabilities of standard systems.

Examples of bespoke ceiling solutions include:

Custom grid sizes and configurations
In some projects, unique grid sizes or non-standard configurations are necessary to meet the design intent. This could involve irregular grid patterns, varied module sizes, or even curved grid layouts to align with specific architectural features. In these instances, it is important to contact your Fricker ceiling representative at the early design phase.

Special acoustic panels
In environments such as auditoriums or studios, bespoke ceiling installations may include custom acoustic panel configurations. These panels need to be securely integrated into the grid while ensuring that their placement optimises sound absorption and meets the acoustic requirements of the space.

Bespoke installations offer the flexibility to accommodate complex design elements and unique client needs. CSR has the ability to create custom grid components or restraint components to make these bespoke solutions work effectively. However, they also require careful engineering and consideration of both structural and aesthetic factors to ensure that all performance standards, including seismic safety, are met.

Seismic design coordination

Seismic design coordination ensures that suspended ceilings are properly integrated into buildings for safety and resilience during seismic events. This involves collaboration between all stakeholders from the beginning of the project to align requirements and meet seismic standards.

Key stakeholders

Seismic Designer	Coordinates the seismic design of suspended ceilings, ensuring compliance.
Architects	Collaborate on placement and restraint of suspended ceilings.
Structural Engineers	Collaborate on placement and restraint of suspended ceilings.
Building Services Engineers	Integrate suspended ceilings with building services while considering seismic forces.
Contractors & Subcontractors	Implement seismic designs during construction.

Design process

Early planning: Introduce seismic considerations from the project's outset to align building and suspended ceiling resilience goals.

Design coordination: Ensure all suspended ceilings are compatible with structural requirements, allowing for controlled movement and stability during seismic activity.

Key considerations

Integration: Proper coordination between disciplines (e.g., architecture, structural, services) is essential to ensure suspended ceilings function safely.

Clear responsibility: Define roles clearly to avoid gaps or overlaps in design responsibilities.

Outcomes

Safety and consistency: Clear coordination ensures suspended ceilings achieve necessary seismic performance and align with safety standards.

Minimised downtime: Well-coordinated suspended ceiling designs help reduce damage, enabling quicker reoccupation after seismic events.

Installation and workmanship

The quality of materials, workmanship and installation shall be in full compliance with Fricker ceiling installation guide and AS/NZS 2785:2020. All work on site shall be carried out by Fricker ceiling accredited installers, who may issue an installation certificate or statement.

How can CSR help?

CSR

Expert consultation
Our team provides expert advice on integrating seismic considerations into susupended ceiling designs, ensuring compliance with relevant standards and best practices.

Collaborative design support
We facilitate collaboration among archictects, structural engineers and building services engineers to ensure suspended ceilings are properly integrated and meet seismic requirements.

Compliance assurance
CSR ensures that all materials and installation methods comply with AS/NZS 2785:2020 and other relevant standards. providing peace of mindregarding safety and quality.

Accredited installation
We work with Fricker celing accredited installers to guarantee high-quality workmanship, offering installation certificates or statements upon project completion.

Seismic design form

CSR offers standard and bespoke seismic restraint design services for the Himmel Fricker ceiling grid systems. To help us to provide this service, you will need to send us the following information:

PROJECT NAME:	
SITE ADDRESS:	
BUILDING IMPORTANCE LEVEL:	
SITE SUBSOIL CATEGORY:	
GRID SPECIFICATION:	
TILE SPECIFICATION:	

ONE OF THE FOLLOWING:	
FOR FULL DESIGN CERTIFICATION OR BESPOKE DESIGN	**FOR PRELIMINARY DESIGN OR A COSTING ESTIMATE**
Full architectural drawing set, including;	*Basic ceiling design details, including;*
☐ Ceiling specification	☐ Ceiling dimensions
☐ RCPs	☐ Floor level height above ground
☐ Floorplans	☐ Level height from floor to slab above
☐ Elevations	☐ Installed ceiling height from floor
☐ Sections	

Please send the completed form and all required information to info@himmel.com.au, and we will get in touch promptly.

If you are unsure about any of the above requirements, or would like assistance with specifying the right grid or tile for your project, feel free to call us anytime on 1800 555 555, or email info@himmel.com.au

HIMMEL™

INTERIOR SYSTEMS

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The Himmel team can assist you with any project or enquiry.

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