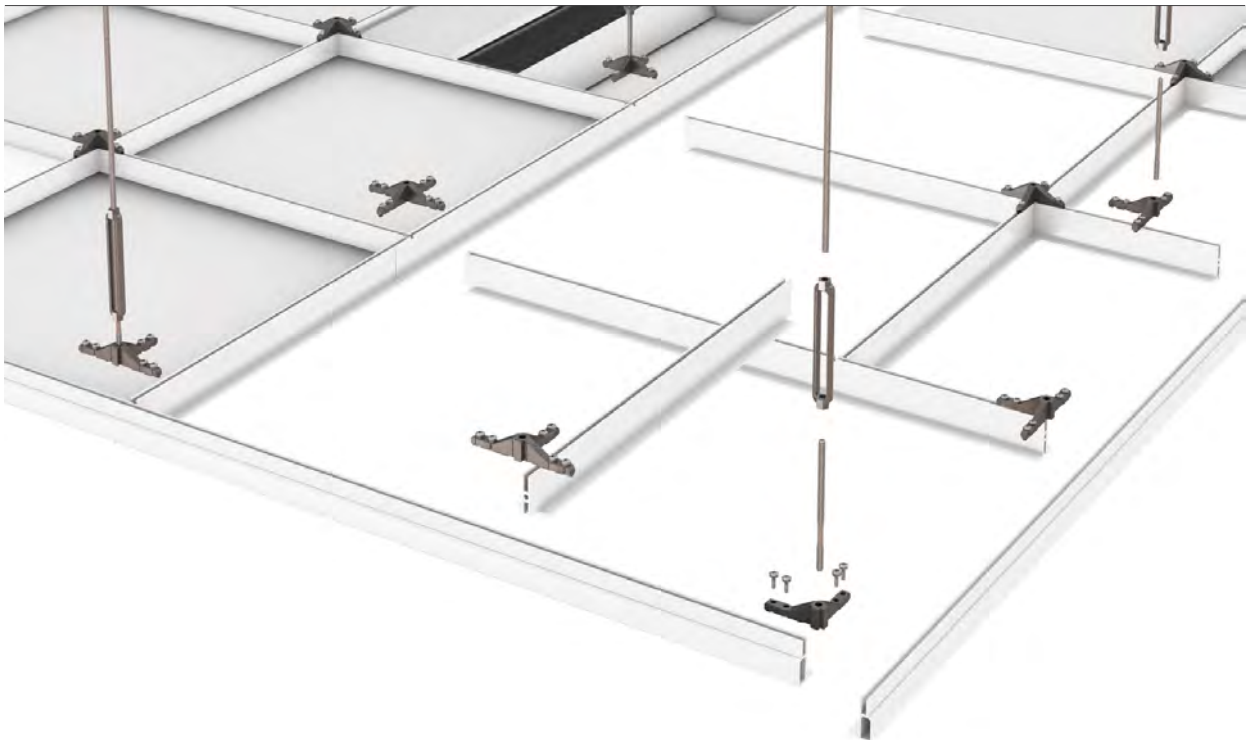


Installation Guide

Tate Grid



THE INFORMATION PROVIDED IN THIS DOCUMENT IS TO BE SHARED WITH
ALL SERVICEPROVIDERS INTERACTING WITH THE TATE GRID CEILING

Note: MAX TORQUE OF 4NM FOR ALL CONNECTIONS TO GRID

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Installation Guide

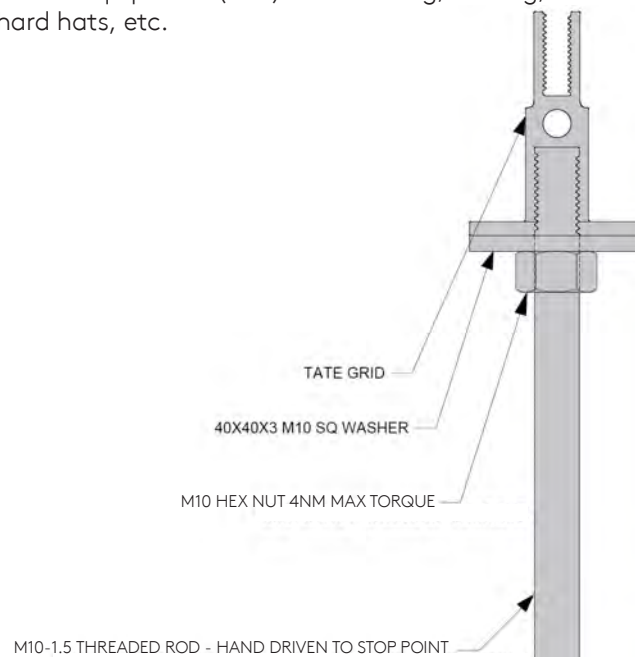
Safety Clause

THIS INFORMATION MUST BE SHARED WITH ALL SERVICE PROVIDERS WHO INTEND TO SUSPEND SERVICES FROM THE TATE GRID SYSTEM

Tate Grid is a structural ceiling system designed to support static vertical loads.

When installing services to the bottom M10 threaded channel, the following instructions must be adhered to:

1. Do not torque the threaded rod or bolts above 4Nm. Over torquing will damage the threads of the slot reducing the load capacity of the Tate Grid system.
2. For threaded rod connections, the rod should be fully engaged. For bolted connections, there must be at least 16mm thread engagement.
3. Be sure all bolts, nuts, and threaded rods are properly tightened down as described in this guide.
4. Do not impose a dynamic load on the connection to Tate Grid. During installation of supported services, bracing is required to prevent dynamic load on the Tate Grid ceiling.
5. All bottom thread fixings should be completed with a Square flanged washer for M12 rod and typical washer for M10 rod and tightened up to 4N-m. to prevent separation of the slot under load.
6. Do not put a load on the system until the installation is complete.
7. Tate Grid is NOT a walk-on ceiling.
8. 2 or more people are required for handling some of the pieces for this system.
9. Wear personal protective equipment (PPE) when drilling, cutting, or installing. PPE includes gloves, safety eyeglasses, hard hats, etc.



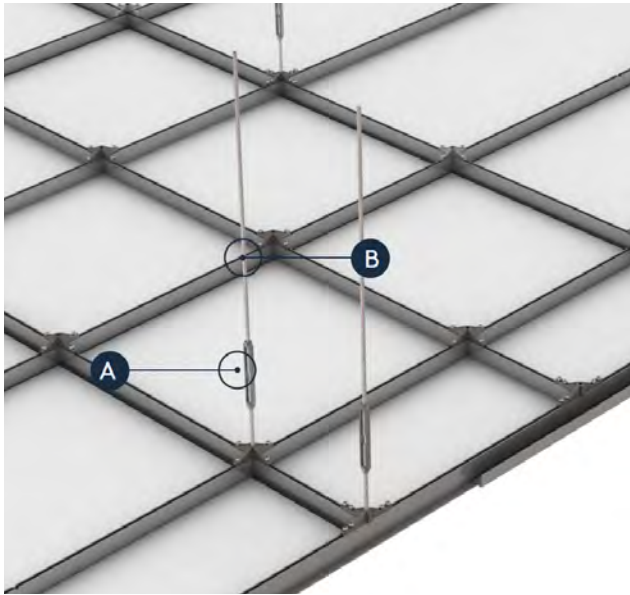
Suitable Connection Methodology

Installation Guide

Building Connections

Tate Scope of Supply:

Tate supplies Grid components up to the turnbuckle. (A), Suitable drop rod and building connections (B) must be sourced by others.



Tate Grid hanging method
from steel building



Tate Grid hanging method
from concrete building

The Tate Grid system may be hung either directly from structural steel or the above concrete slab.



Hanger Configuration:

Tate Grid requires connections every 1200 x 1200mm on centre unless otherwise stated, and always along the perimeter.

Installation Guide

Connector Details

Tate Grid Connector Types:

Note: Every connection can be anchored using a starter rod and turnbuckle.



Field Connector



XL Connector
Main Runner Splice



Perimeter Connector
Easily cut for along walls

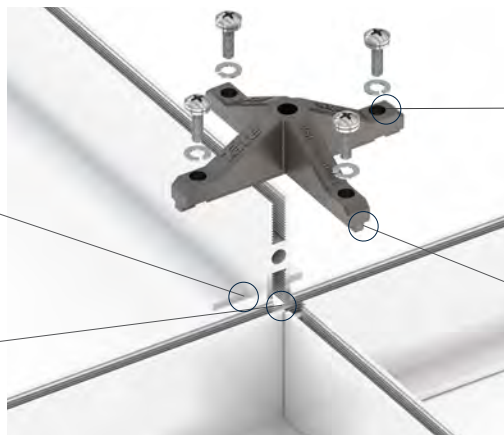
Field Connector Detail:



Cross Tee coped for simplified installation and stronger connections



Main Runners notched to positively position Connectors on centre every time

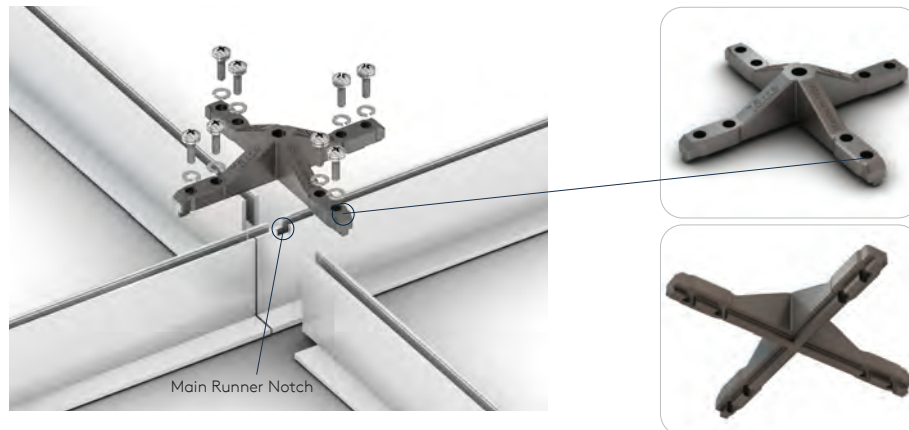


Ribs on Connector to align with grid and prevent cracking

Installation Guide

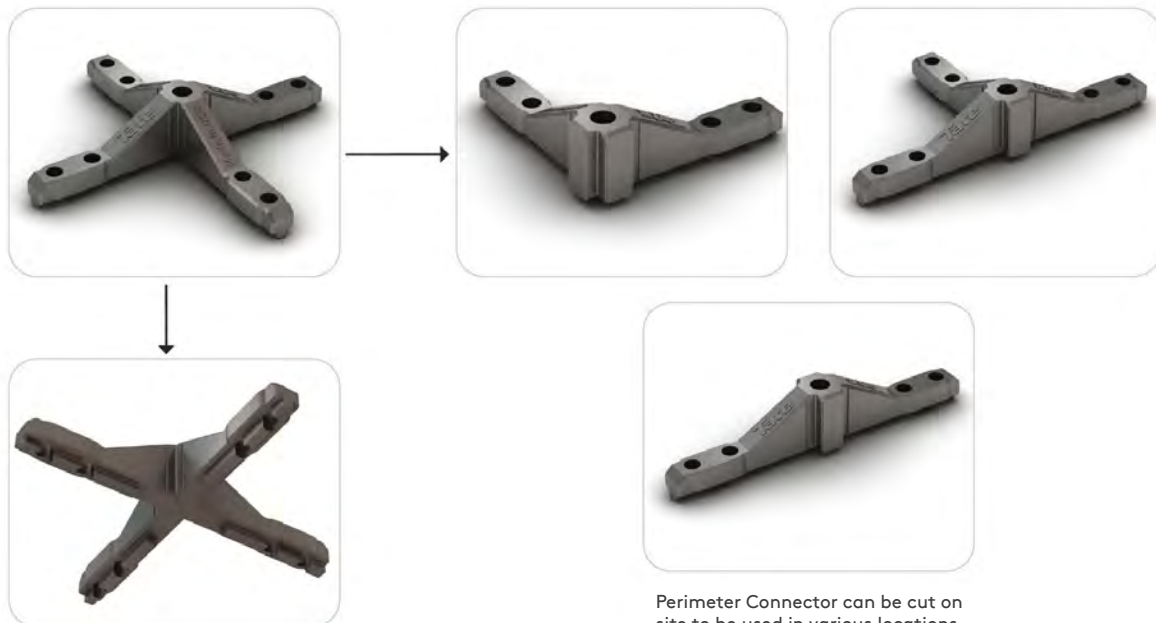
Connector Details

XL Connector Detail (Main Runner Splice):



XL Connector is designed for additional support at the splice of each Main Runner.

Perimeter Connector Detail:



Bottom of Perimeter Connector is designed with ribs that locate the connector on Perimeter Extrusion.

Perimeter Connector can be cut on site to be used in various locations to connect grid together.

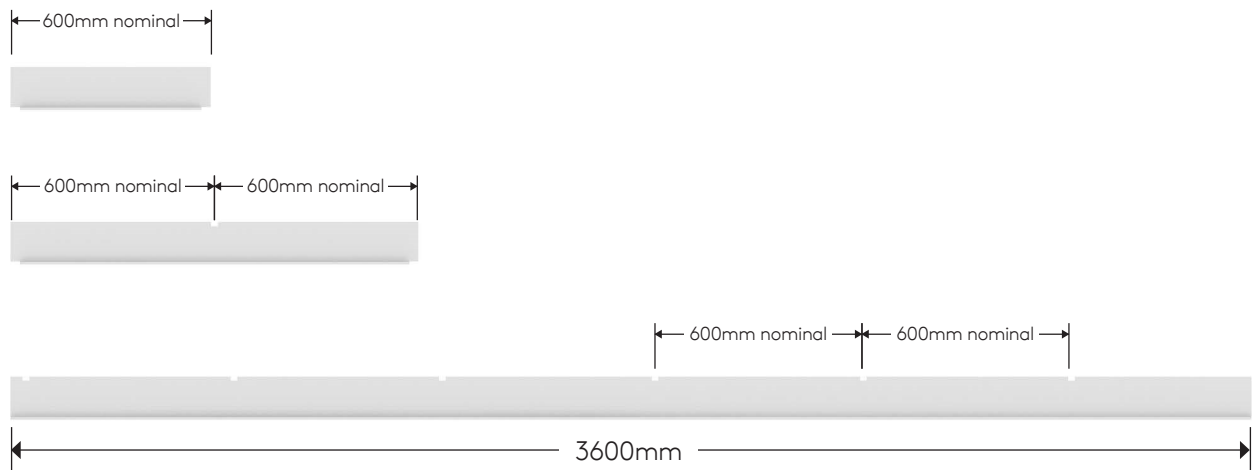
Installation Guide

Notch Details

Structural Tee & Main Runner Notches:

The main runners are not symmetric, they must all be oriented in the same direction. Be sure that all runs of main runners are oriented in the same direction or the grid will not align properly.

All 1200mm Structural Tees and Main Runners are notched every 600mm on center for proper alignment and spacing of the connectors.



Installation Guide

Perimeter Details

Perimeter Options:

The Tate profile should run along all perimeters and should be anchored every 1200mm. This serves multiple purposes:

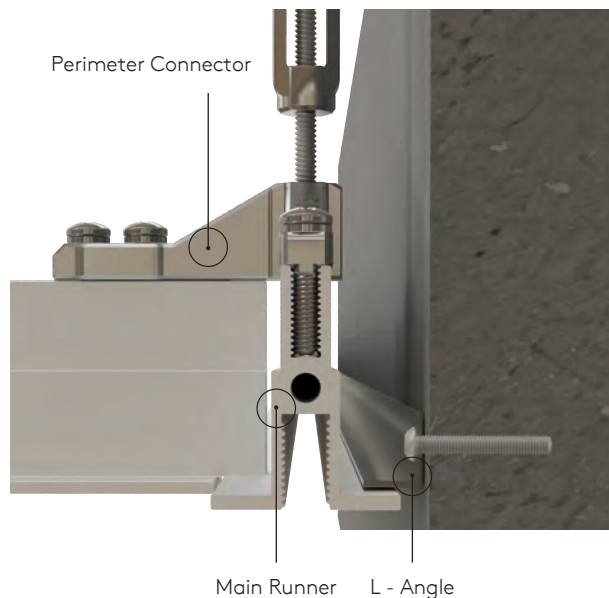
- An engineering purpose as it ensures no part of the system is cantilevered.
- An installation purpose as the notches every 600mm on the profile help you set out during installation.
- It also has aesthetic and air sealing benefits as the tiles sit better in this design.

If this design is not followed, the members of Tate Grid terminating at the wall may not be structurally sound and under load may deflect and fail.

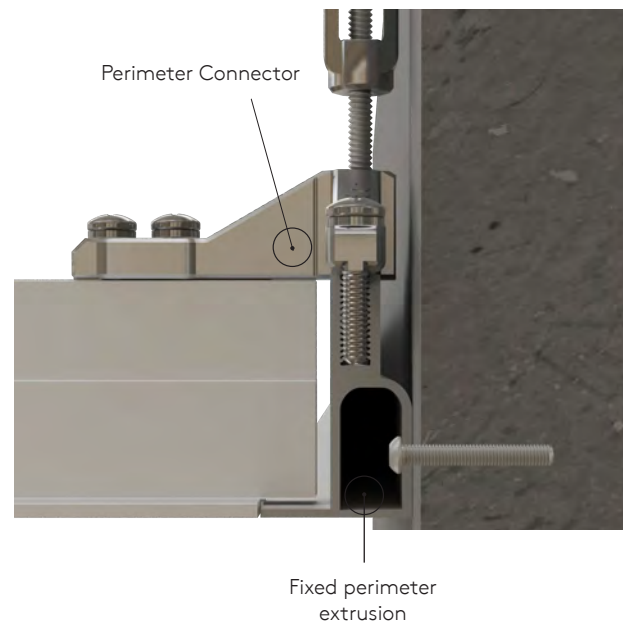
There are two options when installing Tate Grid at the perimeter of a data hall: Floating and Fixed.

Floating perimeters utilize standard Main Runner components which can also be used in other areas of the data hall. Fixed Perimeter details utilize special 3.6m Fixed Perimeter Extrusions, and exact quantities of such need to be calculated in advance.

Floating Perimeter:



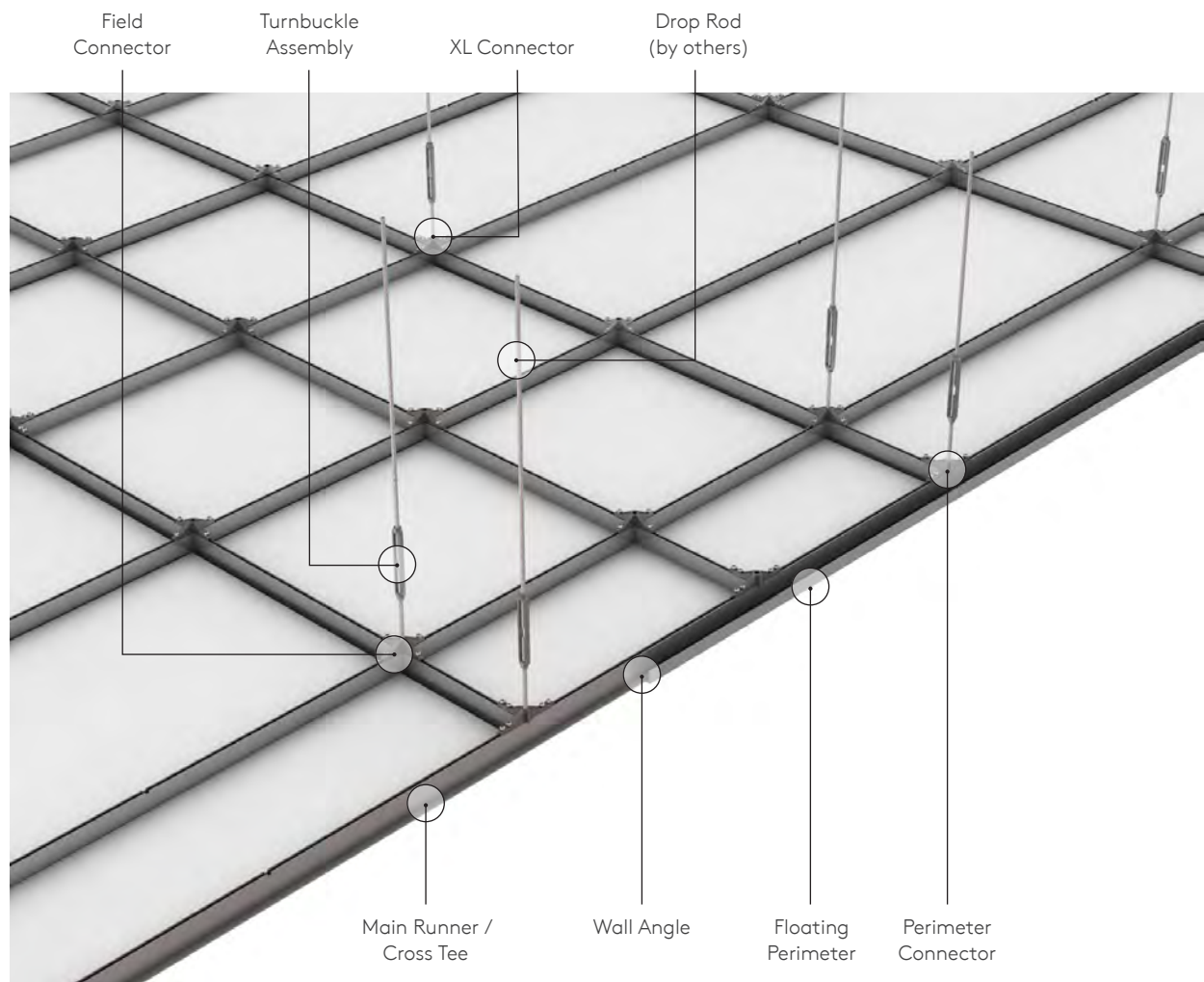
Fixed Perimeter:



Installation Guide

Perimeter Details

Standard Floating Perimeter Detail:



Please note: As typical in most cases, if it is necessary to cut the Structural Tees and Mains Runners around the perimeter of the space, the cut ends need to be coped to match the original factory finish. This is to ensure full load capacity of the grid. Please refer to the Appendix: Field Coping Guidelines at the end of the Tate Grid Installation Guide for more information.

Installation Guide

Tools

Bolt Torque:

All bolt connections to the top slot of the grid should be tightened flush to a washer with a maximum torque value of 4Nm, using a torque limiting screw gun or ratchet similar to:



Torque Limiting Screw Gun

All bolt or nut connections to the bottom slot of the grid should be tightened flush to a washer or mounting bracket with a maximum torque value of 4Nm, using a torque limiting screw gun or wrench similar to:



Wrench

A torque adapter is another alternative tool to ensure the correct torque in all connections. It can be connected to any bit holder and act as a torque screwdriver. The below image shows a torque adapter for 4Nm. Standard torque value that can be easily outsourced.



4Nm Standard Torque Adapter

Thread Engagement:

When threading bolts or threaded rod into bottom slot to hang equipment, ensure that the bolt or rod is long enough to fully engage the depth of the slot entirely or thread tear-out could occur. Any less than 75% (16mm) engagement could cause thread tear-out at less than rated loads for the system.

Installation Guide

Ceiling Assembly

Field Grid Assembly:

Step 1 - Install Main Runners

The Mains are equally spaced every 1200mm. All thread and turnbuckles are placed every 1200mm along the mains to connect them to the building structure. Field Connectors are used along the Mains and the connection point between two adjoining Mains require XL Connectors.



Step 2 - Install 1200mm Structural Tees

The Structural Tees are placed every 600mm along the Mains. The 1200mm Tee's are factory coped on each end so that they rest on top of the Mains. All connections are aligned using factory cut notches every 600mm in the top edge of the Mains. The notches along the Mains provide proper location and alignment of the grid and speed up installation.



Step 3 - Install 600mm Structural Tees (Optional)

For ceilings planning to use a 600mm grid, additional 600mm Structural Tees can be installed between the 1200mm Structural Tees. These 600mm Structural Tees connect to the 1200mm Tees using Field Connectors. The connectors are aligned using factory cut notches in the top edge of the 1200mm Structural Tee.



Installation Guide

Ceiling Tile Installation

Airflow Management:

Apart from offering support for services, Tate Grid ceilings can also be used for airflow management within a datahall. A combination of ceiling tiles, gaskets and clips can be deployed to achieve an air plenum above the ceiling.

Step 1 - Choosing the ceiling tile

While Tate can supply ceiling tiles of various materials, any ceiling tile that fits the Grid configuration (for example a 1200x600 Grid would require an 1180x580 ceiling tile) can be used.

Various materials can be used for the ceiling tile material, e.g metal pan or mineral fibre. The effect of heat transfer from a metal pan tile is negligible when compared with an insulated tile. See "Analysis of the Effect of Various Ceiling Tiles and IT Deployment on Cold Aisle Temperature Rise: A Case Study" whitepaper by Tate. To see a copy contact your Tate representative.

Step 2 - Applying the Gasket

In order to achieve an air seal, Gasket material can be supplied by Tate which is applied to the flange of the runners on the Grid or can be applied to the edge of the tiles.



Step 3 - Install the ceiling tiles

Once the Grid has been assembled and the gasket has been applied, the ceiling tiles can then be installed.

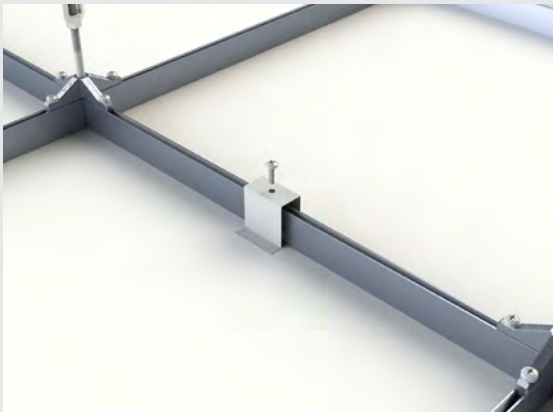
Installation Guide

Ceiling Tile Installation

Step 4 - Installing Ceiling clips

Ceiling clips are recommended in order to firmly secure the ceiling tile to the Tate ceiling. Tate offer Double Spring or Security Clips.

Please contact your local Tate representative to define to correct number of clips required for each tile.



Security Clip Detail

Security Clip

- Secured to top channel by a 1/4"-20 bolt
- Holds tile securely in place during normal operation of a data hall to prevent access to above ceiling plenum
- To remove a tile during standard operating conditions of the data hall, the bolt on the top of the clip needs to be un-screwed
- To remove a tile in the centre of the data hall, the tiles must be removed sequentially from an access tile or from the hot aisle opening



Double Spring Clip Detail

Double Spring Clip

- Secured to top channel by a 1/4"-20 bolt
- Allows access to above ceiling plenum
- Tiles can be removed and installed by hand during normal operation of the datahall
- By applying pressure from below, the ceiling tile can be pushed upward past the spring clip
- Once access to the ceiling plenum is no longer needed, the tile slots back over the spring clip, where it is held in place once more

Installation Guide

Service Conditions

Connecting to the bottom slot of the Grid:

A standard 10mm threaded bar can be used to suspend services from the M10 bottom slot of the Grid. Fixings to the bottom slot of the Grid must be at least 75% engaged, or to a depth of at least 16mm.

Bottom Slot Torque:

See page 10

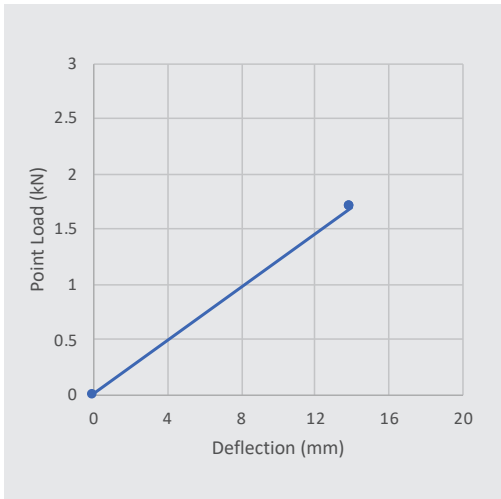
Hot Aisle Containment:

Hot Aisle Containment components supplied by Tate can easily be secured to the bottom slot of the Grid.



System Performance:

The bottom side of the structural grid is M10-1.5 continuous threaded slot for mounting items directly to the grid. Refer to the table below for load performance details on the grid and connections.



Hanger Configuration	Max. Safe Working Uniform Load (kN/m2)	Max allowable deflection (mm)	Max. Safe Working Point Load* (kN)	Ultimate Load (kN)
1200mm x 1200mm	2.4	14	1.7*	3.1

*Max safe working point load no less than 1200mm in any direction

Installation Guide

Service Conditions

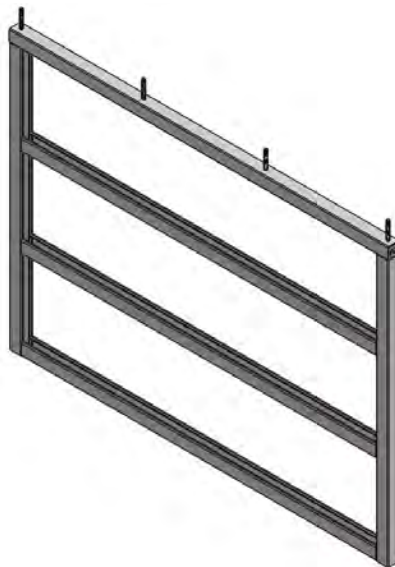
Cable Installation & Bracing Drops:

Do not pull cables or expose the Grid to any dynamic loading. Dynamic loads and dragging cables across the Grid may exceed the Ultimate Load of the Grid.

To distribute a load that would otherwise exceed the stated 1.7kN point load, cable ladders can be employed to achieve up to 2.4kN/m². This is the recommended method to distribute load to ensure no single M10 stud exceeds the 1.7kN point load.

Tate recommends a maximum distance of 1.2m between M&E services supports.

See below example:



Please note: Bracing is required during cable pull. The installer should use a bracing method to hold the ladder racks in position so when cables are pulled during install the ladder does not swing back or forth. Bracing must be strictly adhered to in order to avoid exceeding the stated system load tolerances.

Installation Guide

Maintenance

Cleaning:

To clean Tate Grid components please use a common non-abrasive mild detergent containing less than 0.5% phosphate and water, applied using a sponge. The components should be dried using a soft towel. If solvents are required to remove materials not soluble in water such as petroleum products, the following solvents can be used: Isopropyl alcohol, denatured alcohol, mineral spirits or methanol. Paintscratches can be touched up. Contact the factory for matching paint.

Maintenance of above ceiling Services:

The Tate Grid system should not be walked on under any circumstances. This may expose the system to excess dynamic loads and cause a failure.

Ceiling tiles may be removed in order to build a scaffold like structure that rises through the Grid and can allow walk-on access above the Grid without exposing the Grid system to extra loads.



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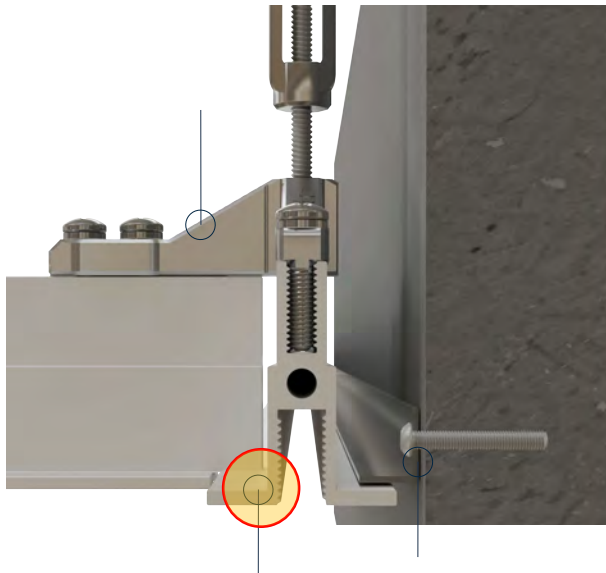
Installation Guide

Appendix: Field Coping Guidelines

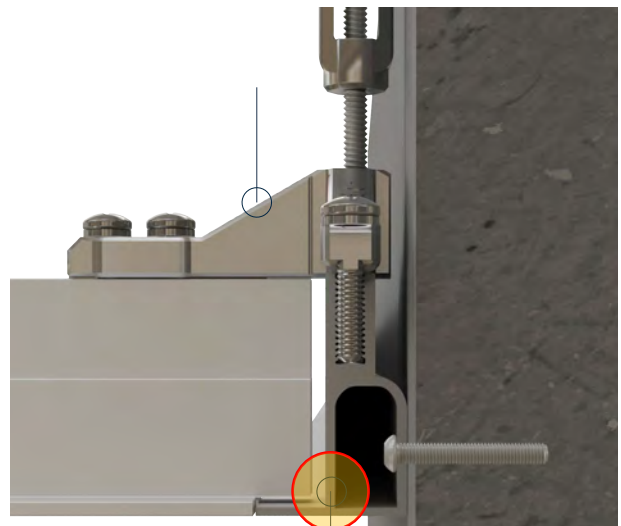
Methodology:

Although every 1200mm or 600mm a Cross Tee will be delivered with coped ends, there may be situations on site, specially at the areas close to the perimeter, where it will be required to perform the cope on-site in order to achieve any of the below perimeter details:

Floating Installation Detail



Fixed Installation Detail



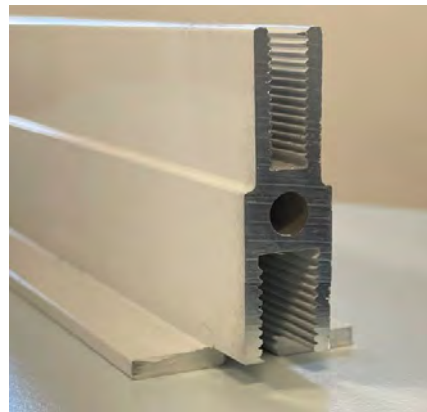
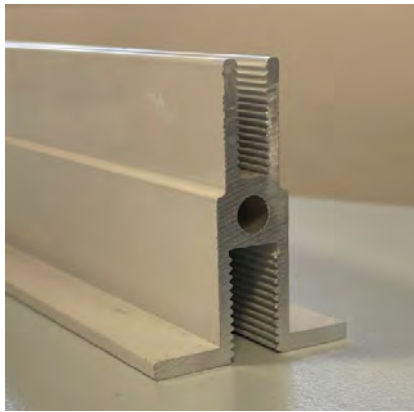
Fixed Perimeter Extrusion

Installation Guide

Appendix: Field Coping Guidelines

Example of Differences:

The images below show the differences between an extrusion without coped a extrusion with coped end.



Equipment Required:

In order to do a field cope the following equipment and materials are required:

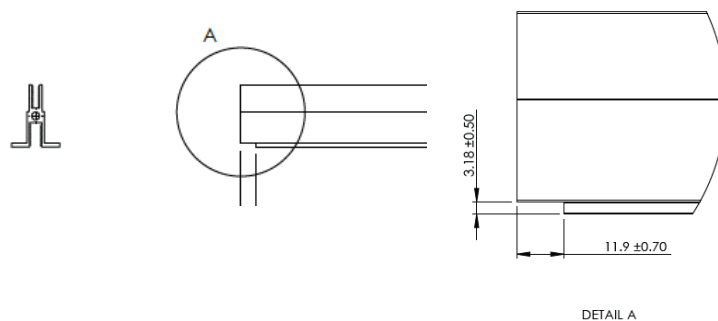
- Portable hand saw
- Workshop table
- Ruler
- Marker
- Any clamping method to fix the Tate Grid extrusion when coping

Installation Guide

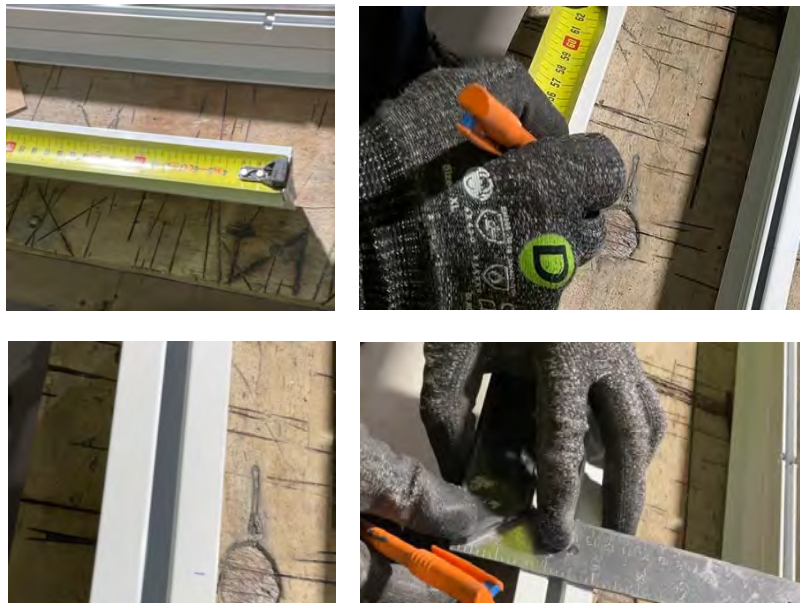
Appendix: Field Coping Guidelines

Step 1:

First, mark the cope distance. Measured from the end of the extrusion, the cope should have a width of 12mm. See below cope detail and measuring examples.



Tate Grid detail showing the exact cope dimensions



Measuring and marking of the cope dimensions on a Tate Grid extrusion

Installation Guide

Appendix: Field Coping Guidelines

Step 2:

Once the cope width has been marked, the extrusion should be positioned and clamped into the workshop table to stop it from moving when cutting with the bandsaw.



Positioning of the Tate Grid extrusion before coping it

The images below show an example of a band saw used on site to do the cope.



Bandsaw - Front View



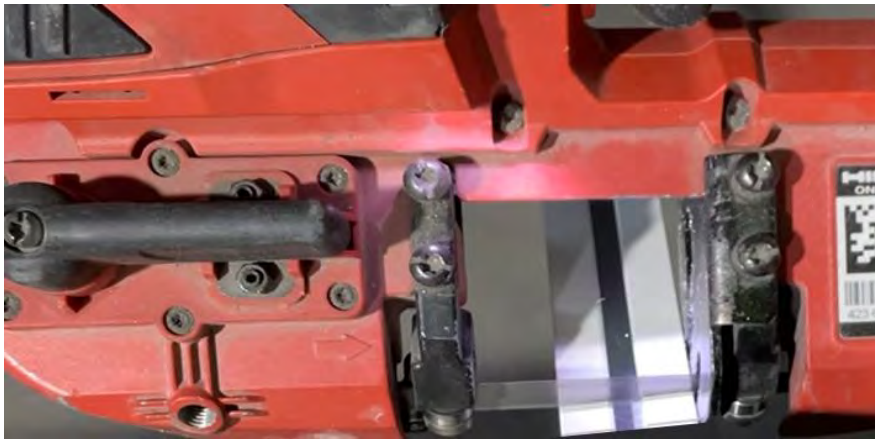
Bandsaw - Back View

Installation Guide

Appendix: Field Coping Guidelines

Step 3:

Once the bandsaw is correctly positioned and clamped, use the bandsaw to cut the flange of the Tate Grid Extrusion with a 90 degree angle as shown in the image below. The flange thickness is approximately 3.2mm.



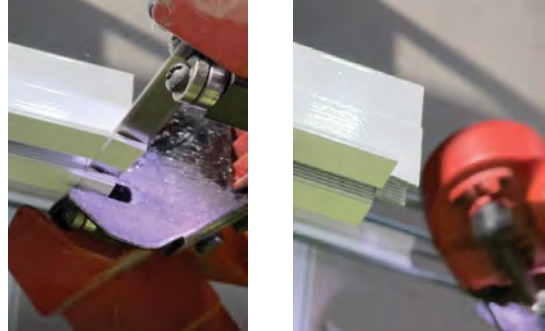
Field coping with a bandsaw

Installation Guide

Appendix: Field Coping Guidelines

Step 4:

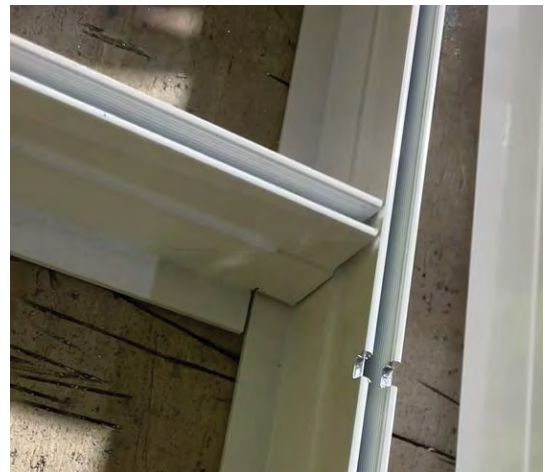
Next, cut the remaining part as shown in the images below. The bandsaw should be positioned with a 90 degree angle as demonstrated.



Field coping with a bandsaw

Step 5:

When the cut is complete, check that the cope is correctly done by placing the piece perpendicular to the Main Runner and ensure that there are no gaps in between.



Checking the accuracy of the field cope