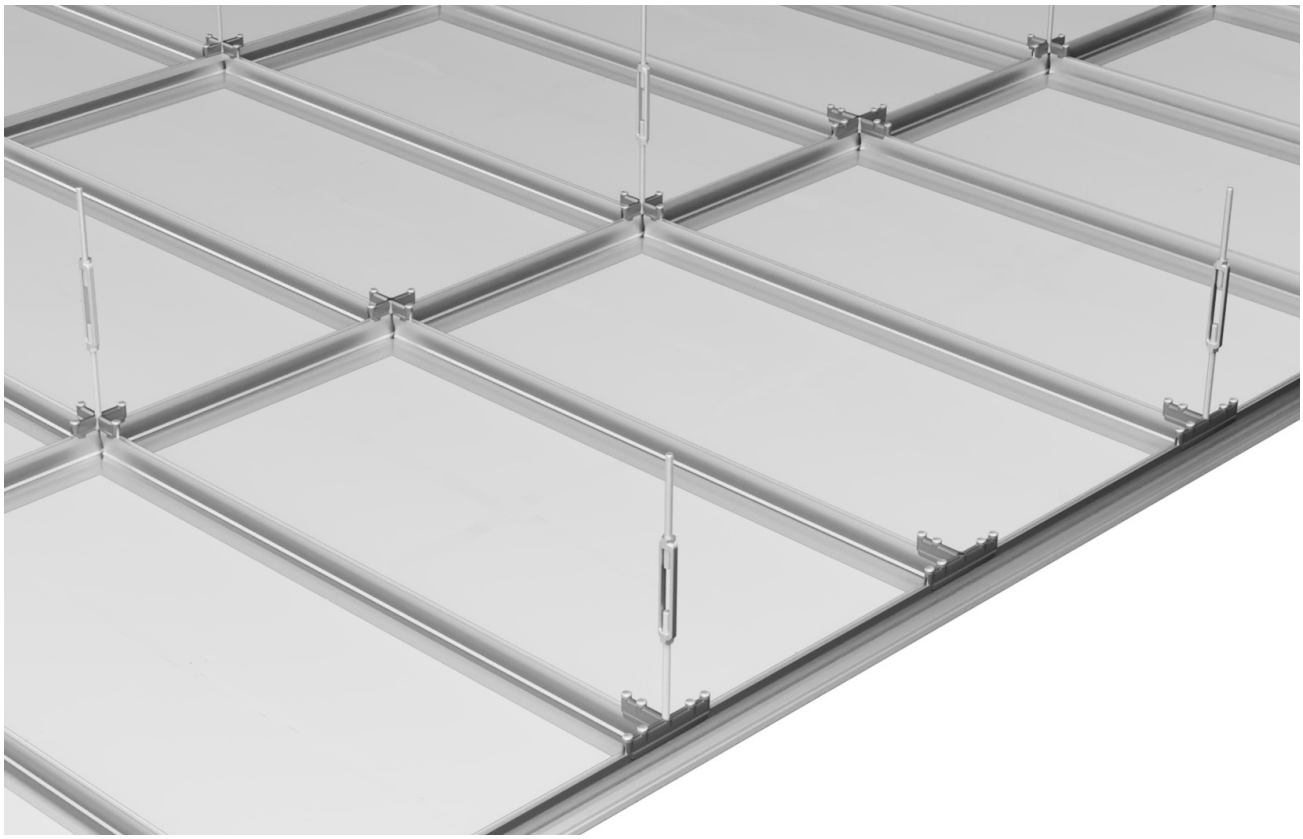
Tate Grid+ LEC User Installation Reference Guide



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

NOTE: ALL CONNECTIONS TO GRID+ LEC SHALL BE TIGHTENED TO BETWEEN 20 IN-LBS AND 30 IN-LBS OF TORQUE

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Safety Guidelines

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

Tate Grid+ LEC is a structural ceiling system designed to support static vertical loads. When installing services to the bottom 3/8"-16 threaded channel, the following instructions must be adhered to:

1. Tate Grid+ LEC is limited to a maximum point load of 450 lbs or distributed load of 75 lb/ft2.
   a. Exceeding these values may cause a failure in the system.
2. Torque the threaded rod or bolts between 20 in-lbs and 30 in-lbs. Over torquing will damage the threads of the 3/8"-16 slot reducing the load capacity of the Tate Grid+ LEC System.
   a. Failure to adhere to this may result in the shearing of bottom slot threads reducing the load capacity of the Tate Grid+ LEC system.
3. Equal care must be taken during the installation of the Tate Grid+ LEC to install the top screws connecting the Tate Grid+ LEC to the suitable connector at a torque limit between 20 in-lbs and 30 in-lbs.
   a. Failure to adhere to this may result in the shearing of top slot threads reducing the load capacity of the Tate Grid+ LEC system.
4. Only screws supplied by Tate should be used on the top slot.
   a. Failure to adhere to this may result in the reduction of the load capacity of the Tate Grid+ LEC system.
5. There must be at least 1/2" thread engagement between threaded rod or bolt supporting the suspended service(s).
   a. Failure to adhere to this may result in the reduction of the load capacity of the Tate Grid+ LEC system.
6. Do not impose a dynamic load on the connection to Tate Grid+ LEC. During installation of supported services, bracing is required to prevent dynamic load on the Tate Grid+ LEC ceiling.
   a. Moment forces imposed on the Tate Grid+ LEC system may cause failure of the connection between the services and the Tate Grid+ LEC system.
7. All bottom thread fixings should be completed with suitable washers.
8. Tate Grid+ LEC is NOT a walk-on ceiling.
9. In certain conditions the loading capacity of the Tate Structural Ceiling System may be greater than the loading capacity of the building structure and/or means of attachment to the building structure. Consult with a licensed structural engineer to obtain site specific recommendations regarding the attachment of the Tate Structural Ceiling System and any associated loading to the building structure.
10. Structural ceiling systems as a whole shall be analyzed and designed to local codes by a qualified engineer.

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

Introduction

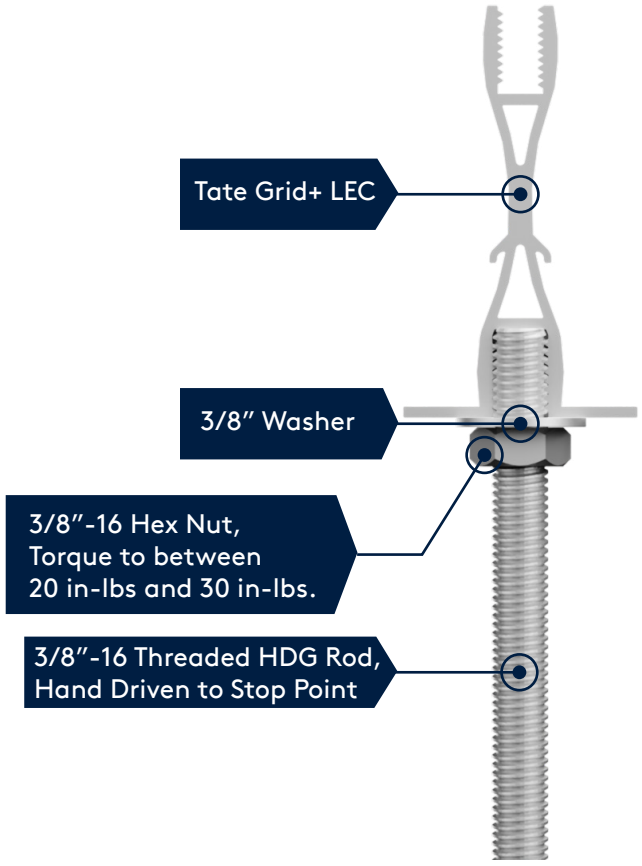
Thank you for choosing Tate Grid+ LEC. The purpose of this guide is to provide you with a reference for typical installation situations. We would be interested in hearing any comments you have on this installation manual, product, or overall experience. Please call or email Technical Services: Phone: 410-799-4200, Email: Info@tateinc.com

Safety

Tate Grid+ LEC is a structural ceiling system designed to support static vertical loads. When installing services to the bottom 3/8"-16 threaded channel, the following instructions must be adhered to:

1. Do not torque the threaded rod or bolts above 30 in-lb. Over torquing will damage the threads of the slot reducing the load capacity of the Tate Grid+ LEC system
2. There must be at least 1/2" thread engagement between threaded rod or bolt
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+ LEC. During installation of supported services, bracing is required to prevent dynamic load on the Tate Grid+ LEC ceiling.
   a. Moment forces imposed on the Tate Grid+ LEC system may cause failure of the connection between the services and the Tate Grid+ LEC system.
5. All bottom thread fixings should be completed with suitable washers.
6. Do not put a load on the system until the installation is complete
7. Tate Grid+ LEC 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.

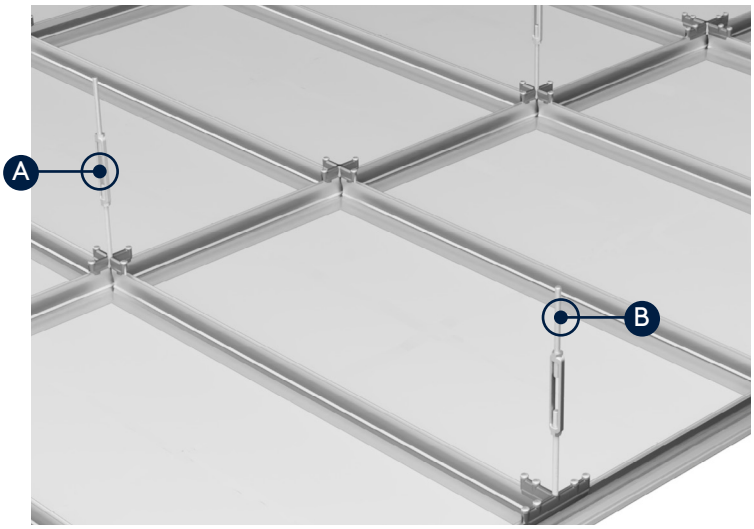
Suitable Connection Methodology

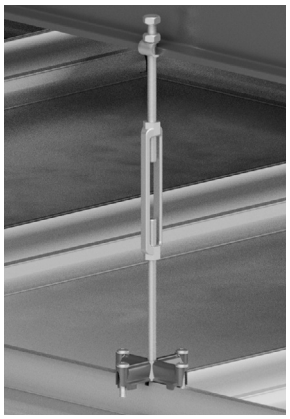


1. Building Connections

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+ LEC hanging method from steel building

Tate Grid+ LEC hanging method from concrete building

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

Drop Rod Frequency:

- Tate Grid+ LEC requires connections every 4′ x 4′ nominal on center, and 4′ on center along the perimeter.
- Tate Grid+ LEC requires connections on every side of a column.

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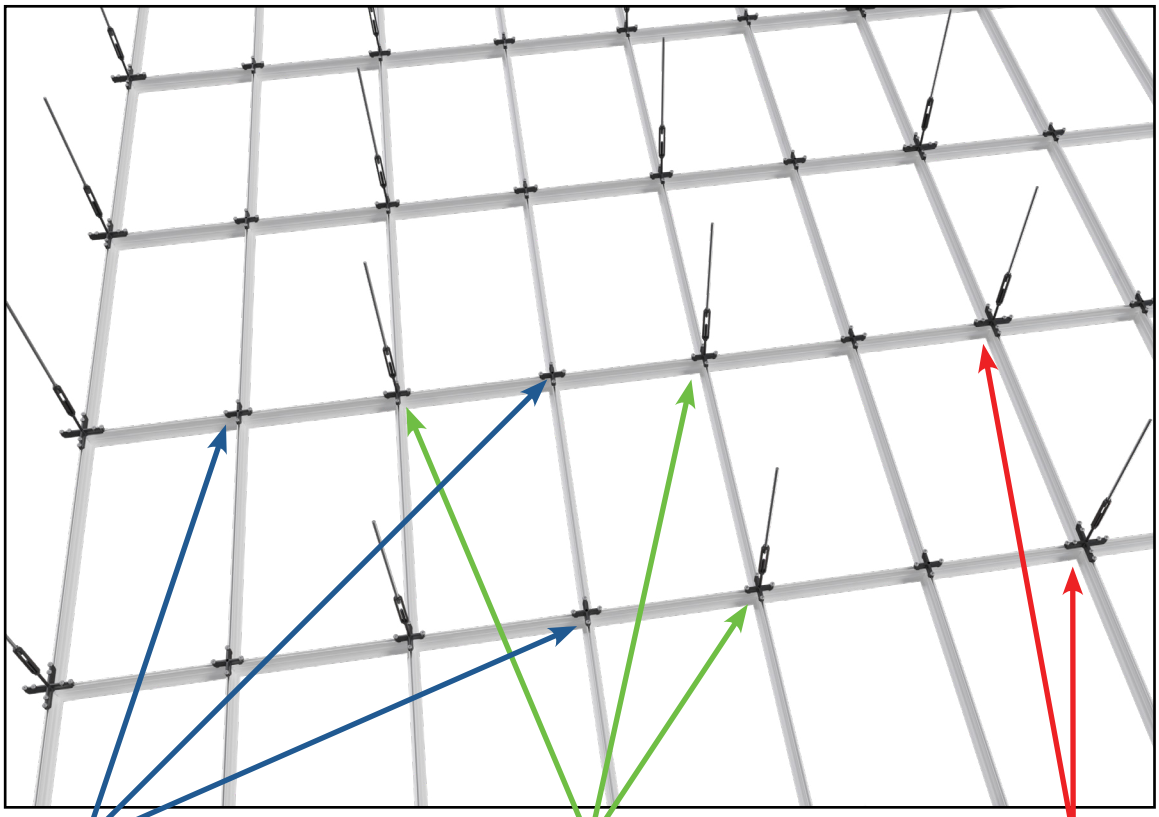
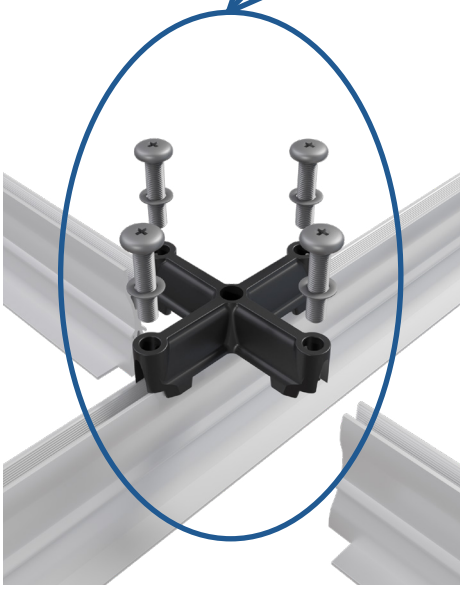
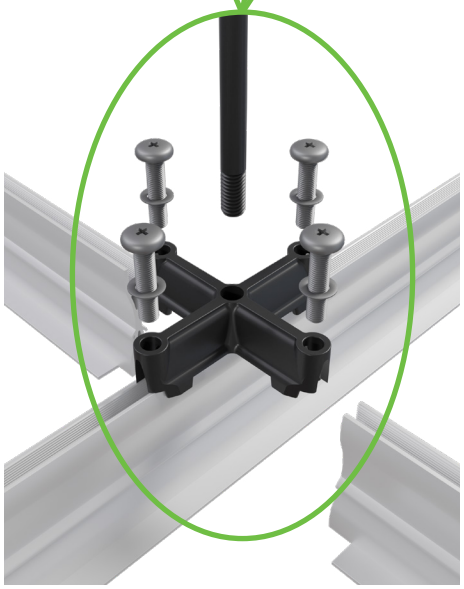
2. General Layout & Part Numbers

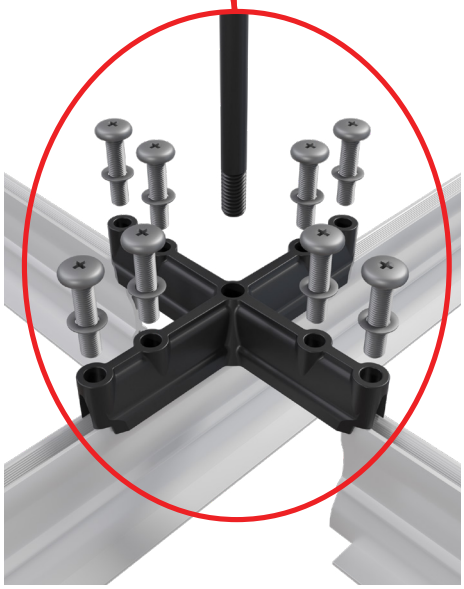




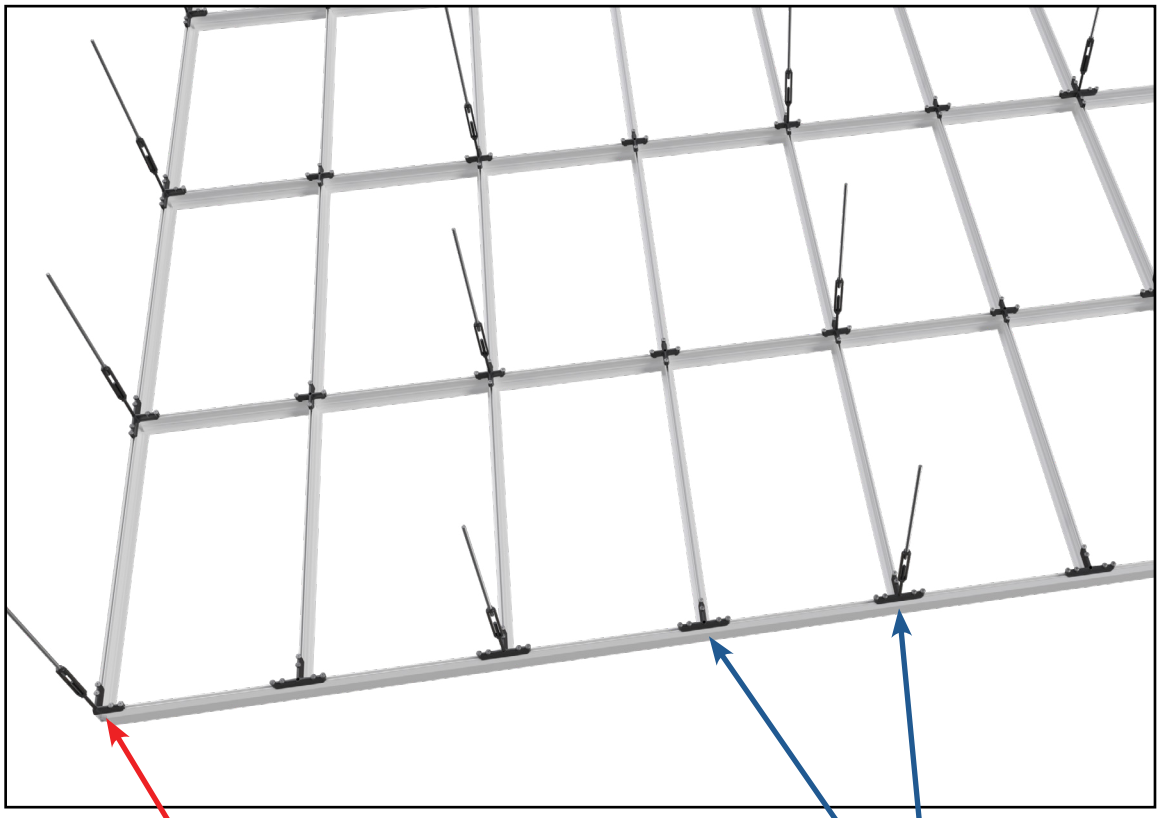
Structural Tee Connections to a Main Runner
Field Connector (PN47690)
5/16"-18 Screw with Lock Washer (PN48182)

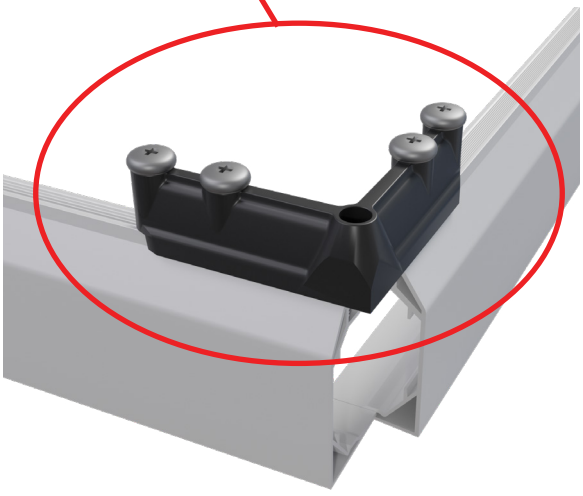


Turnbuckle Drops mid-Main Runner
Turnbuckle & Starter Rod (PN28361)
Field Connector (PN47690)
5/16"-18 Screw with Lock Washer (PN48182)

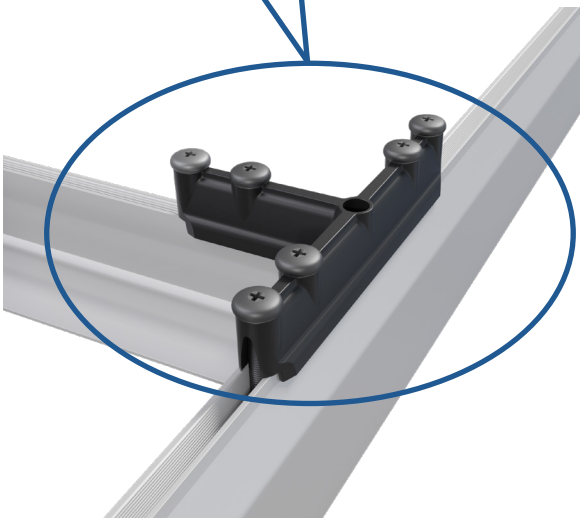


Main Runners to Main Runner Splice
Turnbuckle & Starter Rod (PN28361)
XL Connector (PN47691)
5/16"-18 screw with Lock Washer (PN48182)





Corner Connector
Corner connector (PN47279)
5/16"-18 Screw with Lock Washer (PN48182)



Perimeter Connector
Perimeter connector (PN47278)
5/16"-18 Screw with Lock Washer (PN48182)

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3. Connector Details

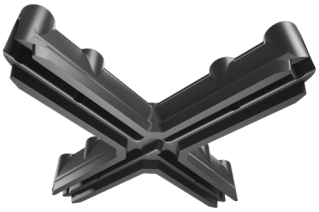
Tate Grid+ LEC Connector Types

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

Corner Connector

Straight Connector

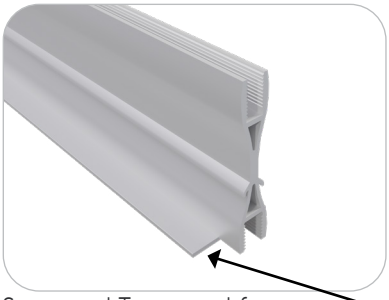
Field Connector



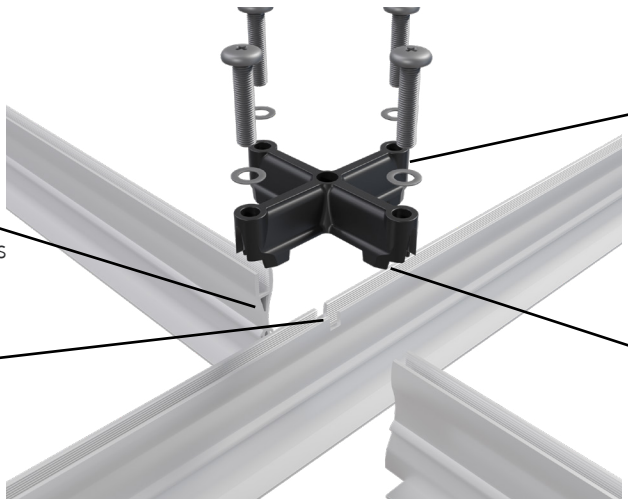
XL Connector
Main Runner Splice

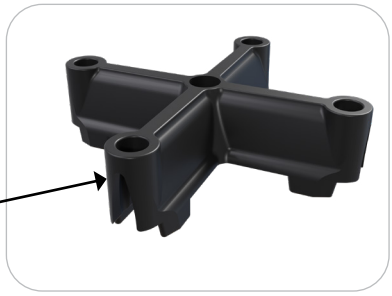
Perimeter Connector

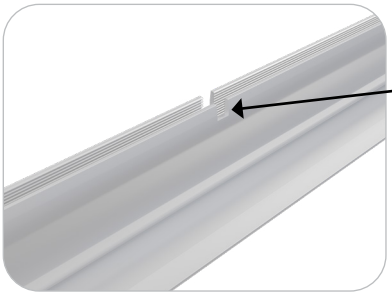
Field Connector Detail



Structural Tee coped for easy installation and stronger connections







Main Runners notched to positively position connectors on center every time

Ribs on connector to align with grid and prevent racking

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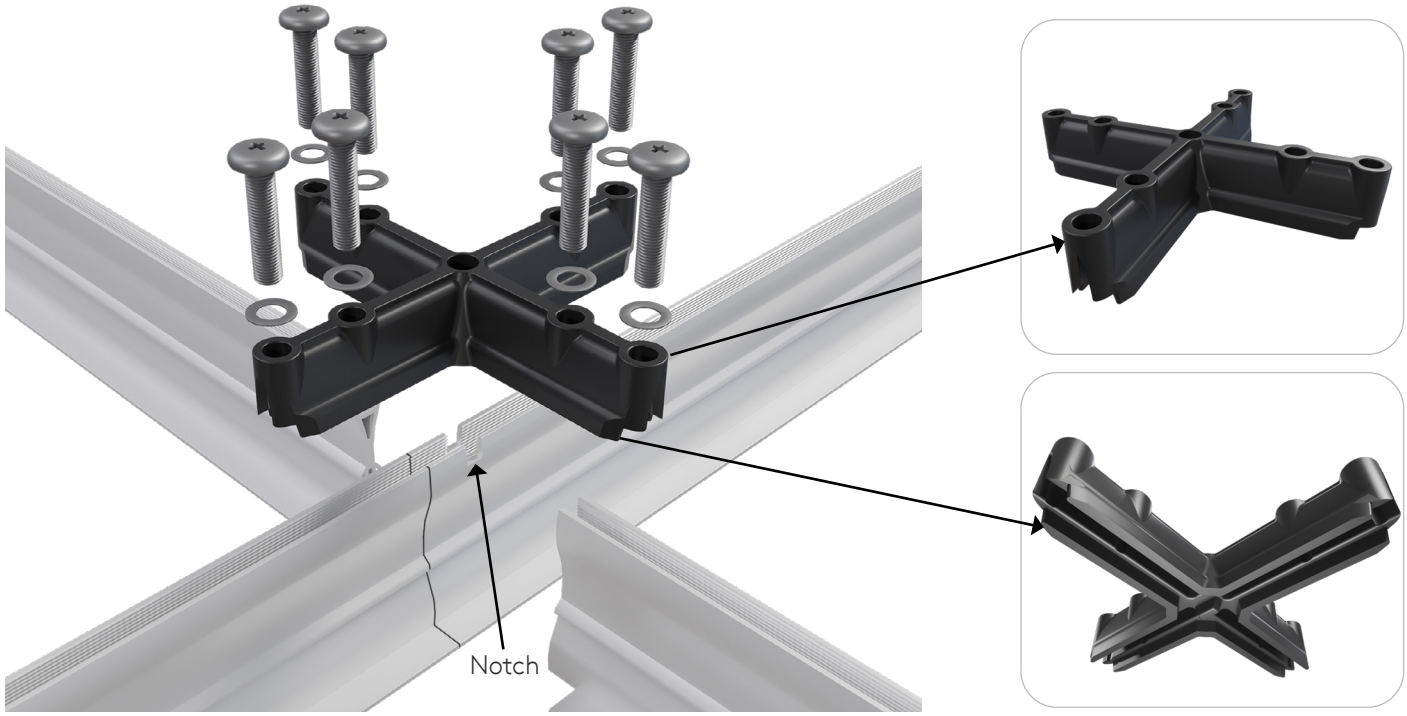
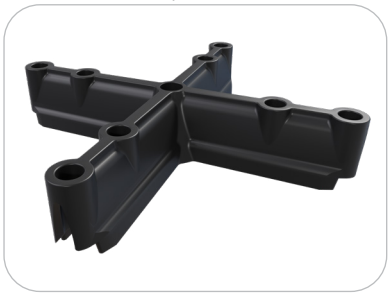
XL Connector (Main Runner End Joint) (PN39564)

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

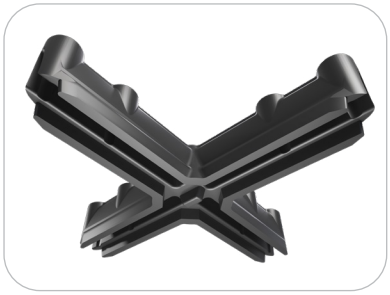


Perimeter Connector Detail (PN39563)

Top View



Bottom View



Corner Connector

Straight Connector

Perimeter Connector

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4. Notch Details

Structural Tee & Main Runner Notches

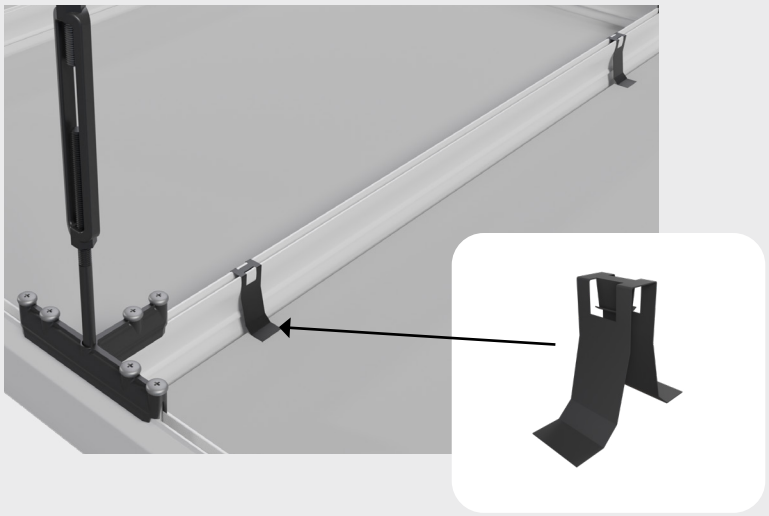
The main runners are not symmetric, they must all be oriented in the same direction. Be sure that all runs of main runners are oriented in the same direction or the grid will not align properly.

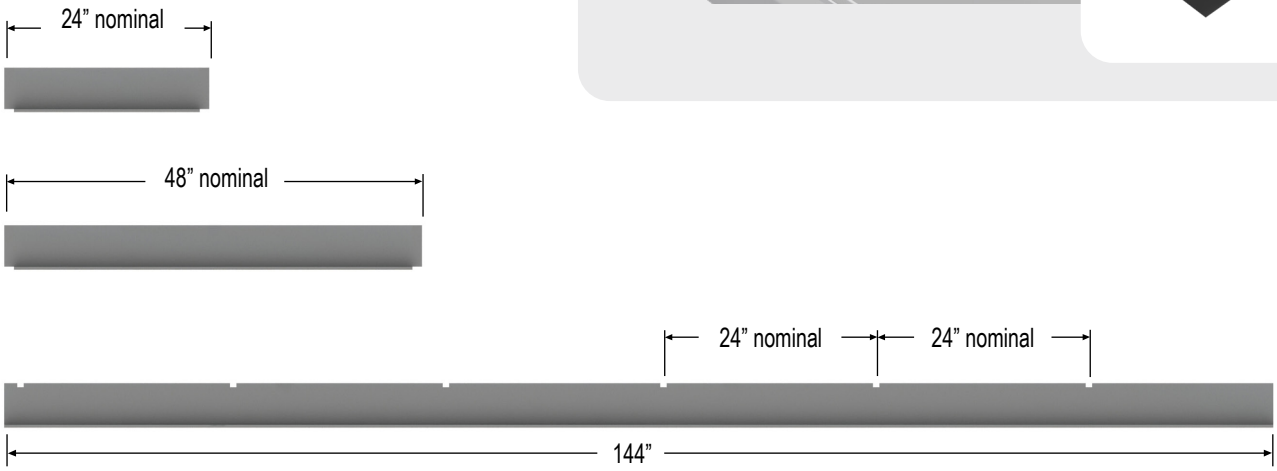
All Structural Tees and Main Runners are notched every 24" on center for proper alignment and spacing of the connectors.

For 2'x2' grid systems, the 4' tees should first be installed between the main runners.

Hold Down Clips

- Hold down clips can be provided with the Tate Grid+ LEC system as an option.
- Two hold down clips are recommended per tile.
- Hold down clips are installed by pressing them into the top thread by hand or lightly tapping them with a mallet.
- Hold down clips are designed for use with 1/2" - 1" thick ceiling tiles
- PN44403





24" & 48" Structural Tees have coped ends which allow the grid to rest on the longer sections for stronger connections.

48" Structural Tees and 12' Main Runners are notched every 24" on center for proper alignment and spacing of the connectors.

Note: Structural Tee and Main Runner dimensions are nominal and are adjusted for custom-sized ceiling grid designs

5. Perimeter Details

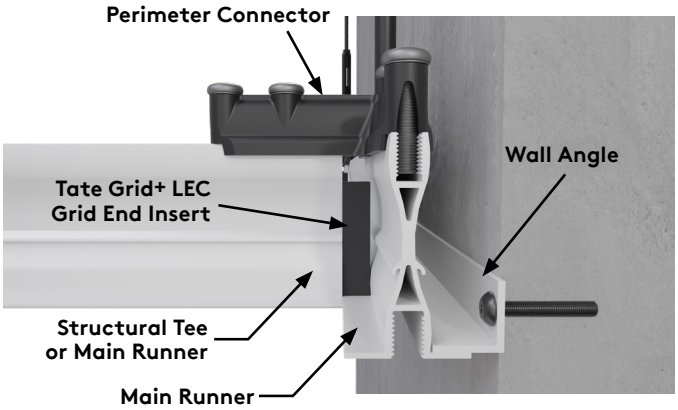
Perimeter Options:

The Tate profile should run along all perimeters and should be anchored every 4′. This serves multiple purposes:

- An engineering purpose as it ensures no part of the system is cantilevered.
- 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+ LEC terminating at the wall may not be structurally sound and may deflect and fail under load.

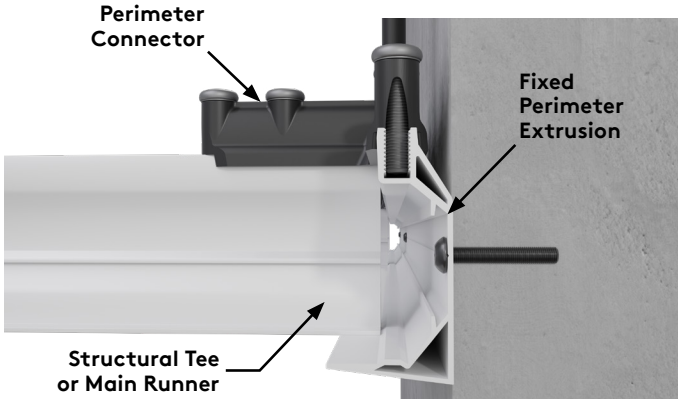
There are two options when installing Tate Grid+ LEC at the perimeter of a data hall: Floating and Fixed. Floating perimeters utilize standard Main Runner components which can also be used in other areas of the data hall. Fixed Perimeter details utilize special 12′ Fixed Perimeter Angles.



Floating Installation Detail

Main Runners are utilized when installing with a floating detail. When installing with a floating perimeter, Perimeter Connectors should be utilized.

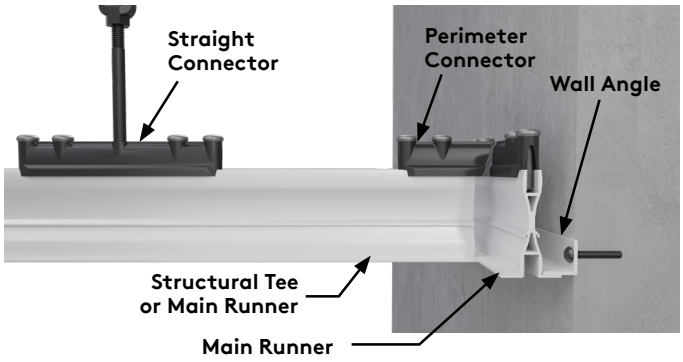
Additionally it is recommended to utilize a Wall Angle attached to the perimeter.



Fixed Installation Detail

Perimeter Extrusions are designed to create a fixed perimeter detail. Perimeter Extrusions can be cut on-site to desired length when assembled along perimeter walls. Perimeter Extrusions can be bolted to the wall with appropriate fasteners for the wall type.

Note, pre-drilling is recommended and through holes are suggested for simpler light fixture or drop ceiling tile installation.



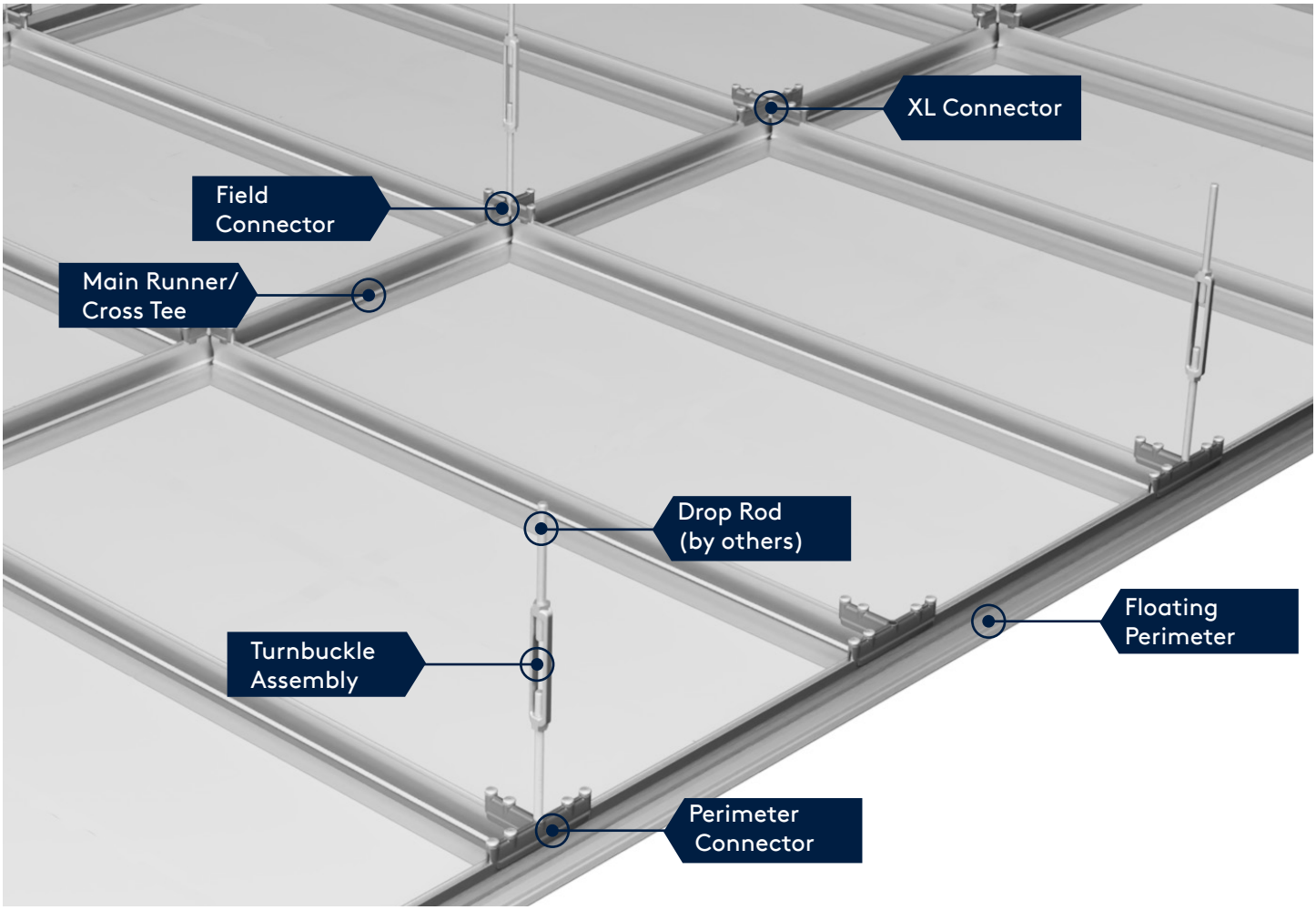
Individually Supported Grid Members with Floating Perimeter Installation Detail

Main Runners are utilized when installing with a floating perimeter detail. When installing with a floating perimeter, Perimeter Connectors are utilized to connect a structural tee or a main runner to a floating perimeter main. A Straight connector with a rod drop is required within 12″ from the perimeter on every structural tee or main runner that is connected to a floating perimeter main.

Additionally, it is recommended to utilize a Wall Angle attached to the perimeter to close up the ceiling and prevent air leakage.

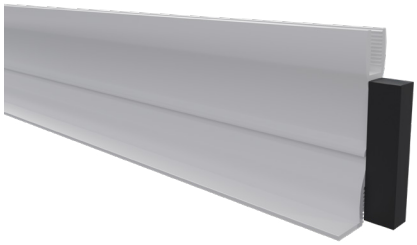
5. Perimeter Details

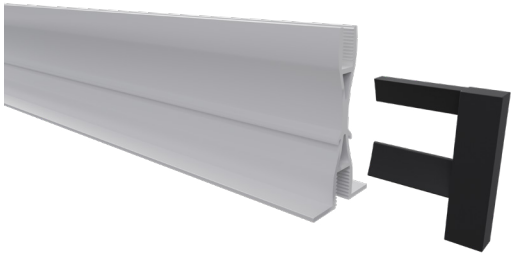
Standard Floating Perimeter Detail



Tate Grid+ End Insert

The Tate Grid+ End Insert is used for additional support at the end of the uncoped Tate Grid+ Structural Tee.





6. Ceiling Assembly

Bolt Torque

All bolt connections to the top slot of the grid should be tightened flush to a washer with a **torque value between 20 in-lbs of 30 in-lbs**, using a torque limiting screw gun or ratchet similar to:

All bolt or nut connections to the bottom slot of the grid should be tightened flush to a washer or mounting bracket with a **torque value between 20 in-lbs and 30 in-lbs**, using a torque limiting screw gun or wrench similar to:

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 be possible. Any less than 1/2" engagement could cause thread tear-out at less than rated loads for the system.

Field Grid Assembly

While Tate Grid+ LEC can be customized to meet the needs of your specific application, the following example is based on 2′ x 2′ grid spacing with turnbuckle connections on 4′ x 4′ centers.

Step 1

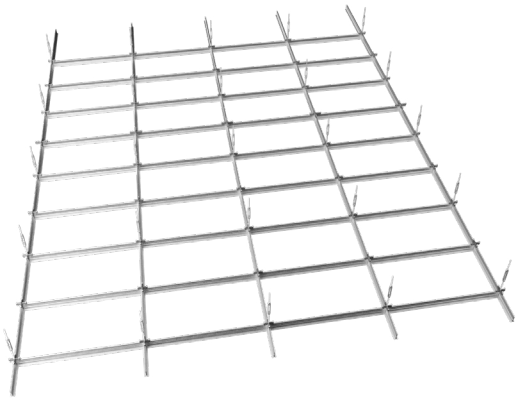
Install Main Runners

The Mains are equally spaced every 4′. All thread and turnbuckles are placed every 4′ 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 4′ Structural Tees

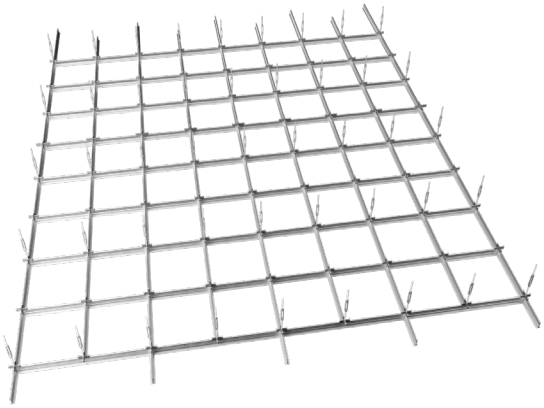
The Structural Tees are placed every 2′ along the Mains. The 4′ Tee's are factory coped on each end so that they rest on top of the Mains. All connections are aligned using factory cut notches every 2′ in the top edge of the Mains. The notches along the Mains provide proper location and alignment of the grid and speed up installation.



Step 3 (only used for 2x2 layouts)

Install 2′ Structural Tees

For ceilings planning to use a 2′ grid, additional 2′ Structural Tees can be installed between the 4′ Structural Tees. These 2′ Structural Tees connect to the 4′ Tees using Field Connectors. The connectors are aligned using factory cut notches in the top edge of the 4′ Structural Tee.



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7. Service Conditions

Connecting to the bottom slot of the Grid+ LEC:

A standard 3/8"-16 threaded rod can be used to suspend services from the 3/8"-16 bottom slot of the Grid. Fixings to the bottom slot of the Grid+ LEC must be at least 1/2".

Bottom Slot Torque:

20 in-lbs to 30 in-lbs max, See Section 6 for details

Hot Aisle Containment:

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

Performance Criteria

The following load capacities must be strictly observed when installing services from the Tate Grid.

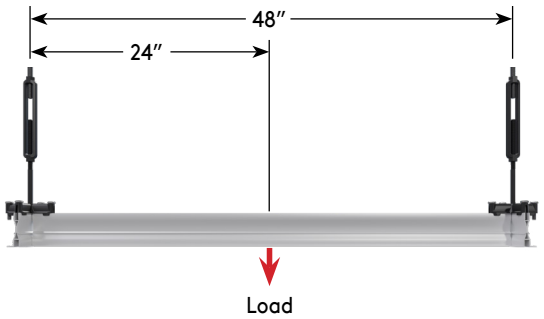
On Center Hanger Spacing	Max. Uniform Load	Max. Safe Working Load (Point Load)	Midspan Deflection at Max. Safe Working Load	Safety Factor
4' x 4'	75 lbs/ft^2	475 lbs*	.40"	2x

**Do not exceed 475 lb, load within single 4' section (between two suspension points)*

Field System Performance:

The Ultimate Load of the Tate Grid+ LEC system is the point at which the system will fail - see stress graph below:

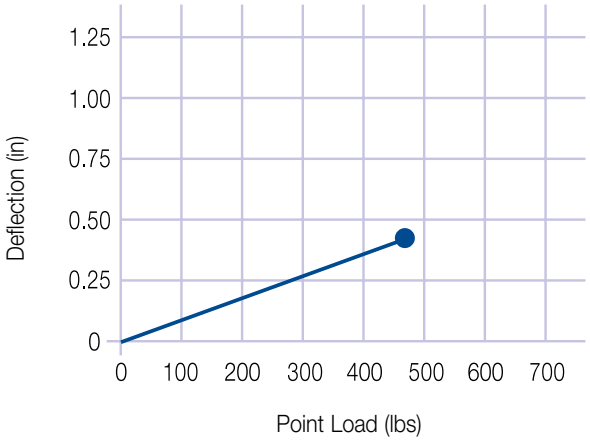
Structural Tee Deflection
(Midspan Beam)



Calculate midspan beam deflection at any point below yield

$$S = \frac{WL^3}{48EI}$$

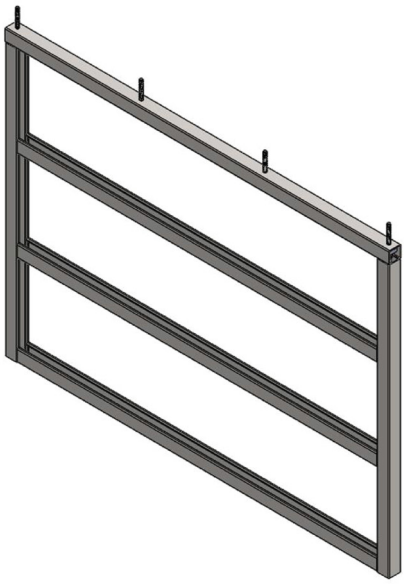
S = Deflection
W = load
L = 48in
E = 10x10^6 lbs/in^2
I = .153 in^4



Cable Installation & Bracing Drops:

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

To distribute a load that would otherwise exceed the stated 475 lb point load, cable ladders can be employed to achieve up to 75 psf. The example to the right shows the recommended method to distribute load so as to ensure no single 3/8" stud exceeds the 475 lb point load.



8. Maintenance

Cleaning:

To clean Tate Grid+ LEC 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: Isotropy alcohol, denatured alcohol, mineral spirits or methanol. Paint scratches can be touched up. Contact the factory for matching paint.

Maintenance of above ceiling services:

The Tate Grid+ LEC 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 to build a scaffold like structure that rises through the Grid+ LEC and can allow walk-on access above the Grid+ LEC without exposing the Grid system to extra loads.

Tate®

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