



ENGINEERED STRUCTURAL CEILING SYSTEM

Overhead Infrastructure Solution for Futureproofing Data Centers & Critical Applications

Installation Manual

THANK YOU

for choosing U-Flex Structural load-bearing ceiling grid solution. The intent of this guide is to provide you with a reference for typical installation situations.

If you have any installation related queries, please email at

 projects@united-group.in

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ABBREVIATIONS

(RH and LH)	: Right Hand and Left Hand
GI	: Galvanized Iron
PPE	: Personal protective equipment
LV tray	: Low voltage
HV tray	: Heavy voltage
CCTV	: Closed Circuit Television
CNC	: Computer numerical control
Lbs	: Libra pondo
GFC	: Good for the Construction
O.C.	: Occupancy Certificate
CSK	: Countersunk (head rivet)
CL3	: Cover level 3
Mtr	: Meter
Thk	: Thick/Thickness
mm	: millimeter
(W)	: Width
(H)	: Height
kN	: Kilonewton
kg	: Kilogram
Max	: Maximum
D	: Dimension
L	: Length

COMPONENT SHEET

1. Main Runner 3600 mm
2. Cross Runner 1200 mm
3. Cross Runner 600 mm
4. X Connector (144 x 144 x 29 mm)
5. T Connector (perimeter connector) (144 x 82 x 29 mm)
6. L Connector (82 x 82 x 29 mm)
7. I Connector (144 x 20 x 29 mm)
8. Turnbuckle M10 x 1.50 x 180 mm
9. M10 x 1.5 x 25 mm flat head hexagonal allen screws
10. M10 x 1.5 Lock Nut (RH and LH)
11. M10 x 1.5 LH/RH x 150 mm Stud for Turnbuckle
12. M10 x 1.5 Threaded stud/rod (Length as per site)
13. Mechanical anchor fastener
14. Beam clamps
15. Metal Ceiling tile 0.60/0.70 thickness GI pre-coated/powder-coated
(Optional as per client's requirement)
 - a. Hold down clip
 - b. Suspension Components
 - c. Clamps - Pipe and U clamp
16. Seismic Components
 - a. (4mm dia steel wire rope)
 - b. Turnbuckle M8
 - c. Bracing angle 25 x 25 x 1 mtr
 - d. M8 x 1.25 x 25 mm eyebolt
 - e. M10 x 1.50 x 16 mm eyebolt
 - f. Steel wire rope
 - g. Thimble
 - h. (40 x 40 x 3 thk) L cleat

Note: Seismic components vary as per the option selected.

TOOLS REQUIRED

List of the most common tools needed for installing a suspended ceiling. Required tools and materials may vary based on job-specific conditions:

- Measure tape
- Chalk line
- String line: control/ dry line
- Carpenter Pencil
- Ladders, rolling scaffold
- Lasers: horizontal line leveling, vertical alignment, point
- Cordless drill with screw tips and drill bits, hammer drill machine
- Metal cutting circular saw
- PPE: Cut-resistant gloves, safety glasses, safety helmet, safety shoes, reflective jackets, ear plugs and nose mask.

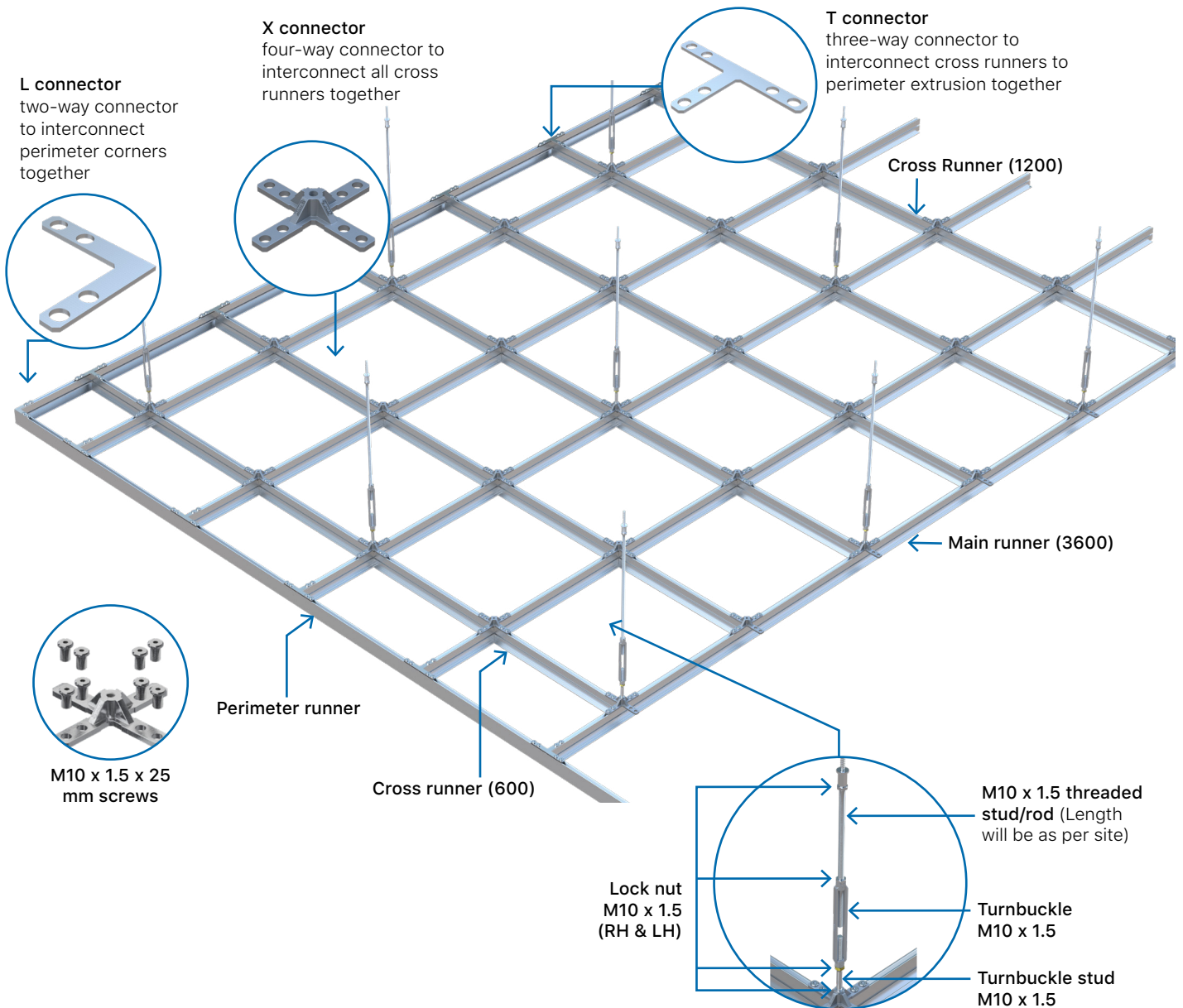
Below tools required if in case if metal ceiling is included in the scope of work:

- Snips: metal cutting tin snips
- Pop riveter, aluminum white pop rivets
- Rubber mallet

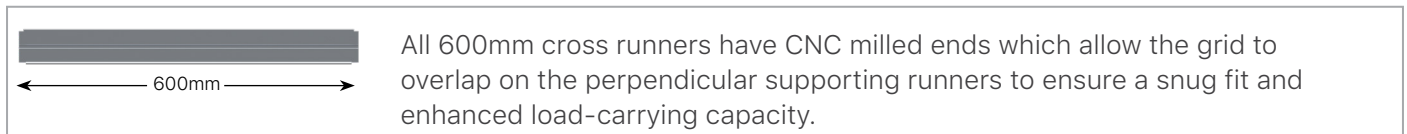
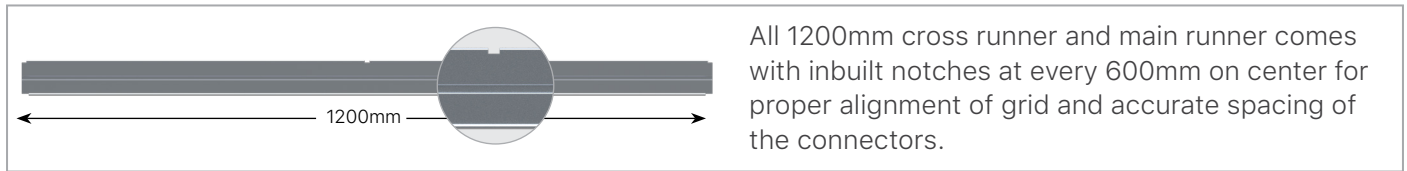
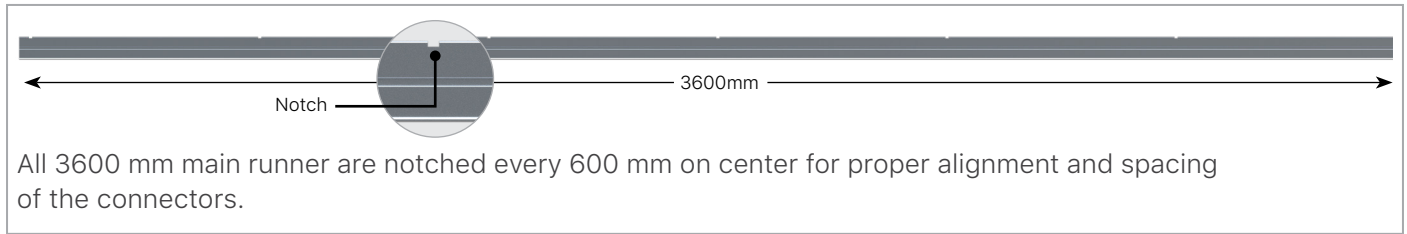
SYSTEM OVERVIEW

Pre-engineered to exacting tolerance - The U-Flex structural grid system is designed to offer flexible and reconfigurable support to all overhead heavy-duty services and fixtures, for enabling easy installation of firefighting systems, LV tray, and HV tray (busbars, sensors and detectors, lights, CCTV camera, and other such utilities at any location) via M10 threaded rod connections to structure.

Each of the connectors features a snub at the bottom that connects to the top rail of the grid. Adjusting the notch by locating them in the main and cross runner ensures interlocking and accurate alignment.

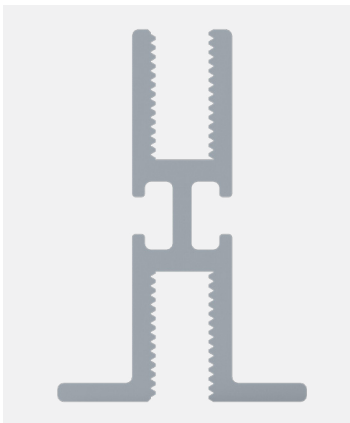


Runner Specifications:



The mains are notched every 600 mm to help with alignment of the cross runner at every intersection. For 600 x 600 mm grids, the 1200 mm runners will have a notch in the middle.

Extrusion Profiles:

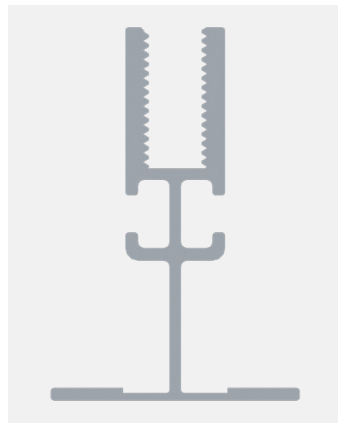


Main Extrusion

3600/1200/600:
40 (W) x 60 (H)

- Top: M10 x 1.5 - 20 mm deep continuous threaded slot.
- Bottom: M10 x 1.5 - 20 mm deep continuous threaded slot.

Main runner composed of aluminium is the primary load bearing runner section (3600 mm) that utilizes standard hardware connectors as per U-Flex structural ceiling grid system.

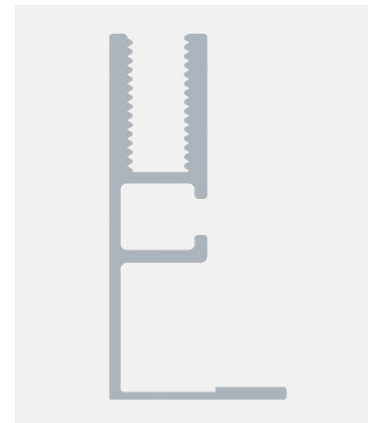


Light Duty Extrusion

1200/600: 40 (W) x 60 (H)

- Top: M10 x 1.5 - 20 mm deep continuous threaded slot

Light-duty extrusions are light-duty load-bearing runner sections (1200/600mm) for infill applications where complete mounting flexibility across the ceiling is not required.



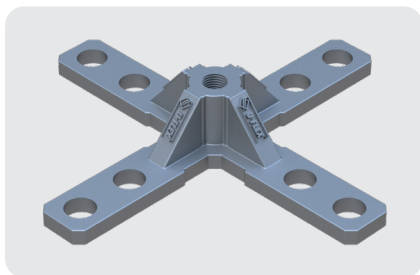
Perimeter Light Duty Extrusion

3600: 29 (W) x 60 (H)

- Continuous threaded M10 x 1.5 - 20mm deep top slot

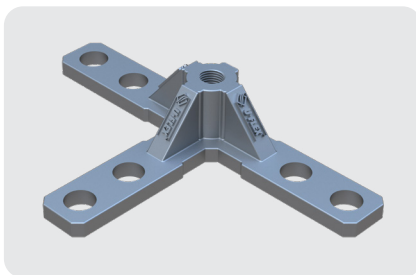
The perimeter light-duty extrusion is a light-duty load-bearing runner section (3600mm) directly screwed to the wall or perimeter where there is no need for complete ceiling mounting flexibility.

Connector Details:



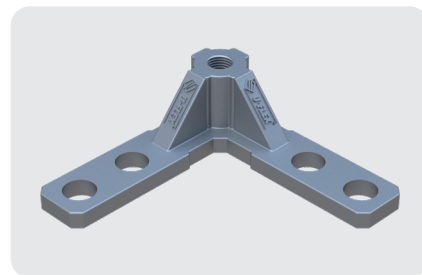
X connectors

X connectors are high strength and corrosion resistant cast aluminium construction used to interlock all cross tees for rigid connection.



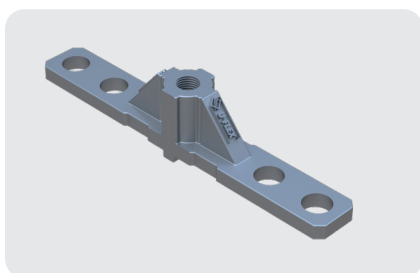
T connectors

T connector also known as perimeter connectors, composed of high strength and corrosion resistant cast aluminium construction, are primarily used for installation along the walls/ columns or any other space interface.



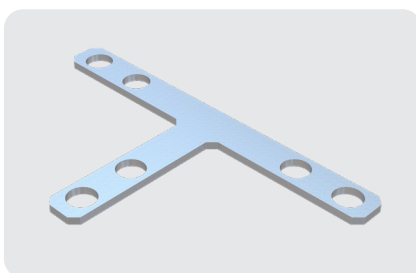
L connectors

L connectors are high strength and corrosion resistant die cast aluminium construction used to interlock perimeter extrusion corners together.



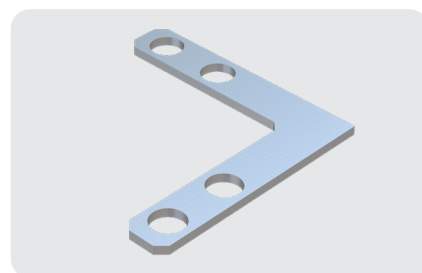
I connectors

I connectors are high strength and corrosion resistant die cast aluminium construction used to interlock the main beam ends.



T Flat bracket

T connector also known as perimeter connectors, made of Mild Steel with Zinc Electroplating, are primarily used for installation along the walls/columns or any other space interface. They are therefore designed to be customized on-site during installation.



L Flat bracket

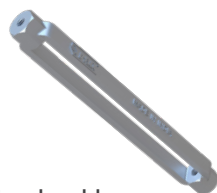
L connector also known as perimeter connectors, made of Mild Steel with Zinc Electroplating, are primarily used for installation along the walls/columns or any other space interface. They are therefore designed to be customized on-site during installation.

Other Component Specifications



Eye to Eye Turnbuckle

Turnbuckle stud composed of zinc electroplated, is used wherever a fastener of greater length and rigidity is needed to secure the turnbuckle and the runner together.



Turnbuckle

Turnbuckle composed of cast steel alloy acts as a connector between threaded rods to create structural support for the grid.



Threaded Rod

Threaded rod composed of zinc electroplated, are used as a ceiling suspension fixed to hard point on one end such as concrete or steel structure and ceiling frame on the other.



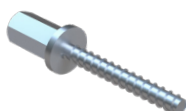
Beam Clamp

Beam clamp of cast steel alloy zinc plated, provide steel-to-steel connections between structural beams eliminating the requirement for drilling, welding, etc.



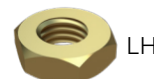
Ultra Low Head Allen Socket Screws

Allen socket screws for fixing connectors and services



Mechanical Anchor Fastener

Mechanical anchor fastener made of steel alloy zinc plated is used for fixing with threaded rods suspended ceilings with concrete structures



Lock Nut

Lock nut made of zinc electroplated acts as a connector to fasten and lock the turnbuckle to the structural grid.

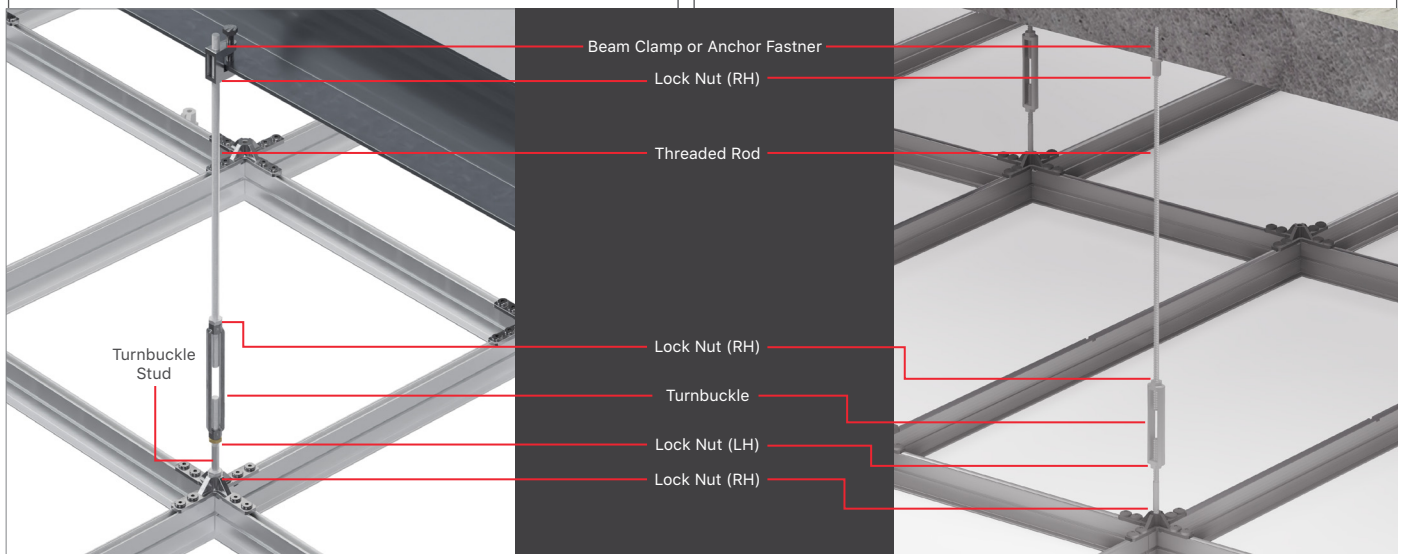
Scope of Supply:

Installation on structural beam

Die casted bracket or beam clamp support from a steel structure on ceiling slab.

Installation on concrete

Anchor fastener hanging method from a concrete slab structure.



Basics of U-Flex Structural ceiling solution:



Maximum grid point load: 4.0 kN/ 400kgs based on a building connection spacing of 1200mm on center.



Grid sizes available: 600 x 600mm, 600 x 1200mm, and 1200 x 1200mm.



Lightweight & non-combustible system made up of special grade structural aluminium alloy extrusions and die-casting components.



Sustainable and recyclable product offers rapid installation with quick and easy assembly on-site

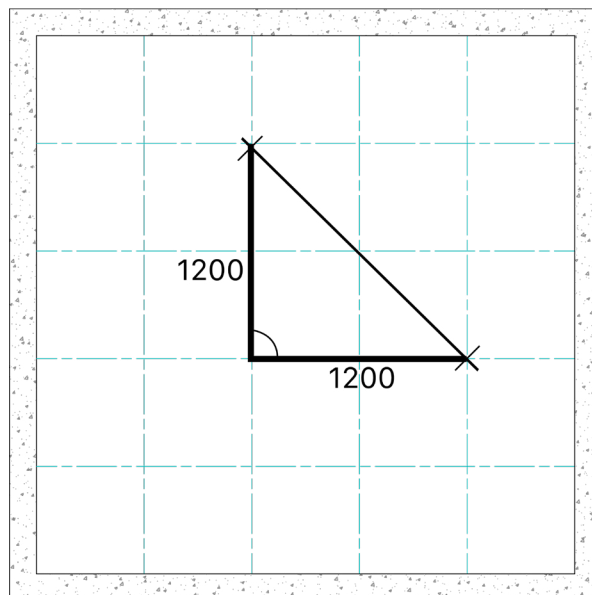
Important points to consider before installation:

1. Exceeding the values mentioned in the loading chart will decline the integrity of the system.
2. Do not apply circulatory force on the threaded rod or bolts above 30 in-lbs. This will damage the threaded slots reducing the load capacity.
3. Avoid using any other screws than those that are supplied by us in the kit.
4. No load should be imposed on the connection system during installation of supported services.
5. U-Flex structural ceiling platform is not a walk-on ceiling.
6. Ensure 4 threads are exposed inside the turnbuckle from the ceiling rod drop. Failure to do so can compromise the integrity of the system.
7. Wear personal protective equipment (PPE) when drilling, cutting, or installing. PPE includes gloves, safety eyeglasses, hard hats, etc.

Note: For structural load data please refer to the U-Flex structural ceiling technical specification sheet.

STEPS OF INSTALLATION

Step 1: Marking of grid



This step is crucial prior to initiating the actual grid installation. It involves determining the grid layout based on room dimensions (length, breadth, height) and the client's specified starting point from the approved GFC drawing. Using a laser leveling machine, mark 1200 x 1200 mm according to the client's starting point, and trim the threaded rod to match the ceiling height specified by the client.

For instance:

The total ceiling area is 221 square meters, including 600 x 600, 600 x 1200, and 1200 x 1200 mm grids. The plenum height is 645 mm, and the system height from the top of the turnbuckle to the bottom of the runner is 350 mm.

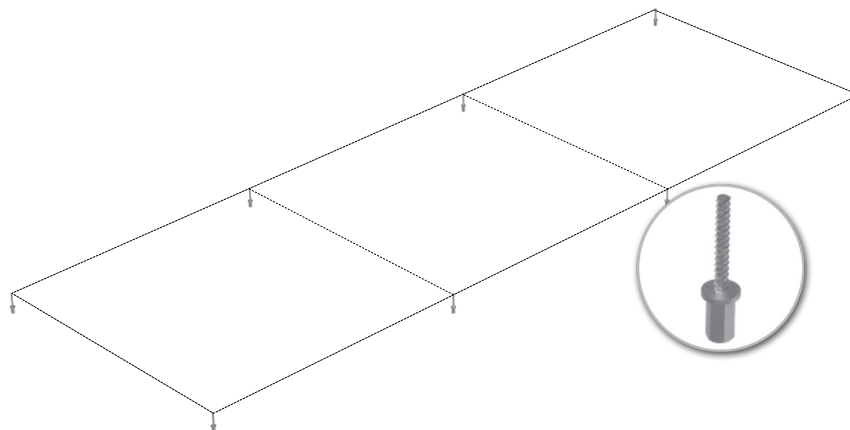
Step 2: Perimeter Installation



Marking perimeter trim lines and installing perimeter wall angles.

STEPS OF INSTALLATION

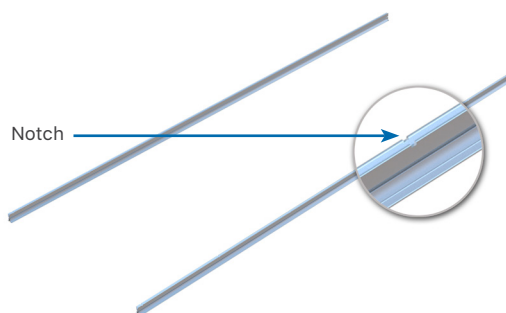
Step 3: Installing the suspension rods



Drilling the Fasteners on the marked location at every 1200 mm center to center.

Step 4: Forming the grid assembly

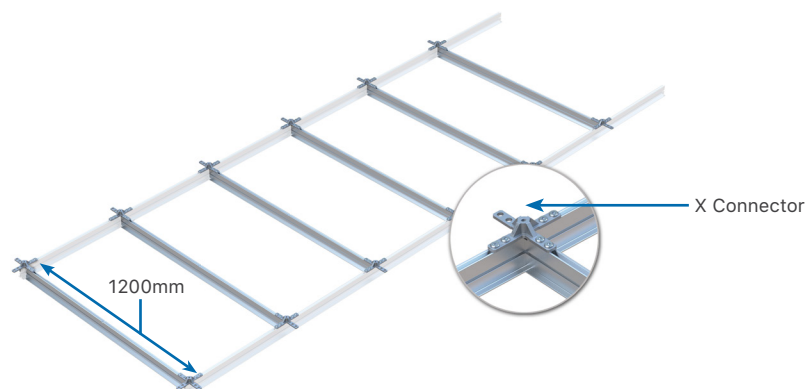
Step 4.1: Laying the main runner



To assemble the grid module, use the designated Jig table or a assembly space in the facility.

- Equally space the main runners (3600 mm) every 1200 mm
- All main runners are notched at every 600 mm for proper alignment

Step 4.2: Laying the 1200 mm cross runner at every 600 mm on the notches

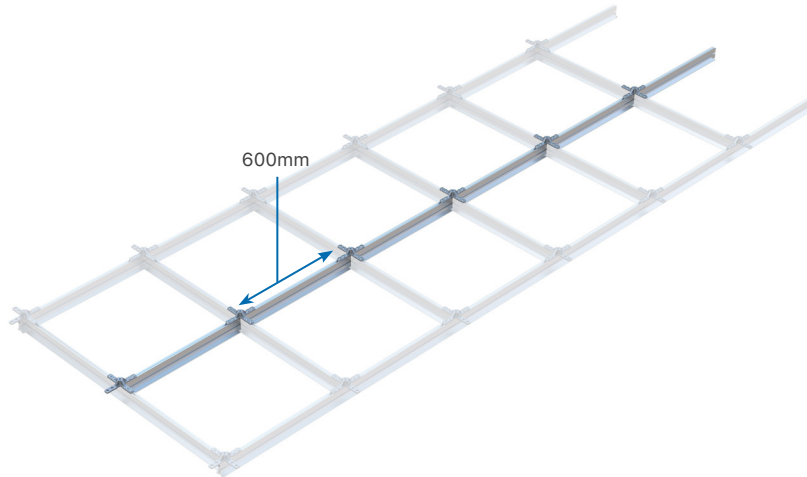


Cross runner placement (1200)

Place cross runners (1200 mm) at every 600 mm along the main runner, ensuring precise grid alignment by adjusting the grooves on the main runner's top edge.

STEPS OF INSTALLATION

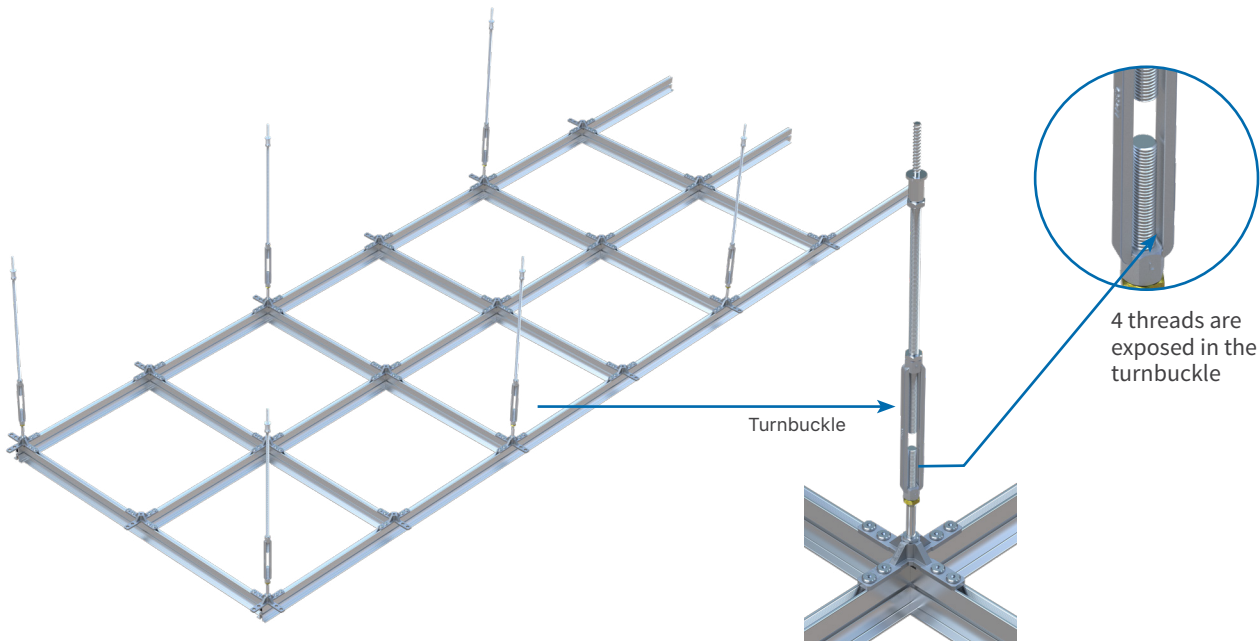
Step 4.3: Further segmenting with 600mm cross runners to form 600 x 600 mm grid



Cross runner placement (600)

For a ceiling designed on a 600 mm grid, insert a 600 mm cross runner between the existing 1200 mm cross runners using connectors. Align the connectors with the factory-cut groove on the top edge of the 1200 mm cross runner.

Step 4.4: Installing threaded rod and turnbuckle in U-Flex X-Connector



Installing Turnbuckle Rod Assembly

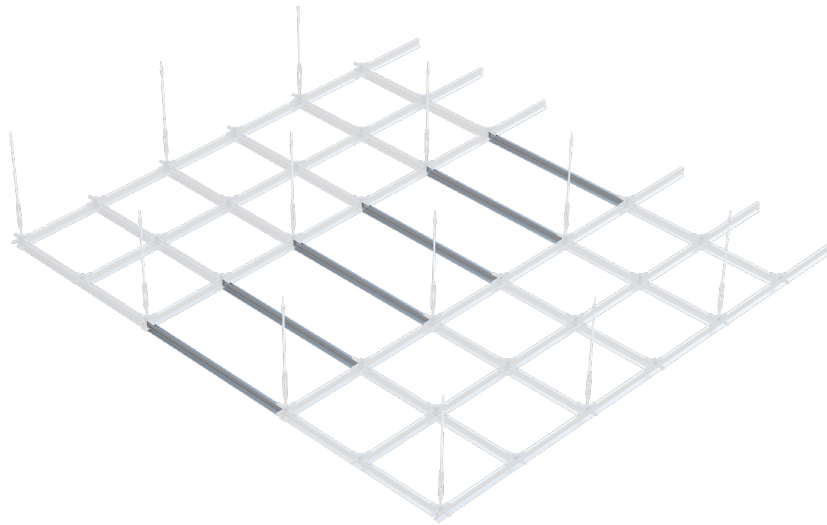
Position the turnbuckle rod assembly at every 1200 x 1200 mm. Lift each module to the specified threaded rod (M10 x 1.5) with lengths adjusted as per site requirements, then fasten them using turnbuckles. The ceiling height can be modified by twisting the turnbuckles. Once the desired height is achieved and levelled, secure the turnbuckle in place using the nut on the threaded rod.

Note: The 3600mm x 1200mm modules are directional, with turnbuckles at the alternate ends (as shown in the image). Check the modules before suspending to ensure proper suspension. Ensure 4 threads are exposed inside the turnbuckle from the ceiling rod drop. Failure to do so can compromise the integrity of the system

STEPS OF INSTALLATION

Step 5. Connecting modules

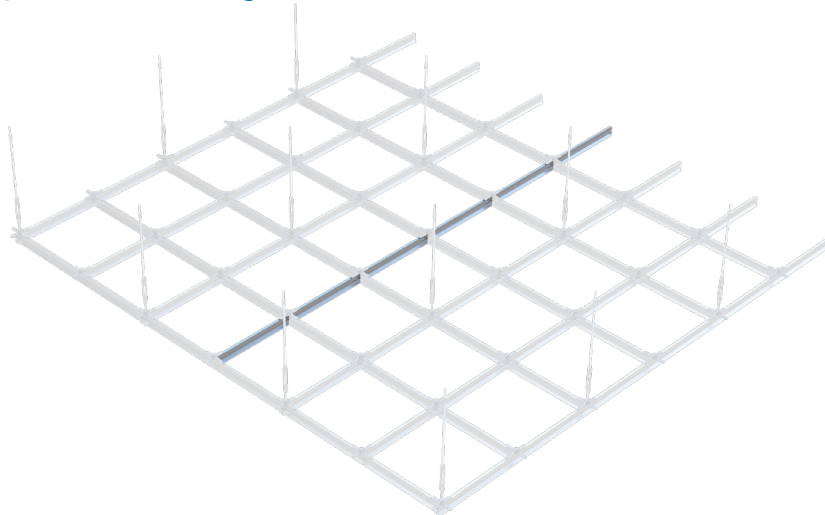
Step 5.1: Connecting cross runner (1200 mm) between two modules



Module Run Installation (1200)

Space each run of modules 1200 mm apart, connecting them with 1200 cross runners. Insert the 1200 mm cross runner in between the modules and orient it to align with the notches on the main runners. Secure it in an upright position and slide it under the U-Flex X-Connector at each intersection using M10 x 1.5 X 25 mm flat head hexagonal screws.

Step 5.2: Connecting cross runner (600 mm) between two modules



Module Run Installation (600)

Space each run of modules 600 mm apart, connecting them with 1200 cross runners. Insert the 600 mm cross runner in between the modules and orient it to align with the notches on the main runners. Secure it in an upright position and slide it under the U-Flex X-Connector at each intersection using M10 x 1.5 X 25 mm flat head hexagonal screws.

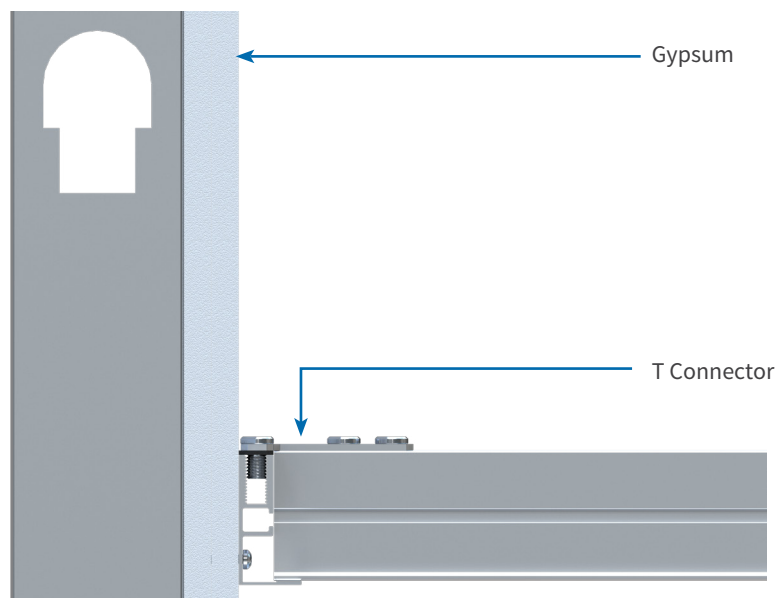
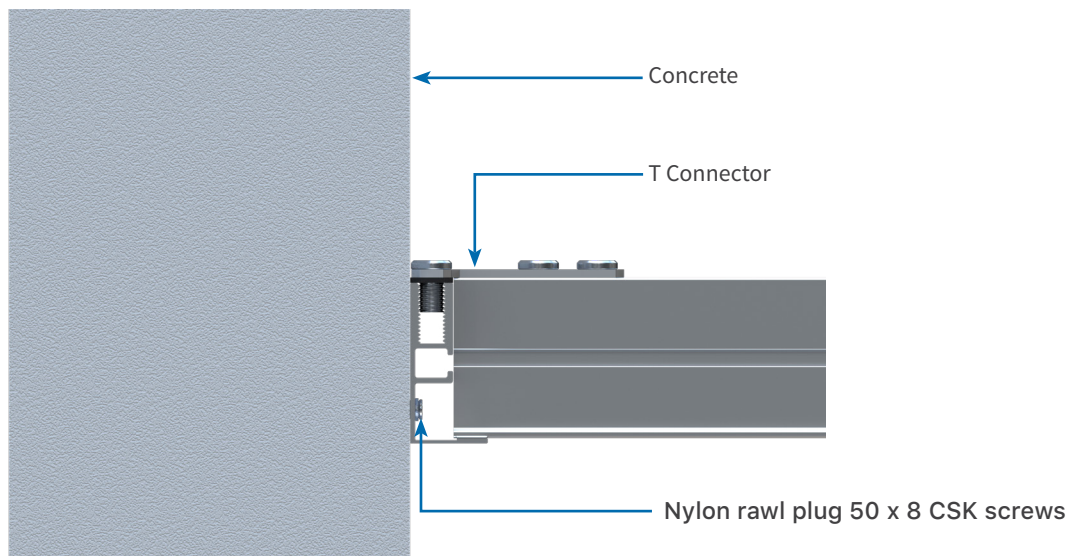
STEPS OF INSTALLATION

Step 6. Installation at Perimeter

Perimeter Fixation

Secure the ceiling's perimeter to studs or structure. Pre-drill holes in the periphery at intervals of 500 mm or a maximum of 600 mm from the center to allow screws to pass. For added stability in case of applied loads, ensure wall molding has threaded rods (4' O.C. max). If not, screws in the perimeter slot can aid in drilling.

Step 6.1: Connecting joints



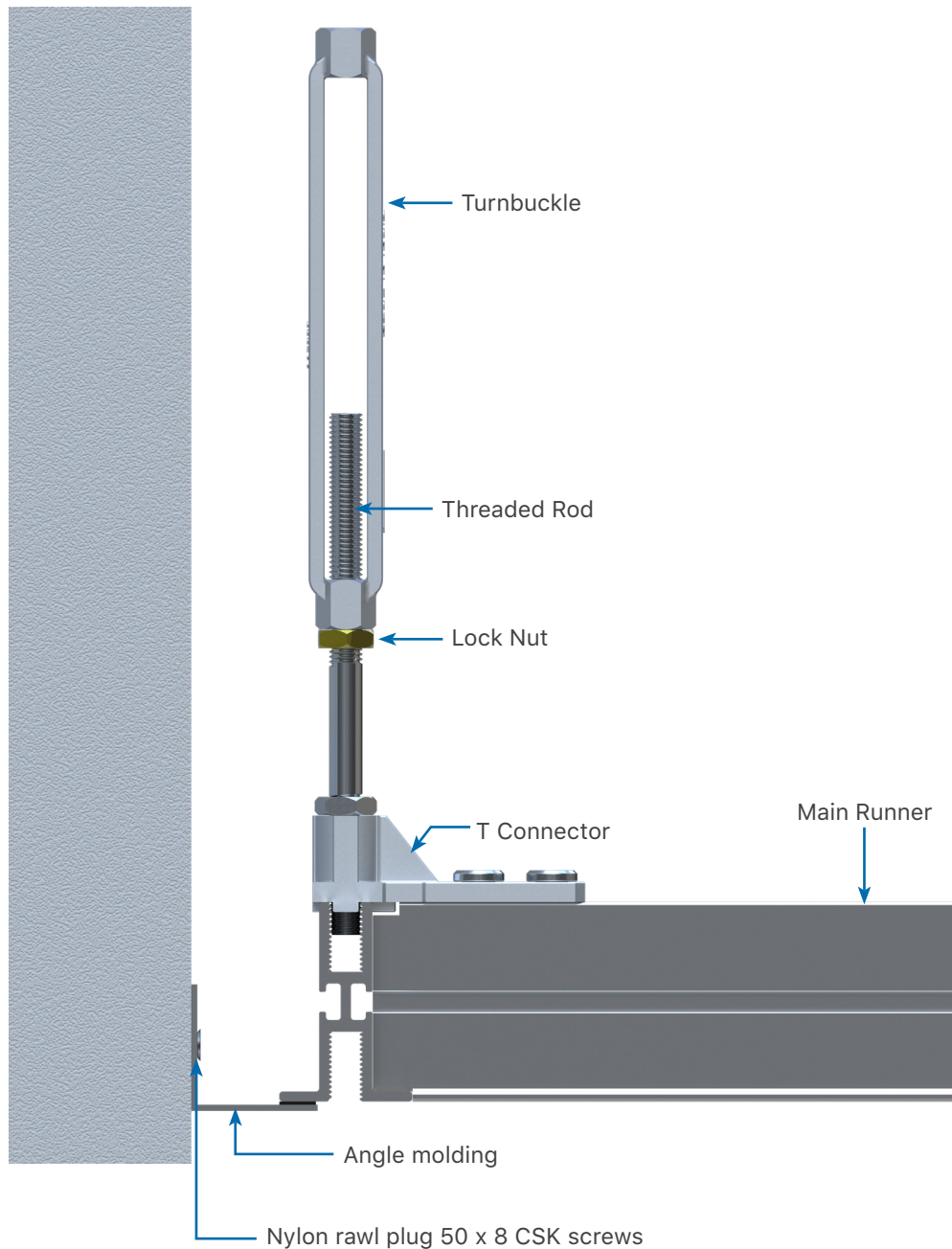
All main runners and cross runners are to be connected to the structural wall angle with a U-Flex T-Connector with M10 x 1.5 x 25 mm Philips pan head socket screws.

Perimeters at all corners should be interconnected using a U-Flex L-Connector.

NOTE: perimeter cross tees will sit on top of perimeter molding with the override. Gasketing may be required.

STEPS OF INSTALLATION

Step 6.2: Perimeter connecting to a wall at a distance



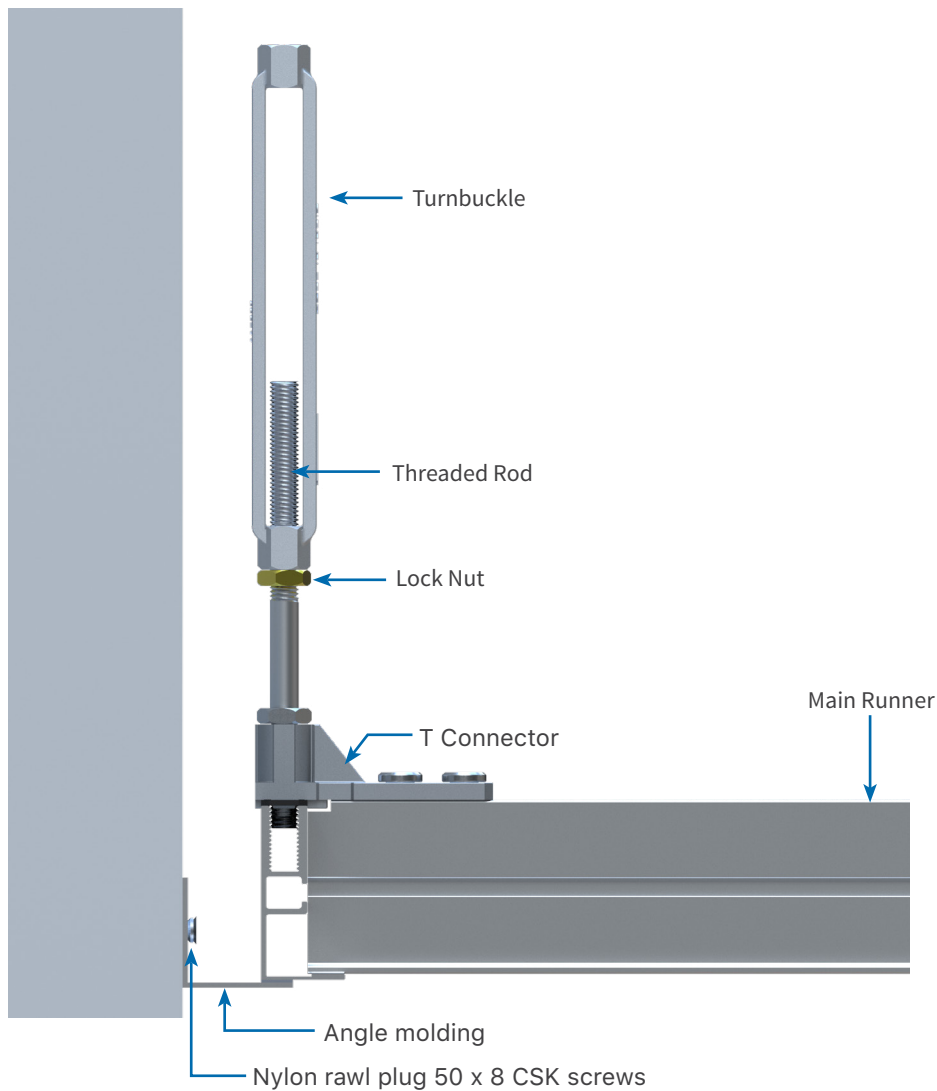
Runner Connection and System Tolerance

Connect all main runners and cross runners to the structural wall angle using U-Flex T-Connectors and M10 x 1.5 x 25 mm Philips pan head socket screws. Maintain a fully modular system by using factory-sized runners and main runners at the perimeter. Allow for imperfections in the walls with a thickness of 38 x 38 x 1.5.

Note: Similar perimeter grid and components will be available for the gypsum wall.

STEPS OF INSTALLATION

Step 6.3: Perimeter connecting to the wall at a lesser distance



Floating Perimeter and Seismic Design

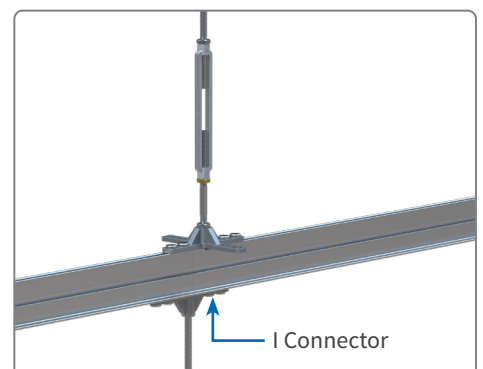
In areas with a floating perimeter condition and a threaded rod drop, maintain a 13 mm gap between the wall and the perimeter wall angle to enable proper turnbuckle adjustment. The U-Flex structural ceiling system is designed for connection to perimeter walls and supporting loads using perimeter molding or seismic separation joints, depending on the project's structural engineering requirements. Notably, standard seismic requirements for acoustical grid attachment to the structural wall molding do not apply in this system.

Note: Similar perimeter grid and components will be available for the gypsum wall.

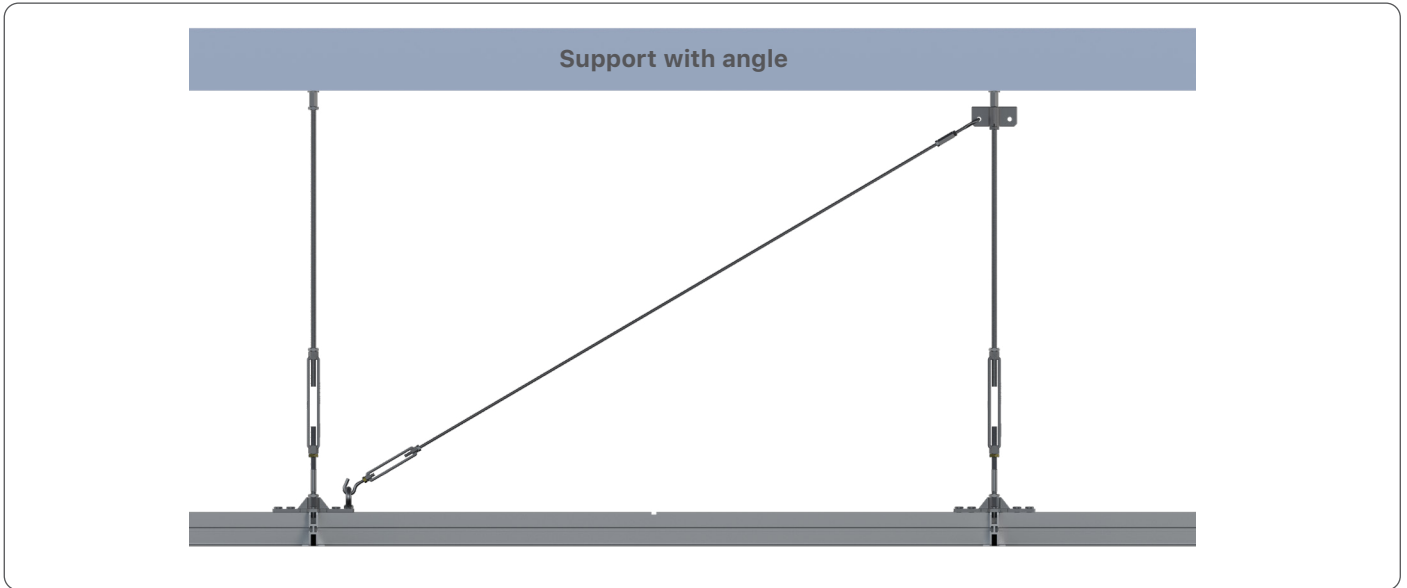
Perimeter Loads

The grid section at the perimeter and the cross runner must be supported between the perimeter and the load on either end of the cross runner with a U-Flex I-Connector in the middle of the wall.

Note: No load shall be within 100 mm from the bottom flange of the runner. In situations where the runner is supported within 177 mm of the perimeters, the perimeter does not require rod drop supports.

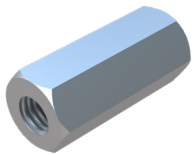


SEISMIC CONSIDERATIONS



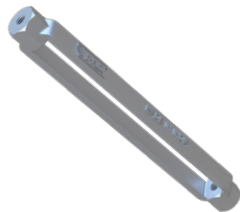
These are options/suggestions if lateral bracing is needed. Cable trays need to be independently designed & braced for seismic zone areas.

Support Components



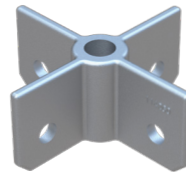
Hexagonal Boss

Product code: 114267



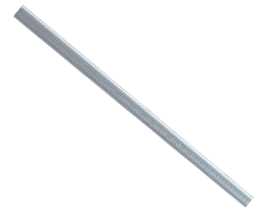
Threaded Turn Buckle

Product code: 114265



Seismic Support Bracket

Product code: 114260
(80 x 80 x 35 x Ø11)



Threaded Rod

Product code: 114266
(M6 x 1.00 RH)



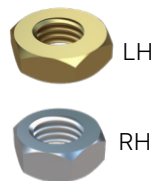
Eye Bolt

Product code: 112884
M10 x 1.50 x 25.00 mm



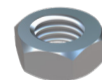
Long Screw Hook

M6 x 1.0 x 75 mm
Product code:
LH: 114261 RH: 114262



Check Nut

M6 x 1.00 mm
Product code:
RH: 114263 LH: 114264



Lock Nut

M10 X 1.50 mm
Product code: 112545

SAFETY & PRECAUTIONS

Personal protective equipment (PPE):

To advocate a strong safety policy, all installers MUST wear PPE consisting of hard hat, rubberized gloves, jacket, steel toes and glasses during installation of the ceiling system.



Safety Helmet

Prevents injury to the head from small falling objects at construction site.



Jacket

Provides better visibility at low visibility construction site.



Rubberized Gloves (CL3)

Prevents injury to the hand from flared edges.



Glasses

Prevents small particles while cutting from entering into the eyes and causing injury.



Safety Shoe

Prevents toe injury due to sharp or obstructive objects laying on the floor.



Safety Gears

Safety masks to protect the contact of mouth droplets, and dust and ear plugs for passive noise cancellation.



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