



Suspended Ceilings Seismic Design Requirements / CISCA – Guidelines for Seismic Restraint for Direct Hung Suspended Ceiling Assemblies- OSSC Section 1613.6 and ASCE 7-10 Section 13.5.6.2.2

Suspended Ceilings shall be designed by a **Registered Design Professional** to meet the seismic force requirements of ASCE 7-10 Section 13.5.6 and shall be installed with the requirements listed below or installed per an **Accepted Standard**.

General Requirements:

- Partitions that are tied to the ceiling and all partitions greater than 6 feet in height shall be laterally braced to the structure. Bracing shall be independent of the ceiling splays bracing system.
Exception: Partitions **not taller than 9 feet** when the horizontal seismic force does not exceed 5 psf.
- A **Heavy Duty** (HD) T-Bar system shall be used.
- All cross tees shall be capable of carrying the design load without exceeding deflection equal to 1/360 of its span.
- For purposes of calculations, the weight of the ceiling (Wp) including grid, panel or tile, light fixtures and air terminals **shall not be taken less than 4 psf**.
- Changes in ceiling planes will require positive bracing.
- All wire ties are to be three tight turns around itself within 3 inches.
- Powder-driven pins shall not be allowed as acceptable attachment devices in concrete construction per ASCE 7-10 Section 13.4.5

Lateral Force Bracing Requirements:

- Lateral force bracing is required for ceiling areas **over 1000 square feet** per ASCE 7-10 Section 13.5.6.2.2 part c.
- Lateral Force bracing shall be **12 feet on center (maximum)** in direction and begin **no farther than 6 feet** from the walls.
- Splay wires are to be four 12 gage wires attached to the main beam. Wires are arrayed 90 degrees from each other and at an angle not exceeding 45 degrees from the plane of the ceiling. Splay wires shall be attached to the grid and to structure in such a manner that they can support a design load of not less than 200 lbs or the actual design load, with a factor of safety of 2, whichever is greater.
- Splay wires are to be **within 2 inches** of the connection of the vertical strut to the suspended ceilings.
- Rigid braces may be used in lieu of splay wires.
- Vertical struts must be positively attached to the suspension system and the structure above.

Perimeter Closure Angle Requirements:

- Perimeter closure angles are required to have a horizontal flange **2 inches wide**, unless alternate methods are approved prior to installation.
- The grid shall be attached to two adjacent walls.
- There shall be a **¾ inch clearance** from the end of the grid system at unattached walls.
- Spreader bars are required at the ends of the main beams at perimeter walls, unless alternate methods are approved prior to installation.

Hanger Wire Requirements:

- Hanger and perimeter wires must be plumb unless counter sloping wires are provided.
- Any connection device at supporting construction shall be capable of carrying not less than **100 pounds**.
- Hanger wires shall be 12 gage and spaced at **4 feet on center** unless other specified by the manufacturer.
- Terminal ends of each main beam and cross tee must be supported within 8 inches of each wall with a perimeter wire.

Mission Statement

“Partnering to promote completeness of design calculations and plan submission necessary to expedite structural engineering review and approval for buildings that satisfy Oregon Structural Specialty Code (OSSC). Partial or incomplete engineering design submittal has been found to create unnecessary protracted review period.”

Electrical and Mechanical Component Requirements:

- All light fixtures are required to be positively attached to the suspended ceiling system. The attachment device shall have a capacity of 1.4 of lighting fixture weight and 1.4 acting in any direction.
- Light fixtures weighing **less than 10 pounds** shall have one 12 gage hanger wire connected from the fixture to the structure above.
- Light fixtures weighing **more than 10 pounds and less than 56 pounds** shall have two 12 gage hanger wires attached at opposite corners of the light fixture to the structure above.
- Light fixtures weighing **more than 56 pounds** shall be supported directly from the structure above.
- Pendant mounted fixtures shall be directly supported from the structure above using 9 gage wire without using the ceiling suspension system for direct support.
- Mechanical terminals or services weighing **more than 20 pounds and less than 56 pounds** shall have two 12 gage wires connecting them to the ceiling system hangers or the structure above.
- Mechanical terminals or services weighing **more than 56 pounds** shall be independently supported from the structure above.
- Additional mechanical and electrical components not listed above **shall be supported independently** of the ceiling hanger or bracing wires.

Seismic Separation Joint Requirements:

- For ceiling areas **exceeding 2500 square feet**, a seismic separation joint per ASCE 7-10 Section 13.5.6.2.2b or full height wall partition that breaks the ceiling unless analysis is performed of the ceiling bracing system, closure angles and penetrations provide sufficient clearance.

Sprinkler Head Requirements:

- For ceilings without rigid bracing, sprinkler head penetrations shall have a **2 inch** oversize ring, sleeve or adapter through the ceiling tile to allow free movement of at least 1” in all direction.

Action Required: The following information is **required** for review and approval.

1. Plans showing the area of ceiling grid and typical bracing details.
2. Calculations and structural details stamped by a **Registered Design Professional** or installed per an **Accepted Standard**.
3. Periodic special inspection during the anchorage of suspended ceilings shall be required per ASCE 7-10 section 13.5.6.2.2.h or as required per the **Accepted Standard**.

Definitions:

Accepted Standard: Standards developed within the industry and represent acceptable procedures for design and construction. Individual Standards must be approved by the Local Jurisdiction.

Registered Design Professional: An individual who is registered or licensed to practice his or hers respective design profession as defined by statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed.

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