

Suspended Grid Ceiling

Design Guidance

This is a guide for the design of suspended, acoustical or grid ceiling. Please ensure the following items are addressed in the permit documents. Additional information may be needed as the plans are reviewed.

SEISMIC DESIGN

Suspended, acoustical or grid ceilings, except those that are no more than 144 sf and restrained on all sides, must be designed and constructed to resist the effects of earthquake motions per IBC Chapter 16, ASCE 7, ASTM C635, ASTM C636 and ASTM E580. In Seismic Design Categories D, E and F, some of the requirements include:

- Perimeter supporting angle shall be positively attached to walls. It shall be not less than 2 inches wide unless qualified perimeter supporting clips are used (see below);
- The suspended grid system must be attached to the perimeter angle on two adjacent walls. At the opposite walls it must be free to slide with a 3/4" clearance;
- The ends of main runners and cross members that are not fixed to the wall shall be tied together with stabilizer bars within 8 inches of the wall or have another approved means to prevent spreading;
- Hanger wire shall be no. 12 gauge wire. Where wire is wrapped through or around members, it must be in tightly formed loops and wrapped around itself 3 turns within 3 inches of length;
- Each hanger wire shall hang no more than 1 inch out of plumb for every 6 inches of vertical drop unless a symmetric counter splay wire is added;
- Hangers for carrying channels or main runners shall be installed not more than 4 feet on-center;

- For a ceiling area more than 1,000 sf, lateral restraints consisting of four wires at 45 degrees or rigid bracing shall be placed 12 feet on-center in both directions starting within 6 feet of each wall;
- A ceiling area more than 2,500 sf must have a seismic separation joint or full height partition separating areas each not more than 2,500 sf and not more than 4 times longer than its width;
- Ceilings must have 2-inch trim rings for sprinklers and other penetrations unless the ceiling and the penetrations are designed by an engineer as an integral unit.

If perimeter supporting clips are used instead of 2-inch perimeter angle, provide the evaluation report for the specific ceiling system. The evaluation report is subject to review and approval. The report must be a valid research report prepared by an independent entity based on an approved testing procedure such as ICC-ES AC156.

Cloud ceilings (not attached to any wall) shall be designed by an engineer unless an alternate method based on approved testing and reports can be approved.

OTHER REQUIREMENTS

Suspended ceilings shall also comply with other applicable requirements of the IBC, which include:

- Materials and installation requirements of Section 808;
- Interior finish requirements of Section 803;
- If part of a fire-resistance rated assembly, it shall be installed in the same manner used in the assembly tested and shall comply with Chapter 7.

Code references current at the time of update: 2021 International Building Code Sections 104.11, 808 and 1613.1, ASCE 7-16 Section 13.5.6, ASTM C635, ASTM C636 and ASTM E580 Section 5.

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