



*Working with Oregonians
to ensure safe building
construction while
supporting a positive
business climate.*

**No: 2004 OSSC Section 1621.1 and
2007 OSSC (effective on April 1, 2007) Section
1613.1.**

Code Section: 2004 OSSC Section 1621.1,
2007 OSSC Section 1613.1,
ASCE 7-02 Section 9.6.2.6 and
ASCE 7-05 Section 13.5.6.2.2

Code Edition: 2004 and 2007 for OSSC's and
2002 and 2005 for ASCE Standard 7.

Date: *REVISED: April 20, 2007*

Subject: Construction requirements for Suspended Ceiling Systems.

Question: What are the minimum requirements of the Oregon Structural Specialty Code for the construction of suspended ceiling systems?

Answer: *I. The following options are available:*

- a. An engineered ceiling system designed for appropriate forces,
- b. Prescriptive ceiling systems per CISCA standards as provided below, except for ceiling systems in structures classified as Occupancy category III or IV:
 - i. in Seismic Design Category *C*, construction in accordance with CISCA standards for seismic zones 0-2.

All of the notes in section IV of this interpretation shall be applicable in addition to the CISCA requirements.

- ii. in Seismic Design Categories *D* through *F*, construction in accordance with CISCA standard for seismic zones 3 and 4 with modifications as noted in ASCE 7- 02 or ASCE 7-05 standard.

All of the notes in sections IV and V of this interpretation shall be applicable in addition to the requirements contained in ASCE 7- 02/05 or ASCE 7-05 and the CISCA standards for



Seismic Design Categories D through F.

- c. Effective April 1, 2007, (with the adoption of the 2007 OSSC) the following two additional options will be available based upon ASCE 7-05 Sections 13.2.5 and 13.2.6:
 - i. Shake table testing of components and their supports, to determine their seismic capacities, in accordance with ICC Acceptance criteria 156. {Section 13.2.5 of the ASCE 7-05.}, or
 - ii. Seismic qualification by experience data based on nationally recognized procedures. {Section 13.2.6 of the ASCE 7-05.}

II. Northwest Wall & Ceiling Bureau - Technical Bulletin 401 OREGON (NWCB TB 401OR): In structures other than those classified as occupancy category III or IV, suspended ceilings installed in accordance with the prescriptive provisions of *NWCB TB 401OR* ***are deemed to comply with this interpretation.***

NWCB TB 401OR contains information compiled from the different applicable documents such as ASCE Standard 7-05, IBC 2006, ASTM Standard C635 and CISCA and is available at the following internet address:

http://www.nwcb.org/images/resource_files/401_OREGON.pdf

All of the notes in sections IV and V of this interpretation shall be applicable in addition to the requirements contained in NWCB TB 401OR.

III. The Seismic restraint for suspended ceiling systems in structures classified as Occupancy Category III and IV, are required to be designed for the specific project and the anchorage of the ceiling system is required to be periodically special inspected in Seismic Design Categories D, E, and F in accordance with the provisions of the current edition of the Oregon Structural Specialty Code.

IV. GENERAL NOTES. The following notes are applicable to sections I and II:

- a. ***SPECIALTY CEILINGS. Specialty ceilings, must be installed using an engineered design and may not use the provisions of this interpretation.*** Specialty ceilings include but are not limited to those:
 - i. Incorporating arched ceilings, curved or curvilinear ceilings or sloped ceilings; or
 - ii. Having no direct connection to the surrounding walls or supports, such as "free floating" or "cloud" ceiling elements.
- b. ***TILES.*** Suspended ceilings installed to this interpretation may use either standard acoustical lay-in ceiling panels, tegular or kerfed ceiling panels.

- c. SPREADER BARS.
 - i. Wire ties are deemed equivalent to spreader bars
 - ii. Spreader bars are not required if a 90 degree intersecting cross or main is within 8 inches of the perimeter wall.
 - iii. Spreader bars are not required at perimeters where ceiling grid ends are attached to closure angles.
- d. WIRE GAUGE: The minimum wire size shall be US Steel Wire Gage #12 (0.1055 inch).

V. Notes Specific to Design Categories D through F

- a. Lateral force bracing is required for ceilings over 144 square feet.
- b. Ceilings with interstitial spaces less than 12 inches to framing are not required to have lateral force bracing.
- c. GRID ATTACHMENT: The suspended ceiling grid **shall be attached to two adjacent walls**. Soffits complying D(ii)(2) are deemed to be equivalent to walls.
- d. SEISMIC JOINTS
 - i. For ceiling areas exceeding 2,500 square feet, a seismic separation joint shall be provided. The layout and location of seismic separation joints shall be per the designer of record and noted on the plans.
 - ii. In lieu of seismic separation joints, the ceiling may be divided into areas less than 2,500 square feet by the use of partitions or soffits as described below.
 - 1. Partitions. Where used, partitions shall extend a minimum of 6 inches above the level of the plane of the grid and shall be independently braced to the structure above.
 - 2. Soffits. Where used, soffits shall extend to a point at least level with the bottom plane of the grid and shall be independently supported and laterally braced to the structure above.
 - iii. Other than partitions and soffits, seismic joints may not be used as part of a fire rated ceiling assembly unless substantiating documentation is provided.
 - iv. The minimum movement that must be accommodated at seismic joints is $\frac{3}{4}$ of an inch.
- e. PERIMETER CLIPS: Where substantiating documentation is provided, perimeter clips may be used to satisfy the following requirements:
 - i. 2 inch closure angle
 - ii. Spreader bar requirements
- f. Sprinkler Heads: Flexible head design that can accommodate 1 inch free movement in any direction shall be permitted as an

alternate to the requirement for 2 inch oversize rings, sleeves or adapters through the ceiling tile.

- g. "Powder driven shot-in-anchors" when used for seismic application as part of the prescriptive path in Seismic Design Categories D, E, & F shall have an ICC-ES approval for seismic applications and shall require "special inspection" irrespective of the type of "occupancy category" the structure is in. Anchors for kicker wires (splayed wires installed for purposes other than seismic restraint) are exempt from this requirement.

As of the issuance of this interpretation, approved load testing values for the use of "powder driven shot-in- anchors" in normal-weight concrete over a metal pan deck have not been established. Until such time as approved load testing values are established, an on-site pull-test of such assemblies is required. The test shall demonstrate that the anchor can support a minimum 250 lbs for not less than 10 seconds and be conducted by an approved testing agency. At a minimum, such testing shall be performed on 5% of the total number of wires but no less 5. Test samples shall be selected from dispersed locations.

On Site Test Failures.

In case of pull test failures, the testing agency shall notify the local jurisdiction. An increased level of testing, as described below, shall be conducted. All failed anchors shall be replaced.

Increased testing requirements.

1. A minimum of 6 anchors in the immediate vicinity of the failed anchor shall be tested.
2. In the event of any additional failure, all anchors placed on the same day shall be tested.

Load testing results are required to be submitted to the local jurisdiction for approval prior to the ceiling grid inspections.

- h. ***Expansion, Screw In and Adhesive Anchors.*** The International Codes Counsel – Evaluation Services (ICC-ES) has recently issued new acceptance criteria for the anchors noted above. In order to give manufacturers time to complete the approval process, the Building Codes Division is authorizing the following grace periods effective immediately:

1. Expansion anchors: ***Grace period expires November 30, 2007.*** In the interim, expansion anchors must comply with the previously issued acceptance criteria "AC01." After that date, expansion anchors must comply with the new ICC-ES acceptance criteria "AC193."
2. Screw anchors: ***Grace period expires April 30, 2008.*** In the interim, screw anchors must comply with the previously issued acceptance criteria "AC106." After that date, screw

anchors must comply with the new ICC-ES acceptance criteria “AC193.”

3. Adhesive anchors: ***Grace period expires April 30, 2008.*** In the interim, adhesive anchors must comply with the previously issued acceptance criteria “AC58.” After that date, adhesive anchors must comply with the new ICC-ES acceptance criteria “AC308.”

Please note that the grace periods referenced above will not be extended.

VI. Upgrading of Existing Ceilings;

- a. ***Ceilings without Seismic Bracing.*** Where existing ceilings are without seismic bracing, the ceiling system shall be brought into substantial compliance with current code requirements when 50% or more of the ***ceiling tile*** is altered, repaired or replaced as part of a general space alteration, or if all of the ***ceiling system*** is removed.

Substantial Compliance means installation of the following items where required in new construction;

- i. lateral force bracing (splayed wires)
- ii. compression struts
- iii. slack wires on all light fixtures and air terminals.

This requirement does not trigger the need for;

- i. 2 inch closure angle as specified in section II
- ii. Seismic separation joints
- iii. 1 inch movement in all directions around sprinkler pendants

These upgrades ***are not required*** when:

- i. removing portions of tiles or panels and/or grid to alter ductwork, sprinkler pipe, etc.
 - ii. portions of a ceiling are removed only to facilitate the installation of sprinkler piping.
- b. ***Ceilings without Compression Struts.*** Where existing ceilings have seismic bracing but do not have compression struts at the center of the splayed wires, the addition of compression struts will only be required when and where the grid is replaced, altered, raised or lowered.

Analysis: Building Codes Division staff has obtained clarifications from both the ASCE and Cisca staff regarding the intent of provisions in their respective documents. Both documents intended to allow the prescriptive construction of suspended ceilings in accordance with the methodology provided in the appropriate Cisca standard along-with the modifications listed in the ASCE 7 document.

Contact: Richard S. Rogers, Structural Program Chief
richard.rogers@state.or.us (503) 378-4472