Suspended Acoustical Ceilings
(Per 2012 IBC - Seismic Design Category D, E & F)

LIMITATIONS
1. This handout is provided as an alternative to providing an engineered design for building department approval. The use of this handout is subject to the approval of the building department prior to installation. The building department takes no responsibility for the design included herein. If the owner wishes to use this handout, they claim full liability.
2. These recommendations are intended for suspended ceilings to receive lay-in tiles not weighing more than 4 lbs per square foot including grid panels/tile, light fixtures, air terminals and other accessories supported by the suspension system (ASCE7-10 Section 13.5.6.2).
3. Lateral bracing wires are not required for areas smaller than 1,000 square feet. (ASTM E580 Section 1.6)
4. Where the area exceeds 2,500 square feet seismic separation joints shall be provided. (ASTM E580 Section 5.2.9.1)
5. Areas separated by seismic separation joints shall not exceed 2,500 square feet and shall have a maximum length to width ratio of 4:1 (ASTM E580 Section 5.2.9.1).
6. Gypsum board ceilings attached to suspended members and spanning from wall to wall are exempt from these requirements. (ASTM E580 Section 1.7)
7. If your project does not satisfy the limitations noted above, this handout may not be used.

MISCELLANEOUS ITEMS
1. Lighting fixtures shall be attached to the suspending ceiling structure by mechanical means.

MISCELLANEOUS ITEMS (CONT.)
2. Lighting fixtures weighing less than or equal to 10 lbs shall have one, 12-gauge safety wire connected from the fixture to the supporting structure. It is not necessary for these safety wires to be taut.
3. Lighting fixtures weighing greater than 10 lbs but less than or equal to 56 lbs shall have two, 12-gauge safety wires connected from the fixture to the supporting structure. It is not necessary for these safety wires to be taut.
4. Lighting fixtures weighing greater than 56 lbs shall be supported directly from the structure above by approved hangers.
5. Flexible sprinkler and ceiling-mounted air terminals less than 20 lbs shall be positively connected to the suspended ceiling support members.
6. Mechanical, electrical, and plumbing (MEP) services weighing greater than 21 lbs but less than 56 lbs shall have two, 12-gauge safety wires connected from the fixture to the supporting structure. It is not necessary for these wires to be taut.
7. MEP services weighing greater than 56 lbs shall be supported directly from the structure above by approved hangers.
8. Sprinkler heads and other penetrations shall have a 2 inch ring to provide for 1 inch lateral movement in any direction (ASTM E580 Section 5.2.5.5).
9. Partitions greater than 6 feet in height that are tied to the ceiling shall be laterally braced to the supporting building structure (ASTM E580 Section 5.5.1).
GENERAL REQUIREMENTS

1. The splices, intersection connectors, and expansion devices of main runners and cross runners shall be designed and constructed to carry a mean ultimate test load of not less than 180 lb in compression and in tension (ASTM E580 Section 5.1.2).

2. The perimeter support angle (molding) shall have a minimum width of 2 inches (ASTM E580 Section 5.2.2) unless an approved seismic clip is provided; in which case, a \( \frac{3}{8} \) inch support angle (molding) is sufficient.

3. Main runner and/or cross runner ends shall be attached to the perimeter on two adjacent walls. A \( \frac{3}{8} \) inch gap shall be provided at the free end (ASTM E580 Section 5.2.3). Where seismic clips are used, a \( \frac{3}{8} \) inch gap shall be provided at the free end. See Figures 1A and 1B.

4. Mechanically-connected cross runners shall be provided at a maximum spacing of 60 inches. Stabilization shall occur within 24 inches of each wall (ASTM E580 Section 5.2.5).

5. The terminal end of each cross runner and main runner shall be supported independently, within a maximum of 8 inches from each wall or discontinuity by no smaller than a 12-gauge wire (ASTM E580 Section 5.2.6).

6. Suspension wires shall not be smaller than 12 gauge and spaced at a maximum of 48 inches (ASTM E580 Section 5.2.7.1).

7. Suspension wires shall be within 1 in 6 of plumb (ASTM E580 Section 5.2.7.3).

8. All wires must be wrapped around itself a minimum of three full turns within 3 inches (See figures 4 and 5). Connection to the supporting structure shall be designed for a minimum of 90 lbs (ASTM E580 Section 5.2.7.2).

KEY:

- CONNECTION TO CLOSURE ANGLE - SEE DETAILS 1A AND 1B
- 12 GAUGE VERTICAL HANGER WIRE - SEE DETAIL 2
- LATERAL BRACING (REQ'D @ AREAS GREATER THAN 1,000 SQ. FT. - SEE DETAIL 3
1. Lateral restraint shall be placed 12 feet on center in both directions with the first point within 6 feet of each wall (ASTM ES80 Section 5.2.8.2).
2. Lateral restraint shall be provided by four 12-gauge wires splayed at 90° separation at a 45° angle from the plane of the ceiling. The wires shall be secured to the main runner within 2 inches of the cross runner intersection (ASTM ES80 Section 5.2.8.2).
3. Connection of the splay wires to the supporting structure shall be designed to support a minimum of 250 lbs (ASTM ES80 Section 5.2.8.3).
4. Provide a strut fastened to the main runner at the location of the bracing wires extend to the support structure above. The strut shall be adequate to resist the vertical component induced by the bracing wires (ASTM ES80 Section 5.2.8.2).
5. EMT conduit or metal studs may be used in lieu of a strut per the alternate compression strut table provided (see below).
6. A trapeze or equivalent device shall be used where obstructions preclude direct suspension (ASTM ES80 Section 5.2.7.4).
7. Stabilizers or spacers per Section B-B are required at the free end of main runners or cross runners (ASTM ES80 Section 5.2.4) where seismic clips are not provided.

### ALTERNATE COMPRESSION STRUT

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<tr>
<th>EMT CONDUIT</th>
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<tbody>
<tr>
<td>1/2&quot; EMT CONDUIT</td>
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<tr>
<td>3/4&quot; EMT CONDUIT</td>
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<table>
<thead>
<tr>
<th>METAL STUD</th>
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<tr>
<td>1-5/8&quot; METAL STUD (25-GAUGE)</td>
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<tr>
<td>2-1/2&quot; METAL STUD (25-GAUGE)</td>
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FIGURE 1A: PERIMETER CLOSURE ANGLE DETAIL

FIGURE 1B: PERIMETER CLOSURE ANGLE w/ SEISMIC CLIP DETAIL

FIGURE 2: VERTICAL HANGER WIRE

FIGURE 3: LATERAL BRACING WIRE

FIGURE 4: VERTICAL HANGER WIRE BEND

FIGURE 5: LATERAL BRACING WIRE BENDS