

HOW TO APPROXIMATE CEILING LOUDSPEAKERS FOR AN INSTALLATION:

You should always use a reflected ceiling plan for laying out ceiling speakers. This plan should show light fixtures, HVAC vents, and sprinklers. Having the furniture/floor plan underneath is helpful but not necessary.

“Ear Height”: 3.5 feet for seated audience, 5 feet for standing. If a room is "multi-purpose", like a ballroom at a hotel, use standing ear height - by the time the "cone" spreads for seated you are definitely good.

“Mounting Height” is the height you attach the speaker. This could be the drop tile ceiling height or the bottom of a z-beam you attach a surface mounted speaker pointing 90 degrees down.

Here is how you calculate spacing (speaker to speaker):

For 1.5dB in direct field: Floor to Mounting Height - Ear Height x 1.5

For 3 dB in direct field: Floor to Mounting Height - Ear Height x 2.0

For 6 dB in direct field: Floor to Mounting Height - Ear Height x 2.5

Speech intelligibility = Excellent using 1.5 dB (should be spacing for voice only systems for classrooms etc)

Speech intelligibility = Good/Very Good using 3.0dB (will be used for multipurpose rooms like gyms/ballrooms)

Speech intelligibility = Average using 6.0dB (use for background music system with light paging duties i.e. your table is ready)

Here is how you lay out the ceiling speakers:

Step 1: Take spacing and divide by 2. Starting in a corner, place first speaker at this 1/2 spacing down the wall and 1/2 spacing into the room.

Step 2: Using this starter speaker, use full spacing working left to right for first row. Come back to starter speaker, go down full spacing, and use the full spacing to complete next row. Follow same procedure until grid of speakers fills the room. **DO NOT WORRY** that you land on lights/fixtures, out of the room, etc. This step just establishes the grid.

Step 3: Center the entire grid into the room. Make sure you have an equal boundary on the top/bottom and left/right of the room.

DO NOT WORRY that you land on lights/fixtures, out of the room, etc.

This step just establishes coverage within the room.

Step 4: Move any speaker on top of light fixture, HVAC, Sprinkler, etc.

You can move a speaker 2 feet in any direction and not disturb the direct field coverage.

This method assumes you have a speaker with a minimum 90-degree conical coverage pattern. If you have a non-symmetrical coverage pattern (i.e. 120 x 90, etc) you will need to apply a very different method (a staggered layout).

This is "advanced speaker placement and even if you use the above method you will get 6dB in the direct field with an asymmetrical pattern.