LeadingEdge - Acoustic Panels

How to Work Out What You Need and Where to Place Them?

The use of LeadingEdge Acoustic Panels is considerably more straightforward than most other acoustic treatments. The self-compensating nature of the panels makes it impossible to make the acoustics in your listening room worse, while correct placement will have a hugely positive impact. Achieving correct placement is simplicity itself, if you follow four basic rules. These rules will enable you to determine exactly how many acoustic panels are required for your listening room and where best to place them. We'll start by establishing the basic rules and then we'll look at each one in more detail and offer a few examples.

The Rules

Start by estimating the total volume of your room in cubic meters. Divide that number by 10 and that gives you the total panel area required in square meters.

Note that double-sided panels, whether they are free standing, suspended from the ceiling or fixed to the wall, require a minimum of 200mm or 8" of free space above/behind them, whereas single-sided panels can be mounted flush to the wall. Double-sided panels are more cost and space efficient (in terms of overall panel area required) but do require this depth behind them.

Use the table of panel effective areas and the layout of your room to combine single and double-sided panels to match the total area required.

Decide on final placement. The panels are most effective at the halfway points along room boundaries, so that means the centre of the ceiling, halfway down the walls or centrally between the speakers. The most effective solutions combine ceiling or sidewall placement with a single panel between the speakers.

Now let's look at those basic rules in a little more detail.

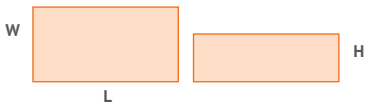
Rule 1 - Estimating panel area requirement.

Calculate the volume of your listening room (in cubic metres). If in doubt you can use the examples below as a guide to assist. Once you have the total room volume, divide that figure by 10 - this gives you the approximate panel area required for your room (in square metres).

Room Examples:

Examples 1 & 2

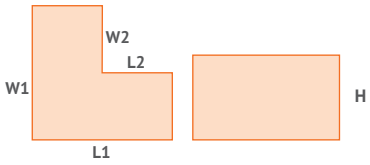
cubic/flat ceiling (small/med)



1. L = 5m, W = 4m, H = 2.2m
2. L = 6m, W = 5m, H = 2.2m

Example 3

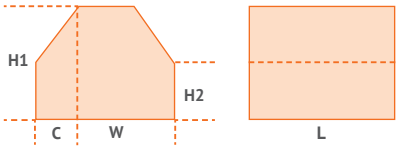
L shape/flat ceiling (large)



L1 = 7m, W1 = 5m, L2 = 2m,
L3 = 2m H = 2.5m

Example 4

cubic/vaulted ceiling (v large)



W = 6m, H1 = 4m, H2 = 2.2m
C = 2m, L = 7m

Example no.	Floor Area	Ceiling height	Room volume	Approximate panel area required
1	(L x W) 5m x 4m = 20m2	(x H) x 2.2m	= 44m3	4.4m2
2	(L x W) 6m x 5m = 30m2	(x H) x 2.2m	=66m3	6.6m
3	(L1xW1)-(L2xW2) = (7m x 5m) - (2m x 2m) = 31m2	(x H) x 2.5m	= 77.5m3	7.7m2
	Cross-section area	**Length**	**Room volume**	**Approximate panel area required**
4	(W x H1) - ((H1-H2) x C) = (6m x 4m) - (4m - 2.2m) x 2m) = 24 - 3.6 = 20.4m2	(x L) x 7m	= 142.8m3	14.3m2

Rule 2 - Fixing Considerations

Consider whether a free-standing or fixed solution is preferable, or even a mixture of the two. Both single and double-sided panels can be fixed to walls or ceilings. Double-sided panels can be free-standing (feet provided). When wall or ceiling mounted, single sided panels can be flush or batten mounted, double-sided panels need to be spaced at least 200mm/8" from the wall or ceiling and mounting kits are available for this purpose.

Rule 3 - Determining the number and type of panels required.

The following table gives the approximate effective surface area of the panels.

Panel Type	Dims	Single or double sided	Effective area
FP1	800mm x 600mm	Single sided	0.5m2
FP2	1100mm x 600mm	Single sided	0.7m2
FP3	1600mm x 600mm	Single sided	1.0m2
FP4	800mm x 600mm	Double sided	1.0m2
FP5	1100mm x 600mm	Double sided	1.4m2
FP6	1600mm x 600mm	Double sided	2.0m2

By adding together the combined effective areas of the various panels, you should now be able to match the number and choice of panels to your room. These panel areas are ideal but if it is impossible to accommodate an optimum arrangement, even a reduced panel area will still offer really significant improvements.

Below, we have laid out the options for the room examples used above. This should help establish the available options in your room and situation. Note that where fixing is refered to as batten mount, this could also be flush mount in a full refurbish/install project.

Example no.	Panel area required	Option 1	Option 2	Option 3
1	4.4m2	2 x FP6 free-standing or wall/ ceiling mounted (stand-off or suspended) 1x FP1 behind speakers (batten mount)	4 x FP3 wall/ceiling mounted (stand-off or suspended) plus 1x FP1 behind speakers (batten mount)	2 x FP5 ceiling mount (suspended) 1 x FP2 wall mount behind speakers (batten mount)
2	6.6m2	3 x FP6 free-standing or wall/ ceiling mounted (stand-off or suspended) 1x FP1 behind speakers (batten mount)	6 x FP3 wall/ceiling (batten mount) 1x FP1 behind speakers (batten mount)	2 x FP6 ceiling mount (suspended) 2 x FP2 side wall mount (batten mount) 2 x FP2 behind speakers (batten mount)
3	7.7m2	4 x FP6 free-standing or wall/ ceiling mount (stand-off or suspended)	7 x FP3 wall/ceiling (batten mount) 1x FP2 behind speakers (batten mount)	4 x FP2 wall mount (batten mount) 4 x FP2 ceiling (batten mount) 2 x FP3 behind speakers (batten mount)
4	14.3m2	6 x FP6 free-standing or wall/ ceiling mount (stand-off or suspended) 2 x FP3 behind speakers (batten mount)	4 x FP6 ceiling (suspended) 4 x FP3 side wall (batten mount) 2 x FP3 behind speakers (batten Mount)	4 x FP5 ceiling (suspended) 4 x FP5 side wall (stand-off) 3 x FP4 behind speakers (stand-off)

Rule 4 - Location considerations

The panels should be placed at the midpoints of the room axes, where particle velocity is greatest.

There are three main options for panel locations:

1. Central ceiling mounting.
2. Standing or fixed halfway along each sidewall.
3. Standing or fixed centrally between and behind the plane of the loudspeakers.

The most effective position is the central ceiling mount, as this treats both the longitudinal and lateral axes simultaneously, increasing the benefit of each panel.

If that is not possible, the sidewall positions are the next most effective.

However, after making a decision between these two placements, supplementing that with a panel placed between the speakers is extremely effective, so having chosen between ceiling or sidewall placement, your next priority should be that central panel. You'll notice that many of the options outlined above include a single FP1 which is ideal for this purpose.

Overall, the most cost-effective general solution seems to be a pair of panels suspended horizontally, centrally in the ceiling, with a third panel positioned vertically between the speakers. This layout might involve single or double-sided panels as long as the requisite area is achieved. Note that assuming you have the ceiling height, suspended panels can be used to hide uplighters, or create a dropped ceiling, either approach disguising their presence. Bear in mind also, that raising the panel between the speakers so that it is halfway between floor and ceiling (or using a taller, freestanding panel in this location) will also increase its effectiveness.

So, in our nominal 4m x 5m room, the most cost effective solution would be a pair of medium sized, double-sided FP6 panels suspended from the ceiling, with an FP1 single-sided medium panel mounted on the wall between the speakers (or an FP3 used free-standing). Alternatively you could suspend two double-sided FP5 medium panels from the ceiling and use an FP2 single-sided medium panel between the speakers.

These rules are general in application so they can be adapted to any given situation. Adjust room dimensions and thus the required panel area accordingly and go from there. Each specific situation is of course different, especially when it comes to levels of furnishing. Modern interiors without wall to wall carpeting and with lighter upholstery or curtains will tend to need an increase in panel area and vice versa. However, the self-compensating nature of the panels means that the guidelines above should provide a decent starting point.

For further information on LeadingEdge Acoustic Panels please contact:

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