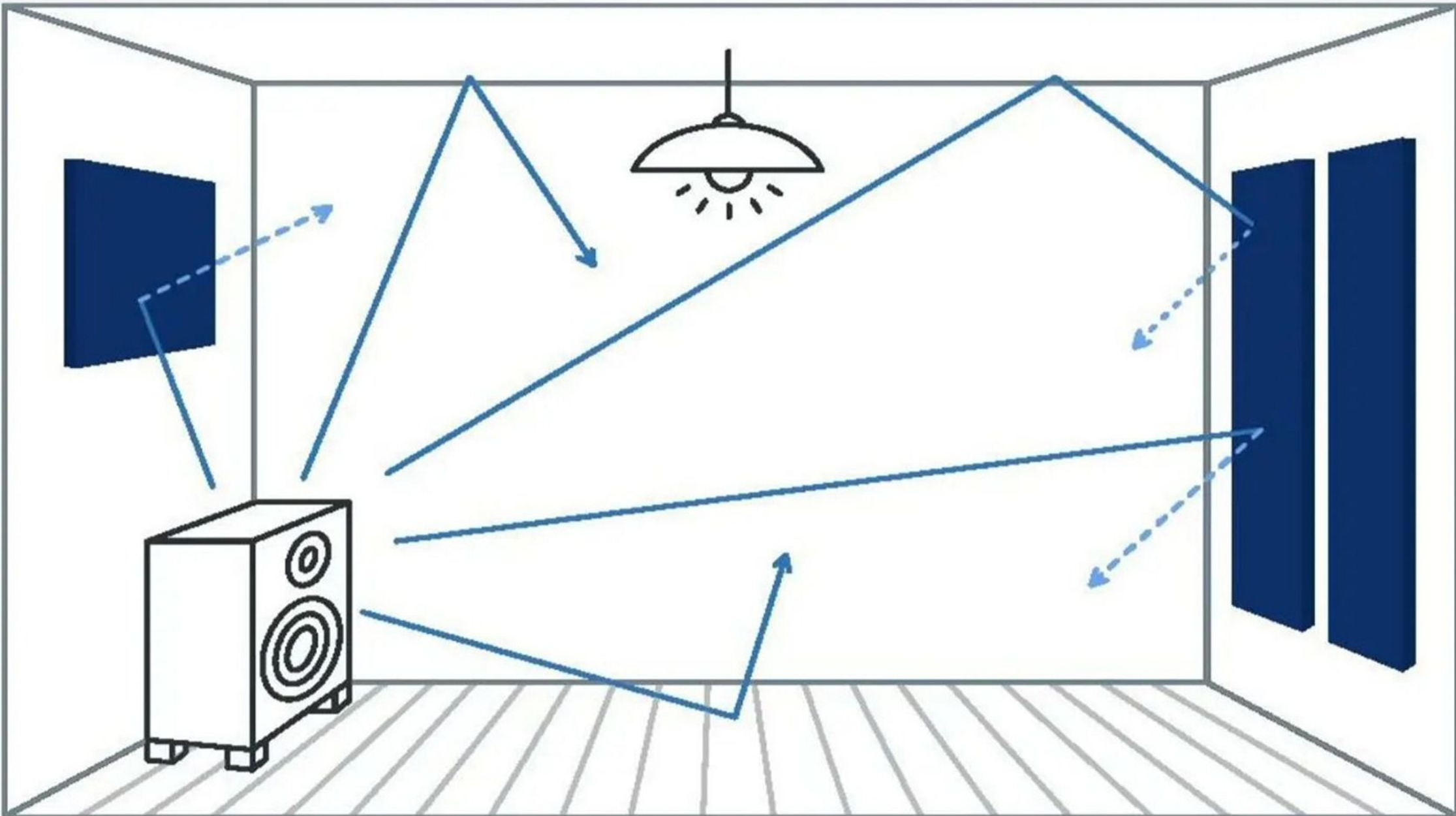
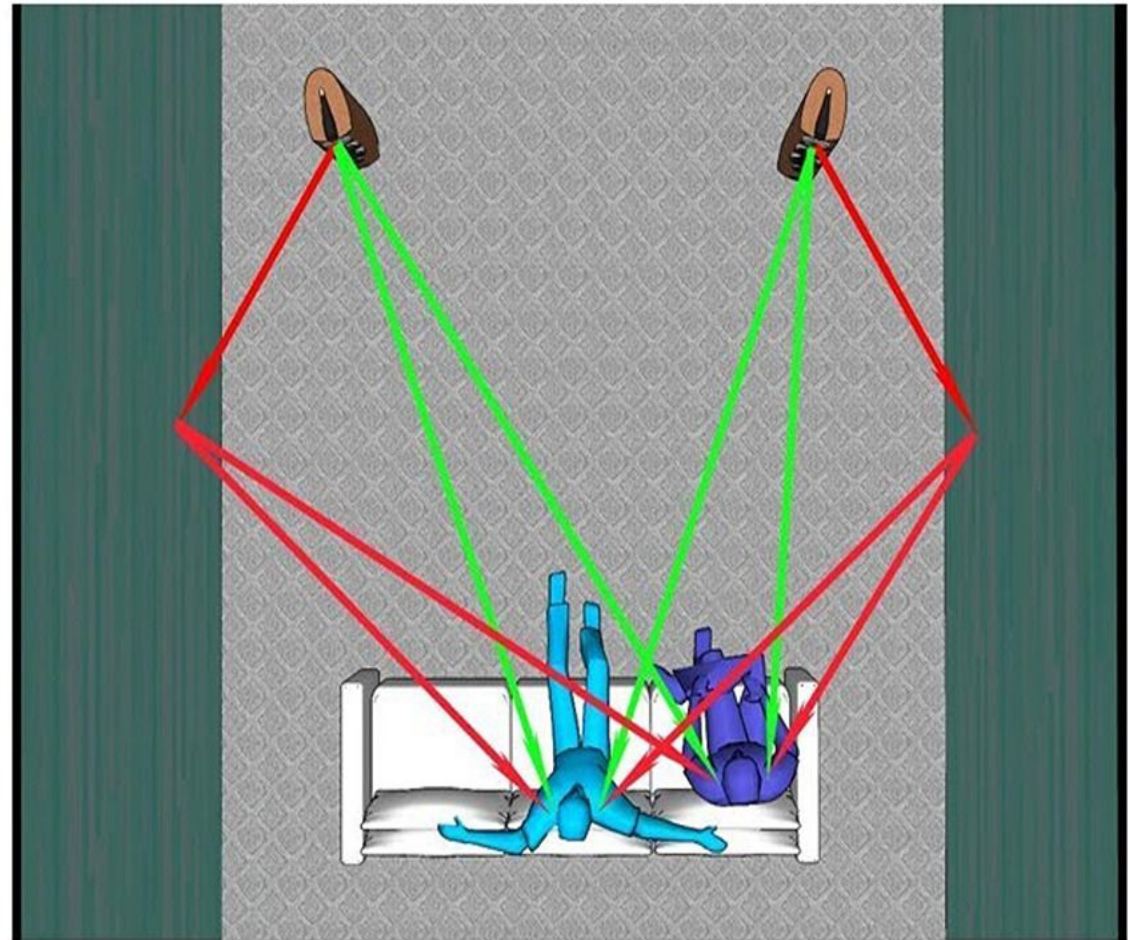
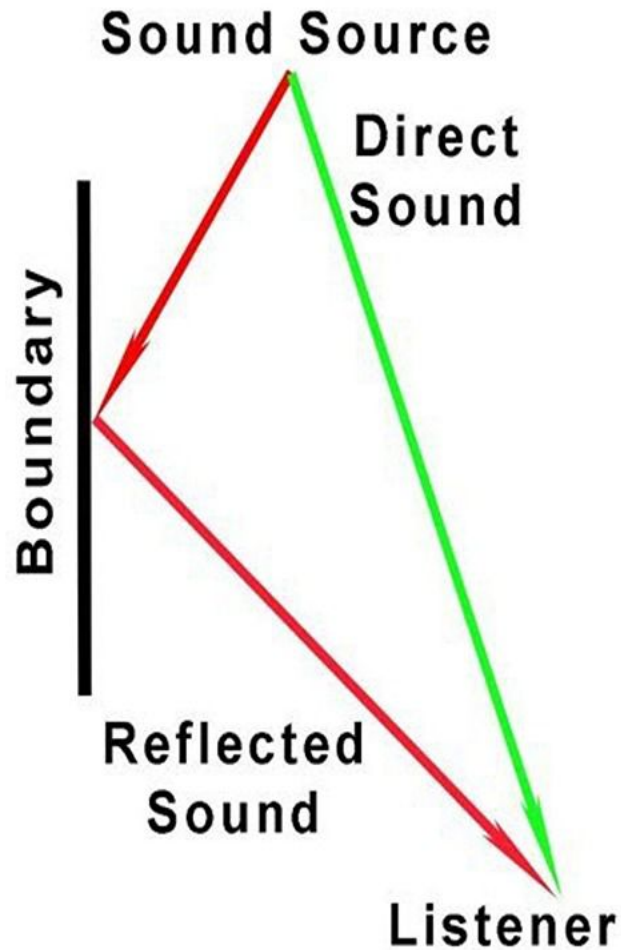


# ECHO IN A ROOM

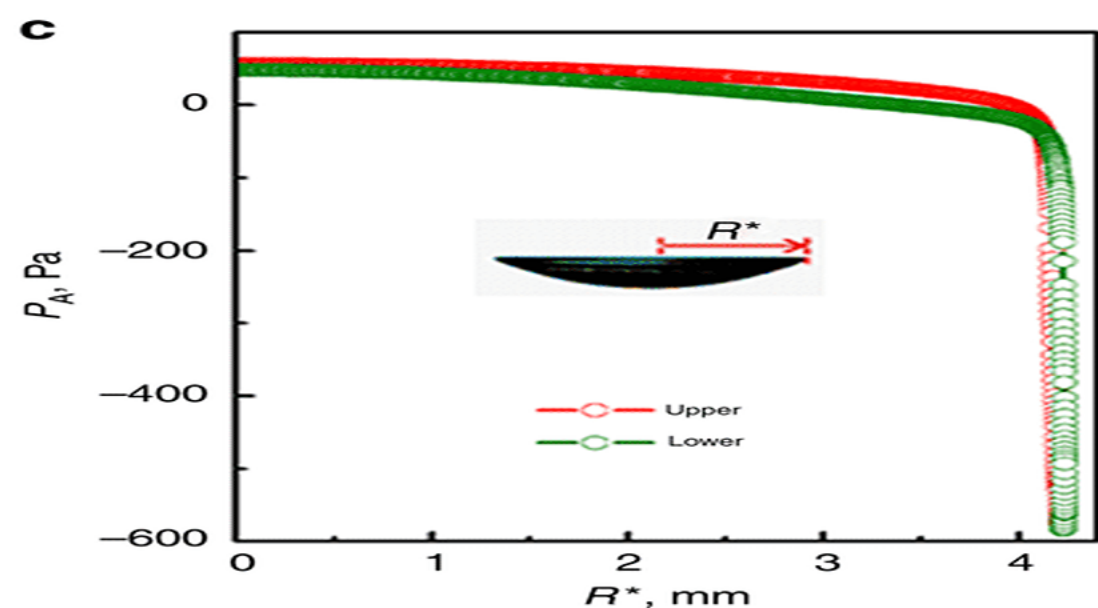
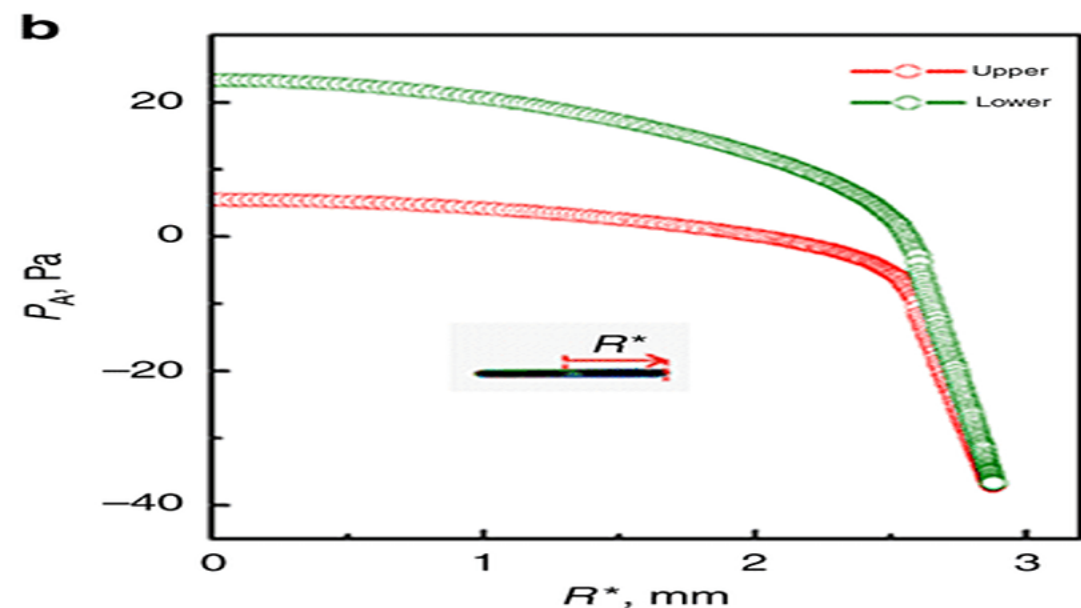
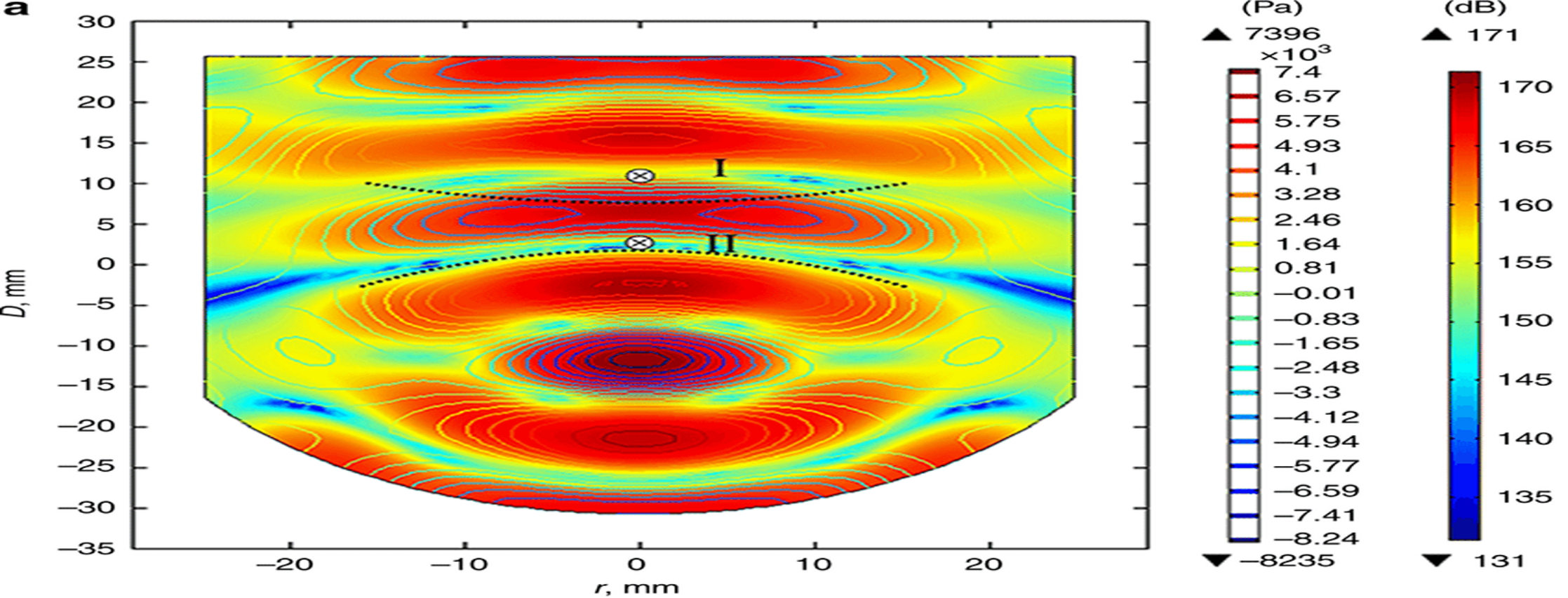


# How Rooms Affect Sound

Room Acoustics Can Negativity Impact Audio Performance



First reflections muddy imaging , smear detail and hurt voice intelligibility



## Floating floor calculation

### Sound Transmission to the below areas

Plant room Reference: AHUs at Roof Level

Receiver Room: Bedroom / Living Room

### Noise Sources - FAHU 1

OCTAVE BAND FREQUENCY	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	
Supply Air SWL	95	97	91	88	88	86	81	76	From technical Data Sheets
Exhaust Air SWL	84	84	80	80	80	77	75	72	From technical Data Sheets
Total	95	97	91	89	89	87	82	77	Addition of SWLs
Casing Attenuation	8	12	17	25	30	30	30	30	
Add 3 dB safety	3	3	3	3	3	3	3	3	
SWL Used in Calculations	90	88	77	67	62	60	55	50	
SPL near Critical Partition - SPL 1	87	85	74	63	58	56	51	47	
TL of Slab - dB	36	37	43	47	50	54	58	62	R
TL of System with FF	44	47	55	62	67	71	75	79	R'
Attenuation due to Source Room	-4	-4	-4	-4	-4	-4	-4	-4	
10 Log Sp	12	12	12	12	12	12	12	12	
10 Log A	9	10	11	11	12	10	11	12	
SPL other Side of Partition - SPL 2 without FF	54	49	32	17	8	3	0	0	$SPL2 = SPL1 - R + 10\text{LogSp} - 10\text{LogA}$
SPL other Side of Partition - SPL 2' with FF	46	39	20	2	0	0	0	0	$SPL2' = SPL1 - R' + 10\text{LogSp} - 10\text{LogA}$
Recommended Noise Levels	<b>NC 30</b>								
Achieved Noise Levels without Floating Floor	<b>NC 30 + 1</b>								
Achieved Noise Levels without Floating Floor	<b>NC 20</b>								

# Floating wall calculation

## SEEF TERRACES

### Floating Wall Calculations - 10th Floor - Mechanical Rooms

Noise Sources: Axial Fans

Octave Mid-Band Frequencies - Hz	63	125	250	500	1000	2000	4000	8000	Remarks	References
Casing radiated sound power- dB	101	94	97	104	107	106	100	92	Manufactuer Sound Power Level Data	Page 1
Sound reduction index of Partition - R (dB)	- 37	- 37	- 39	- 45	- 49	- 53	- 57	- 61	450 mm Block Wall - Table 5-2 (Hoover & Keith Book)	Page 2
Area of slab (Sp)	12	M2								
10 Log Sp - dB	11	11	11	11	11	11	11	11	ASHRAE 2009 - 8.11, SPL2 = SPL1- R+10LogSp-10LogA	Page 3a & 3b
10 Log A - dB	-4	-4	-5	-5	-5	-6	-6	-6		
Absorptive panels	- 1	- 3	- 4	- 4	- 5	- 5	- 5	- 5	50% of walls and ceiling area to be covered with Kinetics 50mm KNP Style Panels	
<b>Resultant Sound pressure level - dB</b>	<b>69</b>	<b>61</b>	<b>60</b>	<b>60</b>	<b>59</b>	<b>53</b>	<b>43</b>	<b>31</b>		
<b>NC adjacent Bed Room</b>	<b>NC 55 +2dB</b>									
Additional Attenuation Floating Wall - dB	10	11	11	11	12	13	13	13	Two layers of 12mm Thick Gypsum Board System with Kinetics ISOMAX with 50mm thick 32kg/m3 density Insulation	
Resultant Sound pressure level achieved (with Floating Wall ) - dB	60	50	49	49	47	41	30	18	at Adjacent Bedroom with Floating Wall & 50% Wall Lining	
<b>NC Achieved (with Floating Wall)</b>	<b>NC 45</b>									
<b>Design Target - NC 35</b>	60	52	46	40	37	34	32	31		

#### Note:

1. Units must be placed on the vibration isolators as per the ASHRAE standard guidelines, ASHRAE 2007 - CHAPTER 47, TABLE 48)
2. Any MEP service penetrations must be acoustically treated as per the ASHRAE standard guidelines (ASHRAE 2007 - CHAPTER 47, FIGURE 29)
3. Accuracy of the evaluation is totally based on the equipment sound data, any deviation in sound data will drastically increase the sound level at site.

# RT60 calculation

## RT<sub>60</sub> Calculations

Room Reference Studio 5 FF A'-A/3-11

### Room Geometry

Length	5.435	M
Width	4	M
Height	4	M
Volume	86.96	M <sup>3</sup>

### Room Areas

Wall 1	21.74	M <sup>2</sup>
Wall 2	21.74	M <sup>2</sup>
Wall 3	16	M <sup>2</sup>
Wall 4	16	M <sup>2</sup>
Floor	21.74	M <sup>2</sup>
Ceiling	21.74	M <sup>2</sup>
<b>Total Surface Area</b>	<b>118.96</b>	<b>M<sup>2</sup></b>

Area (M <sup>2</sup> )	Finish	Sabines @ Octave Band Frequency							
		63	125	250	500	1000	2000	4000	8000
0	Brickwork	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Concrete	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Up to 4 mm glass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	6 mm plate glass	0.16	0.30	0.12	0.08	0.06	0.04	0.04	0.04
0	Marble or Glazed Tiles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Plaster on solid wall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Curtains in folds against wall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Acoustic Wall Panels	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34		25	50						
0		100							
37	12 Plaster Board on battens and infill	9.25	11.10	7.40	5.55	1.85	1.85	1.85	1.85
21.74	Suspended plasterboard (large airspace)	4.35	4.35	3.26	2.17	1.09	1.09	1.09	1.09
2.42	Wooden Panel / Door	0.48	0.68	0.53	0.41	0.22	0.24	0.27	0.24
0	Acoustic Tiles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0		Class A							
0		Class B							
0		Class C							
0	Acoustic Banners	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0		Vinyl							
0		Sail Cloth							
0	Rubber Floor Tiles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Thick pile carpet on sponge rubber underlay	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Medium pile carpet on sponge rubber underlay	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21.74	Haircord carpet on felt underlay	1.09	1.09	1.09	2.17	4.35	9.78	14.13	14.13
0	Tiles / Marble	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Wood parquet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Empty fully upholstered seat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Empty seat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Adult Person	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Child	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	Wooden Furniture	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total S<sub>o</sub></b>	<b>18.7</b>	<b>27.7</b>	<b>32.8</b>	<b>41.0</b>	<b>41.6</b>	<b>47.0</b>	<b>51.4</b>	<b>51.4</b>
	<b>RT<sub>60</sub></b>	<b>0.7</b>	<b>0.5</b>	<b>0.4</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>

Sound Transmission to the adjacent areas With REAPOR								
Plant room Reference: MEP Room Tent Majlis						Receiver Room: OUTSIDE AREA		
Noise Sources - PAC-01,02								
OCTAVE BAND FREQUENCY	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
SWL	95	90	90	89	87	84	82	78
Add 3 dB [2 Package Units]	3	3	3	3	3	3	3	3
SWL Used in Calculations	98	93	93	92	90	87	85	81
Absorption due to REAPOR	4	4	6	6	6	6	6	6
Attenuation due to Distance, 6mtr.	-24	-24	-24	-24	-24	-24	-24	-24
Attenuation due to path length difference, 4.1ft.	11	13	16	19	21	22	24	24
SPL at Reciever location without Reapor	66	59	56	52	48	44	40	36
SPL at Reciever location with Reapor	59	52	48	44	40	36	32	28
Noise Levels without Reapor	55dBA @ 6 mtr Distance							
Achieved Noise Levels with Reapor	46dBA @ 6 mtr Distance							
<b>Notes and Recommendations:</b>								
Above calculation is done only for the noise traveling over the wall.								
Considering Reapor on the walls								

