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Ceiling Partition Baffle

DESCRIPTION



Over the ceiling acoustic insulation

Acoustic insulation where it involves indirect or flanking paths such as over ceilings is often called a ceiling overlay or acoustic baffle. In new construction, many times it is impractical for walls to go through the ceiling space due to the presence of services such as ductwork and electrical services or due to prohibitive costs of extending the wall. Similarly, in retrofit situations walls cannot go through lay in tile type ceilings to a concrete slab and as a result the wall finishes at the ceiling. In these cases sound can travel across the ceiling space from one room to the other thus flanking the wall between the rooms.

Queensland Textiles have designed a variety of acoustic isolation options to minimize this flanking. This is based on the dividing wall having at least equivalent but preferably lower R_w (weighted sound reduction index), to the over ceiling path transmission loss.

In many cases the ceiling-to-ceiling transmission loss is called weighted suspended ceiling normalized level difference (or $D_{n,c,w}$). The rating previously used was CAC (Ceiling attenuation class). Where the over the ceiling path ($D_{n,c,w}$) has a higher rating than that of the dividing wall (R_w) the room-to-room sound transmission should be taken as the wall value.

Queensland textiles have developed a new system to achieve the required $D_{n,c,w}$ for these applications. This is based on treating the ceiling space directly over the wall.

APPLICATION



Use

Queensland Textiles Ceiling partition baffle fitted above a wall and extending by a minimum of 300mm either side of the wall will add an additional 10 to 16 dB of transmission loss through the ceiling space. Ceiling partition baffle reduces the need to ensure the wall goes through the ceiling thus significantly reducing building costs.

Furthermore Ceiling partition baffle provides the acoustic sealing of the ceiling plenum where services are placed as a simple exercise. Thus where mineral fiber or plasterboard lay in tiles of a rating of $D_{n,c,w}$ of 35 are used in a ceiling this rating can be increased to more than 50 and for continuous plasterboard ceilings up to 55dB (depending on the level of compression at 10% to 30%, the nature of the ceiling lining and its ability to handle the deflection due to the Ceiling partition baffle compression). Below is a summary of the acoustic performance of Ceiling partition baffle systems

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Room-to-Room $D_{n,c,w}$ for Ceiling Systems

Ceiling Plasterboard linings thickness mm either side	No Insulation	Ceiling partition baffle compressed to 10%**	Ceiling partition baffle compressed to 30%**	Ceiling partition baffle compressed to 50%**	Low density acoustic insulation laid over the ceiling Ceiling partition baffle compressed to 30%
10/10	35	46	48	49	55
13/13	39	49	>50	>50	>55
16/16	43	>50	>50	>50	>55
Ceiling Tiles Mineral Fiber	33*	44	46	47	53

* Mineral fiber tiles $D_{n,c,w}$ typically vary from 20 to 35

Down lights and other penetrations will degrade the ceiling $D_{n,c,w}$ by nominally 1 to 2 dB/downlight up to 4 and need to be compensated for in the final design

** Ceiling partition baffle may be installed to a height of one meter without design considerations. Over this height advice should be sought on load requirements of the grid manufacturer

Design Considerations

In designing for speech privacy where the R_w of the dividing wall is specified, the appropriate flanking insulation over the ceiling should be such that it is equal to or greater by about 3dB than that of the R_w of the wall.

Therefore as examples where the specification is for:

- Normal voice privacy (i.e. Normal voice conversation can be just heard) the R_w of the dividing wall maybe 40 to 45 With a continuous ceiling of 10mm plaster and where the wall meets the ceiling, Ceiling partition baffle is also used over the dividing wall
- Normal Voice Confidential privacy (Normal voice can be heard only as muffled sound) eg R_w of the dividing wall 45 to 50 and where a continuous ceiling of 10mm plaster meets the wall a combination of low density acoustic insulation laid over the ceiling and Ceiling partition baffle should be considered
- Raised Voice Confidential Privacy (Normal voice levels cannot be heard) e.g. R_w of the dividing wall 50 to 55 and a continuous ceiling of 10mm plaster meets the wall a combination of medium density acoustic insulation laid over the ceiling and Ceiling partition baffle should be used.