

Providing Acoustic Comfort in Modern Design:

A Product Guide for Reducing Noise Transfer and Improving Sound Absorption



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Introduction

Noise is a growing concern for both residential and commercial developments. Exposure to excessive noise is now considered a major health and environmental issue, with the ability to interfere with sleep, rest and conversation, plus it is a major cause of fatigue, irritability, headaches and stress¹.

Domestically, the issue has been exacerbated by Australia's major shift towards medium and high-density housing, with multi-unit commencements now reaching record levels, accounting for around 25 per cent of the new home building market². Unfortunately, current sound insulation requirements for multi-unit housing and apartment buildings are not particularly high³. This has led to noise becoming the fastest growing area of complaints and disputes in urban Australia⁴.

Over the past decade, more offices have been constructed with an open plan design to promote collaboration and communication amongst workers. This has also created more noise. A University of Sydney study found that nearly 30 percent of workers are frustrated with office noise.

Office noise, building HVAC systems and external noise such as construction and road, rail and aircraft traffic have together created a "perfect storm" of noise issues within today's office environments. This has forced architects and designers to address each noise issue whilst meeting other cost, compliance and environmental concerns.

When it comes to improving acoustics and reducing noise, there are two main issues that must be addressed: reducing noise transfer and increasing sound absorption. Here we look at how these two issues impact both residential and commercial projects and what architects and designers must do to tackle them.



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Reducing noise transfer

The ability to minimise noise transfer is critical to good acoustics. In multi-residential living, noise can be easily transferred between rooms along a variety of paths (commonly known as flanking paths) such as open doors, openings in separating rooms, stairwells or heating and air-conditioning ducts. Noise can also pass directly through walls, floors and ceilings into other rooms and adjacent apartments. In offices, this can occur through partitions and via meeting rooms.

Coincidence dip resonance

Lightweight building boards are increasingly being used in various wall and floor structures because of their ease of use and lower costs. Unfortunately, the sound reducing properties of common lightweight building materials such as plasterboard, drywall, plywood and hollow core walls is greatly reduced due to a phenomenon known as 'coincidence dip'. Coincidence dip occurs when the wavelength of the bending wave in the panel coincides with the wavelength of the sound propagating in the air, which allows the sound to transmit through the panel⁵.

Increasing sound absorption

In most instances, good acoustics depends directly on having a short reverberation time. As relative noise increases in apartments due to smaller spaces and higher resident density, an increase in technology home theatre and sound systems means efforts to reduce reverberation time become critical to acoustic comfort. The key to reducing reverberation is to improve sound absorption. Hard surfaces including walls, floors and ceiling will increase sound reflection and the length of time noise reverberates throughout the room. Increasing absorptive surfaces will help reduce sound reflection and improve the acoustics⁶.

In the modern open office sound absorption is virtually non-existent or poor. In these offices, speech privacy has become of major concern, with people talking over each other to communicate. A recent study has shown that workers lose as much as 86 minutes per day due these noise distractions⁷. Improving acoustics in these spaces is critical to the health and productivity of employees.

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– Complete Soundproofing solutions

Pyrotek's Noise Control division provides a complete suite of acoustic solutions for residential and commercial projects to help address the issues of both noise transfer and sound absorption.

Wavebar® – Acoustic noise barrier

To address increasing occurrence and concern regarding noise transfer, Pyrotek Noise Control has developed Wavebar, a high-performance, flexible mass-loaded vinyl noise barrier offering superior acoustic transmission loss. Wavebar helps to reduce noise transfer and prevent coincidence dip resonance in commercial and residential applications.

The dense core mass layer of Wavebar reflects and absorbs the transmission of sound through walls, ceiling and floors, reducing noise. Wavebar can be used in new developments or retrofitted inside cavities.

Independent research has shown that even the smallest gaps can result in 12dB performance loss at certain frequencies. Wavebar has been formulated to seal small gaps without splitting and is ideal for applications that require flexibility and low thickness to weight ratio including window mullions, seismic joints, ceiling plenums, power sockets, light fittings, bottom wall plates, HVAC penetrations and access hatches.

Echohush® – Room acoustic panels

The Echohush range of acoustic panels combine high-performance with modern aesthetics to assist in sound absorption in a range of commercial and residential applications. To reduce conflicting echo and reverberated sound, Echohush is perfect for home-theatre/surround sound systems, and controlling background noise to improve privacy and speech intelligibility in open office environments.

Echohush panels can be incorporated during the design process or retrofitted once construction is complete, as they provide an excellent option to resolve reverberation problems at any stage of a building fit-out. The Echohush range of panels can be printed to create original colours and patterns, in corporate or trade branding, safety messages or to create a 3D look with textured finishes.

Soundlag® – Acoustic pipe lagging

Soundlag was developed as an easy to use acoustic treatment which reduces noise breakout from waste pipes and general plumbing. Soundlag is a pipe wrap comprising of 5.0kg flexible acoustic barrier bonded to 25mm thick flexible convoluted foam. The product is highly flexible, bending to allow it to conform to even the smallest diameter pipes and be easily installed without specialist tools or trade.

Soundlag offers proven performance with independent lab and field testing, with no product failures in its 15 years of manufacture. Soundlag performance is warranted for the life of the building and is certified to comply with green building volatile organic compound (VOC) levels.



Pyrotek Noise Control

Established in Australia in 1972, Pyrotek's Noise Control division provides a range of noise control products and tailored acoustic insulation solutions to the Australian building and architecture market. With a team of specialist engineers in-house, Pyrotek is able to create advanced materials and innovative products that anticipate changing customer needs.

Our customers benefit from the experience and innovation from Pyrotek's 80 locations in 35 countries throughout the world, allowing Pyrotek to deliver the latest in noise control technology to Australia's building and design community.

To find out more visit www.pyroteknc.com



REFERENCES

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