

Providing Acoustic Comfort in Urban Design: Understanding Acoustics and Effective Solutions within Urban Environments



Pyrotek[®]

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Introduction: noise reduction in urban environments

Urban areas have become a battleground for noise control in recent years and opened up a can of worms in terms of surrounding noise issue impact. Increasing density means shared spaces such as courtyards are more popular.

Finding proven acoustic solutions for urban outdoor environments is a critical issue for building owners and developers. Acoustic Consultants and Specifiers need innovative solutions with a high noise reduction coefficient (NRC) that are weatherproof, sustainable and non-combustible.

Urban outdoor courtyards are notably difficult spaces for acoustics and noise control. The hard surfaces create high noise reverberation and bounce, while proximity to neighbouring properties exacerbates the noise reflection problem. This leads to neighbour complaints and makes it difficult to meet the stringent EPA laws and regulations.

Then there's the challenge of creating a good acoustic experience for the people using the outdoor area.

Pyrotek® is a leader in acoustic products for urban environments. In this whitepaper, we outline the key challenges and present innovative solutions for Acoustic Consultants and Specifiers to consider.



Acoustic Consultants and Specifiers not only need solutions to absorb noise, but also need effective ways to create an optimum acoustic experience for patrons, customers or residents.

The trend towards medium density

Australia is experiencing a rapid and sustained increase in medium and high density developments in urban areas. Approvals for medium-density dwellings now surpass that of stand-alone properties. Half the approvals in the 12 months to November 2015 were for medium-density housing, well above the average 34.4 per cent over the past 20 years.¹

In some areas of Sydney, the population density is now higher than 10,000 persons per km².²

This trend is driving a need to make use of every available square metre of space – including outdoor areas.

In residential areas, outdoor courtyards are being appropriated as an “outdoor room”. These spaces are used as a compact backyard where people relax and entertain.

Likewise, the outdoor spaces attached to urban buildings are now high traffic, high use areas. What's more, they're often juxtaposed against other properties. As a result, noise control is becoming one of the biggest issues facing residential and commercial property owners and developers.

The resulting noise levels jeopardise the compliance with EPA laws and regulations, and can turn customers away.



Managing reflective noise off hard surfaces

In outdoor urban courtyards, the noise reverberates and reflects, bouncing off the floors, walls and ceilings, making it difficult to talk and hear, and causing noise control problems with neighbours.

Acoustic Consultants and Specifiers not only need solutions to absorb (or reduce) noise, but also need effective ways to address noise issues for patrons, customers or residents.

Urban courtyards: challenging environments

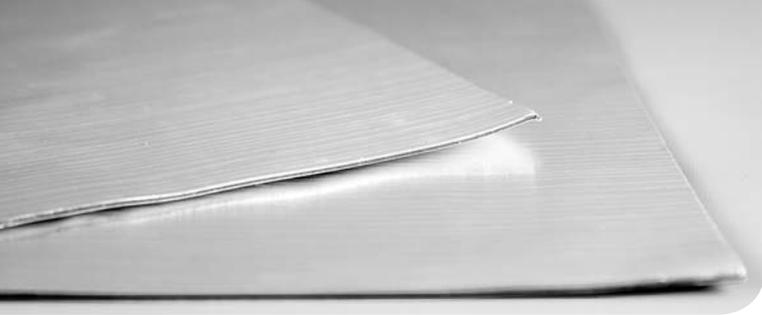
Outdoor environments bring distinct challenges for Acoustic Consultants and Specifiers.

Indoor acoustic solutions are problematic for outdoor environments. Foam and polyester options can deteriorate when exposed to weather, and are often highly flammable, which makes them unsafe for smoking areas or exit ways.

There's a strong need for durable acoustic solutions that are weather resistant, non-combustible, easy to install, cost-effective and of course, one that provides an outstanding NRC rating.

1 2016, "Housing Density Report 2016", Bank West at <https://www.bankwest.com.au/media-centre/financial-indicator-series/housing-density-report-2016-1292540980899>

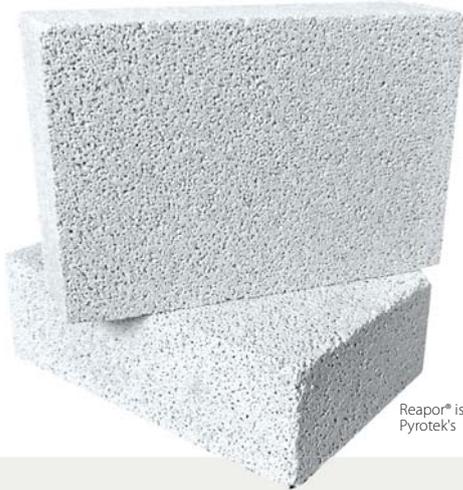
2 2015, "Population densities of Australian Capital Cities – Melbourne and Sydney", id at <http://blog.id.com.au/2015/population/australian-demographic-trends/population-densities-of-australian-capital-cities-melbourne-and-sydney/>



Decidamp® CLD - is used to reduce structural vibration for HVAC and building tops



Quadzero™ application on the exterior of a building, protecting residents from urban noise.



Reapor® is just one example of Pyrotek's unique acoustic solutions

Easy to install

Pyrotek® are considered to be experts in providing simple and effective product solutions to highly complex noise problems. With the right combination of absorbing, damping and barrier products, rest assured there are light weight and easy to install methods to control noise issues. What's more, products are non-fibrous, non-toxic and VOC free, making them safe for installers.

Fireproof, weatherproof acoustic solutions

Pyrotek® offers premium acoustic solutions for urban environments, providing a unique range of benefits for use in outdoor spaces.

For example Reapor® has a non-combustible rating and it's safe and legal to use in all building areas and applications. A fire-safe way to control unwanted noise, it is easily installed in exit ways, stairwells and outdoor smoking areas. Reapor® is tested to conform to AS1530.1 and AS1530.3 as well as stringent international standards.

Environmental performance rating

Reapor® has been certified with the Blue Angel, an international ecolabel which indicates an exacting standard of sustainable consideration.

Weatherproof and moisture proof

Because Reapor® is made of glass, it gives an outstanding weather resistance to rain, storms and environmental contamination.

Reapor® is:

weather resistant	non-combustible	eco labelled
aesthetically pleasing	easy to install	independently tested and proven to give a high NRC rating

From both sides: Noise causes and how to solve the problem

Noise from within

Buildings by nature have back of house and HVAC by-products to consider, and noise is no different. Often a cause for neighbourly disturbance, some older configurations and some newer ill considered designs mean that noise can have a real impact on residents, both inside and outside their homes.

Development and Construction

Cities are constantly evolving and noise from construction can be a headache for residents. Both permanent and temporary noise measures are recommended options for builders and owners alike.

Infrastructure: highways, traffic and rail noise

Urban environments naturally are in the business of moving its residents from place to place. In close proximity, the noise from roads and transport can be a real issue that needs to be addressed.



Damping the Noise - Decidamp® CLD

Decidamp® CLD relies on the viscoelastic properties of the inner layer constrained by a rigid metal layer, reducing structural vibration and sound transmission from motors, fans, compressors etc. - most with moving parts that rotate or vibrate at a given, audible frequency. Used on neighbouring noise issues, it can help improve ambience.

Block the Noise - Wavebar® and Quadzero™

Wavebar® can be designed as partial or a complete enclosure around noise sources, or as a physical barrier between the space and the issue to reduce noise transference. The science behind Wavebar's ability to stop noise is its high density and flexibility. With no resonance from material stiffness, Wavebar reduces audible frequencies meaning it is effective for noise sources such as mechanical equipment, engines and electronic audio technology.

Absorb the Noise - Reapor®

Reapor® is made from porous glass beads. The primary acoustic absorption means a loss of sound waves' energy as noise travels between the granules of Reapor®. The cut stone look also means Reapor® can be displayed out in the open in its raw form - blending in with the surroundings and cleverly absorbing reverberated noise.



About Pyrotek®

Pyrotek® provides innovative noise control products and tailored acoustic insulation solutions to the Australian building and architecture market. With an inhouse engineering team, Pyrotek® can create highly specialised products to designed specifications and performance requirements.

To find out more about Reapor®, Wavebar®, Decidamp® CLD or other acoustic solutions, visit www.pyroteknc.com

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