Acoustic Studs in Wall Design

A Guide for Architects and Specifiers

siniat

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INTRODUCTION

With urban densification and the rise of multi-functional buildings, controlling inter-space noise transfer presents a significant challenge for architects and specifiers. Uncontrolled noise is not merely an inconvenience—it has been linked to adverse health effects, including poor mental well-being, auditory strain and cardiovascular stress. As the built environment continues to evolve, the need for effective soundproofing solutions has never been more pressing.

Walls play a dual role in buildings, providing both structural support and sound insulation. Achieving an optimal balance between these functions requires advanced materials and construction techniques. The NCC emphasises sound insulation standards, particularly for separating walls and floors in Class 1, 2, and 3 buildings, to mitigate noise transfer between spaces. Builders and specifiers must ensure compliance with these requirements while also managing cost efficiency and project timelines.

Acoustic studs have emerged as a highly effective solution for enhancing soundproofing in wall assemblies.

Designed to interrupt the direct transmission of vibrations, these engineered studs significantly reduce airborne noise without compromising structural integrity. By acoustically isolating the linings on opposite sides of a wall, acoustic studs contribute to creating quieter, more comfortable environments.

KEY TERMS AND CONCEPTS

Noise is quantified using sound pressure level, which is expressed in **decibels (dB)**. This measurement helps assess the intensity of noise and its impact on building occupants. Sound levels from 0 to 40 dB are considered quiet, 60 to 80 dB is moderately loud to noisy, and exposure to levels above 80 dB can potentially cause hearing damage over time.

Airborne noise refers to sound that travels through the air from common sources such as voices, televisions, and radios. It is one of the primary types of noise architects and specifiers must consider when designing acoustic wall assemblies.

The **Weighted Sound Reduction Index (Rw)** is a numerical rating that measures a material or system's ability to reduce sound transmission. An increase of **1 Rw unit** corresponds to approximately **1 dB reduction** in noise level. A **higher Rw value** indicates better soundproofing performance.

The **Rw + Ctr** rating adjusts for **low-frequency noise**, such as bass sounds from home theatres and sound systems, which the Rw rating alone may not fully capture. The Ctr correction factor is always negative, meaning the Rw + Ctr value is lower than the Rw rating. The Rw + Ctr performance of a material depends on factors such as weight, stiffness, thickness, and cavity insulation. The higher the Rw and Rw + Ctr values, the better the material's ability to reduce noise transmission across different frequencies.

By incorporating acoustic studs into wall assemblies, builders can achieve high levels of noise reduction without the need for complex or wide walls.

WHAT ARE ACOUSTIC STUD WALLS?

Acoustic stud walls are specially designed wall assemblies that incorporate acoustic studs—engineered steel or timber framing members that help minimise sound transmission. These studs are designed to disrupt the direct transfer of sound waves through the wall structure, reducing airborne noise.

Unlike standard wall framing, acoustic studs feature unique shapes, flexible elements, or isolating mechanisms that absorb and break up sound energy, improving the overall acoustic performance of a space.

HOW DO ACOUSTIC STUDS WORK?

Noise is the result of vibrations traveling through air or solid structures. Impact noise propagates through building materials as vibrations, often transmitting to adjacent spaces. In conventional wall assemblies, standard studs conduct these vibrations across their web, allowing sound to spread through the structure.

Acoustic studs work by interrupting the direct transmission of sound vibrations through the wall assembly. Unlike standard studs, acoustic studs feature a unique shape and design that helps absorb sound energy. By effectively decoupling wall assemblies, these studs reduce vibrations traveling through the framing.

When combined with glasswool insulation and sound-resistant plasterboard, these studs create a high-performance acoustic barrier that mitigates noise transmission. Glasswool insulation absorbs sound waves within the cavity, while specialised plasterboards add mass to limit sound transfer. This integrated system is particularly effective in multi-residential, commercial, and mixed-use buildings, where controlling sound transfer is critical for occupant comfort and regulatory compliance.

NCC REQUIREMENTS FOR SOUND INSULATION

The NCC outlines strict sound insulation requirements for Class 2, 3 and 9C buildings, which include apartments, hotels and residential care facilities. According to NCC Vol. 1, Functional Statement F7F1, any building component that separates sole-occupancy units (SOUs) must be designed to prevent undue sound transmission. Performance requirements cover both walls and floors, with additional provisions for walls and floors in residential care buildings. Compliance can be demonstrated through suitable evidence of compliance, verification methods, Deemed-to-Satisfy (DtS) provisions, or performance-based solutions tailored to specific projects.

For Class 1 buildings, which include detached and semi-detached houses, NCC Vol. 2 Functional Statement H4F6 requires that any building element separating dwellings must be constructed to prevent undue sound transmission. The Performance Requirement H4P6 further specifies that walls and floors must be designed to limit noise transfer between adjoining residences. Compliance can be achieved through Verification Method H4V4 or by following the DtS Provision H4D8, which aligns with Part 10.7 of the ABCB Housing Provisions.

In the NCC, discontinuous construction is a sound insulation method used to minimise noise transmission between adjoining spaces. This type of construction is required for walls separating bathrooms, sanitary compartments, laundries or kitchens from habitable rooms.

Table 1. Summary of sound insulation requirements for SOUs

	Airborne Sound Insulation	Impact Sound Insulation
Building Class 1 – NSW, Vic, Qld, Tas, WA, SA and ACT		
Walls separating a bathroom, toilet, laundry or kitchen and a habitable room (other than a kitchen) in adjoining SOUs.	Rw + Ctr ≥ 50	✓Discontinuous
Walls separating SOUs in all other cases.	Rw + Ctr ≥ 50	
Walls or ceilings separating a duct, soil, waste or water supply pipe or storm water pipe from a habitable room.	Rw + Ctr ≥ 40	
Walls or ceilings separating a duct, soil, waste or water supply pipe or storm water pipe from a kitchen, bathroom or other non-habitable room.	Rw + Ctr ≥ 25	
Building Class 2 & 3 – NSW, Vic, Qld, Tas, WA, SA and ACT		
Walls separating habitable rooms in adjoining SOUs.	Rw + Ctr ≥ 50	
Walls separating kitchens, toilets, bathrooms and laundries in adjoining SOUs.	Rw + Ctr ≥ 50	
Walls between a bathroom, toilet, laundry or kitchen and a habitable room (other than a kitchen) in adjoining SOUs.	Rw + Ctr ≥ 50	✓Discontinuous
Walls between an SOU and a public corridor, public lobby, stairway or the like or parts of a different classification.	Rw ≥ 50	
Walls between an SOU and a plant room or lift shaft.	Rw ≥ 50	✓Discontinuous
Walls or ceilings separating a duct, soil, waste or water supply pipe or storm water pipe from a habitable room.	Rw + Ctr ≥ 40	
Walls or ceilings separating a duct, soil, waste or water supply pipe or storm water pipe from a kitchen or other non-habitable room.	Rw + Ctr ≥ 25	
Floors between SOUs and between an SOU and a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification.	Rw + Ctr ≥ 50	Ln,w ≤ 62

SELECTING THE RIGHT WALL SYSTEM: DISCONTINUOUS WALLS, STAGGERED STUDS AND ACOUSTIC STUDS

As noted, the NCC requires discontinuous construction between certain building spaces. This design breaks the physical connection, significantly reducing both airborne and impact noise transmission.

Staggered stud walls offer an alternative approach to improving sound insulation by offsetting the studs on a shared base plate, thereby reducing the direct structural connection between wall planes. When combined with sound-absorbing insulation, staggered stud walls can enhance sound resistance by dampening airborne noise.

However, unlike fully discontinuous walls, staggered stud designs still maintain a structural link between the two sides through the top and bottom tracks, allowing sound vibrations to transfer through these points. While they provide better soundproofing than standard stud walls, staggered stud walls do not meet the NCC's definition of discontinuous construction, which is mandated in certain applications.

Why use acoustic studs?

Where enhanced acoustic performance is required, an effective solution is to replace staggered stud walls with acoustic stud wall systems. Acoustic studs offer a streamlined and efficient solution for soundproofing wall assemblies while simplifying the construction process. By incorporating acoustic studs into wall assemblies, builders can achieve high levels of noise reduction without the need for complex or wide walls.

Another key advantage of acoustic stud walls is their optimised use of space. Traditional high-performance acoustic walls often require thicker profiles to achieve the necessary sound insulation, which can reduce usable floor area. Acoustic studs, however, enable thinner wall constructions that still meet or exceed acoustic performance requirements. Their compatibility with acoustic insulation and specialised plasterboards further enhances their effectiveness, allowing architects to design slimmer walls without sacrificing soundproofing.

Acoustic stud walls are well-suited for applications requiring high sound insulation ratings, such as sole-occupancy units, where compliance with building regulations is essential. Staggered stud walls can deliver the same level of performance but can be more complicated to build, more expensive and may not be able to resist the higher wind loads experienced in tall buildings, particularly for tall walls.

THE ADVANTAGE OF SINIAT'S ACOUSTIC STUD SYSTEM

Siniat's Acoustic Stud System provides a high-performance, cost-effective alternative to traditional staggered stud wall systems. Unlike staggered stud designs, which require plasterboard to be fixed to only one side of the stud, the Siniat Acoustic Stud System allows for plasterboard installation on both sides, enabling greater wall heights while maintaining superior acoustic performance. This streamlined installation process not only simplifies construction but also reduces material costs by minimising the number of studs required.

Engineered for versatility and efficiency, the Siniat Acoustic Stud System has been tested in various configurations with multiple plasterboard types, achieving sound insulation ratings up to Rw 60. Comparative testing by the CSIRO demonstrated that the Siniat system increases Rw ratings by 5 and enhances Rw + Ctr values by the same margin, making it a proven solution for high-performance acoustic wall assemblies.

This range of performance options ensures that the system can meet diverse acoustic requirements, making it ideal for applications such as residential apartments, commercial offices, hospitality settings, and public buildings where noise control is critical. Additionally, Siniat offers a comprehensive system that integrates seamlessly with its acoustic plasterboards and compound solutions, ensuring optimal performance and compliance with NCC requirements.

By combining ease of installation, superior acoustic performance, and compliance with modern building standards, Siniat's Acoustic Stud System represents an innovative step forward in soundproofing technology. Architects, designers and builders seeking a simplified yet highly effective acoustic wall solution can rely on Siniat's expertise and rigorously tested products. With a full suite of technical resources and national service support, Siniat continues to set the benchmark for reliable acoustic solutions in the built environment.

ABOUT SINIAT

The lightweight building materials specialist

Siniat is one of the Etex Group's flagship commercial brands and one of the leading global manufacturers of interior and exterior materials for drywall construction. All over the world, Siniat is synonymous with innovative lightweight construction materials, trusted by small builders to the most acclaimed architects, builders and contractors.

In Australia, Siniat manufactures and supplies full plasterboard and metal products to the construction industry. Plasterboard products are manufactured in their factories in Matraville (Sydney, NSW), Altona (Melbourne, Vic), Hazelmere (Perth, WA) and Bundaberg (Qld); compounds are manufactured in Altona and Hazelmere and metal products are manufactured in their roll-forming plant in Beenleigh (Brisbane, Qld). Some products, including the acoustic ceiling range, are manufactured in Etex factories overseas.

A wide range of Siniat's plasterboard and metal products are supplied carbon neutral under their Opt2Act® program.

All information provided correct as of April 2025