



ARTA

AUSTRALIAN ROOFING TILE ASSOCIATION

Physical Properties and what to consider

**Part 3: Insulations
Considerations –
Acoustic &
Thermal**

Insulation is an important component of every Australian home, not just for regulating internal temperatures but external sound too. By initiating a positive roof insulation scheme for your home, you stand to reap great benefits including large savings on internal heating and cooling costs.

In this guide we will cover not just the strong thermal properties inherent in roof tiles, but their effective sound resistances and what they can bring to your family.

IMPORTANT INSIGHT

In any home, the roof loses up to 25% of heat, after walls at 30-40%. For this reason it is important to invest in effective insulation tactics for your home with specific focus on the roof and where thermal consideration can be best optimised.



Why are Roof Tiles effective sound and thermal performers?

The effective natural insulation properties of roof tiles come from the superior density and thickness inherent of the final product. These factors influence the volume of sound and heat that filter down into your home from external sources.



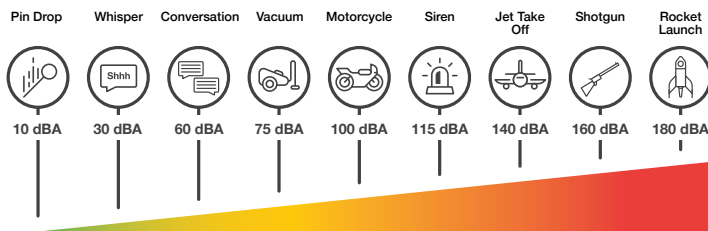
Why Acoustic Insulated Tiles Affect Everyone

External noise comes from a nearly limitless list of sources and there is no avoiding it, whether you live in the depths of the city, or the remote tranquillity of the forest.

The following is a list of common loud noises that could impact your ability to relax at home.

- Rainfall (50 decibels)
- Planes flying overhead (70+ decibels depending on elevation)
- Busy traffic (80 decibels)
- Cicadas (up to 100 decibels)
- Emergency sirens (120 decibels)
- Thunder (120 decibels)
- Rock Concert (120 decibels)

Prolonged exposure to sounds above 85 decibels can damage your hearing.



A quarter of heat is lost through the roof in an uninsulated home.

On average, people spend approximately 90% of their time indoors, making the temperature of your home important.



FAST FACTS

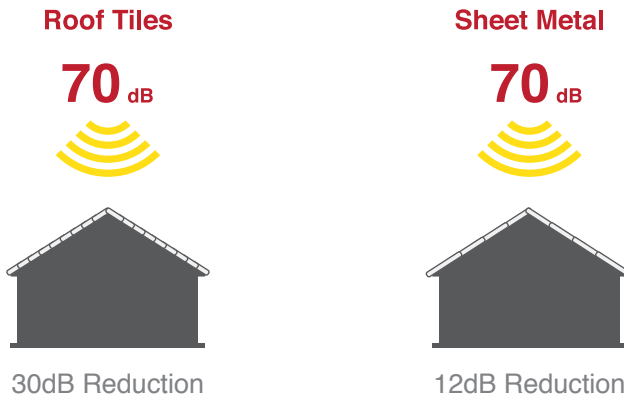
A tile roof can reduce the volume of external noise entering your home by 30 full decibels, outperforming sheet metal which cuts only 12 decibels.



Tiles vs Sheet metal acoustic performance

High density terracotta roof tiles and concrete roof tiles are found to achieve levels of sound insulation performance far exceeding the minimum required by the Building Code of Australia. In fact, roof tiles could reduce external noise by as much as 30 decibels, compared with a reduction of 12 decibels for sheet metal.

Sound insulation capabilities of concrete roof tiles and sheet metal roofing



Please note: the above diagram is an example only and is based on testion results in which roof tiles reduce outside noise by 30 decibels and metal roofing reduces noise by 12 decibels.



FACT: A tiled roof also helps minimise "creaking" and "popping" sounds which occur with some types of roofing as a results of temperature variations.



How to protect your home from external noise

Controlling the sounds that thrive outside your home is not always within your power, but you can certainly limit their impact in your life. Whether you live below a popular flight path or cannot sleep during the rain, there are plenty of effective measures that can be implemented to reduce noise penetration.

- **Utilise curtains and drapes:** This acts as a second barrier with the window, able to reduce external noise by a further 10% depending on thickness.
- **Line walls with furniture:** Walls are responsible for 30 – 40% of sound that penetrates your home. Noise can be reduced by building brick or concrete masonry walls.
- **Check doors:** Many doors are hollow on the inside, which means external sounds lose less power travelling through them than thickened ones.



Why Thermal Insulated Tiles Affect Everyone

Australia is renowned worldwide for its tough climate. During the summer of 2017, the Bureau of Meteorology recorded temperatures in Sydney reaching as high as 47 degrees Celsius.

In a climate capable of such extremes, all measures to combat the worst should not be underestimated.

A tiled roof can also help minimise 'creaking and popping' sounds, which occur with certain roofing types as a result of temperature variations. Because roof tiles come in such a wide variety of colours, achieving an optimum roof design style that meets the needs for battling the Australian heat becomes very achievable.



How to protect your home from heat and cold

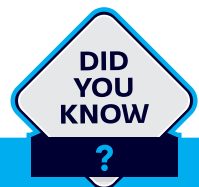
Australia's intense summers and chilling winters have put stress on the energy bills of many families. With a proper strategy, homeowners can not only survive the temperature strains of the harsh seasons but lose large amounts of weight off their energy bills.

- **Block gap beneath front door:** Some front doors have small gaps between their lowest points and the ground. During the winter this can cause excess cold air to slip into your home. Either have the gap seen to by an expert or block it with a door blocker in winter.
- **Roof Tiles:** Because roof tiles have poor thermal performance, they do not absorb much heat making for cooler summers. During winter, all trapped heat is reused to warm your home.
- **Open/Close a window:** During the summer it is important airflow is promoted lest the humidity become intolerable. In winter, keeping a window closed will guard against the worst of the chill.
- **Ventilation:** Make sure the housing is provided with sufficient ventilation to regulate temperature and control moisture levels and avoid condensation to protect your family from health risks.



Roof Tiles vs Metal Roofs

Though roof tiles and metal roofs both provide effective insulation solutions. Roof tiles are superior in terms of thermal and acoustic performance. This is due to the thermal mass of the product, which inhibits heat absorption allowing for cooler summers and warmer winters. Furthermore, due to the density of roof tiles, they are capable of reducing external noises by as many as 30 decibels which is more than half as effective as metal or steel.



Research conducted by the University of Newcastle has shown that light coloured tiles yield energy savings between 25-36% compared to dark coloured tiles.



Sarking and Thermal Performance

Before roof tile installation, builders may install sheets across the roof frame. This is known as sarking and it enhances the already effective insulation properties of roof tiles. A sarked roof is essential for the warm Australian climate as it promotes protection from heat gain during the day and rapid heat loss in the evenings. Though certain types of insulations have been known to cause health issues. Roof tiles and sarking are perfectly 100% safe.



MYTH BUSTED:

Roof Insulation is bad for your health

FALSE: *Though certain types of insulations have been known to cause health issues. Roof tiles and sarking are perfectly 100% safe and natural.*



Tips for Insulating your Home

Roofs and ceilings work together to regulate internal temperatures. In that regard it is important that you capitalize on this feature.

- Install insulation under the roofing material to reduce heat and sound gain, sarking.
- Insulation can also be applied to the ceiling or in unused attic spaces for further effectiveness.
- Because the process of insulation can be quite extensive depending on the amount of work that needs to be done, it is best done during the more temperate seasons of spring and autumn. This is to protect against unwanted temperature exposure during periods of difficulty.



FAST FACT: A roof tiles colour affects its thermal performance. Light shades like white offer the optimum results in reducing solar radiation heat gain.



Building Codes of Australia and Insulation

The Building Code of Australia (BCA) has set strict rules in terms of minimum insulation requirements for housing countrywide. These divisions are not set by state by territory but by climate zones ranging from 1 – 9 with 1 representing the highest.

To account for the hotter temperatures, Australia's northern regions fall within the scope of the lower numbers. With temperatures easing in the southernmost regions.

The climate zones dictate the insulation requirements in terms of walls, ceilings and floors as well as optimum colours and shades for best performance.



Terminology Guide

Acoustics: The factor that contributes to the volume of sound that can be transmitted into a room.

Apex: The highest point of your roof, typically the spot where multiple roof slopes meet.

Batten: A piece of timber installed horizontally above the rafters which is used for the easy application of sheet metal and sarking.

Cladding: The practice of fitting one material over another in order to promote internal heating and cooling.

Cold Roof: A roof that has insulation laid at a horizontal level

Gable: The triangular section of a roof wall at the end of a pitched roof.

Hipped Roofs: A roof type with slopes on four sides.

Warm Roof: An insulated roof with a vapour barrier.



Resources

For more detail on technical content, please see:

<https://rtaa.blob.core.windows.net/media/1419/the-properties-of-roof-tiles.pdf>

For more detail on roof acoustic performance, please see:

[INSERT LINK TO TECHNICAL GUIDES ONCE LIVE]

PO Box 275, St Leonards NSW 1590 Australia
Suite 7.01, Level 7, 154 Pacific Highway, St Leonards NSW 2065 Australia
Telephone +61 2 8448 5500
Technical hotline 1300 667 617
ABN 67610821871
ausrooftiles.com.au

