

build for living



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Introduction to Roof Tiles

The roof is one of the largest external facing surface areas of your home, and a key component of the home impacting internal temperatures as a consequence. For this reason the choice of roofing material is paramount to creating an energy efficient home.



Both in their construction and their ongoing use, our homes have a significant impact on the environment. For this reason it is important that building product manufacturers, builders, architects, and home buyers ensure the products they produce or use offer both aesthetic and functional benefits in the operation of the home.

As one of Australia's largest suppliers and installers of concrete and terracotta roofing products, Bristile Roofing is aware of its responsibility to operate with a sustainable conscience. We continually strive to minimise the impact of our operations on the environment and offer products that provide aesthetic appeal and practical benefits.

The information in this document illustrates roof tiles practical benefits across a number of categories including strength, longevity, embodied energy, reusabilty, thermal performance, and solar absorptance. Research has been gathered from leading institutions in Australia and abroad, and gives insight into the factors that should be considered when making a choice of roofing material. Roof tiles have long been one of the most popular products used on Australian homes, and now research proves the choice Australians have made for generations has been the right one.



The Facts About Roof Tiles

Research conducted by universities and independent institutions, confirms that a roof constructed from terracotta or concrete roof tiles offers many benefits. The research shows that roof tiles reduce energy consumption, do not rust or corrode and offer the added benefits of fire resistance and sound insulation.

Extensive testing and investigations has been conducted and the results show that roof tiles offer:



Affordability

Concrete roof tiles are one of the most affordable roofing products on the Australian market.



Large Colour and Profile Range Roof tiles are available in more colour and profile combinations than any other commonly used roofing product in Australia.



Ideal for Coastal Areas Roof tiles are ideal for use in coastal areas as they are impervious to rust and corrosion.



Strength

Roof tiles must comply with strict standards in strength and concrete roof tiles actually increase in strength as they age.



Sound Insulation

Roof tiles can reduce noise by 30 decibels which is more than twice the noise reduction achieved by other commonly used roofing materials.



Reduced Cooling Requirements

Testing of similarly coloured roofing products shows roof tiles have a lower cooling requirement than other commonly used roofing materials.





Fire Resistance

Roof tiles are ideal for bushfire prone areas as they are non combustible.



Low Embodied Energy

Testing shows that concrete roof tiles are the lowest embodied energy product of the three most commonly used roofing materials in Australia.



Solar Reflectance

Testing shows roof tiles will reflect more heat away from the home than other commonly used roofing materials.



Water Capture/Run Off

Water run off from tiled roofs is as safe to use as that from any other roofing material.



Longevity

When it comes to longevity, concrete and terracotta roof tiles both outperform the leading competing alternative. Concrete roof tiles offer a 50 year product warranty and terracotta roof tiles are supplied with our famous "Colour For Life" warranty.

Solar Absorption/Reflectivity Roof tiles have higher reflectivity than metal roofing

Products such as roof tiles reflect more heat away from the home thereby reducing the need for artificial cooling.

Solar absorptance and solar reflectance are interlinked as the value of both together must add up to 1 (so if the reflectance of a product is 0.80 then the absorption value must be 0.20).

Solar reflectance measures the amount of solar energy that is reflected back into the atmosphere after coming into contact with a given material, with the solar energy reflected remaining at the same strength as when it hits the surface of that material.

Solar absorption refers to the amount of solar energy that is transmitted into the material itself and is used as a measure to determine the amount of heat and cool energy that is transmitted through building materials into internal living areas. Solar reflectance and absorption are used to determine the ability of a material to minimise the need for heating and cooling by reducing external temperature fluctuations impacting the temperature of internal living areas. As solar energy moves through a given material it can (depending on the properties of the material through which it is being transmitted) dissipate or reduce in strength as the energy is absorbed by the material.

Based on testing, concrete and terracotta roof tiles cause the amount of the energy being transmitted through them to dissipate significantly.

Tests conducted by the Florida Solar Roofing Center (USA)* show that roof tiles reflected more heat away from the home than metal roofing of the same colour. This means the roof tile had lower solar absorption, and is more effective in reducing the transfer of heat into the roof space, thereby effectively reducing the need for cooling devices such as air conditioning.



Solar Reflectance of Roof Tiles and Metal Roofing



*Source: Florida Solar Energy Center, Comparative Summer Attic Thermal Performance of Six Roof Constructions (1997). Tests compared a white barrel style concrete roof tile with a standard white standing seam metal roofing sheet.

Roof tiles reflect 7.8% more heat away from the home than metal roofing in the same colour.





Embodied Energy

Roof tiles are low in embodied energy

Embodied energy measures the amount of energy involved in the extraction of raw materials, their transportation to the point of manufacture, the production process, delivery to the building site and installation of the product.

Embodied energy is one of the terms used to measure the impact of a product on the environment which is why an understanding of the term is important to informed debate on environmental sustainability.

The figures opposite show the difference in embodied energy between Australia's three most commonly used roofing materials: concrete roof tiles, terracotta roof tiles, and sheet metal roofing. In order to enable comparison, three structures were built using common construction materials (timber framing and plasterboard) and changing the one independent variable: the roof cladding.

The results of the testing clearly identify concrete roof tiles as the lowest embodied energy product, followed by terracotta roof tiles. Sheet metal roofing attained the highest embodied energy of the three materials tested.

It is important to note that while embodied energy is important, it should be considered in relation to a product's usage life or product lifecycle.



The total amount of energy used to produce various types of roof cladding



Source: Lawson Buildings, Materials, Energy and the Environment (1996) Figures calculated using a roof size of 250m²



Sound Insulation

Roof tiles are the quieter roofing material

The density of roof tiles means they are better at insulating against external noise from vehicles, air traffic and extreme weather conditions.

Most roofs reduce noise but a tile roof provides a more substantial barrier than many other roofing materials due to its sheer density. In fact, roof tiles can reduce external noise by as much as 30 decibels compared to a reduction of 12 decibels for a sheet metal roof.* A tiled roof also helps minimise "creaking" and "popping" sounds which occur with some types of roofing as a result of temperature variations.

The raw figures alone are impressive enough. However, the jump from 12 to 30 decibels, in terms of actual noise levels, is exponential. Something akin to going from a sneeze to a New Year's firecracker.



Sound insulation capabilities of concrete roof tiles and sheet metal roofing



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

The difference between 12 to 30 decibels is something akin to going from a sneeze to a New Year's firecracker."

*Cement and Concrete Association of Australia Technical Report. TR/F81.Sept. 1984



Longevity Roof tiles are long lasting

With their 50 year product warranty and an abundance of examples attesting to their longevity, it's no surprise that concrete roof tiles are the most commonly used material on Australian roofs.

The Bristile Roofing 50 year product warranty on concrete roof tiles states that roof tiles will not "crack, split or warp due to defective manufacturing, will not become porous or leak, and will not be damaged by coastal salt". Terracotta roof tiles are offered with a "Colour for Life" warranty meaning the colour of the tile is warrantied for the life of the product. This is due to the high temperature of the firing process during manufacturing which effectively seals the product and locks in the colour. The long life of terracotta roof tiles has been recognised for centuries with many hand made tiles still featured on some of the worlds ancient marvels.



Standard Warranty Periods for Roofing Products



Reusability/Recyclability Roof tiles are reusable and recyclable

The ability to re-use a product lengthens its lifecycle and ensures the energy used during manufacture is spread over a longer period achieving greater efficiency.

Roof tiles can be re-used by simply removing them from one building and transferring them to another, eliminating the energy consumption and costs that would be associated with manufacturing a new product.

Both concrete and terracotta roof tiles can also be recycled for use in other products. Concrete roof tiles are commonly recycled as road base while terracotta roof tiles can be used in the manufacture of products such as bricks or utilised in the production of new terracotta roof tiles.

How Roof Tiles are Re-used

Manufactured

in our factory







Transported to site





Reinstalled on a new roof



Removed and transported to the next site

Re-use of building materials roof tiles commonly saves about 95% of embodied energy.

Repair and Replacement Roof tiles are easy to repair or replace

Because a tiled roof is composed of a large number of small pieces, damaged tiles can be removed and replaced with relative ease. This not only reduces costs and saves time but also reduces energy expelled in production of the material required to repair the roof. Competing alternatives require entire sections of the roof to be replaced even when only a small section of it is damaged.

Roofing Repairs - Roof Tile Vs Metal



If a tiled roof is damaged, one or more tiles can be easily removed and replaced.



When a metal roof is damaged the entire metal panel needs to be replaced, even when only a small part of it is damaged.



Corrosion Resistance/Marine Exposure Roof tiles are ideal for coastal homes

Some building materials can be damaged by corrosion as a result of exposure to salt and moisture. Concrete and terracotta roof tiles however are non corrosive and rust resistant which makes them ideal for use in coastal areas or marine environments.



Roofing Product Warranties

The simple facts

	Warranty applies to product installed within 200m of breaking surf	Warranty applies to product installed within 5km of salt water	Roof must be cleaned with fresh water biannually to maintain warranty*	Warranty applies to colour longevity
Bristile Roofing Colour For Life Warranty - Terracotta Roof Tiles	Yes	Yes	No	Yes
Bristile Roofing 50 Year Product Warranty - Concrete Roof Tiles	Yes	Yes	No	No
Standard Metal Roofing 25 Year Warranty	No	Conditions Apply	Yes	No
Standard Metal Roofing 30 Year Extended Warranty	No	No	Yes	No

* Areas not normally exposed to rain must be washed every six months with fresh water.



Other Factors

Water Capture/Run Off

Water run off from tiled roofs is as safe to use as that from any other roofing material. Please note: the greatest potential for the contamination of water collected from any roof is the organic material that collects in the gutters. To avoid contamination of collected water, the water tank should be installed with a first flush system and/or regularly cleaned.

Fire Resistance

Roof tiles are made from non combustible materials and provide excellent protection against bushfires. Testing funded by Australia's leading manufacturers of concrete and terracotta roof tiles and conducted by the Roofing Tile Association of Australia, revealed that roof tiles are ideal for use in Fire Zone areas provided they are installed to AS 1530.8.



Manufacturing Techniques

Bristile Roofing is continually searching for ways to achieve greater environmental outcomes. We are dedicated to reducing the amount of energy and water consumed, and the amount of waste and greenhouse gas (carbon dioxide) generated through business operations.



High Performing Energy Efficient Housing

8 Star House - Queensland

One of Queensland's major project builders has developed in conjunction with Bristile Roofing[™] and Austral Bricks[®] an 8 Star House at the Eprapah estate in Victoria Point, Queensland.

The 8 Star House demonstrates how heavy weight materials in conjunction with clever design can reach unprecedented energy efficiency levels while still achieving a pleasing aesthetic and contemporary style. From the positioning of the windows, to the choice of building materials, the 8 Star House has been designed to be cool in the hot summer months and warm in the cold season. The rooms are light and airy because the home is oriented to make the most of winter sun and summer airflows, and the exterior has deeper roof eaves to provide shade. The classic brick exterior, roof tiling, striking internal brick walls and beautiful ceramic flooring are not only distinctive design elements of the home, but they also combine to store energy from the sun and replace the need for artificial heat and cooling.

The 8 Star House is an impressive example of sustainable design with real world application, developed in conjunction with Austral Bricks® and Bristile RoofingTM.



9 Star House - Western Australia

The Jade 909 House utilises the four well-established Passive Design Principles: Orientation, Insulation, Ventilation and Thermal mass.

Coined as "beyond carbon neutral", it has no air-conditioning, just ceiling fans to assist ventilation and the three kilowatt PV cells exceed the home's power requirements. The result is a water saving of 76 percent over a standard house and a remarkable 119 percent energy saving. The use of clay bricks and terracotta roof tiles is a feature of the home as both are materials that have a very long life expectancy.

The design and construction of the home meets not only high levels of sustainability but it's also affordable. How affordable is it? The base model is around \$200,000 rising to about \$285,000 as displayed with photovoltaic cells, grey water system and rainwater tanks. Not surprisingly, the home won numerous awards at the WA GreenSmart Awards, including the coveted Home of the Year and Water Efficiency Award.



Associated Companies Brickworks Group of Companies

Abristileroofing

Bristile Roofing[™] was established in 1929 when Sir Lance Brisbane opened his first terracotta products factory in Perth. The division is now one of Australia's largest manufacturers and expert installers of quality terracotta, and concrete roof tiles.

Austral Bricks® is the largest and most efficient producer of pavers, bricks, building materials, façade systems and landscaping products in Australia. With the commissioning of a new brick factory at Wollert, Victoria in 2012 we continue to set the pace for quality, efficiency and high levels of environmental performance. The introduction of robotic brick handling equipment at plants around Australia enables us to greatly reduce manufacturing costs and enhance production flexibility.

australmasonry

The acquisition of a number of concrete masonry manufacturers has complemented established manufacturing Victorian facilities and led to the formation of Austral Masonry[®]. Through natural growth and acquisition Austral Masonry[®] has become a significant player in the market for masonry block and retaining wall systems on the East Coast of Australia and provides further diversification of earnings for the group.





A new addition to the Brickworks Building Products[™] family, our inventive precast solutions team works with clients to deliver architecturally striking and commercially cost-effective solutions for the industrial, commercial and residential markets. World-class style is built on attention to detail, so we're proud of our relentless focus on the use of advanced technology, quality control and commitment to service.

auswesttimbers

Auswest Timbers® manufactures a diverse range of timber products including heavy structural timbers, roof tile battens through to floor boards and decking. The company has manufacturing plants in Western Australia, Victoria and the A.C.T.

roof tiles for

build for **living**

We are committed to social and environmental responsibility and sustainability and are proud of our record of community support.

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