

Thermal Research: Best Building Products for Higher NatHERS Ratings

Brick veneer homes achieve higher ratings using the National House Energy Rating scheme than lightweight, increasing GreenStar Home ratings.

This correlates with independent research from the University of Newcastle



What is the National House Energy Rating Scheme?

- By providing a 'measuring tape' to estimate a home's potential heating and cooling energy use, NatHERS

 a 10 star rating system, helps to make Australian homes more comfortable for their inhabitants and also helps residents to save on energy bills through smarter design choices.
- Homes with higher star ratings are efficiently designed to suit the climate, and to maintain a high degree of thermal comfort.
- NatHERS models the thermal performance of a home's construction, determining the heating and cooling loads to maintain a comfortable temperature in a particular climate zone.

"Often good design can reduce the amount of energy needed to keep a home comfortable with no or little additional construction cost"

– NatHERS

Thermal Research

Best building products for higher NatHERS ratings

Results from eight years of independent research conducted by the University of Newcastle, measuring the thermal performance of typical Australian housing, proves that bricks with higher thermal mass make homes more energy efficient than lightweight construction.

Thermal modelling has been undertaken on a typical Australian home using NatHERS to better understand the performance when constructed using different materials over a range of Australian climates.

Thousands of modelling runs have been completed to compare the thermal performance when different materials are used. From the data obtained graphical comparisons have been prepared to used to educate the market on the benefits of thermal mass construction.



MASTER

The McDonald Jones

Australian home.

Miami house plan serves as the basis for a typical

Effect of external wall type by location (Miami House) (Location/Star Rating)

Melbourne

Liaht weight

Canberra

Brick Veneer



Higher star ratings can be achieved by using brick veneer, cavity brick and Panel Brick Double Wall over lightweight building products.

Cavity Brick

Richmond NSW

Adelaide

Panel Brick Double Wall

Brisbane

Perth

Actual testing demonstrates brick superiority over lightweight products

Thermal mass benefits are demonstrated by testing

Brick is a building material which not only resists the conductive flow of heat, but also provides thermal mass benefits. The thermal mass of bricks acts as a thermal battery keeping your home cooler in summer and warmer in winter.

Brick construction provides natural thermal comfort and superior energy efficiency over lightweight construction.

Results from eight years of independent research conducted by the University of Newcastle into energy efficient housing proves:

- Insulated cavity brick (full brick) construction performed the best.
- · Lightweight construction was the worst performing building in all seasons.

Detailed evaluation of various construction types demonstrate that even when wall systems have the same R-Value, a wall with thermal mass will outperform a lightweight wall. Actual testing of the energy efficiency of these two housing types shows that the insulated lightweight building used twice the energy consumption of a brick veneer building with the same R-Value to maintain the temperature in the comfort zone.

The R-Value is a measure of insulation and the ability of a building material to resist heat flow. R-Value is only one measure of thermal performance and does not capture the benefits of thermal mass.

Bricks when used in the external skin of a house slow the heat flow through a wall. When solar energy impinges on the wall, a large proportion of this heat is reflected back to the exterior environment and doesn't come through the wall into the internal space.

The external brick absorbs heat energy, stores it and releases it later to the environment. This is known as thermal lag and when a home includes thermal mass, dependence on artificial heating and cooling is reduced.

University of Newcastle research*

The insulated lightweight building with over three times the R-value of cavity brick, used over three times the energy, to maintain the temperature in the comfort zone.

Results prove that the use of thermal mass levels out the temperature swings during the heat of summer and the cold of winter.

This is important as the building will not need the same level of artificial cooling during the peak electricity demands of summer as other forms of construction.

Thermal mass results in greater comfort for the building occupants and less frequent use of air conditioning.

R value	Energy use (actual testing)
1.51	160MJ, more than twice as much as brick veneer
1.58	70MJ, less than half of the lightweight house
	R value 1.51 1.58



* A Study of the Thermal Performance of Australian Housing, University of Newcastle, 2011

"It is clear from the research that to obtain a true indication of thermal performance, account must be taken of the performance of the building as a complete system rather than considering the thermal resistance of the walls alone."