

Do-It-Yourself (D.I.Y.) method for the Thermal Comfort Index

Introduction

D.I.Y. is an online method for completing the Thermal Comfort Index in BASIX.

D.I.Y. allows users to enter the details of the dwelling and assess its thermal performance online within the BASIX tool.

D.I.Y. is effectively a web-enabled Deemed to Satisfy (DTS) method, with the ability to describe overshadowing from neighbouring buildings or existing vegetation, and to recognise the benefits of winter heat gain.

Any single dwelling (detached, attached or granny flat) can be tested with D.I.Y., provided it can be accurately described within BASIX.

There are a series of rules and specifications in D.I.Y. that must be adhered to; if this cannot be achieved, the Simulation method should be used.

Why was D.I.Y. developed?

D.I.Y. provides building designers and architects considerable flexibility in achieving BASIX compliance and was developed in response to strong demand from industry.

D.I.Y. provides users with a free assessment of the thermal performance of a dwelling within BASIX, giving instant feedback on the specific aspects of the dwelling that should be improved in order to pass.

DIY is a more flexible version of the Deemed to Comply option which was available in the BASIX single dwelling tool between 1 July 2004 - 31 June 2005.

D.I.Y. has been under construction since April 2005 and has undergone rigorous testing and consultation with industry throughout this time.

Since the introduction of BASIX in July 2004 there has been a strong demand for the inclusion of a genuine alternative to Simulation, to assess the thermal properties of residential dwellings. The inclusion of D.I.Y. within BASIX is consistent with a number of other states and territories throughout Australia where a Deemed-To-Satisfy (DTS) option is available in addition to a 'Simulation' method.

How does D.I.Y. work?

In D.I.Y., the dwelling's construction, orientation, glazing, shading, cross ventilation and overshadowing by neighbouring buildings is described.

D.I.Y. provides the proponent with minimum insulation requirements for the dwelling. Like the Simulation method, the D.I.Y. has a maximum load for heating and cooling appropriate to the climate zone.

If a dwelling has estimated loads higher than the maximum loads, modifications to the design of the house including adjustments to glazing and shading specifications can be made in order to pass.

Climate Zones

D.I.Y. uses the BCA Deemed to Satisfy climate zones. The climate zone provides the climatic information that assists in determining the minimum insulation levels, the maximum heating and cooling loads and the heat gain and loss of the proposed construction and glazing.

The BCA has 8 climate zones across Australia. If an applicant switches from D.I.Y. to the Simulation method, a variation in the maximum allowable heating and cooling loads may occur due to increased climatic variation catered for under Simulation.

Construction

A range of floor, wall, ceiling and roof types can be described to D.I.Y. The selections influence the estimated heating and cooling loads.

The thermal mass within the construction materials has an influence on the estimated heating and cooling loads, particularly the type of floor construction proposed.

The colour of the roof and any roof ventilation also has an impact on the cooling load.

Insulation

D.I.Y. sets minimum standards for the level of insulation needed for floors walls, ceilings, and roofs depending on the climate. Roof insulation is required for medium and dark roofs and there is the opportunity to specify increased roof insulation performance in order to lower minimum ceiling insulation requirements.



The insulation levels have been set in recognition of the climate zone and the space available in common construction systems.

Glazing, Shading and Overshadowing

D.I.Y allows the user to group windows that have the same orientation sector, overshadowing, glass and frame type and shading device. Using the grouping feature ensures D.I.Y is not limited to dwellings with 15 windows or less.

D.I.Y. allows the designer to describe different glazing and shading within a dwelling. With the grouping option, a wide range of dwellings will be able to describe their glazing in D.I.Y.

A variety of glazing and shading types are available. Some windows can have no shading provided the dwelling achieves a pass. Adjustable shading improves (i.e. reduces) both heating and cooling scores.

Overshadowing from neighbouring dwellings, parts of the proposed dwelling and existing vegetation directly in front of a window or glazed door can be described. This may reduce the requirement for shading and correspondingly may increase predicted heating loads if it blocks access to winter sun.

The heating and cooling impact of each window, glazed door and skylight is calculated depending on its orientation, area, glazing type, shading and overshadowing. The cumulative impact is then used along with the previously described construction type to estimate the heating and cooling loads.

A window with a high heating or cooling impact will be identified to the user with a snowman icon (signifying excessive heat loss or insufficient heat gain), or flame icon (signifying excessive heat gain). These windows should be given primary consideration when making refinements to the design although improvements to others may be sufficient to pass.

This flexibility means a dwelling can be tailored in D.I.Y. to pass and compensations can be made for views or other design features which affect the thermal performance.

For example a deep verandah to the north may be shading all the northern glass. These windows will have a low cooling impact but may have a higher heating impact because they do not receive enough winter solar gain. This can be compensated for by using double glazing on one or more of those windows.

The cross ventilation bonus offered in D.I.Y is also available in the Simulation method.

Testing of the D.I.Y. calculation method

D.I.Y. has been tested on over 30 dwellings (representing a broad range of NSW dwelling types), in all climate zones with a variety of modifications, each with an equivalent NatHERS rating to check equivalence to the Simulation method.

The aim of the D.I.Y. testing was to:

- ensure a dwelling could not pass without appropriate design solutions for summer and winter within its climate zone,
- be equivalent in stringency to other Deemed to Satisfy solutions used throughout Australia and,
- have a reasonable equivalence to the Simulation method.

D.I.Y. was found to be, on average, within an acceptable level of variation to NatHERS for both heating and cooling predictions. No dwelling can pass D.I.Y without adequate insulation, appropriate shading and choice of glazing materials.

In general, the requirements to pass D.I.Y. would also result in a pass in the Simulation method.

The areas of difference between D.I.Y. and the Simulation method noted in the testing were:

- lightweight dwellings in mild climates had lower loads in D.I.Y. These dwellings were confirmed as having a reasonable design for the climate, therefore the difference is considered acceptable.
- dwellings with a large proportion of glazing facing north had lower heating loads in D.I.Y. NatHERS is regarded as not providing sufficient recognition of good orientation, so the difference is considered acceptable.
- For dwellings with mudbrick or rammed earth walls, NatHERS assumes higher heating loads than is likely to be the case.

Ongoing monitoring of D.I.Y. will continue and further refinements made as appropriate.

For more information:

Read the Help Notes on the BASIX tool or call the Help Line: 1300 650 908.

