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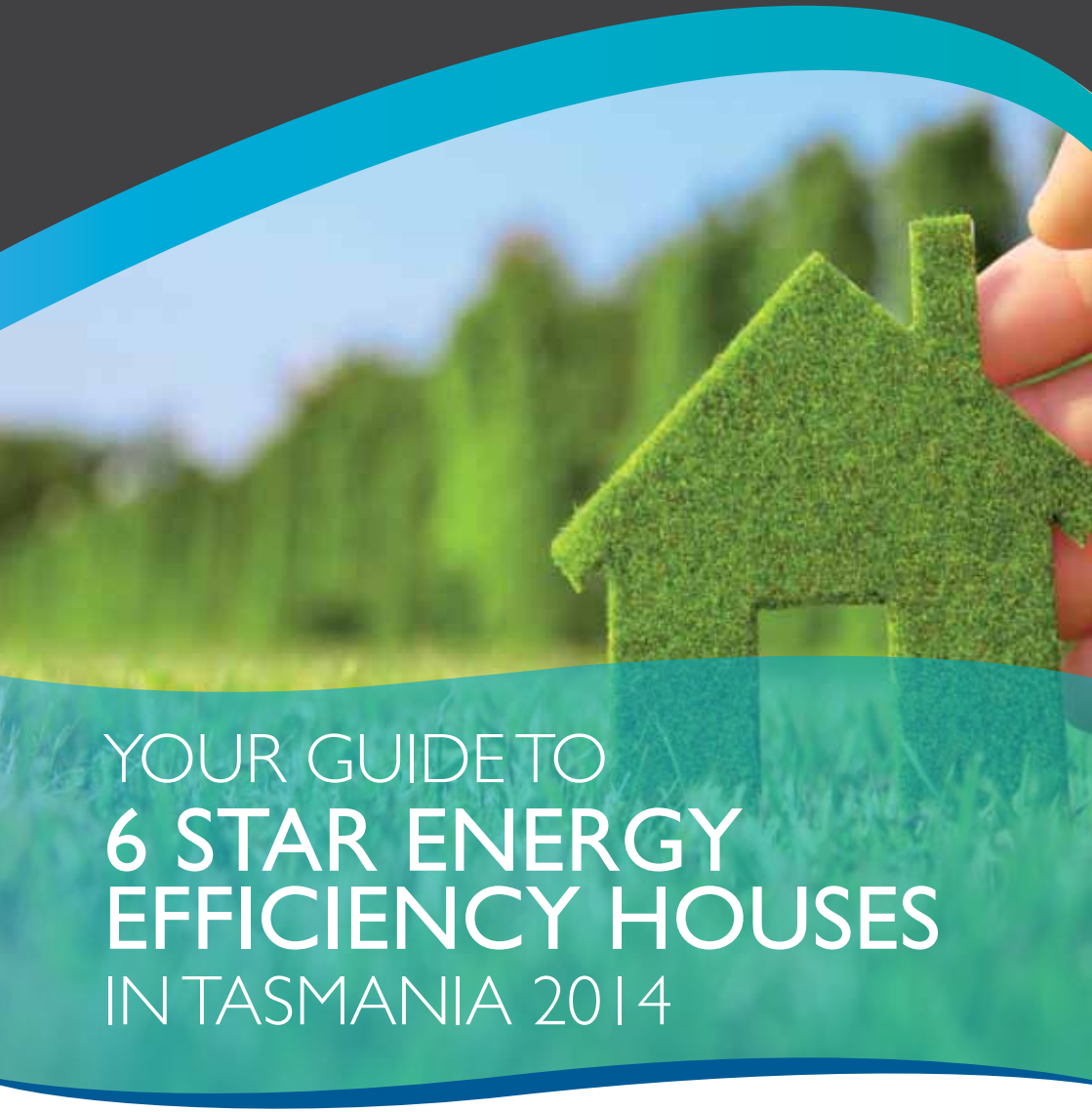

YOUR GUIDE TO 6 STAR ENERGY EFFICIENCY HOUSES IN TASMANIA 2014

Department of Justice

Tasmanian Government

Building Standards
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OPTIONS FOR COMPLIANCE

The following information is a summary of the deemed-to-satisfy energy efficiency requirements under the National Construction Code Series Volume 2 Building Code of Australia for a typical home with a flat ceiling and a pitched roof.

OPTION 1 – USING APPROVED ENERGY RATING SOFTWARE

The house must achieve a minimum 6 star rating using a NatHERS accredited house energy rating tool – i.e. FirstRate5, AccuRate Sustainability or Bers Professional. The energy assessment of the home can be completed by the responsible building designer or architect OR by an independent expert energy assessor accredited by the Association of Building Sustainability Assessors or the Building Designers Association of Victoria. A stamped certificate and plans will be produced to demonstrate the rating achieved by the home's design.

As well as achieving a minimum 6 star rating, the home must also comply with the energy efficiency requirements for lighting and services, and meet the requirements for thermal bridging, ceiling penetrations and building sealing as noted below.

OPTION 2 – USING ELEMENTAL PROVISIONS

The main building elements of the home must meet or exceed the prescribed values for Climate Zones 7 and 8 for the building fabric, glazing, building sealing and air movement, and also comply with the energy efficiency requirements for lighting and services. (Zone 8 is for alpine areas only).

BUILDING FABRIC
1. Roofs, External Walls & Floors

Building Fabric Type	TOTAL R-VALUE REQUIRED TO MEET BCA		R-VALUE OF REQUIRED ADDED INSULATION	
Climate Zone	Zone 7	Zone 8	Zone 7	Zone 8
Roof/Ceiling – Light Colour Roof (SA ≤0.4)	4.1	6.3	3.71	5.91
Roof/Ceiling – Medium Colour Roof (SA >0.4 <0.6)	4.6	6.3	4.21	5.91
Roof/Ceiling – Dark Colour Roof (SA ≥0.6)	5.1	6.3	4.71	5.91
Walls—Weatherboard	2.8	3.8	2.32	3.32
Walls—Brick veneer	2.8	3.8	2.24	3.24
Walls—Cavity brick	2.8	3.8	2.11	3.11
Walls—Cement or metal sheet	2.8	3.8	2.38	3.38
Floor—Timber (Suspended & Unenclosed)	2.75	3.25	2.24	2.74
Floor—Concrete (Suspended & Unenclosed)	2.75	3.25	2.29	2.79
Floor—Timber (Suspended & Enclosed < 600 AGL)	2.75	3.25	1.74	2.24
Floor—Concrete (Suspended & Enclosed < 600 AGL)	2.75	3.25	1.79	2.29

NOTES – Roof/Ceiling: The quoted figures are for a 200 metal roof, flat plasterboard ceiling and unventilated roof space, in an upwards direction. Floors: The quoted figures are in a downwards direction. When enclosed, the sub floor wall is single skin masonry. It is possible to use a combination of insulation materials such as bulk insulation, foil (Reflective Foil Laminate [RFL], Reflective Building Membrane [RBM]) etc. with various R-Values to achieve the required total R-Values. See BCA Clause 3.12.1.6 for treatment of attached garages.

SA – solar absorptance

2. Thermal Bridging

Where a metal roof or lightweight wall cladding is directly fixed to a metal frame, purlin or rafter AND there is no internal lining, or the lining is directly fixed to the metal frame, purlin or rafter, a thermal break of minimum R0.2 must be provided between the external cladding and the frame.

This can be achieved by the use of 12mm expanded polystyrene, a 20mm softwood timber batten or a proprietary tape or similar to the outer face of the stud.

3. Ceiling Penetrations

Penetrations through the ceiling have a major impact on the integrity and performance of the ceiling insulation. Clearances for recessed lights, exhaust fans and flues reduce the overall effectiveness of ceiling insulation. The BCA allows for up to 0.5% loss of insulation from these fittings over the home's total floor area before the minimum R-Value is adjusted to compensate for the loss. If greater than 0.5% of the ceiling area is uninsulated, the minimum R-Value of the ceiling insulation is increased to compensate for the loss.

EXAMPLE: In a 200 square metre house, 0.5 % to 1% of the ceiling area would equate approximately to:

- 2 bathroom heater/light/fan assemblies; and
- An exhaust fan in the kitchen and laundry; and
- 10 down lights with the maximum default 50mm clearance to the insulation

If R4.0 insulation is the minimum required to meet the building fabric requirements (see above), the builder must install R4.7 to compensate for the loss.

CONDENSATION

Condensation is a leading cause of building fabric failure. It is vital that building designers and thermal performance assessors properly consider local conditions when developing a design, not only meet the energy efficiency requirements of the BCA, but to perform well in all weather conditions.

Careful positioning of vapour barriers, insulation and seals plus correct ventilation of roof spaces and cavities can enhance a home's energy efficiency rating and minimise issues with condensation.

It is equally important that builders and contractors follow the design and construct the home in accordance with the design using good building practices and meeting all relevant standards.

4. Roof lights

Roof lights (or skylights) are pathways for heat to escape from a home. The BCA restricts the size of a roof light (measured by its plan area) to no more than 5% of the floor area of the room in which it is located.

The relative shape and dimension of the roof light and the roof/ceiling where it is located determines the properties of the roof light, i.e. U-Value and Solar Heat Gain Coefficient (SHGC) similar to glazing, using a 'shaft index' formula. A roof light with a shorter the 'shaft index" i.e. a short distance between the roof light and the ceiling, will require a better U-Value and SHGC than one with a longer 'shaft index'.

5. Glazing

Glazing is defined in the BCA as being any transparent or translucent element other than a roof light in the external fabric of the home. The treatment of glazing is one of the most important aspects of achieving an energy efficient home.

The two main properties of glazing considered in the BCA are the U-Value and Solar Heat Gain Coefficient (SHGC) that are whole of glazing element values that include

the glass and any frame. A simple calculation compares the area of the glazing in each orientation, the floor area of the home and the properties of the glazing elements. NB. The properties maybe different for different types of glazing i.e. a sliding window versus an awning window, and for elements facing in different directions.

Generally windows in BCA Climate Zones 7 and 8 require lower U-Values and a higher SHGC to comply.

The Australian Building Codes Board (ABCB) has published a Glazing Calculator that allows for the easy entry of all glazing elements and their properties to demonstrate compliance with the BCA. Go to www.abcb.gov.au for details.

6. Building Sealing

Sealing of the building fabric is important part of an energy efficient home. Poorly built floors, gaps to windows and doors, permanent vents and flues all provide pathways for air to infiltrate the home.

The BCA requires that –

- Chimneys to be fitted with dampers
- Roof lights are sealed or have a shutter system installed
- Seals are fitted to all external doors and windows
- Exhaust fans must be fitted with self-closing dampers or similar
- Roofs, walls, floors and openings to be constructed to minimise air leakage with close fitting linings or caulking, skirtings, architraves or the like

7. Air Movement

Sufficient air movement or natural ventilation to rooms within a home is important for comfortable living. In BCA Climate Zones 7 & 8, each room within a home, excluding bathrooms, toilets, laundries (refer to the BCA for the full definition) must have a window, opening, door or other device with a ventilating area of not less than 5% of the floor area of the room to be ventilated.

Sharing ventilation between adjacent rooms to meet the minimum requirements is allowed except from toilets.

SERVICES

This part of the BCA applies to all homes regardless of how the building fabric has been assessed.

1. HEATED WATER SUPPLY SYSTEMS

Heated water systems i.e. hot water systems, hydronic heating systems etc. must be designed and installed in accordance with Part B2 of NCC Volume 3 – Plumbing Code of Australia. Insulation and heat traps are required to these systems. Your plumber should be able to assist you to meet these requirements of the BCA.

2. ELECTRIC RESISTANCE SPACE HEATING

Each room with electric resistance space heating must have its own isolating switch and temperature controller for rooms with similar heating needs. The BCA specifies a maximum power load of 110 W/m^2 for living areas and 150 W/m^2 for bathrooms.

3. LIGHTING

The total wattage of installed lighting (excluding heaters that emit light) to the internal areas of a home must not exceed the following prescribed totals:

- 5 W/m^2 in a home
- 4 W/m^2 on a verandah or balcony
- 3 W/m^2 in a garage that is part of or attached to a home

External lighting is not included in these totals but these must be controlled by a daylight sensor i.e. they turn off when the sun rises in the morning, or are efficient.

If the home has dimmers, movement sensors or other control devices installed within the home, higher levels of lighting are permitted.

4. SWIMMING POOLS AND SPAS

The BCA requires that swimming pools and spas, when heated, must be heated by solar heaters, a heater using reclaimed energy, a gas heater, heat pump or a combination of these.

Swimming pools heated by a gas heater or heat pump must also have a pool cover and be controlled by a time switch.

PRACTICAL CONSIDERATIONS

The following points list some practical issues that builders and designers may face in meeting the energy efficiency requirements of the BCA.

- It is sometimes difficult to achieve the required performance without reassessing traditional building practices. For example, the required R-Value for an external wall may ask for a 70mm high performance batt that is not readily available. The supplier has a 90mm batt with the same R-value in stock that you can use. You must not use the thicker batt! Compression of batts to make them fit is not the answer as their R-Value is related to the amount of trapped air. If you wish to substitute a different product from that specified you must check with the Designer and Building Surveyor to confirm what you propose complies with the approved plans.

- If reflective foil wall wraps are used, they must have an air gap of minimum 20mm if they are to provide any benefit. Wall wraps installed without an air gap give no added R-Value or benefit to the wall.

- Glazing design may often leave little room for changes of mind once the calculations are complete. Builders should never accept an owner's request to alter a window or door element without referring the matter to the building designer, the thermal performance assessor and the building surveyor. Even a minor variation could make the finished dwelling non-compliant.

- The internet is a powerful resource when seeking up to date information about products. Don't rely on printed brochures unless you are sure they are up to date. Insulation product manufacturers publish data on their websites. One particularly useful site is the Insulation Council of Australia and New Zealand (ICANZ). They have published two very useful handbooks, one on the thermal performance of residential and commercial building elements and the second on the correct installation of insulation. Visit www.icanz.org.au

FURTHER INFORMATION

For more details about building legislation contact the Helpline

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