

NCC - BCA VOLUME TWO: ENERGY EFFICIENCY PROVISIONS

INTRODUCTION

This TECHnote includes information useful in satisfying the NCC energy efficiency provisions for Class 1 buildings and Class 10a buildings. The NCC objective is to reduce greenhouse gas emissions – this does not necessarily improve energy efficiency. Operational energy is currently the focus of the NCC. Embodied energy may be considered in the future for sustainability controls.

PERFORMANCE REQUIREMENTS

H6P1 Thermal performance: Provision of building features to facilitate efficient use of energy as appropriate to several considerations including building use and location.

H6P2 Energy usage: Provision of building service features to facilitate the efficient use of energy as appropriate to several considerations including building use and location.

VERIFICATION METHODS

H6V2 Verification using a reference building: This method requires a building to have an annual energy consumption not more than that achieved by a reference building. The reference building must be modelled to the Deemed-to-Satisfy provisions of BCA Part H6 in accordance with H6D2(1)(b). The requirement for calculation of either heating or cooling loads, or both, is dependent on the climate zone.

H6V3 Verification of building envelope sealing: Method 1 of AS/NZS ISO 9972 can be used to measure the building envelope's air permeability using the fan pressurisation method.

DEEMED-TO-SATISFY PROVISIONS

These *Deemed-to-Satisfy* provisions specify:

- Ability of the roof, walls and floor to resist heat transfer.
- Resistance of the glazing to heat flow and solar radiation.
- Sealing of the building envelope against air leakage.
- Provision of air movement.
- Insulation and sealing of heating and cooling ductwork and hot water piping.

Provisions may vary depending upon the *Climate zone* in which the building is to be located, and are covered in the following:

BCA H6 Energy efficiency

There are two options for complying with the energy efficiency performance requirements – either by obtaining a star rating under the Nationwide House Energy Rating Scheme (NatHERS) or by complying with Section 13 of the ABCB Housing Provisions.

ABCB Housing Provision Part 13.2 Building fabric

Provisions contain a range of options designed to accommodate different construction materials and techniques, including bulk and reflective insulation, light-coloured and ventilated roofs, blockwork and cavity masonry walls, shaded and light-coloured external walls, and all forms of suspended and on-ground floors.

ABCB Housing Provision Part 13.3 External glazing

Provisions recognise window orientation, shading and the type of glass and frame used. The Total U-Value and Solar Heat Gain Coefficient (SHGC) characteristics of the glazing must be expressed for the glass and frame combined. These values are determined from the Technical Protocol and Procedures by the Australian Fenestration Rating Council (AFRC). The glazing calculator available on the ABCB website calculates compliance with the provisions based on the proposed glazing.

ABCB Housing Provision Part 13.4 Building sealing

Provisions control unwanted air movement, which has a major impact on the thermal performance of the building, and address the following elements:

- Chimneys and flues.
- Roof lights.
- External windows and doors.
- Exhaust fans.
- Construction of ceilings, walls and floors.
- Evaporative coolers.

ABCB Housing Provision Part 13.5 Ceiling fans

Provisions aim to reduce the size of air conditioning systems by taking advantage of the cooling effect provided by air movement.

ABCB Housing Provision Part 13.6 Whole-of-home energy usage

Provisions developed to limit whole-of-home energy usage. They include building, swimming pool pump and spa pump energy use.

ABCB Housing Provision Part 13.7 Services

Provisions have been developed to minimise the amount of energy lost through air conditioning ductwork, central heating and sanitary hot water piping. They include:

- Sealing and insulation of air conditioning ductwork.
- Insulation of central heating water piping.
- Provisions have been included for electric resistance space heating, artificial lighting and water heaters in a heated water supply system, and heating and pumping for swimming pools or spas.

Definitions

Annual energy consumption: The theoretical amount of energy used annually by the building services, excluding kitchen exhaust and the like.

Climate zone: A geographical area with similar climatic characteristics defined in Figure 2 and Table 2 of the NCC. Climate zone maps are available on the ABCB website.

Conditioned space: A space within a dwelling that is artificially heated or cooled.

Domestic services: The basic engineering systems of a house that use energy or control the use of energy includes heating, air-conditioning, mechanical ventilation, artificial lighting and hot water systems; excludes cooking facilities and portable appliances.

Energy efficiency: A measure of the reduced energy consumption resulting from design improvements in comparison to the amount of energy that would otherwise have been consumed.

Fenestration: Any glazed opening in a building's external envelope, including windows, glazed doors and skylights.

R-Value: The thermal resistance of a component calculated by dividing its thickness by its thermal conductivity. The sum of R-Values of the individual component layers, including air spaces, in a composite element is the Total R-Value.

Solar heat gain coefficient (SHGC): Means the fraction of incident irradiance on glazing that adds heat to a building's space.

Total U-Value: The total thermal transmittance of a composite element. It is the reciprocal of the Total R-Value.



NATSPEC

NATSPEC uses the *Deemed-to-Satisfy* provisions where possible.

Relevant websites

NCC

www.abcb.gov.au

AFRC technical documents

<https://afrc.org.au>

Relevant documents

ABCB *Energy efficiency resources*

NATSPEC TECHnote GEN 011

Specifying NCC requirements

NATSPEC TECHnote DES 013 NCC

Energy efficiency protocol and software for Housing.

NATSPEC TECHnote DES 014

Environmental rating schemes for buildings.

Relevant NATSPEC package

NATSPEC BUILDING Domestic