

BCA – NCC VOLUME TWO ENERGY EFFICIENCY PROVISIONS

INTRODUCTION

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

PERFORMANCE REQUIREMENTS

P2.6.1: Provision of building features to facilitate the efficient use of energy as appropriate to a number of considerations including building use and location.

P2.6.2: Provision of building services features to facilitate the efficient use of energy as appropriate to a number of considerations including building use and location.

VERIFICATION METHODS

V2.6.2.2 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 modeled to the Deemed-to-Satisfy provisions of BCA Part 3.12. The requirement for calculation of either heating or cooling loads, or both, is dependent on the climate zone.

V2.6.3 Verification for a heater in a hot water supply system: Compliance is mandated by prescribed limits on the system's annual greenhouse gas intensity.

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 for free cooling by means of openings and breeze paths.
- Insulation and sealing of heating and cooling ductwork and hot water piping.

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

Part 3.12 Energy efficiency

There are two options for complying with the energy efficiency deemed-to-satisfy provisions 3.12.1 to 3.12.4 – either by obtaining a star rating under the Nationwide House Energy Rating Scheme (NatHERS), or meeting stipulated Total R-values for the building envelope.

Part 3.12.1 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.

Part 3.12.2 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 by the Technical Protocol and Procedures for energy Rating of Fenestration Products 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.

Part 3.12.3 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 and Evaporative coolers.
- Construction of roofs.
- Walls and floors.

Part 3.12.4 Air movement

Provisions aim to reduce the size of airconditioning systems by taking advantage of the cooling effect provided by air movement. Ventilation openings are required to be designed to allow the interior of a house to take full advantage of natural breezes.

Part 3.12.5 Services

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

- Sealing and insulation of airconditioning ductwork.
- Insulation of central heating water piping.
- Insulation and configuration of sanitary hot water piping.
- New provisions have been included for electric space heating, artificial lighting, water heaters in hot water supply and heating / pumping 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 1.1.4 and Table 1.1.2 of the BCA. 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.

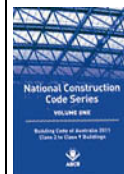
Energy efficiency: A measure of the reduced energy consumption resulting from design improvements in comparison to the amount of energy that would otherwise have been consumed.

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, but most factors involve design decisions.

Relevant websites

www.abcb.gov.au

AFRC technical documents

www.afrc.org.au

Relevant documents

BCA
BCA Energy efficiency provisions information handbook
NATSPEC TECHnote GEN 011
Specifying BCA requirements
NATSPEC TECHnote DES 013
BCA Energy efficiency protocol and software for Housing.

Relevant NATSPEC package
NATSPEC Domestic