

Energy Efficiency and the BCA



The BCA contains energy provisions with the objective of reducing *greenhouse gas emissions by efficiently using energy*. The requirement is that *a building must have, to the degree necessary, a level of thermal performance to facilitate the efficient use of energy for artificial heating and cooling*.

BCA 2005

Currently this is to be achieved via

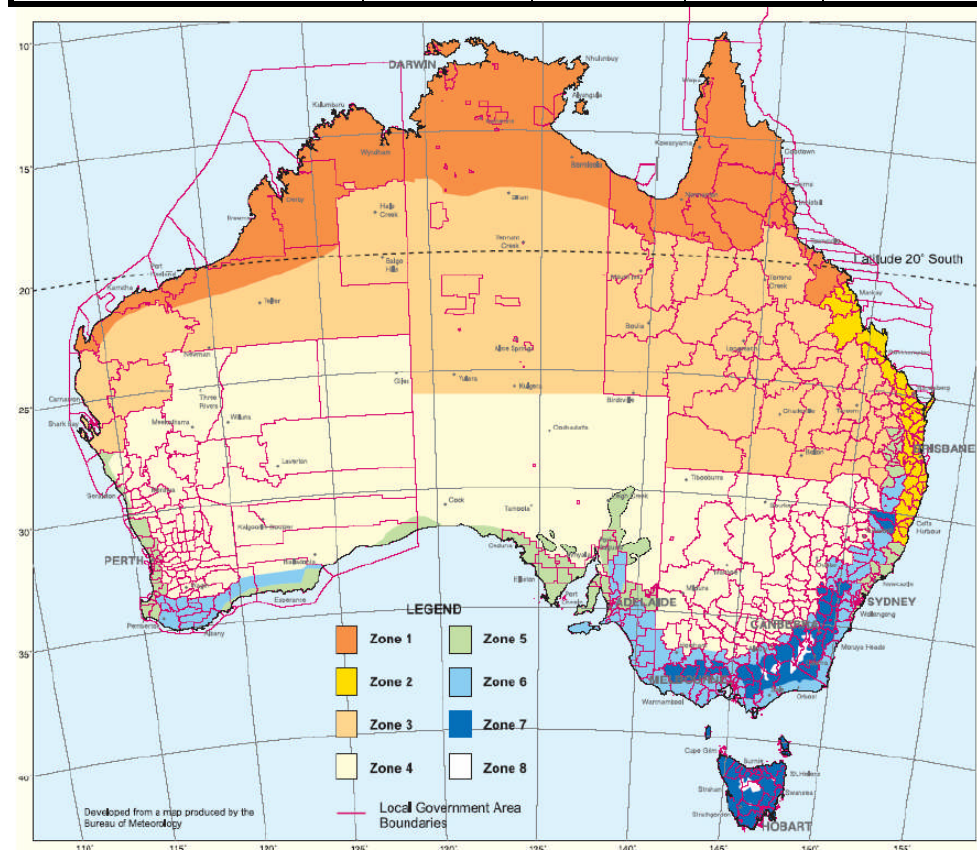
- **Thermal Simulation** A minimum performance standard equivalent to a NatHERS 3 ½ star rating for the three cooling dominated climate zones (1, 2 & 3) and a 4 star rating for the remaining 5 climate zones (4 to 8). In climate zones 1, 2 & 3 there is an additional allowance of 20 MJ/m² for those dwellings that incorporate solar, gas or heat pump water heaters.
- Alternatively there is a raft of “**Deemed to satisfy provisions**” which can be adopted. These provisions relate to the building fabric, external glazing and shading, building sealing, and air movement.

The protocol for thermal calculation methods used to determine the energy rating of houses is detailed in the ABCB Protocol for House Energy Rating Software. Version 3.2 of BERS, version 3.5 of FirstRate and version 2.32 of NatHERS comply with this Protocol.

External walls

The deemed to satisfy alternative requires a minimum total R-value for walls to be as follows:

WALLS - MINIMUM TOTAL R-VALUE FOR EACH CLIMATE ZONE				
Climate zones	1, 2, 3 and 5	4 and 6	7	8
Minimum Total R-Value	1.4	1.7	1.9	2.8



Proposed Amendments BCA 2006 – Volume Two Page A2

The following amendments will take effect mid 2006

3.12.1.4 External walls

- (a) An *external wall* must satisfy one or a combination of the options in Table 3.12.1.3, except for-
 - (i) an *external wall* facing the south orientation sector, as described in Figure 3.12.2.1, in *climate zones* 1, 2 and 3 south of latitude 20° south; and
 - (ii) opaque non-glazed openings in *external walls* such as doors (including garage doors), vents, penetrations, shutters and the like.
- (b) Where the minimum *Total R-Value* specified in Table 3.12.1.3 cannot be achieved, the deficit may be compensated by the performance of the *glazing*, provided the sum of the conductance of the *external walls* and of the *glazing* is not more than that *required*, where-
 - (i) the conductance of the proposed design is calculated-
 - (A) for the *external wall*, by dividing its area by its *Total R-Value*; and
 - (B) for the *glazing*, by multiplying its area by its *Total U-Value* and the applicable frame factor in Table 3.12.2.2; and
 - (ii) the *required* conductance is calculated-
 - (A) for the *external wall*, by dividing its area by the applicable minimum *Total R-Value* specified in (a); and
 - (B) for the *glazing*, in accordance with 3.12.2.1(a)(i).
- (c) A metal framed wall that is *required* to achieve a minimum *Total R-Value* and has an external cladding of weatherboards, fibre cement sheet, or similar light weight material attached directly to the metal frame, must have a thermal break-
 - (i) installed between the metal frame and the external cladding; and
 - (ii) with an *R-Value* of not less than 0.2.
- (d) A wall is deemed to have the *Total R-Value required* by Table 3.12.1.3 if it complies with Figure 3.12.1.3.

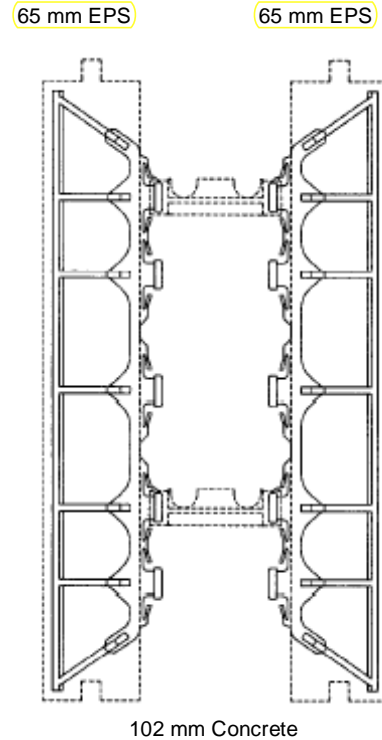
Figure 3.12.1.3 TYPICAL INSULATION OPTIONS FOR TYPICAL WALL CONSTRUCTION				
<i>Climate zones</i>	1, 2, 3 and 5	4 and 6	7	8
Minimum required Total R-Value for walls	1.9	2.2	2.4	3.3

Thermal Properties of Eco-Block

The following R-Values have been calculated using the thermal properties of materials, air films and air spaces used in BERS or NatHERS.

EcoBlock		
Element	thickness	R-Value
Outside Air Film	10	0.05
Outside Render	10	0.01
Expanded Polystyrene	65	1.82
Concrete	105	0.07
Expanded Polystyrene	65	1.82
Inside Render	10	0.01
Inside Air Film		0.11
Total R-Value		3.78
U-Value		0.26

U-Value, (conductance through the building element), is calculated by taking the reciprocal of the sum of the R-Values for the building element.



BCA Deemed to Satisfy Requirements

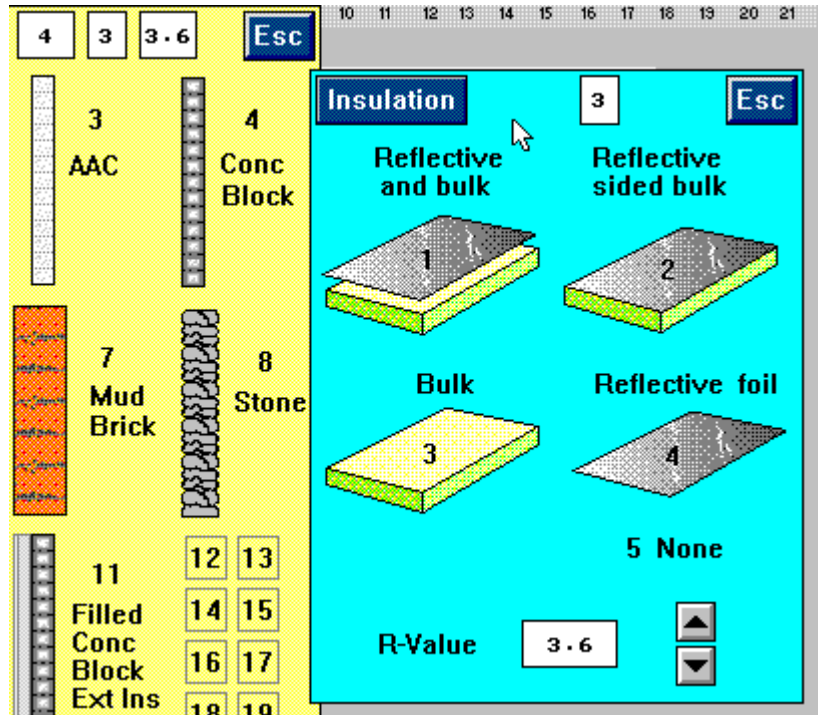
The total R-value achieved with the Eco-Block wall exceeds that required in all climate zones both under the current BCA and under the amendments proposed for mid 2006

Holger Willrath

20/09/2005

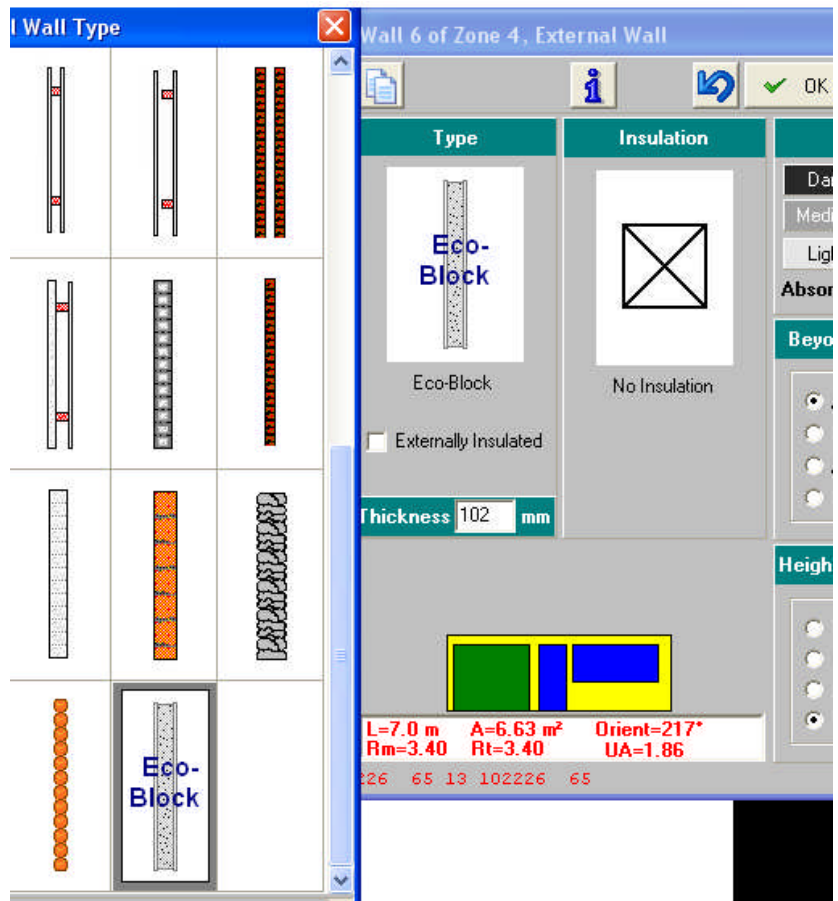
Thermal Simulation with BERS3.2

Eco-Block can not be modelled directly with BERS3.2. The closest approximation is to select concrete block and the chose bulk insulation with an R-value of R3.6.



Thermal Simulation with BERS4.1

Eco-Block will have its own icon and thermal properties selectable from the BERS4.1 wall menu.



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20/09/2005