

Energy Efficiency - BCA 2011 Section J

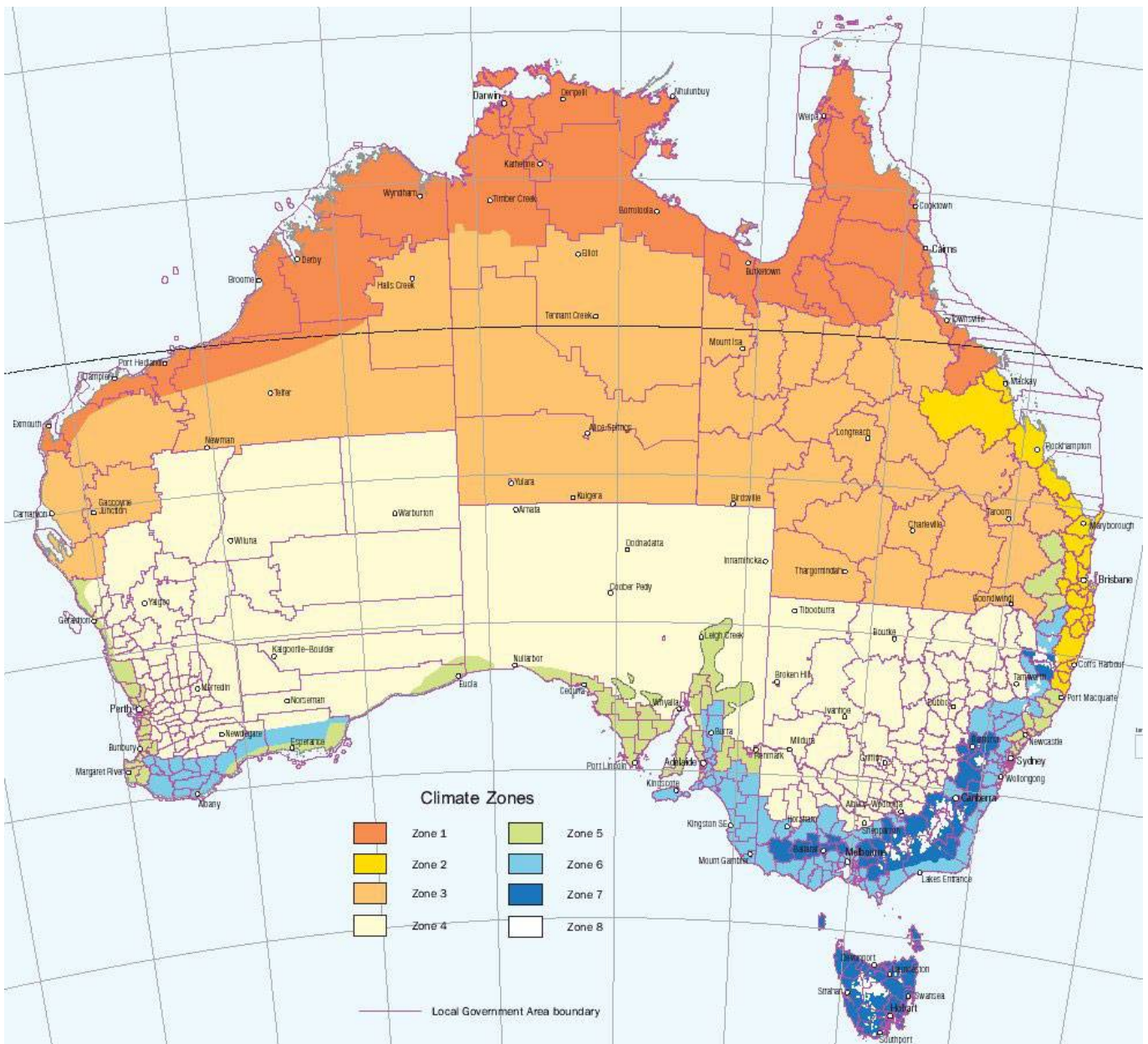
The Building Code of Australia (BCA) Volumes 1 and 2 contains thermal performance requirements in terms of **minimum Total R*** for building fabric (the external ceilings, floors and walls) of new buildings in Australia.

For Volume 1 (non-housing), the requirements are in Part J1. For Volume 2 (housing) the requirements are in Part 3.12.1,

*The Total R-Value is the total thermal resistance of a building surface, including indoor and outdoor air film resistances.

System Selection

- 1) From the Climate Zone Map below, determine the particular Climate Zone for the location. (For more detailed maps, see www.abcb.gov.au)
- 2) Determine the Class of the building.
- 3) From the Climate Zone and Class of building, determine the required Total R for the wall from the Total R tables.



BCA BUILDING CLASSIFICATIONS

<p>Class 1a: Detached house, or one of a group of attached dwellings</p>	Housing
<p>Class 1a: Boarding house, guest house, hostel (with total floor area less than 300 sqm and with not more than 12 residents).</p>	
<p>Class 1a: Detached house, attached dwellings</p>	
<p>Class 2: A building containing two or more sole-occupancy units, each being a separate dwelling</p>	Other residential buildings (apartments, flats, hotels etc.)
<p>Class 3: Boarding houses, guest houses, hostels, lodging-houses or backpackers accommodation. A residential part of a hotel, motel, school, a health-care building or a detention centre. Buildings for the aged, children or disabilities accommodation</p>	
<p>Class 4: A dwelling part of a building in Class 5, 6, 7, 8 or 9</p>	
<p>Class 5: Commercial office buildings excluding Class 6-9 buildings</p>	Public or commercial buildings such as offices, shops, factories, hospitals etc
<p>Class 6: Shop or other retail buildings for the sale of goods, eg restaurant, barber's shop, laundry, market, showroom and service station</p>	
<p>Class 7a: Car parks</p>	
<p>Class 7b: A building for storage or display of goods or produce for sale by wholesale.</p>	
<p>Class 8: Laboratories, production areas, industrial buildings</p>	
<p>Class 9a: A health-care building, school</p>	
<p>Class 9b: Assembly buildings, trade workshops, laboratories in schools, but excluding parts of another class.</p>	
<p>Class 9c: Aged care buildings</p>	
<p>Class 10: A non-habitable building or structure (garage, shed, fenced antenna, swimming pool).</p>	

BCA2011 vol 1, Class 2 to Class 9 Buildings - J1.5 External Walls

- (a) Each part of an *external wall* that is part of the *envelope*, other than of a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, must satisfy one of the options in Table J1.5a except for—
- (i) opaque non-glazed openings in external walls such as doors (including garage doors), vents, penetrations, shutters and the like; and
 - (ii) glazing; and
 - (iii) an earth retaining wall or earth-berm, in other than climate zone 8.

Table J1.5a OPTIONS FOR EACH PART OF AN EXTERNAL WALL THAT IS PART OF AN ENVELOPE

Climate zone	Options
1, 2 and 3	(a) (i) Achieve a minimum Total R-Value of 3.3. (ii) The minimum Total R-Value in (i) is reduced— (A) for a wall with a surface density of not less than 220 kg/m ² , by 0.5; and (B) for a wall that is— (aa) facing the south orientation as described in Figure J2.3, by 0.5; or (bb) shaded with a projection shade angle in accordance with Figure J1.5 of— (AA) 15 degrees to not more than 45 degrees, by 0.5; or (BB) more than 45 degrees, by 1.0; and (C) if the outer surface solar absorptance value is not more than 0.6, by 0.5.
	(b) Where the only space for insulation is provided by a furring channel, top hat section, batten or the like— (i) achieve a minimum Total R-Value of 1.4; and (ii) satisfy <i>glazing</i> energy index Option B of Table J2.4a.
4, 5 and 6	(a) (i) Achieve a minimum Total R-Value of 2.8. (ii) The minimum Total R-Value in (i) is reduced— (A) for a wall with a surface density of not less than 220 kg/m ² , by 0.5; and (B) for a wall that is— (aa) facing the south orientation as described in Figure J2.3, by 0.5; or (bb) shaded with a projection shade angle in accordance with Figure J1.5 of— (AA) 30 degrees to not more than 60 degrees, by 0.5; or (BB) more than 60 degrees, by 1.0.
	(b) Where the only space for insulation is provided by a furring channel, top hat section, batten or the like— (i) achieve a minimum Total R-Value of 1.4; and (ii) satisfy <i>glazing</i> energy index Option B of Table J2.4a.
7	(a) Achieve a minimum Total R-Value of 2.8.
	(b) Where the only space for insulation is provided by a furring channel, top hat section, batten or the like— (i) achieve a minimum Total R-Value of 1.4; and (ii) satisfy <i>glazing</i> energy index Option B of Table J2.4a.
8	(a) Achieve a minimum Total R-Value of 3.8.
	(b) Where the wall is an earth retaining wall or earth-berm, achieve a minimum Total R-Value of 2.0.

BCA2011 vol 2, Class 1 and 10 Buildings (Housing) - 3.12.1.4 External walls

- (a) Each part of an *external wall* must satisfy the requirements of Table 3.12.1.3a for all walls, or Table 3.12.1.3b for walls with a surface density of not less than 220 kg/m², except for—
- (i) opaque non-glazed openings such as doors (including garage doors), vents, penetrations, shutters and the like; and
 - (ii) *glazing* unless covered by Table 3.12.1.3b.

Explanatory information: Surface density is the mass of one vertical square metre of wall.

Table 3.12.1.3a — OPTIONS FOR EACH PART OF AN EXTERNAL WALL

Climate Zone	Options
1, 2, 3, 4 and 5	(a) Achieve a minimum Total R-Value of 2.8.
	(b) (i) Achieve a minimum Total R-Value of 2.4; and (ii) shade the <i>external wall</i> of the storey with a verandah, balcony, eaves, carport or the like, which projects at a minimum angle of 15 degrees in accordance with Figure 3.12.1.2.
6 and 7	Achieve a minimum Total R-Value of 2.8.
8	Achieve a minimum Total R-Value of 3.8.

Table 3.12.1.3b — OPTIONS FOR EACH PART OF AN EXTERNAL WALL WITH A SURFACE DENSITY OF NOT LESS THAN 220 kg/m²

Climate Zone	Options
1, 2 and 3	(a) (i) For a storey, other than one with another storey above, shade the wall with a verandah, balcony, eaves, carport or the like which projects at a minimum angle of 15 degrees in accordance with Figure 3.12.1.2; and (ii) when the <i>external walls</i> are not shaded in accordance with (i) and there is another storey above, external <i>glazing</i> complies with 3.12.2.1 with the applicable value for C _{SHGC} in Table 3.12.2.1 reduced by 20%; and (iii) the <i>external wall</i> incorporates insulation with an <i>R-Value</i> of not less than 0.5; and (iv) the lowest storey containing habitable rooms has— (A) a concrete slab-on-ground floor; or (B) masonry internal walls.
5	(a) (i) For a storey, other than one with another storey above, shade the wall with a verandah, balcony, eaves, carport or the like which projects at a minimum angle of 15 degrees in accordance with Figure 3.12.1.2; and (ii) when the <i>external walls</i> are not shaded in accordance with (i) and there is another storey above, external <i>glazing</i> complies with 3.12.2.1 with the applicable value for C _{SHGC} in Table 3.12.2.1 reduced by 15%; and (iii) the <i>external wall</i> incorporates insulation with an <i>R-Value</i> of not less than 0.5; and (iv) the lowest storey containing habitable rooms has— (A) a concrete slab-on-ground floor; or (B) masonry internal walls.
	(b) (i) Shade the wall with a verandah, balcony, eaves, carport or the like which projects at a minimum angle of 15 degrees in accordance with Figure 3.12.1.2; and (ii) external <i>glazing</i> complies with 3.12.2.1 with the applicable value for C _{SHGC} in Table 3.12.2.1 reduced by 15%; and (iii) the lowest storey containing habitable rooms has— (A) a concrete slab-on-ground floor; and (B) masonry internal walls.

Table 3.12.1.3b — OPTIONS FOR EACH PART OF AN EXTERNAL WALL WITH A SURFACE DENSITY OF NOT LESS THAN 220 kg/m² (continued)

Climate Zone	Options
4 and 6	(a) (i) The external <i>glazing</i> complies with 3.12.2.1 with the applicable value for C _u in Table 3.12.2.1 reduced by 15%; and (ii) the <i>external wall</i> incorporates insulation with an <i>R-Value</i> of not less than 0.5; and (iii) the lowest storey containing habitable rooms has— (A) a concrete slab-on-ground floor; and (B) masonry internal walls.
	(b) The external <i>glazing</i> complies with 3.12.2.1 with the applicable value for C _u in Table 3.12.2.1 reduced by 20%.
	(c) (i) The <i>external wall</i> incorporates insulation with an <i>R-Value</i> of not less than 1.0; and (ii) the lowest storey containing habitable rooms has— (A) a concrete slab-on-ground floor; and (B) masonry internal walls.
7	(a) (i) The external <i>glazing</i> complies with 3.12.2.1 with the applicable value for C _u in Table 3.12.2.1 reduced by 15%; and (ii) the <i>external wall</i> incorporates insulation with an <i>R-Value</i> of not less than 1.0.
	(b) (i) The external <i>glazing</i> complies with 3.12.2.1 with the applicable value for C _u in Table 3.12.2.1 reduced by 20%; and (ii) the <i>external wall</i> incorporates insulation with an <i>R-Value</i> of not less than 0.5.
	(c) The <i>external wall</i> incorporates insulation with an <i>R-Value</i> of not less than 1.5.
8	Achieve a minimum Total R-Value of 3.8.