

ENERGY EFFICIENCY PROVISIONS

BCA Requirement (Part J)



When it comes to sustainability & energy efficiency one name stands out . . .

CLASSIFICATION OF BUILDINGS / STRUCTURES		
Class 1	1a	A single residential dwelling
	1b	A boarding house, guest house or hostel
Class 2	Two or more separate dwellings in a building	
Class 3	Residential buildings other than 1 or 2	
Class 4	The dwelling part in a building of Class 5, 6, 7, 8 or 9	
Class 5	An office building	
Class 6	Shop, shopping centre, restaurant or cafe, showroom or service station	
Class 7	7a	Carpark
	7b	Wholesale storage or goods display building
Class 8	Laboratory or production facility	
Class 9 Public building	9a	Health care building
	9b	Trade workshop, theatre, cinema etc.
	9c	Aged care building
Class 10 Non-habit-able building	10a	Garage, carport, shed
	10b	Non-building structure eg, fence, mast, antenna, wall, swimming pool



Insulated, Fire Rated & Architectural Panel Systems

The issues surrounding climate change have been highlighted with the introduction by the Federal Government through the Building Code of Australia of increased energy efficiency requirements for all buildings. This applies Australia wide to new or refurbished buildings approved after May 2006.

These standards should be viewed not as an imposition, but as a smart decision as it introduces the facility owner or operator to the substantial benefits of sustainability. Sustainability (*doing more for less*) is now the way of the future. The smart business case demands it. Sustainable practice is cost effective, provides numerous benefits in occupant comfortability, marketing and reduced running costs, resulting in increased profits for any business and their facility. There is also the great improvement in environmental outcomes.



1.1 Building Code of Australia

The BCA is a uniform set of technical provisions for the design and construction of buildings throughout Australia. It allows for variations in climate and geographic conditions and is a co-operative arrangement between governments and the building industry.

In May 2006, measures were introduced to the BCA Volume One for Class 5-9 buildings bringing energy provisions to all building classes.

Measures for housing (Class 1 and 10 Buildings) were introduced in 2003 and have now been enhanced around the Nationwide House Energy Rating Scheme.

The objective of Section J is:

“to reduce greenhouse gas emissions by efficiently using energy”.

Section J Assessment and Compliance Reports are required for all commercial buildings as part of the **Development Application** process to demonstrate a design's ability to comply with the BCA.

Section J Assessment is a complex task, however, there are Energy Efficiency Assessment consulting services available to conduct reports for clients.

1.2 How does the Building Code work?

The BCA contains requirements for performance of building materials, components, building design and construction methods. Compliance is achieved using a “building solution”. “Deemed-To-Satisfy” solutions can be used or “alternative solutions” can be proposed. These are outside the prescriptive provisions, but can be assessed as compliant with the BCA requirements using one of four methods:

- Evidence of suitability - documentary evidence that the solution meets the performance requirements.
- Verification method - a “test” inspection, calculation or other method that determines whether a building solution complies with the relevant performance requirements.
- Comparison with “Deemed-To-Satisfy” - in the case of energy efficiency, the annual energy consumption must be calculated and must be equivalent to, or better than, the calculated energy consumption of the same building using the “Deemed-To-Satisfy” provisions.
- Expert judgement - used when an alternative solution cannot be quantifiably benchmarked. This method relies on the judgement of an expert who has the qualifications and experience to determine whether a building solution complies with the BCA.

1.3 Adoption of Requirements

Each State has its own processes for the inclusion of energy efficiency standards. The provisions for energy efficiency of commercial buildings (Classes 5 to 9) form the major component of the amendments of BCA 2006.

Updated provisions include changes to performance requirements and verification methods, new and amended definitions and new “Deemed-To-Satisfy” (DTS) provisions.

The scope of energy efficiency covers eight areas and each provision is designed to work as **part of a system** to ensure the building achieves the desired level of energy efficiency.

• J1 Building Fabric

Part J1 requires building measures that insulate or increase the capacity of the building fabric and structure to reduce heat flow eg. by adding insulation or thermal mass.

Commercial buildings are most likely to be air-conditioned with a higher energy use than a residential building.

If air conditioning is unlikely, the intent is to ensure that sufficient levels of thermal performance enhance the comfort levels of occupants within the building to reduce the need for conditioning.

DTS Provisions cover **Roof Light Performance, Roof / Ceiling Insulation, Wall Insulation, and Floor Insulation.**

• J2 External Glazing

Calculations are required to determine the glazing area, thermal performance, solar orientation and external shading projections or shading devices.

A second calculation method takes into account the impact of energy use in buildings that are likely to be air-conditioned for prolonged periods.

Calculations can be done ‘long hand’ or ‘automated’ using spreadsheet software (see website: www.abcb.gov.au).

• J3 Building Sealing

The building envelope must control air leakage through wall and ceilings junctions and treatment of penetrations such as chimneys and exhaust fans. Currently, building sealing requirements apply to buildings of Class 5 to 9.

New provisions apply to sealing evaporative coolers.

• J4 Air Movement

Ventilation openings allow the interior of a residential building to take advantage of any natural breeze thus reducing the need for air-conditioning.

This applies to buildings of Class 2 and 4 but not to buildings of Class 3 and 5 to 9.

• J5 Air-conditioning / Ventilation Systems

Design is an essential element of building environmental management. There is a need to ensure that systems use energy in an efficient manner including fans and motors, ductwork and thermostats or time switches.

• J6 Artificial Lighting and Power

Traditional lighting systems create heat with extra electrical load on the air-conditioning system.

Accordingly, the establishment of minimum standards for the use of lighting energy is an important step in controlling building energy use.

• J7 Hot Water Supply

Hot water systems must be designed and installed in compliance with Section 8 of AS/NZS 3500.4

• J8 Access for Maintenance

The provisions of access for maintenance are extended to ensure plant and equipment are readily accessible for easy maintenance and efficient operation.

Climate Zones



Part J1 Building Fabric "Deemed-To-Satisfy" Provisions

Where a Building Solution is proposed to comply with the "Deemed-To-Satisfy" Provisions, it must comply with:

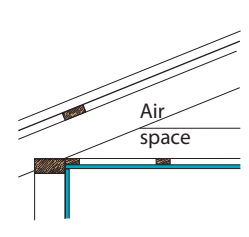
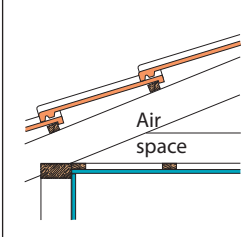
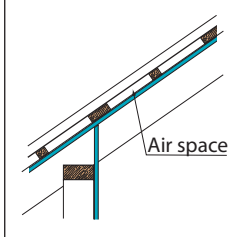
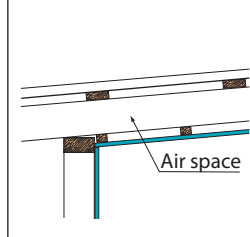
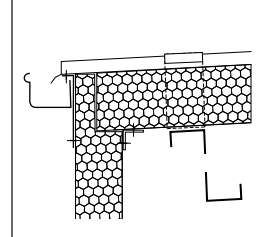
• Roofs and ceilings (as part of an envelope)

Climate zone	1	2		3	4	5	6	7	8
		Below 300m alt.	At or above 300m alt.						
Class 2 or 3 building, Class 4 part of a building or Class 9c Aged Care building									
Min. Total R-Value	2.2	2.2	2.5	2.2	3.0	2.7	3.2	3.8	4.3
Class 5, 6, 7, 8, 9a or 9b building									
Min. Total R-Value	3.2							3.2	4.3

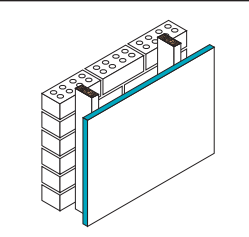
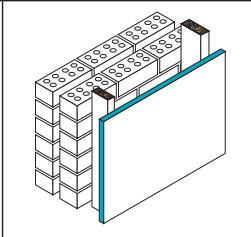
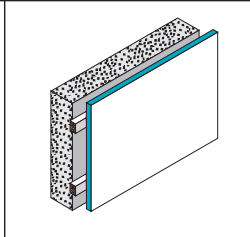
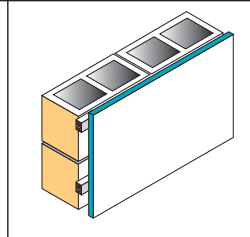
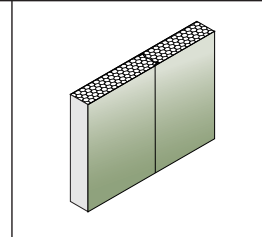
• Walls (as part of an envelope)

Climate zone	1	2		3	4	5	6	7	8
		Below 300m alt.	At or above 300m alt.						
Class 2 or 3 building, Class 4 part of a building or Class 9c Aged Care building									
Min. Total R-Value	1.4				1.7	1.4	1.7	1.9	2.8
Class 5, 6, 7, 8, 9a or 9b building									
Min. Total R-Value	1.8								2.8

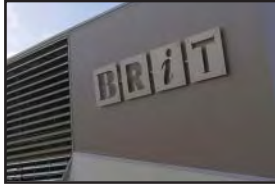
• BCA 2007 J1.3.2 Typical R-values for roof and ceiling construction

2(a) 22-45° PITCH	2(b) 22-45° PITCH	2(c) CATHEDRAL $\geq 45^\circ$	2(e) SKILLION $\leq 5^\circ$	AUSTRAL SYSTEM
				
Metal cladding	Conc. or clay roof tile	Metal cladding	Metal cladding	150mm Econodeck - Skillion $\leq 5^\circ$
Air space	Air space	Air space 30-100mm	Air space 100-300mm	
10mm Horizontal plaster ceiling	10mm Horizontal plaster ceiling	10mm Plaster board - on top of rafters	10mm Plaster board - below rafters	
Total R-value 0.45	Total R-value 0.47	Total R-value 0.38	Total R-value 0.40	Total R-value 4.76

• BCA 2007 J1.5.2 Typical R-values for wall construction

2(a) SINGLE BRICK	2(b) DOUBLE BRICK	2(d) R/C TILT WALL	2(f) CONC. BLOCK	AUSTRAL SYSTEM
				
90mm Clay brick	90mm Clay brick	125mm Solid R/conc.	200mm Conc. block	100mm Econotilt
25-50mm air gap	Cavity 20-50mm 90mm Clay brick	Air gap 20-40mm	Air gap 20-40mm	
90mm stud	Air gap 20-35mm			
10mm Plaster board	10mm Plaster board	10mm Plaster board	10mm Plaster board	
Total R-value 0.47	Total R-value 0.73	Total R-value 0.47	Total R-value 1.92	Total R-value 2.8

Note: BCA 2007 Tables and Figs. shown above, have been abbreviated for purpose of display and those selected illustrate common commercial applications. The AUSTRAL SYSTEM column has been inserted as a substitute building fabric.



Living with panel

... Warm in winter, cool in summer, it's all about energy efficiency.

Compliance with BCA (Part J)

To achieve an Energy-wise building solution, the addition of bulk insulation and reflective foil are essential elements for commercial structures to comply with these new regulations.

Austral insulated panel as a substitute building fabric:
the ready-made solution to meet mandatory energy efficiency standards.

A cost-cutting alternative to adding insulation is laminated insulated panel. Energy-wise efficiency comes naturally to Austral Insulation, from years of experience in the controlled atmosphere industry. Panels comprise two skins of 0.6mm Colorbond® steel which sandwich a core of either expanded polystyrene (EPS), mineral wool or XFlam™; an internal plaster board lining is not required. This pre-painted surface (that meets AQUIS food industry standards) has an interlocking panel joint which seals the building envelope and enables wide spans with minimal fixings. External shading is provided by an Econodeck roof.

Panels come in a modular width of 1200mm by any length up to 24 metres.

BCA Part J1.6 Floor Construction

Austral Insulation manufacture their own core material and supply the building trades with EPS sheet for external cladding and EPS block for site fill and under-slab insulation.

Another of Austral's EPS building products is RETROTHERM® a superior underfloor insulation in convenient 1.2m lengths with concertina snap-off edges for concealed sub-floor application between floor joists or wall studs.



Austral Insulation Fire Rated and Architectural Panel Systems					
Panel thickness (mm)	50	75	100	150	200
R-Values (m ² KW)					
Econotilt™ wall & ceiling panel	1.32	1.97	2.63	3.95	5.26
Econodeck® roof panel	N/A	As above			
XFlam™ fire rated panel	1.61	2.42	3.23	4.84	6.45
Weight (kg/m ²)					
Econotilt & Econodeck	10.9	11.2	11.6	12.2	12.9
XFlam	12.9	13.8	14.8	16.7	18.6



BlueScope Steel Colorbond® comes in a range of designer colours plus 3 Metallics and Permagard™ White to suit all applications.

Naturally, the lighter colours are preferred because they reflect solar radiation and reduce radiant heat flow. Austral panel is available in a choice of finishes to either skin: profiles are Flat, 100mm rib, 50mm Mesa rib and Silkline (similar to a mini-orb).

www.australinsulation.com.au



MELBOURNE

Austral Insulation VIC. Pty. Ltd.
17 Fiveways Boulevard,
Keysborough, VIC. 3173
Email: info@australvic.com.au
Telephone: (03) 9706 3277
Fax: (03) 9706 3544

ADELAIDE

Austral Insulation SA Pty. Ltd.
162a Philip Highway,
Elizabeth South, SA 5112
Email: info@australsa.com.au
Telephone: (08) 8252 7188
Fax: (08) 8252 7388

PERTH

Austral Insulation WA Pty. Ltd.
1 Denninup Way,
Malaga, WA 6090
Email: info@australinsulation.com.au
Telephone: (08) 9249 4022
Fax: (08) 9249 4180