



BCA Section J: Guide to compliance

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Building regulations now in force

BCA SECTION J: Mandatory energy efficiency measures for non-residential construction

The new BCA Section J, which came into force in 2006 will change the way we build. It sets new standards for long term insulation and environmental performance of components and construction methods.

It is the responsibility of all involved in the construction industry to understand and comply with the new mandatory provisions of BCA Section J. This includes:

- designers
- specifiers
- engineers
- building contractors
- owners
- investors

Section J covers all Class 2 to 9 buildings (residential and commercial buildings).

It aims to reduce greenhouse gas emissions by increasing energy efficiency of structures.

Affects all air conditioned and many non-air conditioned buildings.
Specific areas of focus include:

- Loss of energy through heating/cooling leakage through building fabric – roof, ceilings, walls and floors
- External glazing to reduce heat gain and place less pressure on air conditioning
- Sealing to reduce leakage around chimneys, flues, windows, doors and other projections
- Air movement and ventilation to reduce air conditioning needs
- Design of air conditioning systems to prevent excessive power consumption

Section J regulations are different for each class of structure and climate zone in Australia.

The building code of Australia – Section J: Mandatory energy efficiency measures for non-residential construction

The Building Code of Australia (BCA) Section J (mandatory energy efficiency measures for non-residential construction) regulation aims to reduce greenhouse gas emissions from buildings. This regulation has been developed in consultation with state, territory and local governments, building practitioners, industry and the community.

State	Adoption date
Australian Capital Territory	1 May 2006
New South Wales	1 November 2006
Northern Territory	1 May 2006
Queensland	1 May 2006
South Australia	1 August 2006
Tasmania	1 May 2006
Victoria	1 May 2006
Western Australia	1 May 2006

Implementation dates

Energy efficiency measures were initially introduced into the BCA housing provisions

in 2003. In 2005, mandatory measures were introduced into the BCA for Class 2-4 buildings.

This was followed up in 2006 with similar measures for Class 5-9 buildings. All of the BCA provisions are now mandatory for Class 2 to 9 buildings (refer to the appendix description for building classes). Buildings with HVAC are particularly affected by the new regulations.

Greenhouse gas emissions

The Australian government has committed to achieving specific greenhouse reductions as part of the Kyoto Protocol, which came into effect in 2005. Section J in building construction is a key project in the steps taken to achieve these emission targets.

Compliance to Section J

Automatic compliance to Section J mandatory regulations can be achieved by meeting the BCA prescribed building solutions, called *Deemed to Satisfy* provisions.

There is provision for alternative engineered solutions, which will require documentary

evidence, verification, comparative analysis or expert judgement.

New energy efficiency measures

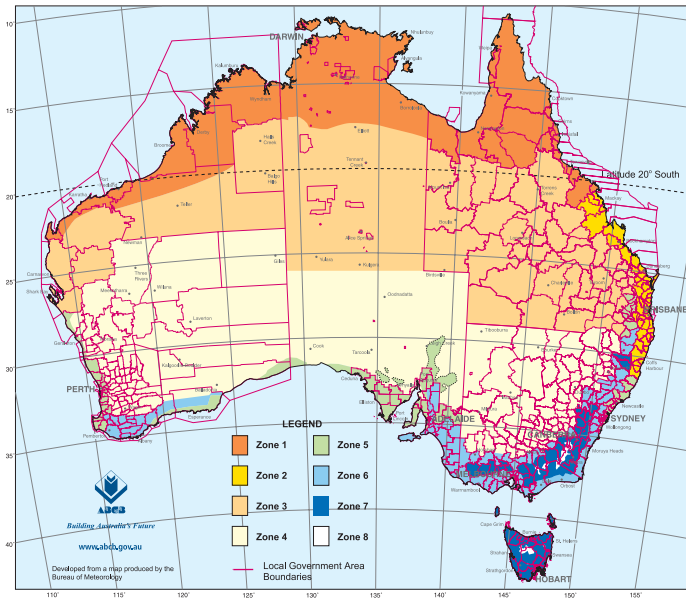
The incorporation of energy efficiency measures in the BCA is targeted towards ongoing operational efficiencies over the life of buildings.

The BCA sets standards for the performance of buildings, including services that aid the efficient use of energy.

Section J incorporates the use of the building, the method of construction, its geographic location, the effects of nearby features such as landforms, structures and buildings, and solar radiation considerations.

The mandatory energy efficiency requirements vary according to the Class of building and are also based on the climate zone. Australia is divided into geographical zones (see map, also available on the ABCB website). Different levels of energy efficiency are required, based on the climate severity for each building being designed.

Specific areas targeted by the BCA for improvement are:



1. Building fabric
The building fabric – the basic components of a building, including the roof, ceilings, walls and floors should have sufficient thermal resistance to ensure that energy is not lost by heat transmission. Roof, ceiling, walls and floors must achieve a specified total R value (which is the total sum of the insulating performance of all individual component layers, including any

building material, insulating material, airspace and associated surface resistances).

2. External glazing
 There are regulations to ensure that the amount of heat gain through windows is not excessive and that air conditioning needed to counteract the heat losses through windows is not excessive. Shading of the building and glazing orientation are also factors that can affect heat loss or gain.

3. Building sealing
 Building sealing effectiveness can not only influence the size of air conditioning HVAC in building design, it can also influence longer term energy operating consumption. The BCA requires sealing around chimneys, flues, windows doors and other projections. The building fabric around roofs, walls and floors also needs to be constructed to minimise air leakage.

4. Air movement
 Air movement within a building offers a form of cooling, so that air conditioning requirements can be reduced. Ventilation requirements vary by building class and climate zone. There are also restrictions on the fixing method and size for ceiling fans or evaporative coolers.

5. Air conditioning and ventilation systems
 Air conditioning must be able to operate at different

temperatures and times to meet the intended use of the building. The design of the HVAC system in terms of motor power and ventilation/exhaust must prevent excessive energy consumption.

6. Artificial lighting and power
 The number of lights and power consumption are to be regulated to within acceptable maximum levels.

7. Hot water supply
 Hot water systems must be designed and installed in accordance with Section 8 of AS/ANZ 3500.4 – plumbing and drainage – heated water services.

8. Access for maintenance
 There are maintenance measures that must be provided to all plant, equipment and components that require maintenance, to ensure that they operate at efficient levels.

Summary

'Section J' energy efficiency measures are implemented through the local standard building approvals process, involving building inspectors and surveyors, and often independent building certifiers and assessors.

Building designers and builders themselves need to be aware of these new requirements. The Section J implications

for building construction are complex, and vary according to the class of building and also with the climate zone.

From Kingspan's experience worldwide where similar regulations have been introduced, it has been the signal/catalyst for further regulations to be developed. Likely further developments include mandatory air leakage testing, regulations

being extended across all classes of buildings, the requirement for thicker insulation, the implementation of elemental calculations and the anticipation of change of tenancy.

For further information contact your state based ABCB office. Additional information can also be obtained from their website at www.abcb.gov.au

Typical insulation requirements for the building envelope under Section J

Roofs and ceilings

Climate zone	1	2a	2b	3	4	5	6	7	8
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Class 2 or 3 building, Class 4 part of building or Class 9c aged care building

Total R	2.2	2.5	2.2	3.0	2.7	3.2	3.8	4.3	
Direction of heat flow	Down	Down and Up			Up				

Class 5, 6, 7, 8, 9a or 9b building

Total R	3.2							4.3
Direction of heat flow	Down						Up	

Walls

Climate zone	1	2a	2b	3	4	5	6	7	8
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Class 2 or 3 building, Class 4 part of building or Class 9c aged care building

Total R	1.4			1.7	1.4	1.7	1.9	2.8
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Class 5, 6, 7, 8, 9a or 9b building

Total R	1.8							2.8
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Where do conventional non-compliant systems sit under Section J?

Typical R values achieved with conventional non-compliant roof construction

Construction method and materials	Typical R value**
Metal deck, cavity, reflective foil, cavity, bulk insulation*, plasterboard	1.14
Metal deck, bulk insulation* with reflective foil laminate, cavity, plasterboard	0.77

These figures assume best practice installation and the absence of insulation voids

* The value of the bulk insulation to be added to the typical R value. A typical R value for bulk insulation of 50mm would be R1.0-1.2 and may vary depending on the product selected

** Different levels of thermal performance can be achieved, based on summer or winter climatic conditions and the use of reflective foils. The minimum value (or winter condition) is the one that in general needs to meet the minimum BCA level of performance and is the value given here

Typical R values achieved with conventional non-compliant wall construction

Construction method and materials	Typical R value**
Concrete tilt-up panel (100mm), bulk insulation*, with furring channel and plasterboard finish	0.28
110mm brick wall with internal stud frame and plaster lining	0.53
Cement clad wall, reflective foil laminate, reflective cavity, bulk insulation*, plasterboard	0.84
Double brick cavity wall, with furring channels and plasterboard	0.73

New concept insulated panels – a compliance solution

Kingspan insulated panels were developed for construction efficiency. They provide energy efficient solutions that are already compliant with BCA Section J and are widely used in markets where such regulations have long been in force.

The external envelope must be procured under one package with a single point of responsibility for design detailing, supervision and installation, rather than as individual building elements. This is at the heart of the Kingspan concept.

KS1000 RW

Core thickness (mm)	30	40	60	100
R value (m ² K/W)	1.82	2.34	3.36	5.35
Weight kg/m ² 0.5/0.4 steel	9.5	9.9	10.7	12.3

An airtight envelope

Building with Kingspan insulated panels guarantees you an airtight envelope. The inherent thickness and structural rigidity of Kingspan insulated panels together with factory-engineered joints and robust details ensures minimal air leakage.

Long term thermal performance

Kingspan insulated roof and wall panels are guaranteed to retain their thermal performance for the life of the product thereby helping to ensure that the building energy performance rating is maintained throughout the life of the building.

References

[1] Australian Building Codes Board, *BCA 2006, Class 2 to 9 Buildings, Volume One*, 2006

[2] Australian Greenhouse Office, *Tracking to the Kyoto Target – Australia's Greenhouse Emissions Trends 1990 to 2008-2012 and 2020*, 2006

Appendix: BCA building classifications used in non-residential construction

Class 2: Two or more sole-occupancy

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

Thermal insulation thickness

Minimum compliance requirements from May 2006 (November 2006 for NSW).

Please note where light colours with high reflective values are used in certain climate zones there is a provision under Section J where the minimum thickness can be reduced from Kingspan 60mm to 40mm.

Contact the Kingspan technical services for further information on **1300 799 594**.

The easy way to become compliant

The easy way to become compliant in all cases is to choose Kingspan as your guide to selecting building systems.

Kingspan's range of roofing and wall panel systems already complies with Section J.

You can spend precious time trying to understand it or you can call Kingspan for expert advice on **1300 799 594**.

Class 4: A dwelling part of a building in Class 5, 6, 7, 8 or 9

Class 5: Office buildings

Class 6: Shop or other buildings for the sale of goods, eg restaurant, barber's shop, laundry, market, showroom and service station

Class 7a: Car parks

Class 7b: Storage or display of goods

Class 8: Laboratories, production areas

Class 9a: A health-care building

Class 9b: Assembly buildings, trade workshops, laboratories in schools

Class 9c: Aged care buildings



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