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## Frequently Asked Questions on Testing to AS ISO 9239-1 for the Building Code of Australia



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Unless specifically stated to the contrary, the comments in this document refer to the Deemed-to-Satisfy provisions of the Building Code of Australia.

This document should be read in conjunction with the Building Code of Australia and particular reference should be made to the State and Territory variations at the end of the BCA.

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## Contents

Disclaimer.....	2
What is the Building Code of Australia?.....	4
What has changed in the May 2011 version of the BCA related to floor coverings?.....	4
What is the difference between a Deemed-to-Satisfy solution and an Alternative solution in the BCA?.....	4
What are the State and Territory variations of the BCA?.....	4
What are the important features of the AS ISO 9239-1 test?.....	5
How is the AS ISO 9239-1 test conducted?.....	5
What is a Flooring System/Flooring Assembly?.....	5
What is the difference between Critical Heat Flux and Critical Radiant Flux?.....	5
I have a result quoting HF-30. Is this equivalent to CHF?.....	5
I have a report from overseas. Is that accepted here?.....	5
I have a report to ASTM E648. Is that acceptable?.....	5
I have a report to ASTM E662. Is that acceptable as a replacement for the smoke measurement in AS ISO 9239-1?....	6
Can I just test a component (e.g. underlay) alone?.....	6
Who decides if the test report is acceptable?.....	6
What are the various classes of buildings in the BCA?.....	6
What is Specification E1.5 of the BCA?.....	7
Is carpet for Class 1 Buildings covered by the BCA?.....	7
What regulations apply to carpet in Class 2 to 9 buildings?.....	7
Critical Radiant Flux (CRF in kW/m <sup>2</sup> ) of Floor Materials and Floor Coverings.....	7
What are the requirements for lift cars?.....	8
Does a refurbishment need to adapt to the BCA?.....	8
Floating floors – does an assembly require to be tested?.....	8
What about carpet tiles?.....	8
Do I need a complying smoke result if the carpet is being used in a sprinklered area complying with Specification E1.5 of the BCA?.....	8
Whose responsibility is it to provide a complying test report?.....	8
What are the implications if carpet is installed without a complying test report?.....	8
Appendix – State and Territory Building Control Administration Contact Details.....	9



## What is the Building Code of Australia?

- The Building Code of Australia is produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government and State and Territory Governments. The BCA has been given the status of building regulations by all States and Territories.
- The goals of the BCA are to enable the achievement and maintenance of acceptable standards of structural sufficiency, safety (including safety from fire), health and amenity for the benefit of the community now and in the future.
- The BCA contains technical provisions for the design and construction of buildings and other structures, covering such matters as structure, fire resistance, access and egress, services and equipment, and certain aspects of health and amenity.

## What has changed in the May 2011 version of the BCA, related to floor coverings?

- Clause C1.10 and Clause C1.10a have been amalgamated and, in some parts, re-written.
- Specification C1.10 and Specification C1.10a have been amalgamated and, in some parts, re-written.
- There have been some minor changes to the requirements for some areas in Class 9b buildings (see the table later in this document).
- This may affect the clause numbers that appear in documentation related to the BCA that the person applying for the building permit may have to submit.

## What is the difference between a Deemed-to-Satisfy solution and an Alternative solution in the BCA?

- The Building Code of Australia sets minimum Performance Requirements which define the level of performance that a Building Solution must meet.
- Building Solutions are the means by which the Performance Requirements in the Building Code of Australia are met. There are three ways of meeting these Performance Requirements:
  - a) a solution which complies with the Deemed-to-Satisfy provisions;
  - b) an Alternative Solution; or
  - c) a combination of (a) and (b)
- A Deemed-to-Satisfy solution is one which if met is deemed to comply with the Performance Requirements of the BCA. The Deemed-to-Satisfy requirements are, in general, set out in the clauses and specifications of the BCA marked as Deemed-to-Satisfy.

This is the normal route followed by most manufacturers of carpet when submitting products for testing.

- An Alternative Solution means a Building Solution which complies with the Performance Requirements other than by means of satisfying the Deemed-to-Satisfy provisions.

Expert advice should be sought prior to offering alternative solutions for the Performance Requirements of the BCA.

- Unless specifically stated to the contrary, the comments in this document refer to the Deemed-to-Satisfy provisions of the BCA.

## What are the State and Territory variations of the BCA?

- Each State's and Territory's legislation adopts the BCA subject to the variation or deletion of some of its provisions, or addition of extra provisions. These variations, deletions and additions are contained in Appendices to the BCA and are noted in the main body of the BCA.
- These provisions should always be consulted when developing a Building Solution.



## What are the important features of the AS ISO 9239-1 test?

- The AS ISO 9239-1 test specimen is horizontal.
- The AS ISO 9239-1 test measures the performance of the “total flooring system”, not just the carpet.
- If a floor covering is installed on a wall then it must be tested in accordance with AS ISO 9705 or AS/NZS 3837 and meet the requirements of Clause 3(c) of Specification C1.10 of the BCA.

## How is the AS ISO 9239-1 test conducted?

- The test specimen reproduces the total flooring system including carpet, underlay, glues and substrate as appropriate, laid horizontally.
- The sample is heated along its length (~1m) using an inclined radiant panel. The sample receives about 11kW/m<sup>2</sup> of heat energy from the panel at one end and about 1kW/m<sup>2</sup> at the other end.
- It is ignited at the hot end.
- The sample is allowed to burn until the flame goes out (extinction).
- The heat energy measured at the point of extinction is the Critical Heat Flux (CHF), also called the Critical Radiant Flux (CRF) in the Building Code of Australia. The Critical Radiant/Heat Flux is basically the lowest energy a fire requires to keep burning hence the higher the value the better.
- Smoke is measured over the duration of the test. The total amount of light extinction (measured as a percentage) due to the smoke obscuring a light beam in the flue is multiplied by the time of the test to give the result (in percent minutes).

## What is a Flooring System/Flooring Assembly?

- This is the total assembly of flooring components including the substrate, any underlay, any glues and the carpet (or other wear surface).
- The substrate used is chosen from a list given in the European Standard EN 13238 depending on the actual subfloor to be used. If the sub floor is non-combustible the sample is tested over cement sheet. If the sub floor is combustible testing will be required over particle board.

## What is the difference between Critical Heat Flux and Critical Radiant Flux?

- In relation to this test method and the Building Code of Australia – nothing. The two terms have the same meaning.

## I have a result quoting HF-30. Is this equivalent to CHF?

- No. HF-30 is the heat flux 30 minutes after ignition of the sample and can be very different to the CHF value (which is measured at extinction of burning).

## I have a report from overseas. Is that accepted here?

- To be acceptable for compliance with the Deemed-to-Satisfy requirements of the BCA the test must measure Critical Heat Flux to AS ISO 9239-1 (or equivalent, e.g. ISO 9239-1). Other tests may be acceptable under the Alternative Solution provisions. Refer to the Building Control Authority for more information.

## I have a report to ASTM E648. Is that acceptable?

- For a Deemed-to-Satisfy solution – No. ASTM E648 has some test parameters that are different to AS ISO 9239-1 and it does not measure the smoke produced during the test. It is not equivalent to AS ISO 9239-1.
- Under the Alternative Solution provisions it could be possible to carry out ancillary testing to demonstrate that ASTM E648 is an acceptable alternative where a smoke value is not required (e.g. where the building has a sprinkler system complying with Specification E1.5).

## I have a report to ASTM E662. Is that acceptable as a replacement for the smoke measurement in AS ISO 9239-1?

- No. ASTM E662 is a totally different test and the results do not correlate with the smoke test done as part of AS ISO 9239-1.

## Can I just test a component (e.g. underlay) alone?

- While the test can be performed, the result is meaningless in relation to compliance with the BCA as it cannot predict the result of a test on a flooring system containing that component (see clause 5.3 of AS ISO 9239-1).
- In some cases the result of testing the components of a flooring system individually can be very misleading as the test on the assembly can be substantially worse than the result on any of the individual components.

## Who decides if the test report is acceptable?

- In the first instance it is the Building Control Authority (eg building certifier or the local council) that makes the decision based on the BCA requirements.

## What are the various classes of buildings in the BCA?

The BCA classifies buildings into 10 classes and a number of sub-classes. These are listed below.

- **Class 1** – one or more buildings which in association constitute –
  - Class 1a** a single dwelling being
    - a detached house; or
    - one or more dwellings each being a building, separated by a fire-resisting wall, including a row house, terrace house, town house or villa unit.
  - Class 1b**
    - a boarding house, guesthouse, hostel or the like, not exceeding 300m<sup>2</sup> and in which not more than 12 persons would be resident; or
    - 4 or more single dwellings located on one allotment and used for short term holiday accommodation.
- **Class 2** – a building ordinarily containing 2 or more sole occupancy units each being a separate dwelling.
- **Class 3** – a residential building, other than class 1 or 2 which is a common place of long term or transient living for a number of persons, including:
  - a boarding house, guest house, hostel, lodging house or backpackers accommodation; or
  - a residential part of a hotel or motel; or
  - a residential part of a school; or
  - accommodation for the aged, children or people with disabilities; or
  - a residential part of a health-care building which accommodates members of staff; or
  - a residential part of a detention centre.
- **Class 4** – a dwelling in a building that is Class 5, 6, 7, 8 or 9 if it is the only dwelling in the building.
- **Class 5** – an office building used for professional or commercial purposes, excluding buildings of Class 6, 7, 8 or 9.
- **Class 6** – a shop, or other building for the sale of goods by retail or the supply of services direct to the public, including
  - an eating room, café, restaurant, milk or soft-drink bar; or
  - a dining room, bar area that is not an assembly building, shop or kiosk part of a hotel or motel; or
  - a hairdresser's or barber's shop, public laundry, or undertakers establishment; or
  - market or sale room, showroom or service station.
- **Class 7** – a building which is
  - Class 7a** – a car park; or
  - Class 7b** – for storage, or display of goods or produce for sale by wholesale.
- **Class 8** – a laboratory or a building in which a handicraft or process of the production, assembling, altering, repairing packing, finishing, or cleaning of goods or produce is carried out for trade, sale or gain.



- **Class 9** – a building of a public nature-
  - Class 9a** – a health-care building; including those parts of the building set aside as a laboratory; or
  - Class 9b** – an assembly building, including a trade workshop, laboratory or the like in a primary or secondary school, but excluding any other parts of the building that are of another class; or
  - Class 9c** – an aged care building.
- **Class 10** – a non-habitable building or structure
  - Class 10a** – a non-habitable building being a private garage, carport, shed or the like; or
  - Class 10b** – a structure being a fence, mast, antenna, retaining or free-standing wall, swimming pool, or the like.
  - Class 10c** – private bushfire shelter

### What is Specification E1.5 of the BCA?

- Specification E1.5 sets out the requirements for the design and installation of fire sprinkler systems.
- It provides four different solutions depending on the class of building.
- State and Territory variations appended to the BCA should also be consulted.

### Is carpet for Class 1 Buildings covered by the BCA?

- No. The BCA Vol. 1 clauses related to floors and floor-coverings only apply to Class 2 to 9 buildings i.e. not single dwellings or other types of Class 1 buildings.

### What regulations apply to carpet in Class 2 to 9 buildings?

- Section 3 of Specification C1.10 of the Building Code of Australia sets out the minimum Deemed to Satisfy requirements for the various classes of buildings.

### Critical Radiant Flux (CRF in kW/m<sup>2</sup>) of Floor Materials and Floor Coverings

Class of Building	General		Fire-isolated exits and fire control rooms
	Buildings <b>not</b> fitted with a sprinkler system complying with Specification E1.5	Buildings fitted with a sprinkler system complying with Specification E1.5	
<b>Class 2,3,5,6,7,8 or 9b</b> <b>Excluding –</b> (i) Class 3 accommodation for the aged; and (ii) Class 9b as specified below	2.2	1.2	2.2
<b>Class 3</b> Accommodation for the aged	4.5	2.2	4.5
<b>Class 9a</b> Patient care areas Areas other than patient care areas	4.5	2.2	4.5
	2.2	1.2	4.5
<b>Class 9b</b> auditorium or audience seating area used mainly for - (i) indoor swimming or ice skating; and (ii) other sports or multi-purpose functions.	1.2	1.2	2.2
	2.2	1.2	2.2
<b>Class 9c</b> Resident use areas Areas other than resident use areas	–	2.2	4.5
	–	1.2	4.5

- The Critical Radiant Flux must be recorded at burnout (extinction).
- In a building not protected by a sprinkler system complying with Specification E1.5 the floor or flooring assembly must have a maximum smoke development rate of 750 percent-minutes.
- Further requirements may be imposed by the specifying body (e.g. a hotel chain may have more stringent requirements than the BCA).

### What are the requirements for lift cars?

- Section 6 of Specification C1.10 states that floors and floor-coverings in lift cars must have a Critical Radiant Flux of not less than 2.2kW/m<sup>2</sup>. There is no smoke requirement for lift cars.
- There are also requirements for the wall and ceiling linings of Lift Cars that relate to carpet if it is installed in those locations.

### Does a refurbishment need to adapt to the BCA?

- Provisions vary from State to State. Check State and Territory variations appended to BCA. In the first instance queries should be directed to the Building Control Authority (eg local council or building certifier.)
- If the refurbishment is substantial enough to require a building permit, then it is likely that all components installed with the refurbishment must meet the requirements of the BCA.
- Contact details for the State and Territory Building Control Administrations are given in the appendix to this document. These bodies can assist with the local rules applicable in each State and Territory.

### Floating floors – does an assembly require to be tested?

- Yes. A floating floor is a floor covering and therefore must meet the requirements of the BCA.

### What about carpet tiles?

- Yes. A floating floor is a floor-covering and therefore must meet the requirements of the BCA.

### Do I need a complying smoke result (ie. maximum smoke development rate of 750 percent-minutes) if the carpet is being used in a sprinklered area complying with Specification E1.5 of the BCA?

- No. The smoke requirements in the BCA only apply to spaces not complying with Specification E1.5.

### Whose responsibility is it to provide a complying test report?

- Responsibility rests with the person who has applied for the building permit/approval and is overseeing the project. This person would normally be relying on the manufacturer to provide this information.

### What are the implications if carpet is installed without a complying test report?

- For Deemed-to-Satisfy solutions, the Building Control Authority (eg local council or building certifier) may take enforcement action, which could require non-complying carpet to be replaced with complying carpet.
- This would not be necessary when an Alternative Solution is proposed and approved.

## Appendix – State and Territory Building Control Administration Contact Details

### AUSTRALIAN CAPITAL TERRITORY

ACT Planning and Land Authority  
Level 3 South, Dame Pattie Menzies Building  
16 Challis Street  
Dickson ACT 2602

### NEW SOUTH WALES

Building Code Advisory Service  
Dept of Planning  
Lands Department Building  
23-33 Bridge Street  
Sydney NSW 2000  
GPO Box 39 Sydney NSW 2001

### NORTHERN TERRITORY

Building Advisory Services  
Department of Lands and Planning  
Ground Floor, Cavenagh House  
38 Cavenagh Street  
Darwin NT 0800

### QUEENSLAND

Building Codes Queensland  
Department of Local Government and Planning  
Level 5,  
63 George Street  
Brisbane  
PO Box 15009  
City East QLD 4002

### SOUTH AUSTRALIA

Building Policy Branch  
Planning SA  
136 North Terrace Adelaide  
GPO Box 1815  
Adelaide SA 5001

### TASMANIA

Building Standards and Regulation  
Workplace Standards  
Dept of Justice  
30 Gordons Hill Road  
Rosny Park TAS 7018

### VICTORIA

Building Commission Victoria  
Goods Shed North  
733 Bourke Street  
Docklands VIC 3008

### WESTERN AUSTRALIA

Building Registration Board  
Level 1, 31 Trood Street  
West Perth WA 6005





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