

### Introduction

For Class 2 to 9 buildings (not applicable to Class 1a houses), the Building Code of Australia (BCA) has requirements for assessing the fire hazard properties of:-

- (a) floor materials and floor coverings; and
- (b) wall and ceiling linings

BCA Specification C1.10a requires floor materials and floor coverings to comply with the required **critical radiant flux (CRF)** and wall and ceiling linings to have the required **material group number**.

Note:-The previous option of complying with the AS/NZS 1530.3 tests for smoke developed and spread of flame indices referred to in Specification C1.10 for these parts of a building have been deleted, but they still apply to other parts.

This Data Sheet provides CRF values and Material Group Numbers for a range of tested timber species to enable their assessment for compliance with the BCA. Users of this data sheet are assumed to have an understanding and sound knowledge of the requirements of the BCA.

### Definitions

**Critical radiant flux (CRF)** – means the critical heat flux at extinguishment as determined by AS ISO 9239.1

**Material Group Number** – means a number assigned to materials when exposed to different levels of irradiation for different periods of time when determined in accordance with AS ISO 9705 or AS/NZS 3837.

### Floor Materials and Floor Coverings

BCA Specification C1.10a requires floor materials and floor coverings to have a CRF **not less** than that given in Table 1a, and for buildings that are not sprinklered, a maximum smoke development rate of 750%-minutes.

**Table 1a Critical Radiant Flux (CRF kW/m<sup>2</sup>) of Floor Materials and Floor Coverings**

Class of building	General		Fire-Isolated Exits
	Building not fitted with compliant sprinkler system	Building fitted with compliant sprinkler system	
Class 2, 3, 5, 6, 7, 8 or 9b excluding accommodation for the aged	2.2	1.2	2.2
Class 3 Accommodation for the aged	4.5	2.2	4.5
Class 9a Patient care areas	4.5	2.2	4.5
Class 9a Areas other than patient care areas	2.2	1.2	4.5
Class 9c Resident use areas	-	2.2	4.5
Class 9c Areas other than resident use	-	1.2	4.5

For **19 mm thick** or greater T&G flooring, Table 1b provides species that have a CRF of 4.5kW/m<sup>2</sup> or greater and Table 1c species that have a CRF of more than 2.2 and less than 4.5 kW/m<sup>2</sup>.

For **12 mm thick** T&G flooring, all species listed in Tables 1b and 1c have a CRF of more than 2.2 and less than 4.5kW/m<sup>2</sup> where they are backed by particleboard or laid on a non-combustible substrate such as concrete.

For **plywood flooring** 15 mm thick or greater, slash, radiata or hoop pine has a CRF of more than 2.2 and less than 4.5kW/m<sup>2</sup>.

All species in Tables 1b and 1c have a **smoke development rate** less than 750%-min.

**Table 1b Species with a Critical Radiant Flux (CRF) of 4.5 kW/m<sup>2</sup> or greater**

Beech, myrtle	Gum, red, river	Karri
Blackbutt, New England	Gum, spotted	Mahogany, red
Blackwood	Gum, sugar	Merbau
Bloodwood, red	Gum, yellow	Pine, white cypress
Box, brush	Ironbark, grey	Tallowwood
Box, grey	Ironbark, red	Turpentine
Gum, blue, Southern	Jarrah	Wattle, silver

**Table 1c Species with a Critical Radiant Flux (CRF) more than 2.2 and less than 4.5 kW/m<sup>2</sup>**

Ash, alpine	Gum, blue, Sydney	Pine, celerytop
Ash, mountain	Gum, Manna	Pine, radiata
Ash, silvertop	Gum, rose	Stringybark, brown
Blackbutt	Gum, shining	
Brownbarrel	Messmate	

## Wall and Ceiling Lining

BCA Specification C1.10a requires wall and ceiling lining to be of a **Material Group** as given by Table 2a.

In addition, for a building that is not fitted with a BCA compliant sprinkler system, the materials used as a finish, surface, lining or attachment to a wall or ceiling shall have an **Average Specific Extinction Area** less than 250m<sup>2</sup>/kg.

Notes: For the table below:

1. 'Sprinklered', means fitted with a BCA compliant sprinkler system
2. 'Specific areas' means:
  - a) For Class 2 and 3 buildings, a sole occupancy unit.
  - b) For Class 5 buildings, open plan offices with a minimum floor dimension/floor to ceiling height ratio > 5.
  - c) For Class 6 buildings, open plan offices with a minimum floor dimension/floor to ceiling height ratio > 5.
  - d) For Class 9a health care buildings, patient care areas.
  - e) For Class 9b theatres, halls, etc, an auditorium.
  - f) For Class 9b schools, a classroom.
  - g) For Class 9c aged care buildings, resident use areas.

**Table 2a Wall and Ceiling Lining Material Groups Permitted**

Class of building	Fire-isolated exits	Public corridors		Specific areas		Other areas
	Wall/ceiling	Wall	Ceiling	Wall	Ceiling	Wall/ceiling
<b>Class 2 or 3 - excluding accommodation for the aged, people with disabilities and children</b>						
Unsprinklered	1	1, 2	1, 2	1, 2, 3	1, 2, 3	1, 2, 3
Sprinklered	1	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
<b>Class 3 or 9a - accommodation for the aged, people with disabilities and children</b>						
Unsprinklered	1	1	1	1, 2	1, 2	1, 2, 3
Sprinklered	1	1, 2	1, 2	1, 2, 3	1, 2, 3	1, 2, 3
<b>Class 5, 6, 7, 8 and 9b schools</b>						
Unsprinklered	1	1, 2	1, 2	1, 2, 3	1, 2	1, 2, 3
Sprinklered	1	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
<b>Class 9b other than schools</b>						
Unsprinklered	1	1	1	1, 2	1, 2	1, 2, 3
Sprinklered	1	1, 2	1, 2	1, 2, 3	1, 2, 3	1, 2, 3
<b>Class 9c</b>						
Sprinklered	1	1, 2	1, 2	1, 2, 3	1, 2, 3	1, 2, 3

The species of timber tested that are given in Table 2b are all **Material Group 3**.

All these species have a maximum **Average Extinction Area** less than 250m<sup>2</sup>/kg.

Except for Blackbutt WA, which was nominally 12mm thick, all the species tested were nominally 19 mm thick, tongued and grooved and with a dressed surface.

**Table 2b Species tested with a Material Group Number 3**

Ash, alpine	Gum, blue, Sydney	Mahogany, red
Ash, mountain	Gum, blue, Southern	Marri
Ash, silvertop	Gum, Manna	Merbau
Beech, myrtle	Gum, red river	Messmate
Blackbutt	Gum, rose	Pine, radiata
Blackbutt, New England	Gum, shining	Pine, cypress, white
Blackbutt WA	Gum, spotted	Sheoak
Blackwood	Gum, sugar	Stringybark, yellow
Bloodwood, red	Gum, yellow	Tallowwood
Box, brush	Ironbark, grey	Turpentine
Box, grey	Ironbark, red	Wattle, silver
Box, grey, coast	Jarrah	
Brownbarrel	Karri	

**Veneered panels** that have a veneer density greater than 500kg/m<sup>3</sup> and are on MDF or particleboard 12 mm thick or greater, have a Group No 3 and an Average Extinction Area of less than 250 m<sup>2</sup> /kg. This covers most timber veneers, but specific test data may be available for some selected low density veneers.

## Test Reports

The information contained in this Data Sheet on CRF and Material Group has been obtained from tests conducted by Warrington Fire Research (Aust) Pty Ltd.

A copy of the short form test reports can be obtained from the members section of Timber Queensland's website [www.timberqueensland.com.au](http://www.timberqueensland.com.au)

## Additional Testing

The testing of additional timber species and products is continuing and as results become available, this Data Sheet will be updated accordingly.

## References

1. BCA 2006 - Building Code of Australia, Volume 2 - Class 2 to Class 9 Buildings
2. Warrington Fire Research Short Form Report No. SFR 41117.2
3. Warrington Fire Research Report No. RIR 45982.1



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