



REGULATORY INFORMATION REPORT

ASSESSMENT OF THE CRITICAL RADIANT FLUX (CRF)
PERFORMANCE OF SOLID TIMBER (MINIMUM
THICKNESS 12MM) AND PLYWOOD (MINIMUM
THICKNESS 15MM) WHEN TESTED IN ACCORDANCE
WITH AS/ISO 9239.1-2003

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Report Sponsor

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1 INTRODUCTION

This report contains the minimum information required to demonstrate compliance with the Building Code of Australia NCC 2015 Volume 1.

The referenced assessment report (EWFA 21419-03) was prepared at the request of the Forest and Wood Products Australia Limited (FWPA) as an assessment of the Fire Hazard performance of solid timber and plywood for use as flooring with respect to the requirements of Specification C1.10 of the Building Code of Australia NCC 2015 Volume 1.

Specification C1.10 requires testing to AS/ISO 9239.1-2003 – “Reaction to Fire Tests for Floors Part 1: Determination of the Burning Behaviour Using a Radiant Heat Source.

The main outcome from these tests is a material’s Critical Radiant Heat Flux (CRF).The test measures the radiant energy required to just sustain burning. The test involves the specimen being held horizontally under the influence of a radiant heat source at one end. When ignited the burning progresses along the specimen away from the radiant source until it stops. The radiant heat flux at the point at which burning ceases is the Critical Radiant Heat Flux.

The amount of smoke evolved is also determined using a light extinction smoke meter mounted in the flue, not that dissimilar to the existing unit on the AS/NZS 1530.3 apparatus.

The tested systems are described in Section 2 and subject to the proposed variations described in Section 3 if tested in accordance with the referenced test method described in Section 4. The conclusions of the report are summarised in Section 5.

The validity of this report is conditional on compliance with Sections 7, 8 and 9 of the report.

2 TESTED PROTOTYPES

The referenced assessment report makes reference to the following reports in Table 1 and 2 referring to tests in accordance with the requirements of Specification C1.10 of the BCA on various solid and plywood timber. The test reports were sponsored by the Forest and Wood Products Australia Limited (FWPA) and undertaken by Warrington Fire Research Australia.

The referenced assessment report makes reference to the reports WFRA 41117.1, WFRA 499241 A-K, 2141900 A-D and 2200000A-B. The referenced reports were prepared by Warrington Fire Research Pty Ltd and sponsored by Forest and Wood Products Australia Limited (FWPA).

3 VARIATION FROM TESTED PROTOTYPES

3.1 TIMBER FLOORING 12MM OR THICKER

The proposed construction is for the timber species as tested in the referenced test reports, to be 12mm thick or thicker and fixed to structural framing (e.g. floor joists) and achieve a CRF of 2.2kW/m² and Smoke Development Rate of less than 750% Minutes.

3.2 PLYWOOD FLOORING 15MM OR THICKER

The proposed construction is for the timber plywood species as tested in the referenced test reports, to be 15mm thick or thicker fixed to structural framing (e.g. floor joists) and achieve a CRF of 2.2kW/m² and Smoke Development Rate of less than 750% Minutes.

3.3 TIMBER FLOORING 12MM OR THICKER ON A SUBSTRATE

The proposed construction is for the timber species as tested in the referenced test reports, to be 12mm thick or thicker fixed to a substrate in Table 3.1 with PVA adhesive and no air gap between flooring and substrate and achieve a CRF of 2.2kW/m² and Smoke Development Rate of less than 750% Minutes.

3.4 PLYWOOD FLOORING 15MM OR THICKER ON A SUBSTRATE

The proposed construction is for the timber plywood species as tested in the referenced test reports, to be 15mm thick or thicker fixed to a substrate in Table 3.1 with PVA adhesive and no air gap between flooring and substrate and achieve a CRF of 2.2kW/m² and Smoke Development Rate of less than 750% Minutes.

Table 3.1 Proposed Flooring Substrates

Substrate	Thickness (mm)
Particleboard 716kg/m ³	19mm or greater
Fibre cement	15mm or greater
Normal Weight Concrete floor	75mm or greater
Light weight concrete floor	75mm or greater

4 REFERENCED TEST PROCEDURES

Reference was made to Specification C1.10 which requires the Critical Radiant Heat Flux (CRF) and the smoke development rate to be tested in accordance with AS/ISO 9239.1-2003.

5 FORMAL ASSESSMENT SUMMARY

On the basis of the discussion presented in the referenced assessment report it is the considered opinion of this test authority that if the tested specimens described in Section 2 had been configured as described in Section 3 they will achieve the performance stated below if tested in accordance with the test method referenced in Section 4, subject to the requirements in section 7.

5.1 TIMBER FLOORING 12MM OR THICKER (NO SUBSTRATE)

Table 5.1 of Performance

Flooring Species	Thickness (mm)	Performance	
		CRF (kW/m ²)	Smoke Development Rate (%- Mins)
Ash, Mountain – <i>Eucalyptus regnans</i>	12mm or greater	Greater than 2.2 and less than 4.5	<750
Pine, Celerytop - <i>Phyllocladus asplenifolius</i>			
Ash, Alpine - <i>Eucalyptus delegatensis</i>			
Gum, Rose – <i>Eucalyptus grandis</i>			
Stringy Bark, Yellow - <i>Eucalyptus muellerana</i>			
Gum, Blue, Sydney - <i>Eucalyptus saligna</i>			
Gum, Spotted - <i>Corymbia maculata</i>			

5.2 PLYWOOD FLOORING 15MM OR THICKER (NO SUBSTRATE)

Table 5.2 of Performance

Species of Plywood Flooring	Thickness (mm)	Performance	
		CRF (kW/m ²)	Smoke Development Rate (%- Mins)
Pine, Hoop - <i>Araucaria cunninghamii</i>	15mm or greater	Greater than 2.2 and less than 4.5	<750
Pine, Radiata – <i>Pinus radiata</i>	17mm or greater		
Pine, Slash – <i>Pinus elliotii</i>	17mm or greater		

5.3 TIMBER FLOORING 12MM OR THICKER ON A SUBSTRATE

Table 5.3 Proposed Flooring Substrates

Substrate	Thickness (mm)
Particleboard 716kg/m ³	19mm or greater
Fibre cement	15mm or greater
Normal Weight Concrete floor	75mm or greater
Light weight concrete floor	75mm or greater

Table 5.4 Timber Flooring Options for Proposed Substrate

Flooring Species	Thickness (mm)	Performance	
		CRF (kW/m ²)	Smoke Develop. Rate %- mins
Ash, Alpine - <i>Eucalyptus delegatensis</i>	12mm or greater	Greater than 2.2 and less than 4.5	<750
Ash, Mountain – <i>Eucalyptus regnans</i>			
Ash, Silvertop - <i>Eucalyptus sieberi</i>			
Beech Myrtle - <i>Northofagus cunninghamii</i>			

Flooring Species	Thickness (mm)	Performance	
		CRF (kW/m ²)	Smoke Develop. Rate %-mins
Blackbutt - <i>Eucalyptus pilularis</i>			
Blackbutt, New England - <i>Eucalyptus andrewsii</i>			
Bloodwood Red - <i>Eucalyptus gummifera</i>			
Box, Brush - <i>Lophostman confertus</i>			
Box, Grey – <i>Eucalyptus microcarpa</i>			
Brownbarrel - <i>Eucalyptus fastigata</i>			
Gum, Blue, Southern (TAS) - <i>Eucalyptus globulus</i>			
Gum, Blue, Southern (VIC) - <i>Eucalyptus globulus</i>			
Gum, Blue, Sydney - <i>Eucalyptus saligna</i>			
Gum, Manna - <i>Eucalyptus viminalis</i>			
Gum, Red, River - <i>Eucalyptus camaldulensis</i>			
Gum, Rose – <i>Eucalyptus grandis</i>			
Gum, Shining – <i>Eucalyptus nitens</i>			
Gum, Spotted - <i>Corymbia maculata</i>			
Gum, Sugar - <i>Eucalyptus cladocalyx</i>			
Gum, Yellow - <i>Eucalyptus leucoxydon</i>			
Ironbark, Grey – <i>Eucalyptus drepanophylla</i>			
Ironbark, Red - <i>Eucalyptus sideroxydon</i>			
Jarraah - <i>Eucalyptus marginata</i>			
Karri - <i>Eucalyptus diversicolor</i>			
Mahogany, Red - <i>Eucalyptus resinifera</i>			
Merbau - <i>Instia bijuga</i>			
Messmate - <i>Eucalyptus obliqua</i>			
Pine, White Cypress - <i>Callitris glaucophylla</i>			
Stringy Bark, Yellow - <i>Eucalyptus muellerana</i>			
Tallowwood - <i>Eucalyptus microcorys</i>			
Turpentine – <i>Syncarpa glomulifera</i>			
Wattle, Silver – <i>Acacia dealbata</i>			

5.4

PLYWOOD FLOORING 15MM OR THICKER ON A SUBSTRATE

Table 5.5 Proposed Flooring Substrates

Substrate	Thickness (mm)
Particleboard 716kg/m ³	19mm or greater
Fibre cement	15mm or greater
Normal Weight Concrete floor	75mm or greater
Light weight concrete floor	75mm or greater

Table 5.6 Timber Plywood Flooring Options for Proposed Substrate

Species of Plywood Flooring	Thickness (mm)	Performance	
		CRF (kW/m ²)	Smoke Development Rate (%- Mins)
Pine, Hoop - <i>Araucaria cunninghamii</i>	15mm or greater	Greater than 2.2 and less than 4.5	<750
Pine, Radiata – <i>Pinus radiata</i>	17mm or greater		
Pine, Slash – <i>Pinus elliottii</i>	17mm or greater		

6 DIRECT FIELD OF APPLICATION

The referenced assessment report applies to floors of buildings that are required to have Fire Hazard Properties in accordance with NCC 2015 Specification C1.10.

7 REQUIREMENTS

The referenced assessment report details the methods of construction, test conditions and assessed results that would have been expected had the specific elements of construction described herein been tested in accordance with AS/ISO 9239.1-2003.

Any further variations other than those identified in the referenced assessment report, may invalidate the conclusions drawn in the referenced assessment report.

8 VALIDITY

The referenced assessment report does not provide an endorsement by Exova Warringtonfire Aus Pty Ltd of the actual products supplied.

The conclusions of the referenced assessment report may be used to directly assess fire hazard, but it should be recognised that a single test method will not provide a full assessment of fire hazard under all conditions.

Because of the nature of fire testing, and the consequent difficulty in quantifying the uncertainty of measurement, it is not possible to provide a stated degree of accuracy. The inherent variability in test procedures, materials and methods of construction, and installation may lead to variations in performance between elements of similar construction.

The referenced assessment report can therefore only relate only to the actual prototype test specimens, testing conditions, and methodology described in the supporting data, and does not imply any performance abilities of constructions of subsequent manufacture.

The referenced assessment report is based on information and experience available at the time of preparation. The published procedures for the conduct of tests and the assessment of test results are the subject of constant review and improvement and it is recommended that the referenced assessment report be reviewed on or, before, the stated expiry date.

The information contained in the referenced assessment report shall not be used for the assessment of variations other than those stated in the conclusions above. The assessment is valid provided no modifications are made to the systems detailed in the referenced assessment report. All details of construction should be consistent with the requirements stated in the relevant test reports and all referenced documents.

9 AUTHORITY

9.1 APPLICANT UNDERTAKINGS AND CONDITIONS OF USE

By using this report as evidence of compliance or performance the applicant(s) confirms that:

- to their knowledge the component or element of structure, which is the subject of this assessment, has not been subjected to a fire test to the Standard against which this assessment is being made, and
- they agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test by a test authority in accordance with the Standard against which this assessment is being made and the results are not in agreement with this assessment, and
- they are not aware of any information that could adversely affect the conclusions of this assessment and if they subsequently become aware of any such information, agree to ask the assessing authority to withdraw the assessment.

9.2 GENERAL CONDITIONS OF USE

This report may only be reproduced in full without modifications by the report sponsor. Copies, extracts or abridgments of this report in any form shall not be published by other organisations without the permission of Exova Warringtonfire Aus Pty Ltd.

9.3 AUTHORISATION ON BEHALF OF EXOVA WARRINGTONFIRE AUS PTY LTD

Prepared by:

Reviewed by:



S. HU



D. Nicholson

9.4 DATE OF ISSUE

25/08/2016

9.5 EXPIRY DATE

21/12/2020