

# warringtonfire

## **ASSESSMENT REPORT**

Classification of Matilda Fireply FR  
treated plwood wall and ceiling lining  
when assessed in accordance with  
AS 5637.1:2015.

### **EWFA Report No:**

41267300.2

### **Report Sponsor:**

Matilda Veneer Pty Ltd  
18-22 Activity Cres  
Molendinar QLD 4214

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## 1 INTRODUCTION

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For the verification of fire hazard properties, the National Construction Code of Australia (NCC) Specification C1.10 requires that a group number of a wall or ceiling lining and the smoke growth rate index or average specific extinction area must be determined in accordance with AS 5637.1:2015<sup>1</sup>.

In accordance with AS 5637.1:2015, the group number of a material shall be determined by either-

- (a) Physical testing in accordance with AS ISO 9705-2003<sup>2</sup>; or
- (b) If the material has a confirmed correlation, prediction in accordance with Clause 4.4 using data obtained by testing the material at 50kW/m<sup>2</sup> irradiance in the horizontal orientation with edge frame in accordance with ISO 5660-1<sup>3</sup> or AS/NZS 3837<sup>4</sup>, as appropriate to the test conducted.

The materials group number is an indication of its 'time to flashover' in the ISO room fire test. Flashover refers to the phenomenon of the sudden ignition of almost all of the exposed combustible surfaces within an enclosed room. During an enclosed room fire, a hot layer of smoke can form at the ceiling level which will radiate heat onto exposed surfaces below. When certain materials are heated, they undergo thermal decomposition and can release flammable gases. Flashover occurs when the flammable gasses and the majority of the exposed surfaces reach a sufficient temperature for ignition to occur. Ignition is usually sudden and can appear to be almost simultaneous across all exposed surfaces.

This report presents an assessment of the Group Number and Average Specific Extinction Area of Matilda Fireply FR treated plywood wall and ceiling lining when assessed in accordance with AS 5637.1:2015.

The tested prototypes described in Section 2 of this report, when subject to the proposed variations described in Section 3, are to perform satisfactorily 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 assessment is conditional on compliance with Sections 6, 7, 8 and 9 of this report.

Summaries of the test data on which this assessment is based are provided in Appendix A together with a summary of the critical issues leading to the assessment conclusions including the main points of argument.

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<sup>1</sup> Determination of fire hazard properties Wall and ceiling linings

<sup>2</sup> Fire tests - Full-scale room test for surface products

<sup>3</sup> Reaction-to-fire tests — Heat release, smoke production and mass loss rate — Part 1: Heat release rate (cone calorimeter method) and smoke production rate (dynamic measurement)

<sup>4</sup> Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter

## 2 TESTED PROTOTYPES

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This assessment is based on referenced test reports EWFA 401171-00a.1 and EWFA 401171-00b.1 performed in accordance with AS/NZS 3837:1998 by AWTA Product Testing and sponsored by Matilda Veneer Pty Ltd.

This assessment is also referencing test report RTF190276 performed in accordance with AS ISO 9705-2003 and classification report ASCRRTF190276 by Warringtonfire Australia, both reports are sponsored by Matilda Veneer Pty Ltd.

EWFA 401171-00a.1 describes a test on three specimens of 100.1mm by 100.1mm by 6mm thick samples of fire retardant treated 3-ply plywood. EWFA 401171-00b.1 describes a test on three specimens of 100.1mm by 100mm by 38mm thick samples of fire retardant treated 25-ply plywood.

RTF190276 describes a test on 12mm thick Matilda Fireply FR plywood and consist of a fire test room where the ceiling and three walls were lined with said product.

Refer to Appendix A for a full summary of the test data.

## 3 VARIATION TO TESTED PROTOTYPES

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The proposed wall and ceiling lining material is to be as tested in RTF190276, EWFA 401171-00a.1 and EWFA 401171-00b.1 subject to the following variations:

- Variation in thickness of the panel between and including 12mm and 50mm

## 4 REFERENCED TEST PROCEDURES

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This report is prepared with reference to the requirements of AS ISO 9705-2003 and AS 5637.1:2015.

## 5 FORMAL ASSESSMENT SUMMARY

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On the basis of the discussion presented in this report, it is the opinion of this testing authority that if the tested prototype described in Section 2 had been varied as in Section 3, it will achieve the results below when tested in accordance with the standards referenced in Section 4 and subject to the requirements of Section 7.

**Table 1 Classification for AS ISO 9705:2003 (R2016) and AS 5637.1:2015 (Australia)**

Criteria	Results
Group number	2
SMOGR <sub>RC</sub> (in m <sup>2</sup> /s <sup>2</sup> × 1000)	Less than 250

**Table 2 Classification for C/VM2 – Verification Method: Framework for Fire Safety Design (New Zealand)**

Criteria	Results
Group number	2-S
Average smoke production rate (0 to 10 minutes) (in m <sup>2</sup> /s)	Less than 5

## **6 DIRECT FIELD OF APPLICATION**

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The results of this assessment are applicable to wall and ceiling linings as defined in the NCC 2019. Volume 1 Specification C1.10.

## **7 REQUIREMENTS**

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This report details the 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 9705-2003.

It is a condition of this assessment that joints between panels shall not form gaps exceeding 8mm in width or 10mm in depth.

Any further variations with respect to size, surface characteristics, symmetry, thickness, composition or joints other than those identified in this report, may invalidate the conclusions drawn in this report.

## **8 VALIDITY**

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

The conclusions of this assessment 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 assessment 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.

This assessment 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 this report be reviewed on or, before, the stated expiry date.

The information contained in this 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 this report. All details of construction should be consistent with the requirements stated in the relevant test reports and all referenced documents.

## 9 AUTHORITY

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### 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 or individuals without the permission of Warringtonfire Aus Pty Ltd.

### 9.3 AUTHORISATION ON BEHALF OF EXOVA WARRINGTONFIRE AUS PTY LTD

Prepared by:



O. Saad

Reviewed by:



M. Akl

Authorized by:



O. Saad

### 9.4 DATE OF ISSUE

03/12/2019

### 9.5 EXPIRY DATE

03/12/2024

## APPENDIX A - SUMMARY OF SUPPORTING DATA

### A.1 TEST REPORT- EWFA 401171-00A.1

#### A.1.1 Report Sponsor

A.1.1.1 Matilda Veneer, 18-22 Activity Crescent, Molendinar, QLD 4214

#### A.1.2 Test Laboratory

A.1.2.1 The tests were performed at AWTA laboratories under the technical control of Exova Warringtonfire Pty Ltd, Unit 2, 409-411 Hammond Road, Dandenong South, Victoria, 3175.

#### A.1.3 Test Date

A.1.3.1 The tests were conducted in February 2016.

#### A.1.4 Test standards prescribed

A.1.4.1 The test was performed in accordance with the requirements of AS/NZS 3837:1998.

#### A.1.5 Variations to Test Standard

A.1.5.1 None.

#### A.1.6 General description of tested specimens

A.1.6.1 A cone calorimeter test on three specimens of 100.1mm by 100.1mm by 6mm thick 3-ply Matilda Fireply FR treated plywood wall and ceiling lining.

#### A.1.7 Instrumentation

A.1.7.1 The instrumentation was provided and applied in accordance with AS/NZS 3837:1998.

#### A.1.8 Test Results

A summary of the results obtained from three tests of samples taken from specimens numbered ewaa-cc-356 to ewaa-cc-365 is given below.

Criteria	Specimen			Mean	Units
	One	Two	Three		
Irradiance	50	50	50	50	kW/m <sup>2</sup>
Exhaust Flow Rate	24	24	24	24	l/sec
Time to Sustained Flaming	90	98	94	94	secs
Test Duration	1912	1476	1684	1691	secs
Peak Heat Release Rate after Ignition	84.9	104.7	96.2	95.3	kW/m <sup>2</sup>
Average Heat Release Rate @ 60s	33.5	68.1	49.4	50.3	kW/m <sup>2</sup>
Average Heat Release Rate @ 180s	39.1	44.7	45.0	42.9	kW/m <sup>2</sup>
Average Heat Release Rate @ 300s	32.1	34.9	34.8	33.9	kW/m <sup>2</sup>
Total Heat Released	29.6	25.8	28.0	27.8	MJ/m <sup>2</sup>
Average Effective Heat of Combustion	14.9	13.8	14.1	14.3	MJ/kg
Initial Thickness	6.0	6.0	6.0	6.0	mm
Initial Mass	24.1	22.4	23.7	23.4	grams
Mass Remaining	2.4	1.3	1.8	1.9	grams
Mass Percentage Pyrolysed	89.9	94.1	92.4	92.1	%
Average Rate of Mass Loss	1.1	1.3	1.2	1.2	g/m <sup>2</sup> /s
Average Specific Extinction Area	35.9	41.7	48.8	42.1	m <sup>2</sup> /kg



**A.2 TEST REPORT- EWFA 401171-00B.1****A.2.1 Report Sponsor**

A.2.1.1 Matilda Veneer, 18-22 Activity Crescent, Molendinar, QLD 4214

**A.2.2 Test Laboratory**

A.2.2.1 The tests were performed at AWTA laboratories under the technical control of Exova Warringtonfire Pty Ltd, Unit 2, 409-411 Hammond Road, Dandenong South, Victoria, 3175.

**A.2.3 Test Date**

A.2.3.1 The tests were conducted in February 2016.

**A.2.4 Test standards prescribed**

A.2.4.1 The test was performed in accordance with the requirements of AS/NZS 3837-1998.

**A.2.5 Variations to Test Standard**

A.2.5.1 None.

**A.2.6 General description of tested specimens**

A.2.6.1 A cone calorimeter test on three specimens of 100.1mm by 100mm by 38mm thick 25-ply Matilda Fireply FR treated plywood wall and ceiling lining.

**A.2.7 Instrumentation**

A.2.7.1 The instrumentation was provided and applied in accordance with AS/NZS 3837-1998.

**A.2.8 Test Results**

A.2.8.1 A summary of the results obtained from three tests of samples taken from specimens numbered ewaa-cc-366 to ewaa-cc-375 is given below.

Criteria	Specimen			Mean	Units
	One	Two	Three		
Irradiance	50	50	50	50	kW/m <sup>2</sup>
Exhaust Flow Rate	24	24	24	24	l/sec
Time to Sustained Flaming	fti*	fti*	fti*	fti*	secs
Test Duration	600	600	600	600	secs
Peak Heat Release Rate after Ignition	NA	NA	NA	NA	kW/m <sup>2</sup>
Average Heat Release Rate @ 60s	NA	NA	NA	NA	kW/m <sup>2</sup>
Average Heat Release Rate @ 180s	NA	NA	NA	NA	kW/m <sup>2</sup>
Average Heat Release Rate @ 300s	NA	NA	NA	NA	kW/m <sup>2</sup>
Total Heat Released	NA	NA	NA	NA	MJ/m <sup>2</sup>
Average Effective Heat of Combustion	NA	NA	NA	NA	MJ/kg
Initial Thickness	38.0	38.0	38.0	38.0	mm
Initial Mass	173.3	178.4	172.1	174.6	grams
Mass Remaining	142.8	149.6	142.9	145.1	grams
Mass Percentage Pyrolysed	17.6	16.1	17.0	16.9	%
Average Rate of Mass Loss	6.3	5.9	6.0	6.1	g/m <sup>2</sup> /s
Average Specific Extinction Area	31.6	26.8	26.4	28.3	m <sup>2</sup> /kg

\*fti – indicates the specimen failed to ignite.

**A.3 TEST REPORT- RTF190276**

**A.3.1 Report Sponsor**

A.3.1.1 Matilda Veneer, 18-22 Activity Crescent, Molendinar, QLD 4214

**A.3.2 Test Laboratory**

A.3.2.1 The test was performed at Warringtonfire Pty Ltd, Unit 2, 409-411 Hammond Road, Dandenong South, Victoria, 3175.

**A.3.3 Test Date**

A.3.3.1 The test was conducted on 30/10/2019.

**A.3.4 Test standards prescribed**

A.3.4.1 The test was performed in accordance with the requirements of AS ISO 9705:2003 (R2016) and AS 5637.1:2015.

**A.3.5 Variations to Test Standard**

A.3.5.1 None.

**A.3.6 General description of tested specimens**

A.3.6.1 The test report documents the findings of the reaction-to-fire test of a wall and ceiling lining undertaken on 30 October 2019 in accordance with AS ISO 9705:2003 (R2016) and AS 5637.1:2015.

A.3.6.2 The tested system consisted of a fire test room where the ceiling and three walls were lined with 12 mm thick Matilda Fireply plywood (7-ply) panels. A summary of the classifications achieved in accordance with AS ISO 9705:2003 (R2016) and AS 5637.1:2015 is provided in Table 1 Instrumentation

A.3.6.3 The instrumentation was provided and applied in accordance with AS ISO 9705:2003 (R2016).

**A.3.7 Classification for AS ISO 9705:2003 (R2016) and AS 5637.1:2015**

A summary of the results obtained from three tests of samples taken from specimens numbered ewaa-cc-356 to ewaa-cc-365 is given below.

Criteria	Results
Group number	2
SMOGR <sub>RC</sub> (in m <sup>2</sup> /s <sup>2</sup> × 1000)	11.4

## APPENDIX B - ASSESSMENT OF SPECIFIC VARIATIONS

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### B.1 SELECTION OF TEST METHOD

- B.1.1.1 AS 5637.1:2015 states that only materials for which there are correlations between cone calorimeter results and room test results shall be tested in the cone calorimeter for the purpose of determining a group number. If the material has confirmed correlation, the group number shall be determined by prediction in accordance with clause 4.4 using data obtained by testing the material in accordance with AS/NZS 3837:1998.
- B.1.1.2 Confirmed correlations means that the materials should have performance datum point when tested in accordance with AS ISO 9705:2003 (R2016) which is available from test RTF190276.
- B.1.1.3 AS 5637.1:2015 clause 5.3.3 gives examples of materials for which the correlation is permitted which include the following:
- A) painted or unpainted paper-faced gypsum plasterboard;
  - B) solid timber and wood products such as particleboard and plywood; and
  - C) rigid non-thermoplastic foams such as polyurethane
- B.1.1.4 It is confirmed that the material under consideration and tested in RTF190276, EWFA 401171-00a.1 and EWFA 401171-00b.1 is plywood, therefore prediction in accordance with clause 4.4 is considered appropriate for assigning group number for product range of 12mm to 50mm.

### B.2 DETERMINATION OF GROUP NUMBER OF TESTED SPECIMENS

- B.2.1.1 Tests of the material in EWFA 401171-00a.1 and EWFA 401171-00b.1 were conducted in accordance with AS/NZS 3837. EWFA 401171-00a.1 describes a test on 6mm thick samples of fire retardant treated 3-ply plywood. EWFA 401171-00b.1 describes a test on 38mm thick samples of fire retardant treated 25-ply plywood.
- B.2.1.2 Test of the material in RTF190276 conducted in accordance with AS ISO 9705:2003 (R2016) where the heat release rate of 1 MW was confirmed at 10 minutes and 48 seconds in to the test.
- B.2.1.3 Following the procedures classification in AS 5637.1:2015 and using AS ISO 9705:2003 test results the material with the proposed variation in thickness is likely to achieve Group 2 performance.

### B.3 DETERMINATION OF GROUP NUMBER OF PROPOSED VARIATIONS

#### B.3.1 Proposal

- B.3.1.1 The proposed wall and ceiling lining material is to be as tested in RTF190276, EWFA 401171-00a.1 and EWFA 401171-00b.1 subject to the following variations:
- Variation in thickness between 12mm and 50mm

#### B.3.2 Discussion

- B.3.2.1 As discussed above, the material tested in RTF190276, EWFA 401171-00a.1 and EWFA 401171-00b.1 is considered appropriate for the use of the prediction method in AS 5637.1:2015.
- B.3.2.2 The proposed material is identical to the tested material in all aspects except thickness. The thickness of suitable material is addressed in AS/NZS 3837 which limits specimen size to a maximum of 50mm thick. Given that all other material aspects are the same, and that the proposed thickness falls within limits of the test standard, it is considered that the prediction method in AS 5637.1:2015 using data obtained by testing the material in accordance with AS ISO 9705:2003 and AS/NZS 3837 is appropriate for the proposed material of any thickness between 12mm and 50mm.
- B.3.2.3 The critical aspects of the performance in a test to AS/NZS 3837 are whether the specimen ignited and the specimen thickness. The thickness of the specimen can increase the rate the specimen heats up and can burn simultaneously on both exposed and unexposed surfaces.
- B.3.2.4 The tested samples were 6mm thick in EWFA 401171-00a.1 and 38mm thick in EWFA 401171-00b.1. The 38mm thick sample failed to ignite while the 6mm thick sample ignited at

94 seconds. Both tested samples achieved what could be equivalent to Group 1 performance. The behaviour of the tested samples is common to many FR treated timber products. A thicker sample has more mass and hence contains more of the fire-retardant additive in total and will likely ignite later than a thinner sample with comparatively less fire-retardant additive.

- B.3.2.5 It is considered reasonable to expect that if the thickness of the proposed material was between 12mm and 38mm, it would exhibit behaviour similar to the 12mm specimen tested in accordance with AS ISO 9705:2003.
- B.3.2.6 The proposal also includes the option of plywood thicker than 38mm up to a maximum of 50mm. The key aspect of this proposal is that the retention of fire retardant be the same for the thicker plywood as it was for the 38mm sample on a pro rata basis based on the volume of the finished product. Since the 38mm sample failed to ignite, it is considered reasonable to expect that a 50mm thick sample would also fail to ignite.
- B.3.2.7 In light of the above discussion, the proposed material of any thickness between and inclusive to 12mm and 50mm is expected to achieve Group 2 performance if tested to AS ISO 9705:2003.

#### **B.4 DETERMINATION OF SMOKE GROWTH RATE INDEX (SMOGR<sub>RC</sub>)**

- B.4.1.1 The tested specimen in RTF190276 achieved Smoke growth rate index of 11.4 ( $m^2/s^2 \times 1000$ ). By inspection of the results and comparing it with EWFA 401171-00a.1 and EWFA 401171-00b.1 data for average specific extinction area of, it is observed that the value decreases as the material thickness increases.
- B.4.1.2 If the fire-retardant retention for the thicker plywood is similar to that of the 38mm tested plywood, it is expected that thicker specimens would exhibit similar or better performance to that of the 38mm plywood tested in EWFA 401171-00b.1.
- B.4.1.3 Given the margin of the tested performance obtained from AS/ANZ 3837 tests is far from the limiting value of 250m<sup>2</sup>/kg, it is expected that the proposed material will also likely Smoke growth rate index of of less than 11.4 ( $m^2/s^2 \times 1000$ ) is tested in accordance with AS ISO 9705:2003.