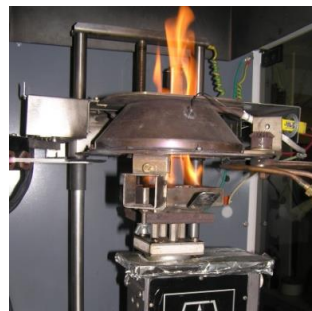




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FIRE TEST REPORT

FH4983

**CONE CALORIMETER TEST AND NZBC VERIFICATION METHOD C/VM2
APPENDIX A AND NCC SPECIFICATION C1.10 OF VARIOUS SURFACE
PREPARATIONS ON MDF**

CLIENT

PrimePanels NZ Ltd
43 Stonedon Drive
East Tamaki
Auckland 2013
New Zealand



International Accreditation New Zealand (IANZ) has a Mutual Recognition Agreement (MRA) with the National Association of Testing Authorities, Australia (NATA). Users of test reports are recommended to accept test reports in the name of either accrediting body.

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TEST SUMMARY

Objective

To conduct cone calorimeter testing and reduce the data in accordance with ISO 5660 and AS/NZS 3837 on client supplied specimens for the purposes of determination of the Group Classifications in accordance with;

- New Zealand Building Code (NZBC) Verification Method C/VM2 Appendix A
- National Construction Code (NCC) Volume One Specifications C1.10 and A 2.4 of the Building Code of Australia (BCA).

Test sponsor

PrimePanels NZ Ltd
43 Stonedon Drive
East Tamaki
Auckland 2013
New Zealand

Description of test specimen

The product submitted by the client for testing was identified by the client as 12 mm and 18 mm thick MDF in the raw state and coated with a range of surface preparations making a total of 14 different specimens.

Date of test

The tests were conducted over the period 26th March to 20th June 2013.



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Test results

For the purposes of compliance with the respective building code documents, the following classifications are considered applicable to the tested samples as described in Section 1 and the variations as discussed in Section 5.

For all of the test products submitted, with two exceptions, the following test results were achieved.

Building Code Document	Group Number Classification
NZBC Verification Method C/VM2 Appendix A	1-S
NCC Specifications C1.10 and A 2.4	1 Smoke less than 250 m ² /kg

In the case of the two exceptions indicated above the two test sample with the surface coating of 0.4 mm Sapele veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m² the following result was achieved.

Building Code Document	Group Number Classification
NZBC Verification Method C/VM2 Appendix A	2-S
NCC Specifications C1.10 and A 2.4	2 Smoke less than 250 m ² /kg

LIMITATION

The results reported here relate only to the item/s tested.

TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in the BRANZ Services Agreement for this work.



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SIGNATORIES



Author

P. C. R. Collier
Senior Fire Research Engineer



Reviewer

E. Soja
Senior Fire Safety Engineer
IANZ Approved Signatory

DOCUMENT REVISION STATUS

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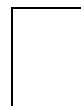
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1. GENERAL

The four products submitted by the client for full testing are described and identified in Figure 1, Figure 2, and Figure 4 below.

Figure 1 Representative specimens of FH4983-2 Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m² (unexposed face on left, typical exposed face on right)



Figure 2 Representative specimens of FH4983-15 Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m² (unexposed face on left, typical exposed face on right)



Figure 3 Representative specimens of FH4983-16 Prime Fireline 12 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m² (unexposed face on left, typical exposed face on right)



Figure 4 Representative specimens of FH4983-20 Prime Fireline 18 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m² (unexposed face on left, typical exposed face on right)



1.1 Sample measurements

The following physical parameters were measured for each specimen prior to testing.

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m²

Specimen ID	Initial properties		Overall apparent density (kg/m ³)
	Mass (g)	Mean thickness (mm)	
FH4983-2-50-1	97.6	12.1	807
FH4983-2-50-2	97.4	12.0	812
FH4983-2-50-3	97.7	12.0	814

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

Specimen ID	Initial properties		Overall apparent density (kg/m ³)
	Mass (g)	Mean thickness (mm)	
FH4983-15-50-1	98.1	12.2	805
FH4983-15-50-2	95.5	12.1	789
FH4983-15-50-3	98.5	12.1	815

Prime Fireline 12 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

Specimen ID	Initial properties		Overall apparent density (kg/m ³)
	Mass (g)	Mean thickness (mm)	
FH4983-16-50-1	95.9	12.2	786
FH4983-16-50-2	95.8	12.2	785
FH4983-16-50-3	97.2	12.2	797



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**Prime Fireline 18 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m²
Polyurethane finish 2 coats 30 g/m²**

Specimen ID	Initial properties		Overall apparent density (kg/m ³)
	Mass (g)	Mean thickness (mm)	
FH4983-20-50-1	137.2	18.0	762
FH4983-20-50-2	136.4	18.0	758
FH4983-20-50-3	139.2	18.0	773



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2. EXPERIMENTAL PROCEDURE

2.1 Test standard

The tests were carried out and data reduced according to the test procedures described in ISO 5660: (2002), Reaction-to-fire tests – Heat release, smoke production and mass loss – Part 1: Heat release rate, and Part 2: Smoke production rate, and AS/NZS 3837:1998 'Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter'; (the test standard). The sample preparation and test procedure were as described in 2.4 and 2.5.

2.2 Test date

The tests were conducted over the period 26th March to 20th June 2013 by Mr Lukas Hersche and Mr Peter Collier at BRANZ Limited laboratories, Judgeford, New Zealand.

2.3 Specimen conditioning

All specimens were conditioned to moisture equilibrium (constant weight), at a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$ immediately prior to testing.

2.4 Specimen wrapping and preparation

All tests were conducted and the specimens prepared in accordance with the test standard. The spark igniter and the stainless steel retainer frame were used. All specimens were wrapped in a single layer of aluminium foil, covering the unexposed surfaces.

2.5 Test programme

The test program consisted of three replicate specimens as identified in the above table, tested at an irradiance level of 50 kW/m^2 . All tests were carried out with the specimen horizontal, and with a nominal duct flow rate of $0.024 \text{ m}^3/\text{s}$.



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3. TEST RESULTS AND REDUCED DATA

3.1 Test results and reduced data – NZBC C/VM2

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m²

Material	Test specimens as described in Section 1 (in accordance with ISO 5660)			Mean
Specimen test number	FH4983-2-50-1	FH4983-2-50-2	FH4983-2-50-3	
Time to sustained flaming s	27	40	35	34
Observations ^a	-	-	-	
Test duration ^b s	1827	1840	1835	1834
Mass remaining, mf g	33.9	32.4	33.0	33.1
Mass pyrolyzed %	65.3%	66.7%	66.2%	66.0%
Specimen mass loss ^c kg/m ²	7.2	7.3	7.3	7.3
Specimen mass loss rate ^c g/m ² .s	118.1	47.1	45.4	70.2
Heat release rate				
peak, \dot{q}_{max}'' kW/m ²	186.7	75.8	79.3	113.9
average, \dot{q}_{avg}''				
Over 60 s from ignition kW/m ²	72.0	40.6	45.6	52.7
Over 180 s from ignition kW/m ²	33.1	20.0	26.2	26.4
Over 300 s from ignition kW/m ²	23.6	16.3	22.7	20.9
Total heat released MJ/m ²	37.8	28.0	41.2	35.7
Average Specific Extinction Area m ² /kg	87.6	63.2	57.3	69.3
Effective heat of combustion ^d , $\Delta h_{c,eff}$ MJ/kg	5.2	3.8	5.6	4.9

Notes :

^a no significant observations were recorded

^b determined by * X_{O2} returning to the pretest value within 100 ppm of oxygen concentration for 10 minutes

** 30 minutes after time to sustained flaming

^c from ignition to end of test;

^d from the start of the test

+ value calculated using data beyond the official end of test time according to the test standard.

NR not recorded

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²



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Material	Test specimens as described in Section 1 (in accordance with ISO 5660)			Mean
Specimen test number	FH4983-15-50-1	FH4983-15-50-2	FH4983-15-50-3	
Time to sustained flaming s	11	17	8	12
Observations ^a	-	-	-	
Test duration ^b s	1811	1817	1808	1812
Mass remaining, mf g	36.4	35.4	36.4	36.0
Mass pyrolyzed %	62.9%	63.0%	63.1%	63.0%
Specimen mass loss ^c kg/m ²	7.0	6.8	7.0	6.9
Specimen mass loss rate ^c g/m ² .s	114.4	111.3	117.1	114.2
Heat release rate				
peak, \dot{q}_{\max}'' kW/m ²	202.5	246.9	211.9	220.5
average, \dot{q}_{avg}''				
Over 60 s from ignition kW/m ²	73.0	79.9	72.0	75.0
Over 180 s from ignition kW/m ²	33.0	34.1	32.6	33.2
Over 300 s from ignition kW/m ²	22.6	24.4	23.7	23.6
Total heat released MJ/m ²	34.8	36.0	36.1	35.6
Average Specific Extinction Area m ² /kg	92.8	72.9	81.4	82.4
Effective heat of combustion ^d , $\Delta h_{c,\text{eff}}$ MJ/kg	5.0	5.3	5.1	5.1

Notes :

^a no significant observations were recorded

^b determined by * X_{O2} returning to the pretest value within 100 ppm of oxygen concentration for 10 minutes

** 30 minutes after time to sustained flaming

^c from ignition to end of test;

^d from the start of the test

+ value calculated using data beyond the official end of test time according to the test standard.

NR not recorded

**Prime Fireline 12 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m²
Polyurethane finish 2 coats 30 g/m**

Material	Test specimens as described in Section 1 (in accordance with ISO 5660)			Mean
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Specimen test number		FH4983-16-50-1	FH4983-16-50-2	FH4983-16-50-3	
Time to sustained flaming	s	6	33	30	23
Observations ^a		-	-	-	
Test duration ^b	s	1806	1833	1830	1823
Mass remaining, mf	g	33.0	30.6	31.0	31.5
Mass pyrolyzed	%	65.6%	68.0%	68.1%	67.2%
Specimen mass loss ^c	kg/m ²	7.2	7.3	7.4	7.3
Specimen mass loss rate ^c	g/m ² .s	58.1	41.8	44.2	48.1
Heat release rate					
peak, \dot{q}_{\max}''	kW/m ²	95.6	102.9	105.9	101.5
average, \dot{q}_{avg}''					
Over 60 s from ignition	kW/m ²	29.6	65.9	62.1	52.5
Over 180 s from ignition	kW/m ²	27.6	33.5	30.4	30.5
Over 300 s from ignition	kW/m ²	21.6	26.2	23.5	23.8
Total heat released	MJ/m ²	30.9	36.1	33.2	33.4
Average Specific Extinction Area	m ² /kg	69.9	109.3	117.2	98.8
Effective heat of combustion ^d , $\Delta h_{c,\text{eff}}$	MJ/kg	4.3	4.9	4.4	4.6

Notes :

^a no significant observations were recorded

^b determined by * X_{O2} returning to the pretest value within 100 ppm of oxygen concentration for 10 minutes

** 30 minutes after time to sustained flaming

^c from ignition to end of test;

^d from the start of the test

+ value calculated using data beyond the official end of test time according to the test standard.

NR not recorded

**Prime Fireline 18 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m²
Polyurethane finish 2 coats 30 g/m²**

Material	Test specimens as described in Section 1 (in accordance with ISO 5660)	Mean
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Specimen test number		FH4983-20-50-1	FH4983-20-50-2	FH4983-20-50-3	
Time to sustained flaming	s	5	42	18	22
Observations ^a		-	-	-	
Test duration ^b	s	1805	1842	1818	1822
Mass remaining, mf	g	50.9	52.7	51.2	51.6
Mass pyrolyzed	%	62.9%	61.4%	63.2%	62.5%
Specimen mass loss ^c	kg/m ²	9.8	9.4	9.9	9.7
Specimen mass loss rate ^c	g/m ² .s	160.0	58.7	55.2	91.3
Heat release rate					
peak, \dot{q}_{\max}''	kW/m ²	219.7	95.7	107.1	140.8
average, \dot{q}_{avg}''					
Over 60 s from ignition	kW/m ²	77.6	53.4	53.6	61.5
Over 180 s from ignition	kW/m ²	36.5	25.3	31.0	31.0
Over 300 s from ignition	kW/m ²	25.7	19.2	24.2	23.0
Total heat released	MJ/m ²	34.3	23.5	28.4	28.7
Average Specific Extinction Area	m ² /kg	59.0	56.6	66.5	60.7
Effective heat of combustion ^d , $\Delta h_{c,\text{eff}}$	MJ/kg	3.5	2.5	2.8	3.0

Notes :

^a no significant observations were recorded

^b determined by * X_{O2} returning to the pretest value within 100 ppm of oxygen concentration for 10 minutes

** 30 minutes after time to sustained flaming

^c from ignition to end of test;

^d from the start of the test

+ value calculated using data beyond the official end of test time according to the test standard.

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3.2 Test results and reduced data – NCC C1.10

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA
100 g/m²

Material	Test specimens as described in Section 1 (in accordance with AS/NZS 3837)			Mean
Specimen test number	FH4983-2-50-1	FH4983-2-50-2	FH4983-2-50-3	
Time to sustained flaming s	27	40	35	34
Observations ^a	-	-	-	
Test duration ^b s	927	928	926	927
Mass remaining, mf g	40.2	40.2	40.6	40.3
Mass pyrolyzed %	58.8%	58.8%	58.4%	58.7%
Specimen mass loss ^c kg/m ²	6.5	6.4	6.4	6.4
Specimen mass loss rate ^c g/m ² .s	106.4	41.4	40.0	62.6
Heat release rate				
peak, \dot{q}_{max}'' kW/m ²	186.7	75.8	79.3	113.9
average, \dot{q}_{avg}''				
Over 60 s from ignition kW/m ²	72.0	40.6	45.6	52.7
Over 180 s from ignition kW/m ²	33.1	20.0	26.2	26.4
Over 300 s from ignition kW/m ²	23.6	16.3	22.7	20.9
Total heat released MJ/m ²	58.3	11.1	17.5	29.0
Average Specific Extinction Area m ² /kg	133.7	69.0	61.8	88.2
Effective heat of combustion ^d , $\Delta h_{c,eff}$ MJ/kg	9.0	1.7	2.7	4.5

Notes :

^a no significant observations were recorded

^b determined by * average mass loss over 1 minute dropped below 150 g/m²
 ** two minutes after flameout or other signs of combustion cease
 *** 60 minutes have elapsed

^c from ignition to end of test;

^d from the start of the test

+ value calculated using data beyond the official end of test time according to the test standard.

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**Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA
100 g/m² Polyurethane finish 2 coats 30 g/m²**

Material	Test specimens as described in Section 1 (in accordance with AS/NZS 3837)			Mean
Specimen test number	FH4983-15-50-1	FH4983-15-50-2	FH4983-15-50-3	
Time to sustained flaming s	11	17	8	12
Observations ^a	-	-	-	
Test duration ^b s	910	1036	980	975
Mass remaining, mf g	36.4	35.2	35.5	35.7
Mass pyrolyzed %	62.9%	63.1%	64.0%	63.3%
Specimen mass loss ^c kg/m ²	7.0	6.8	7.1	7.0
Specimen mass loss rate ^c g/m ² .s	114.4	111.5	118.7	114.9
Heat release rate				
peak, \dot{q}_{max}'' kW/m ²	202.5	246.9	211.9	220.5
average, \dot{q}_{avg}''				
Over 60 s from ignition kW/m ²	73.0	79.9	72.0	75.0
Over 180 s from ignition kW/m ²	33.0	34.1	32.6	33.2
Over 300 s from ignition kW/m ²	22.6	24.4	23.7	23.6
Total heat released MJ/m ²	45.8	45.6	44.2	45.2
Average Specific Extinction Area m ² /kg	109.4	82.8	88.4	93.5
Effective heat of combustion ^d , $\Delta h_{c,eff}$ MJ/kg	6.6	6.7	6.2	6.5

Notes :

^a no significant observations were recorded

^b determined by * average mass loss over 1 minute dropped below 150 g/m²
 ** two minutes after flameout or other signs of combustion cease
 *** 60 minutes have elapsed

^c from ignition to end of test;

^d from the start of the test

+ value calculated using data beyond the official end of test time according to the test standard.

NR not recorded



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**Prime Fireline 12 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m²
Polyurethane finish 2 coats 30 g/m²**

Material	Test specimens as described in Section 1 (in accordance with AS/NZS 3837)			Mean
Specimen test number	FH4983-16-50-1	FH4983-16-50-2	FH4983-16-50-3	
Time to sustained flaming s	6	33	30	23
Observations ^a	-	-	-	
Test duration ^b s	928	950	934	937
Mass remaining, mf g	40.2	38.9	39.1	39.4
Mass pyrolyzed %	58.0%	59.4%	59.8%	59.1%
Specimen mass loss ^c kg/m ²	6.3	6.4	6.5	6.4
Specimen mass loss rate ^c g/m ² .s	51.4	36.5	38.8	42.2
Heat release rate				
peak, \dot{q}_{max}'' kW/m ²	95.6	102.9	105.9	101.5
average, \dot{q}_{avg}''				
Over 60 s from ignition kW/m ²	29.6	65.9	62.1	52.5
Over 180 s from ignition kW/m ²	27.6	33.5	30.4	30.5
Over 300 s from ignition kW/m ²	21.6	26.2	23.5	23.8
Total heat released MJ/m ²	13.8	17.5	15.1	15.4
Average Specific Extinction Area m ² /kg	73.7	122.6	124.0	106.8
Effective heat of combustion ^d , $\Delta h_{c,eff}$ MJ/kg	2.2	2.7	2.3	2.4

Notes :

^a no significant observations were recorded

^b determined by * average mass loss over 1 minute dropped below 150 g/m²
** two minutes after flameout or other signs of combustion cease
*** 60 minutes have elapsed

^c from ignition to end of test;

^d from the start of the test

+ value calculated using data beyond the official end of test time according to the test standard.

NR not recorded

**Prime Fireline 18 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m²
Polyurethane finish 2 coats 30 g/m²**



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Material	Test specimens as described in Section 1 (in accordance with AS/NZS 3837)			Mean
Specimen test number	FH4983-20-50-1	FH4983-20-50-2	FH4983-20-50-3	
Time to sustained flaming s	5	42	18	22
Observations ^a	-	-	-	
Test duration ^b s	1116	1210	1420	1249
Mass remaining, mf g	67.3	66.0	55.5	62.9
Mass pyrolyzed %	50.9%	51.6%	60.1%	54.2%
Specimen mass loss ^c kg/m ²	7.9	7.9	9.4	8.4
Specimen mass loss rate ^c g/m ² .s	129.6	49.2	52.4	77.1
Heat release rate				
peak, \dot{q}_{\max}'' kW/m ²	219.7	95.7	107.1	140.8
average, \dot{q}_{avg}''				
Over 60 s from ignition kW/m ²	77.6	53.4	53.6	61.5
Over 180 s from ignition kW/m ²	36.5	25.3	31.0	31.0
Over 300 s from ignition kW/m ²	25.7	19.2	24.2	23.0
Total heat released MJ/m ²	42.9	13.3	20.8	25.7
Average Specific Extinction Area m ² /kg	79.1	63.4	67.9	70.1
Effective heat of combustion ^d , $\Delta h_{c,\text{eff}}$ MJ/kg	5.4	1.7	2.2	3.1

Notes :

^a no significant observations were recorded

^b determined by * average mass loss over 1 minute dropped below 150 g/m²
 ** two minutes after flameout or other signs of combustion cease
 *** 60 minutes have elapsed

^c from ignition to end of test;

^d from the start of the test

+ value calculated using data beyond the official end of test time according to the test standard.

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4. SUMMARY



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The test standards require that the mean heat release rate (HRR) readings over the first 180 s from ignition for the three specimens should differ by no more than 10% of the arithmetic mean of the three readings. In the event of this criterion not being met, a further three specimens are required to be tested.

4.1 FH4983-2 Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m²

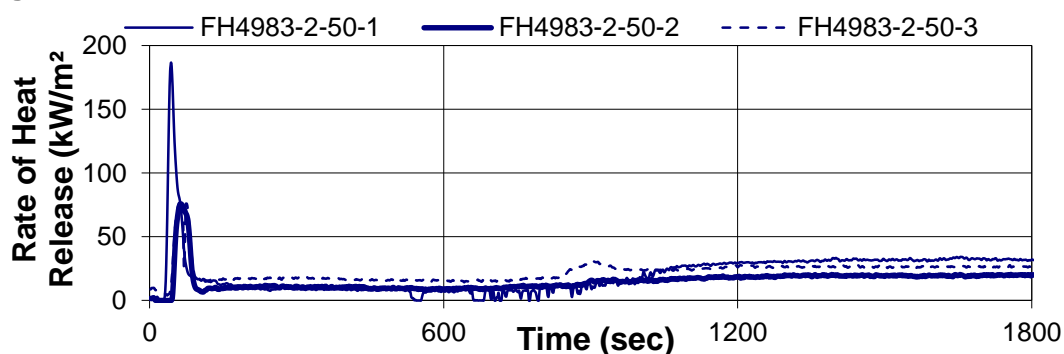
Specimen ID	Average HRR over 180s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH4983-2-50-1	33.1	26.4	25.3%
FH4983-2-50-2	20.0		-24.5%
FH4983-2-50-3	26.2		-0.8%

The above table identifies one of the specimens exposed to 50 kW/m² irradiance met the acceptance criteria and the other two exceeded the 10% limitation. Although two of the specimens were outside of the variability criteria of the test standard, the same NZBC and NCC Group Classifications for each specimen. A further set of three tests as required by the test standard was deemed not to be necessary and would not be expected to lead to an alteration of the classification.

The report summary for the specimens as described in Section 1, exposed to an irradiance of 50 kW/m² is:

Mean Specimen thickness (mm)	Irradiance (kW/m ²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m ²)	Average Specific Extinction Area (m ² /kg)
12.0	50	34	113.9(NZBC) 113.9(NCC)	69.3NZBC) 88.2(NCC)

Figure 5 Rate of heat release verses time



4.2 FH4983-15 Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

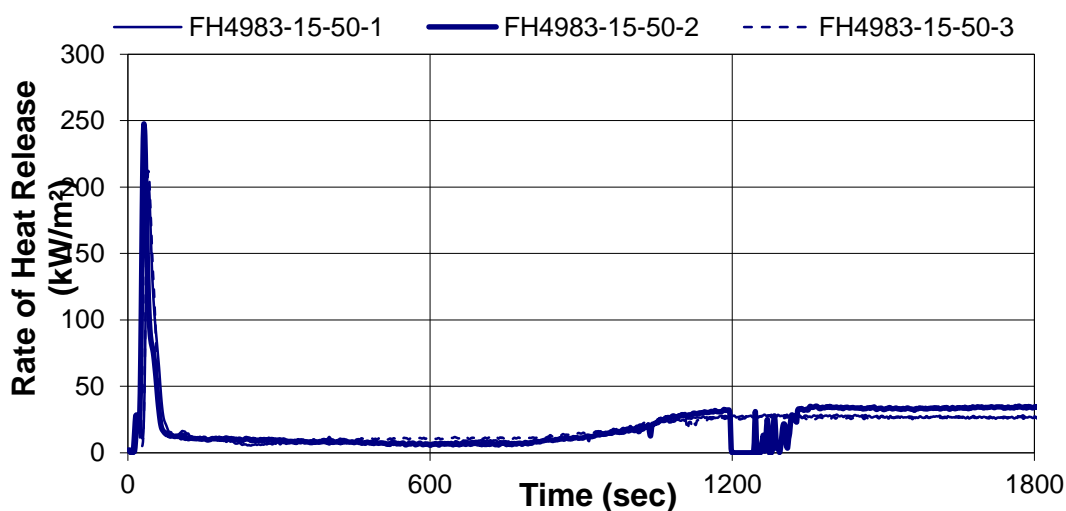
Specimen ID	Average HRR over 180s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH4983-15-50-1	33.0	33.2	-0.6%
FH4983-15-50-2	34.1		2.6%
FH4983-15-50-3	32.6		-2.0%

The above table identifies all of the specimens exposed to 50 kW/m² irradiance met the acceptance criteria.

The report summary for the specimens as described in Section 1, exposed to an irradiance of 50 kW/m² is:

Mean Specimen thickness (mm)	Irradiance (kW/m ²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m ²)	Average Specific Extinction Area (m ² /kg)
12.1	50	12	220.5(NZBC) 220.5(NCC)	82.4(NZBC) 93.5(NCC)

Figure 6 Rate of heat release verses time



4.3 FH4983-16 Prime Fireline 12 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

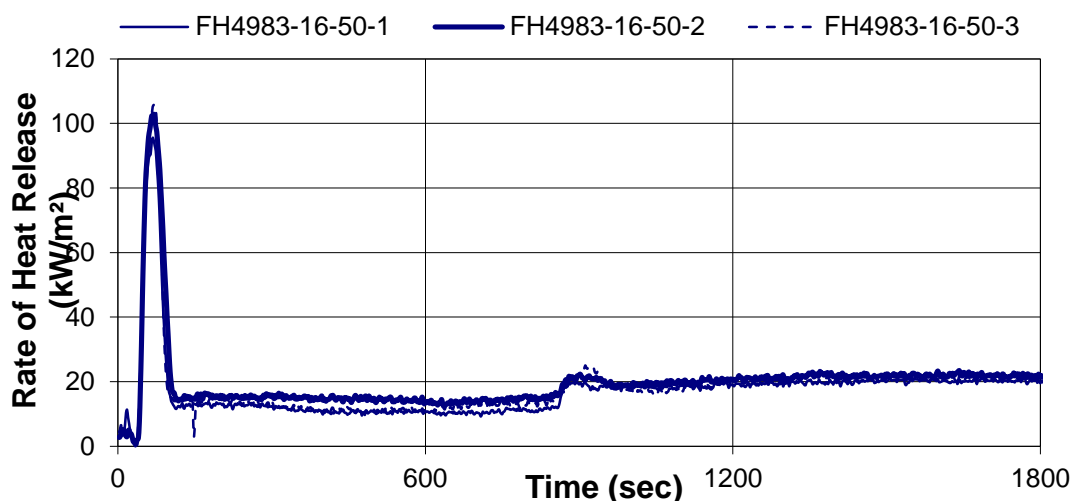
Specimen ID	Average HRR over 180s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH4983-16-50-1	27.6	30.5	-9.6%
FH4983-16-50-2	33.5		9.9%
FH4983-16-50-3	30.4		-0.3%

The above table identifies all of the specimens exposed to 50 kW/m² irradiance met the acceptance criteria.

The report summary for the specimens as described in Section 1, exposed to an irradiance of 50 kW/m² is:

Mean Specimen thickness (mm)	Irradiance (kW/m ²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m ²)	Average Specific Extinction Area (m ² /kg)
12.2	50	23	101.5(NZBC) 101.5(NCC)	98.8(NZBC) 106.8(NCC)

Figure 7 Rate of heat release verses time



4.4 FH4983-20 Prime Fireline 18 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

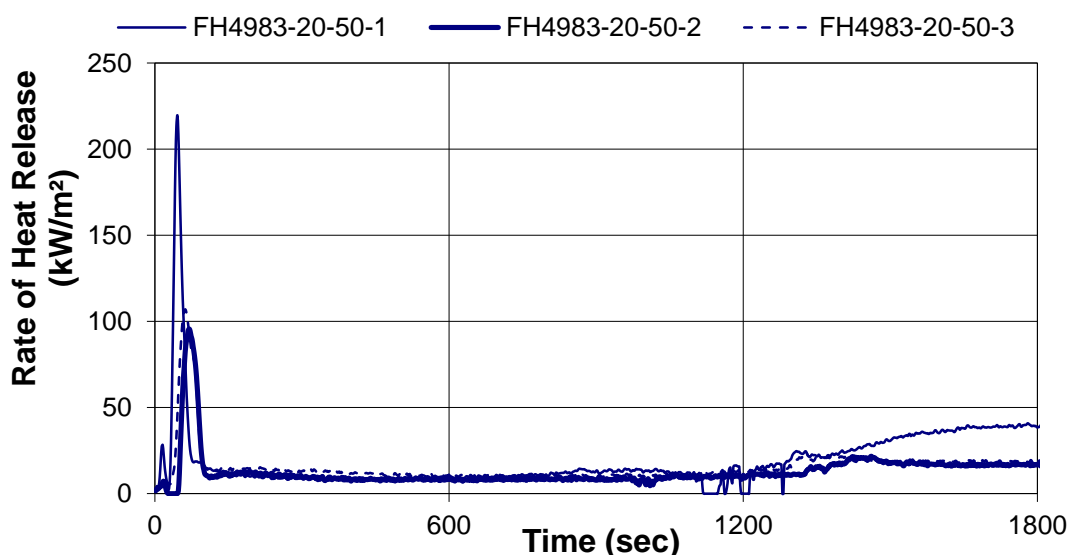
Specimen ID	Average HRR over 180s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH4983-20-50-1	36.5	31.0	18.0%
FH4983-20-50-2	25.3		-18.3%
FH4983-20-50-3	31.0		0.3%

The above table identifies one of the specimens exposed to 50 kW/m² irradiance met the acceptance criteria and the other two exceeded the 10% limitation. Although two of the specimens were outside of the variability criteria of the test standard, the same NZBC and NCC Group Classifications for each specimen. A further set of three tests as required by the test standard was deemed not to be necessary and would not be expected to lead to an alteration of the classification.

The report summary for the specimens as described in Section 1, exposed to an irradiance of 50 kW/m² is:

Mean Specimen thickness (mm)	Irradiance (kW/m ²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m ²)	Average Specific Extinction Area (m ² /kg)
12.2	50	22	140.8(NZBC) 140.8(NCC)	60.7(NZBC) 70.1(NCC)

Figure 8 Rate of heat release versus time



5. DISCUSSION

Ten additional variations of the panel systems to the above four fully tested specimens were submitted and each was subjected to a single indicative test in accordance with the test standards.

The results were analysed in accordance with the respective Group Classification requirements and these are summarised in the tables in Sections 10.1 and 10.2 for NZBC Verification Method C/VM2 Appendix A and NCC Volume One Specification C1.10 respectively.

The details of the individual sample preparations are detailed in Section 11.

The results from the indicative testing illustrated trends confirming that the raw MDF achieves a Group 1 classification at the low end of the spectrum in terms of heat release and the additions of surface preparations generally increases the heat release until a Group 2 classification is indicated.

The results from the full testing of three samples indicated that those preparations place the classifications close to the boundary between Groups 1 and 2 performance. The majority of the indicative (single) tests confirmed the performance was clearly in the Group 1 classification category by a comfortable margin. The only exception was the FH4983-19-50-1 sample which was classified as a Group 2 and this was consistent with the preparation of the FH4983-15-50-1(to 3) where the common surface preparation was 'Sapele and polyurethane'.



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BRANZ Ref	Base MDF	Surface finish	Polyurethane	NZBC	NCC
FH4983- 1-50-1	Reddish brown, 12 mm	Pine	No	1-S	1, SEA<250
FH4983- 2-50-2	Reddish brown, 12 mm	Sapele	No		
FH4983- 12-50-2	Reddish brown, 12 mm	paint black	No		
FH4983- 13-50-1	Reddish brown, 12 mm	paint white	No		
FH4983-14-50-1	Reddish brown, 12 mm	raw	No		
FH4983-16-50-1	Reddish brown, 12 mm	Pine	Yes		
FH4983-17-50-1	Reddish brown, 12 mm	Melamine white	No		
FH4983-18-50-2	Reddish brown, 12 mm	Melamine black	No		
FH4983-20-50-1	Reddish brown, 18 mm	Pine	Yes		
FH5128-21-50-1	Reddish brown, 18 mm	Melamine white	No		
FH5128-22-50-1	Reddish brown, 18 mm	Melamine black	No		
FH4983-23-50-1	Reddish brown, 18 mm	raw	No		
FH4983-15-50-2	Reddish brown, 12 mm	Sapele	Yes	2-S	2, SEA<250
FH5129-19-50-1	Reddish brown, 18 mm	Sapele	Yes		



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6. CLASSIFICATION IN ACCORDANCE WITH NZBC VERIFICATION METHOD C/VM2 APPENDIX A

The following classification has been assessed in accordance with the New Zealand Building Code Verification Method C/VM2 Appendix A: Establishing Group Numbers for lining materials. Calculations were carried out according to section A1.3 for predicting a material's group number for each specimen tested. It states that "If a different classification group is obtained for different specimens tested, then the highest (worst) classification for any specimen must be taken as the final classification for that material." The classification for the specimens as described in Section 1 is as follows:

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m²

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	1-S	1-S	1-S	1-S

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	1-S	2-S	2-S	2-S

Prime Fireline 12 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	1-S	1-S	1-S	1-S

Prime Fireline 18 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	1-S	1-S	1-S	1-S



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7. CONCLUSION

The cone calorimeter testing was carried out on the four specimen types as described in Section 1. For the purposes of compliance with the NZBC Verification Method C/VM2 Appendix A, the following classification is considered applicable to the material as described in Section 1, and others as discussed in Section 5.

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m²

Group Number Classification	1-S
-----------------------------	-----

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

Group Number Classification	2-S
-----------------------------	-----

Prime Fireline 12 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

Group Number Classification	1-S
-----------------------------	-----

Prime Fireline 18 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

Group Number Classification	1-S
-----------------------------	-----

8. CLASSIFICATION IN ACCORDANCE WITH NCC VOLUME ONE SPECIFICATION C1.10

The following classification has been assessed in accordance with the National Construction Code (NCC) Volume One Specification C1.10 of the Building Code of Australia (BCA). Calculations were carried out according to Specification A2.4. It states that “where a different classification group is obtained for different specimens tested, then the highest (worst) classification for any specimen must be taken as the final classification for that material.” The classification for the specimens as described in Section 1 is as follows:

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m²

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	1	1	1	1



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The average specific extinction area for the sample is less than the 250 m²/kg limit and therefore it may be used in buildings with or without a sprinkler system complying with Specification E1.5 in accordance with Specification C1.10 Table 2.

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	1	2	2	2

The average specific extinction area for the sample is less than the 250 m²/kg limit and therefore it may be used in buildings with or without a sprinkler system complying with Specification E1.5 in accordance with Specification C1.10 Table 2.

Prime Fireline 12 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	1	1	1	1

The average specific extinction area for the sample is less than the 250 m²/kg limit and therefore it may be used in buildings with or without a sprinkler system complying with Specification E1.5 in accordance with Specification C1.10 Table 2.

Prime Fireline 18 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	1	1	1	1

The average specific extinction area for the sample is less than the 250 m²/kg limit and therefore it may be used in buildings with or without a sprinkler system complying with Specification E1.5 in accordance with Specification C1.10 Table 2.



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9. CONCLUSION

The cone calorimeter testing was carried out on the four specimen types as described in Section 1. For the purposes of compliance with the NCC Volume One Specification C1.10 for the Classification of Fire Performance of Wall and Ceiling Lining Materials, the following classification is considered applicable to the material as described in Section 1, and others as discussed in Section 5.

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m²

Group Number Classification	1
The average specific extinction area was less than the 250 m ² /kg limit.	

Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

Group Number Classification	2
The average specific extinction area was less than the 250 m ² /kg limit.	

Prime Fireline 12 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

Group Number Classification	1
The average specific extinction area was less than the 250 m ² /kg limit.	

Prime Fireline 18 mm (reddish brown) 0.4 mm pine veneer, glued PVA 100 g/m² Polyurethane finish 2 coats 30 g/m²

Group Number Classification	1
The average specific extinction area was less than the 250 m ² /kg limit.	



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10. SINGLE INDICATIVE TEST RESULTS

10.1 In accordance with NZBC Verification Method C/VM2 Appendix A

Ref. no	Number of specimens tested	Time to Ignition (s)	Duration of test (s)	Peak Heat Release Rate (kW/m ²)	Average Specific Extinction Area (m ² /kg)	Total Heat Release Rate (MJ/m ²)	Indicated Group No.
FH4983- 1-50-1	1	48	1848	98	55	29	1-S
FH4983- 2-50-2	1	40	1840	176	63	28	1-S
FH4983- 12-50-2	1	21	1821	71	53	26	1-S
FH4983- 13-50-1	1	29	1829	56	38	15	1-S
FH4983-14-50-1	1	750	2550	31	98	50	1-S
FH4983-15-50-2	1	17	1817	247	73	36	2-S
FH4983-16-50-1	1	6	1806	96	70	31	1-S
FH4983-17-50-1	1	38	1838	46	76	32	1-S
FH4983-18-50-2	1	37	1837	22	63	25	1-S
FH5129-19-50-1	1	11	1811	220	67	29	2-S
FH4983-20-50-1	1	5	1805	220	59	34	1-S
FH5128-21-50-1	1	78	1878	27	71	25	1-S
FH5128-22-50-1	1	28	1828	93	51	32	1-S
FH4983-23-50-1	1	1400	3200	21	68	44	1-S

Shaded – Single result only, as reported in Section 3.

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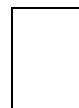
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10.2 In accordance with NCC Volume One Specification C1.10

Ref. no	Number of specimens tested	Time to Ignition (s)	Duration of test (s)	Peak Heat Release Rate (kW/m ²)	Average Specific Extinction Area (m ² /kg)	Total Heat Release Rate (MJ/m ²)	Indicated Group No.
FH4983- 1-50-1	1	48	930	98	65	12	1
FH4983- 2-50-2	1	40	928	76	69	11	1
FH4983- 12-50-2	1	21	856	71	60	10	1
FH4983- 13-50-1	1	29	888	56	42	7	1
FH4983-14-50-1	1	750	810	23	92	4	1
FH4983-15-50-2	1	17	1036	247	83	46	2
FH4983-16-50-1	1	6	928	96	74	14	1
FH4983-17-50-1	1	38	766	46	81	39	1
FH4983-18-50-2	1	37	908	22	70	8	1
FH5129-19-50-1	1	11	724	220	67	10	2
FH4983-20-50-1	1	5	1116	96	63	13	1
FH5128-21-50-1	1	78	3600	27	124	60	1
FH5128-22-50-1	1	28	802	93	48	11	1
FH4983-23-50-1	1	1400	3600	21	71	52	1

Shaded – Single result only, as reported in Section 3.

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11. CLIENT SPECIFIED SAMPLE PREPARATIONS AND COVERAGE RATES

Ref No.	Base MDF	Surface finish	Polyur ethane	Details of composition or construction
FH4983- 1-50-1	Reddish brown, 12 mm	Pine	No	Prime Fireline 12 mm (reddish brown) 0.4 mm Pine veneer, glued PVA 100 g/m ²
FH4983- 2-50-1	Reddish brown, 12 mm	Sapele	No	Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m ²
FH4983- 12-50-2	Reddish brown, 12 mm	paint black	No	Prime Fireline 12 mm (reddish brown) 2 coats of Mirotone 1 pack black @ 40 g/m ²
FH4983- 13-50-1	Reddish brown, 12 mm	paint white	No	Prime Fireline 12 mm (reddish brown) 2 coats of Mirotone 1 pack white @ 40 g/m ²
FH4983-14-50-1	Reddish brown, 12 mm	raw	No	Raw
FH4983-15-50-1	Reddish brown, 12 mm	Sapele	Yes	Prime Fireline 12 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m ² Polyurethane finish 2 coats 30 g/m ²
FH4983-16-50-1	Reddish brown, 12 mm	Pine	Yes	Prime Fireline 12 mm (reddish brown) 0.4 mm Pine veneer, glued PVA 100 g/m ² Polyurethane finish 2 coats 30 g/m ²
FH4983-17-50-1	Reddish brown, 12 mm	Melamine white	No	Prime Fireline 12 mm (reddish brown) 80 g/m ² Melamine white paper heat and pressure applied
FH4983-18-50-1	Reddish brown, 12 mm	Melamine black	No	Prime Fireline 12 mm (reddish brown) 80 g/m ² Melamine black paper heat and pressure applied
FH5129-19-50-1	Reddish brown, 18 mm	Sapele	Yes	Prime Fireline 18 mm (reddish brown) 0.4 mm Sapele veneer, glued PVA 100 g/m ² Polyurethane finish 2 coats 30 g/m ²
FH4983-20-50-1	Reddish brown, 18 mm	Pine	Yes	Prime Fireline 18 mm (reddish brown) 0.4 mm Pine veneer, glued PVA 100 g/m ² Polyurethane finish 2 coats 30 g/m ²
FH5128-21-50-1	Reddish brown, 18 mm	Melamine white	No	Prime Fireline 18 mm (reddish brown) 80 g/m ² Melamine white paper heat and pressure applied
FH5128-22-50-1	Reddish brown, 18 mm	Melamine black	No	Prime Fireline 18 mm (reddish brown) 80 g/m ² Melamine paper black heat and pressure applied
FH4983-23-50-1	Reddish brown, 18 mm	raw	No	Raw

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