

An advisory report summarising the testing of Mitsubishi ALPOLIC NC aluminium composite panels in accordance with AS/NZS 1530.3: 1999

Advisory Report

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Client: Tamaya (trading as Network Architectural)

Commercial-in-confidence

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1 Introduction

This advisory report summarises the details and results of the AS/NZS 1530.3:1999 tests conducted on various configurations of Mitsubishi ALPOLIC NC aluminium composite panels.

2 Summary of Results

This advisory report refers to various AS/NZS 1530.3:1999 tests conducted on various configurations of Mitsubishi ALPOLIC NC aluminium composite panels. A detailed summary of the specimens and test observations is presented in Section 3 and the indices achieved from the tests are listed below.

Table 1 –Summary of AS/NZS 1530.3:1999 test results

Report No.	Specimen reference Figure No.	Product Trade Name	Specimen configuration	AS/NZS 1530.3: 1999 indices			
				Ignitability Index	Spread of Flame Index	Heat Evolved Index	Smoke Developed Index
FNE 12860	1 Exposed face: silver (front)	Mitsubishi ALPOLIC NC	600-mm x 450-mm flat panel with 20-mm x 20-mm square section cut out	0	0	0	1
FNE 12861	2 Exposed face: silver (front)	Mitsubishi ALPOLIC NC	600-mm x 450-mm flat panel with 200-mm x 200-mm square section cut out	0	0	0	1
FNE 12863	3 Exposed face: silver (front)	Mitsubishi ALPOLIC NC	4 x panel sections with 14-mm wide vertical and horizontal joints	9	0	0	3
FNE 12889	4 Exposed face: grey (back)	Mitsubishi ALPOLIC NC	600-mm x 450-mm plain flat panel with a 20-mm x 20-mm square section cut out	0	0	0	0-1
FNE 12890	5 Exposed face: grey (back)	Mitsubishi ALPOLIC NC	600-mm x 450-mm plain flat panel with a 200-mm x 200-mm square section cut out	0	0	0	0-1

FNE 12893	6 Exposed face: silver (front)	Mitsubishi ALPOLIC NC	600-mm x 450-mm plain flat panel	0	0	0	0-1
FNE 12894	7 Exposed face: grey (back)	Mitsubishi ALPOLIC NC	600-mm x 450-mm plain flat panel	0	0	0	0-1

For a complete record of the results, refer to the referenced test reports identified in Section 3.

The test reports listed above were undertaken by CSIRO and were sponsored by Hansen Yuncken Pty Ltd. Hansen Yuncken Pty Ltd. has confirmed in writing permission to CSIRO to reference these reports and present them in this advisory report in the name of Tamaya (trading as Network Architectural).

3 Supporting Test Data

CSIRO was engaged by Hansen Yuncken Pty Ltd to conduct tests on aluminium composite panels in accordance with AS/NZS 1530.3 - 1999 for the purpose of determining the fire hazard properties of the assembly in accordance with NCC 2019 Volume 1, Schedule 6 clause 2.2 (a) on test specimens prepared in accordance with NCC 2019 Volume 1, Schedule 6 clause 2.3, as requested by the NSW Cladding Product Safety Panel (CPSP), refer to document 'Methodology for Material testing: Bonded laminate materials' issued on 11th November 2021.

3.1 CSIRO Report No. FNE 12860

Date of Test: 19 January 2022

Sponsor of the Test: Hansen Yuncken Pty Ltd

Product Trade Name: Mitsubishi ALPOLIC NC

Manufacturer: Mitsubishi Chemical Infratec Co. Ltd

The specimen was a component of the ALPOLIC NC panel which included a penetration, see Figure 1.

The Sponsor of the test prepared the specimen for testing.

Tamaya (trading as Network Architectural) described the tested specimen as an aluminium composite panel comprised of the following layers:

- Layer 1: 28-µm thick fluoropolymer coating;
- Layer 2: 0.5-mm thick aluminium alloy skin;
- Layer 3: 35-µm thick adhesive film;
- Layer 4: 3-mm thick core comprised of aluminium hydroxide (Al(OH)₃), calcium carbonate (CaCO₃) and additives.
- Layer 5: 35-µm thick adhesive film;
- Layer 6: 0.5-mm thick aluminium alloy skin;
- Layer 7: 5-µm thick polyester coating.

The aluminium alloy skin adhered to the core with an adhesive film applied at an application rate of 0.057 m²/L. The configuration of the specimen was a panel with a 20-mm x 20-mm square section cut out, offset by 100mm in the axial plane and 40 mm in the horizontal plane.

Nominal total thickness of panel: 4 mm
 Nominal total mass: 8.6 kg/m²
 Colour: Silver [face] / grey [back]

The configuration of the test specimen assembly was determined by the Sponsor of the test. CSIRO was not involved in the design of the specimen configuration, or the selection of materials used to form the test specimen.

The specimen assembly was clamped onto the test rig's backing board in four places. The front face of the assembly for the test was the silver panel with penetration in the upper left quadrant.

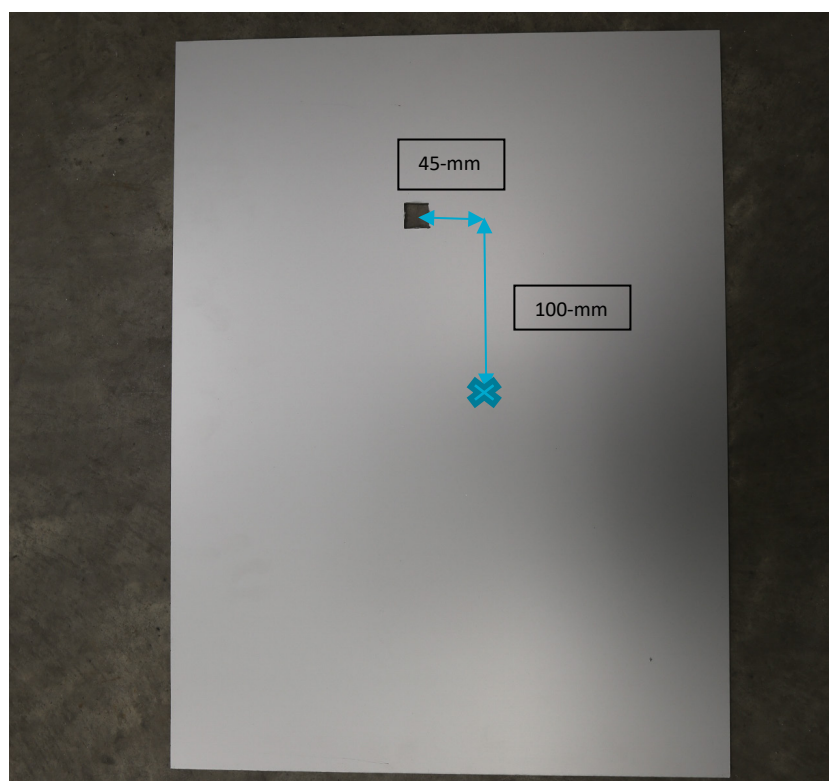


Figure 1 Aluminium composite panel test assembly

Note: Normative dimensions of penetration location.

Test Supplementary Observations

The following supplementary observations were obtained during the testing:

Clause 5.3 Supplementary Observations	Specimen under test
Number of specimens tested	Six samples
Where all specimens did not ignite, the number of specimens that did ignite	None observed
Where flashing was encountered, and ignition was based on a 10-second flash	None observed
Where all specimens did not emit a rise of 1.4 kW/m ² during the prescribed period, the number of specimens for which such rise was recorded	None observed
Any observations of associated phenomena, such as transitory flaming, melting and production of flaming droplets, or inconsistent ignition behaviour	None observed
Where the test was performed on thin flexible materials, a statement that testing materials to the flammability test (see AS 1530.2) are also relevant to the assessment of fire hazard covering this type of material	Not applicable
Variable behaviour between different colours or patterns within a set of specimens of the same material or component	Not applicable



Figure 2 Aluminium composite panel test sample, ignition

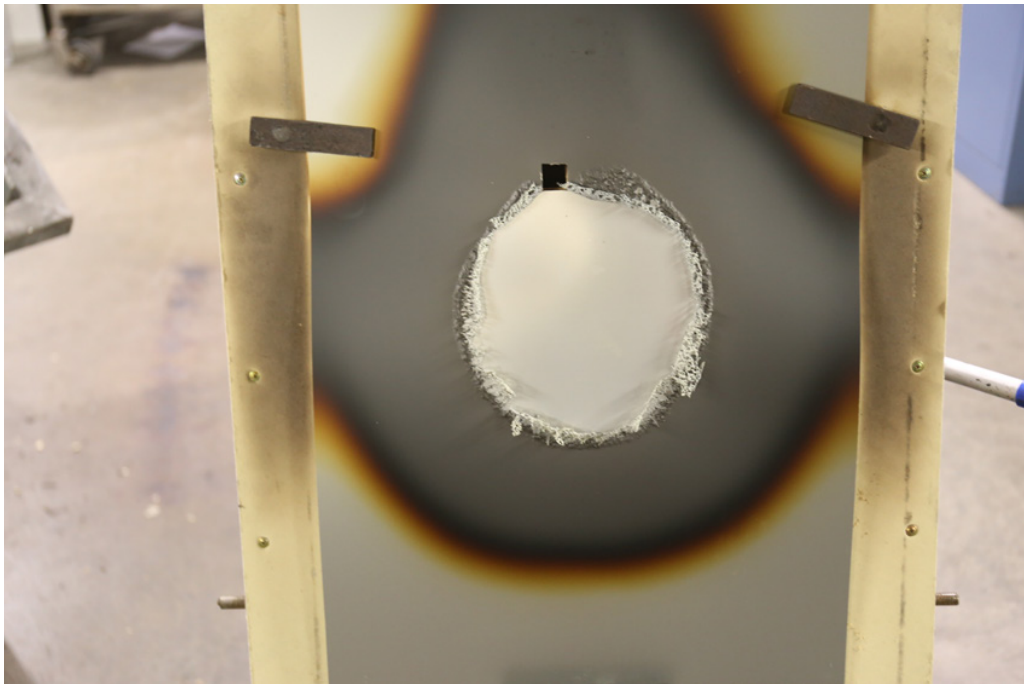


Figure 3 Aluminium composite panel test sample, completion of the test

3.2 CSIRO Report No. FNE 12861

Date of Test: 20 January 2022

Sponsor of the Test: Hansen Yunken Pty Ltd

Product Trade Name: Mitsubishi ALPOLIC NC

Manufacturer: Mitsubishi Chemical Infratec Co. Ltd

The specimen was a component of the ALPOLIC NC panel which included a penetration, see Figure 4.

The Sponsor of the test prepared the specimen for testing.

Tamaya (trading as Network Architectural) described the tested specimen as an aluminium composite panel comprised of the following layers:

- Layer 1: 28- μm thick fluoropolymer coating;
- Layer 2: 0.5-mm thick aluminium alloy skin;
- Layer 3: 35- μm thick adhesive film;
- Layer 4: 3-mm thick core comprised of aluminium hydroxide ($\text{Al}(\text{OH})_3$), calcium carbonate (CaCO_3) and additives.
- Layer 5: 35- μm thick adhesive film;
- Layer 6: 0.5-mm thick aluminium alloy skin;
- Layer 7: 5- μm thick polyester coating.

The aluminium alloy skin adhered to the core with an adhesive film applied at an application rate of $0.057 \text{ m}^2/\text{L}$. The configuration of the specimen was a panel with a 200-mm x 200-mm square section cut out, offset by 50 mm in the axial plane and 100 mm in the horizontal plane.

Nominal total thickness of panel: 4 mm
Nominal total mass: 8.6 kg/m^2
Colour: Silver [face] / grey [back]

The configuration of the test specimen assembly was determined by the Sponsor of the test. CSIRO was not involved in the design of the specimen configuration, or the selection of materials used to form the test specimen.

The specimen assembly was clamped onto the test rig's backing board in four places. The front face of the assembly for the test was the silver panel with penetration in the lower left quadrant.

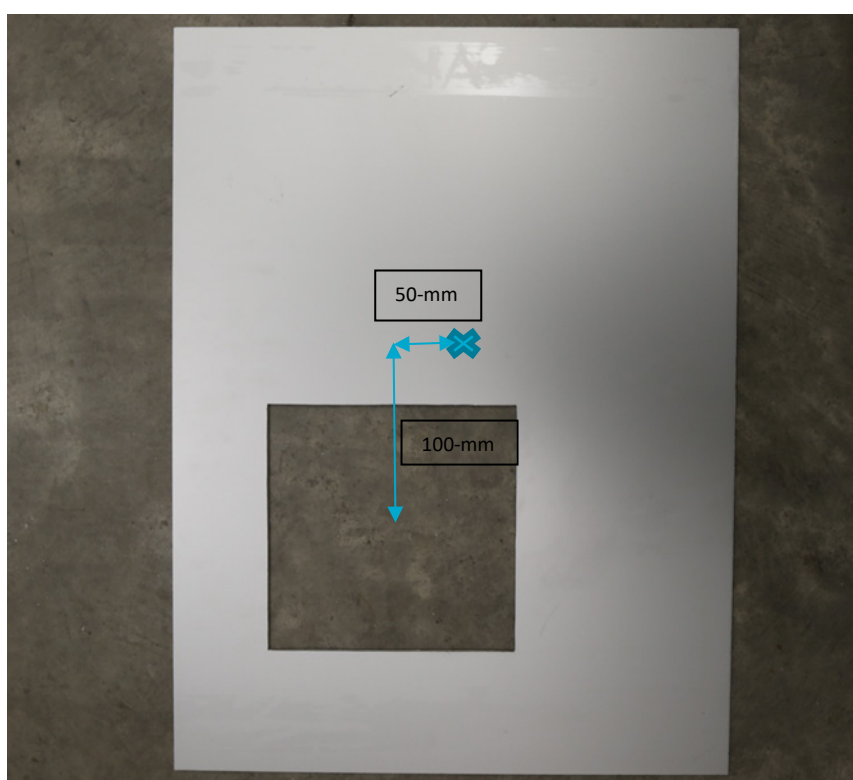


Figure 4 Aluminium composite panel test assembly

Note: Normative dimensions of penetration location.

Test Supplementary Observations

The following supplementary observations were obtained during the testing:

Clause 5.3 Supplementary Observations	Specimen under test
Number of specimens tested	Six samples
Where all specimens did not ignite, the number of specimens that did ignite	None observed
Where flashing was encountered, and ignition was based on a 10-second flash	None observed
Where all specimens did not emit a rise of 1.4 kW/m ² during the prescribed period, the number of specimens for which such rise was recorded	None observed
Any observations of associated phenomena, such as transitory flaming, melting and production of flaming droplets, or inconsistent ignition behaviour	None observed
Where the test was performed on thin flexible materials, a statement that testing materials to the flammability test (see AS 1530.2) are also relevant to the assessment of fire hazard covering this type of material	Not applicable
Variable behaviour between different colours or patterns within a set of specimens of the same material or component	Not applicable



Figure 5 Aluminium composite panel test sample, ignition

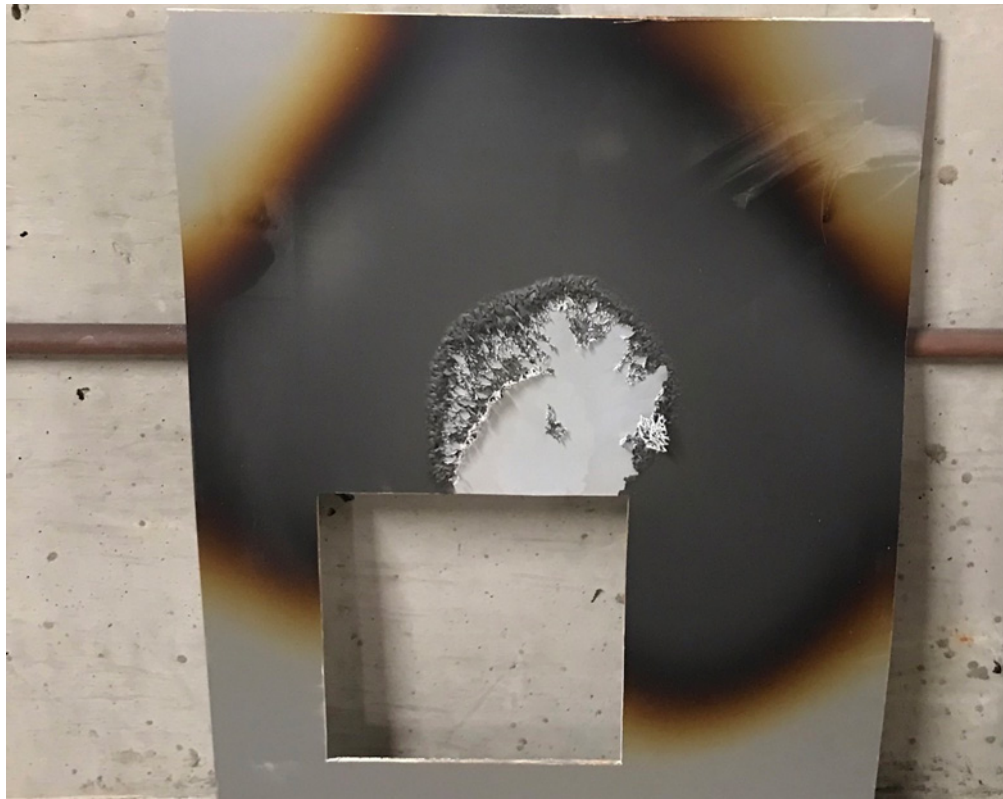


Figure 6 Aluminium composite panel test sample, completion of the test

3.3 CSIRO Report No. FNE 12863

Date of Test: 1 February 2022

Sponsor of the Test: Hansen Yunken Pty Ltd

Product Trade Name: Mitsubishi ALPOLIC NC

Manufacturer: Mitsubishi Chemical Infratec Co. Ltd

The specimen was a component of the ALPOLIC NC panel which included joints, see Figure 7.

The Sponsor of the test prepared the specimen for testing.

Tamaya (trading as Network Architectural) described the tested specimen as an aluminium composite panel comprised of the following layers:

- Layer 1: 28- μm thick fluoropolymer coating;
- Layer 2: 0.5-mm thick aluminium alloy skin;
- Layer 3: 35- μm thick adhesive film;
- Layer 4: 3-mm thick core comprised of aluminium hydroxide ($\text{Al}(\text{OH})_3$), calcium carbonate (CaCO_3) and additives.
- Layer 5: 35- μm thick adhesive film;
- Layer 6: 0.5-mm thick aluminium alloy skin;
- Layer 7: 5- μm thick polyester coating.

The aluminium alloy skin was adhered to the core with an adhesive film applied at an application rate of $0.057 \text{ m}^2/\text{L}$. The configuration of the specimen was four panel sections supported by a perimeter frame, the central vertical and horizontal joints were 14 mm in width restrained on the back face by top hats. The joints were backed with 16 mm open cell low density polyurethane foam backing rod and then filled with Prosil 41M black matt silicon to a depth of 12mm level with the face of panels.

Nominal total thickness of panel: 4 mm
Nominal total mass: 8.6 kg/m²
Colour: Silver [face] / grey [back]

The configuration of the test specimen assembly was determined by the Sponsor of the test. CSIRO was not involved in the design of the specimen configuration, or the selection of materials used to form the test specimen.

The specimen assembly was clamped onto the test rig's backing board in four places. The front face of the assembly for the test was the silver side with a silicon filled joint.

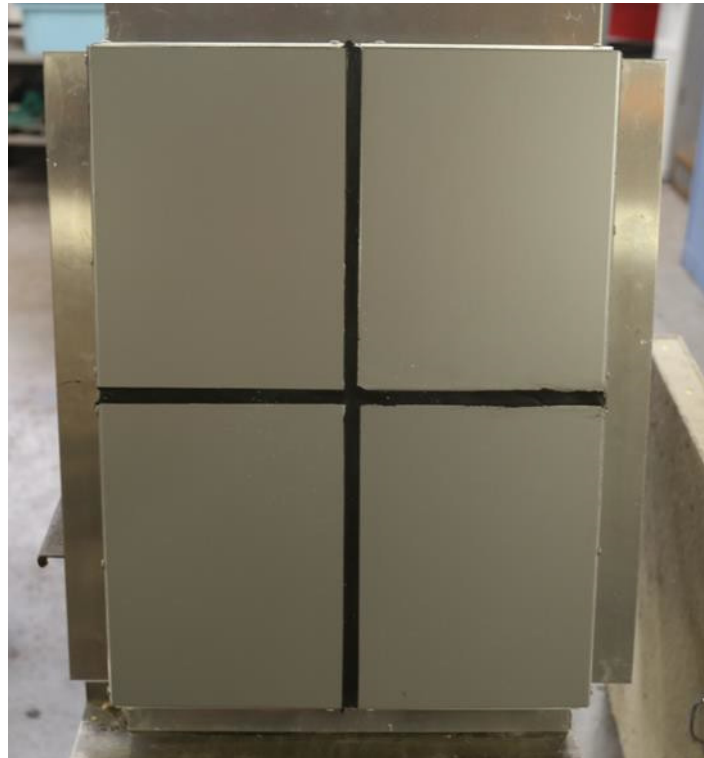


Figure 7 Aluminium composite panel test assembly

Test Supplementary Observations

The following supplementary observations were obtained during the testing:

Clause 5.3 Supplementary Observations	Specimen under test
Number of specimens tested	Six samples
Where all specimens did not ignite, the number of specimens that did ignite	All six of the samples ignited, see comment.
Where flashing was encountered, and ignition was based on a 10-second flash	Ignition observed
Where all specimens did not emit a rise of 1.4 kW/m ² during the prescribed period, the number of specimens for which such rise was recorded	None observed
Any observations of associated phenomena, such as transitory flaming, melting and production of flaming droplets, or inconsistent ignition behaviour	Melting of silicon observed
Where the test was performed on thin flexible materials, a statement that testing materials to the flammability test (see AS 1530.2) are also relevant to the assessment of fire hazard covering this type of material	Not applicable
Variable behaviour between different colours or patterns within a set of specimens of the same material or component	Not applicable

Comment: Ignition occurred on the silicon joints at the centre of the specimen, see Figure 8.



Figure 8 Aluminium composite panel test sample, ignition

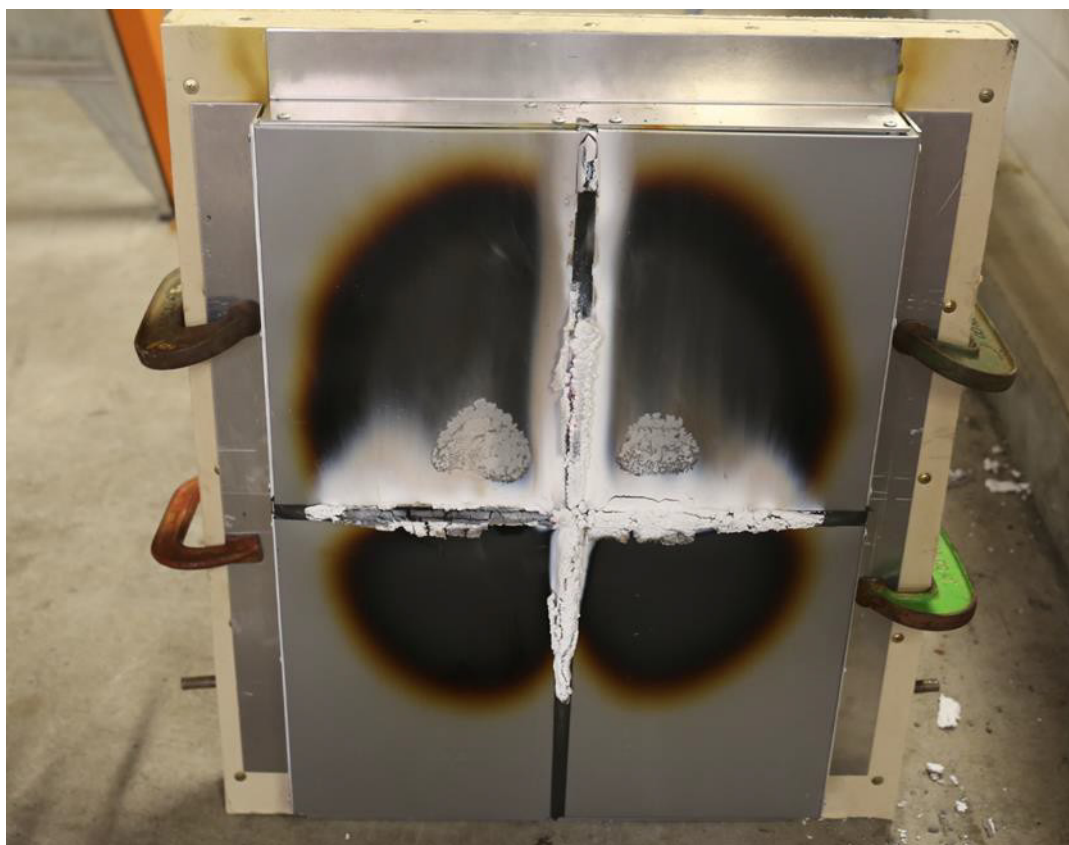


Figure 9 Aluminium composite panel test sample, completion of the test

3.4 CSIRO Report No. FNE 12889

Date of Test: 21 March 2022

Sponsor of the Test: Hansen Yunken Pty Ltd

Product Trade Name: Mitsubishi ALPOLIC NC

Manufacturer: Mitsubishi Chemical Infratec Co. Ltd

The specimen was a component of the ALPOLIC NC panel which included a penetration, see Figure 10.

The Sponsor of the test prepared the specimen for testing.

Tamaya (trading as Network Architectural) described the tested specimen as an aluminium composite panel comprised of the following layers:

- Layer 1: 28- μ m thick fluoropolymer coating;
- Layer 2: 0.5-mm thick aluminium alloy skin;
- Layer 3: 35- μ m thick adhesive film;
- Layer 4: 3-mm thick core comprised of aluminium hydroxide ($\text{Al}(\text{OH})_3$), calcium carbonate (CaCO_3) and additives.
- Layer 5: 35- μ m thick adhesive film;
- Layer 6: 0.5-mm thick aluminium alloy skin;
- Layer 7: 5- μ m thick polyester coating.

The aluminium alloy skin was adhered to the core with an adhesive film applied at an application rate of 0.057 m^2/L . The configuration of the specimen was a panel with a 20-mm x 20-mm square section cut out, offset by 150-mm in the axial plane along the centre line of the panel.

Nominal total thickness of panel: 4 mm

Nominal total mass: 8.6 kg/m^2

Colour: Silver [face] / grey [back]

The configuration of the test specimen assembly was determined by the Sponsor of the test. CSIRO was not involved in the design of the specimen configuration, or the selection of materials used to form the test specimen.

The specimen assembly was clamped onto the test rig's backing board in four places. The exposed face of the assembly for the test was the grey (back) panel with penetration in the upper middle quadrant.

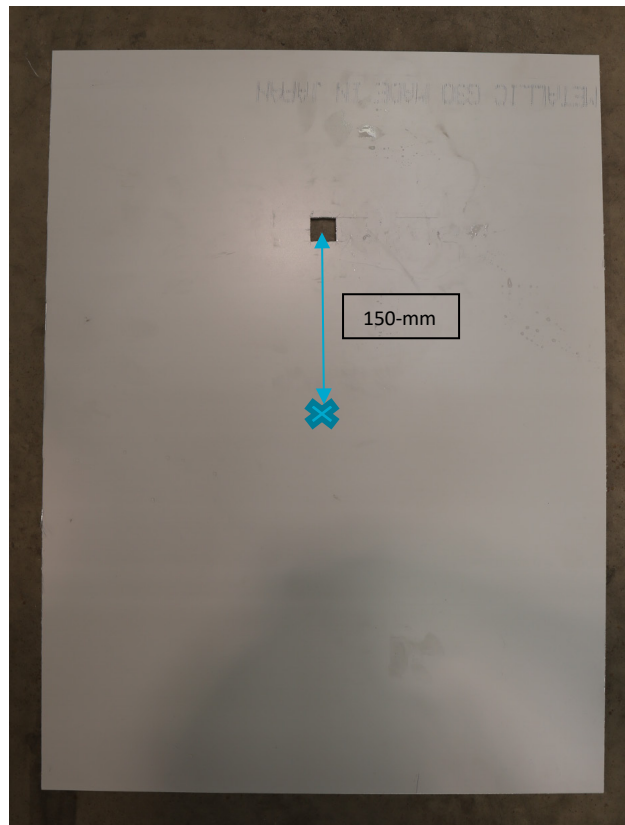


Figure 10 Aluminium composite panel test assembly

Note: Normative dimensions of penetration location.

Test Supplementary Observations

The following supplementary observations were obtained during the testing:

Clause 5.3 Supplementary Observations	Specimen under test
Number of specimens tested	Six samples
Where all specimens did not ignite, the number of specimens that did ignite	None observed
Where flashing was encountered, and ignition was based on a 10-second flash	None observed
Where all specimens did not emit a rise of 1.4 kW/m ² during the prescribed period, the number of specimens for which such rise was recorded	None observed
Any observations of associated phenomena, such as transitory flaming, melting and production of flaming droplets, or inconsistent ignition behaviour	None observed
Where the test was performed on thin flexible materials, a statement that testing materials to the flammability test (see AS 1530.2) are also relevant to the assessment of fire hazard covering this type of material	Not applicable
Variable behaviour between different colours or patterns within a set of specimens of the same material or component	Not applicable

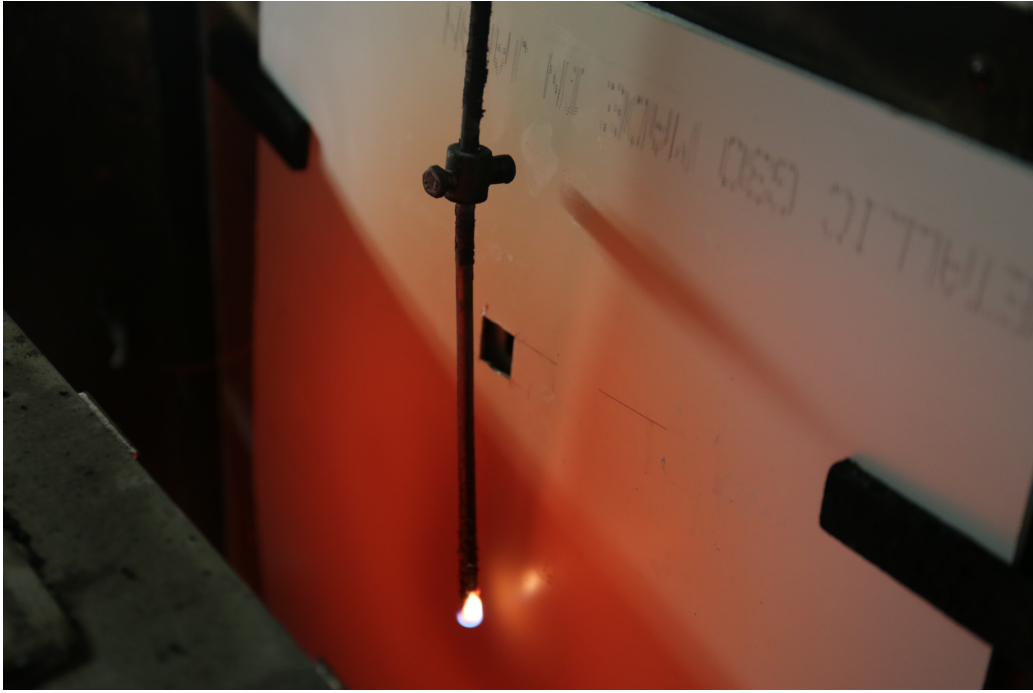


Figure 11 Aluminium composite panel test sample, ignition

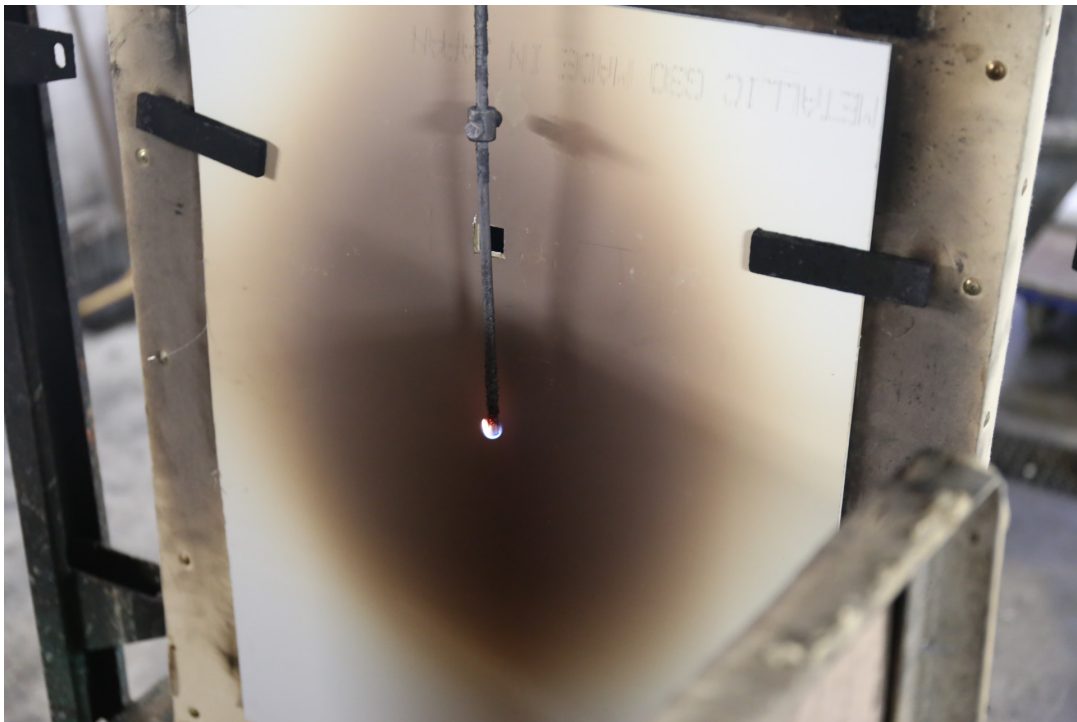


Figure 12 Aluminium composite panel test sample, completion of the test

3.5 CSIRO Report No. FNE 12890

Date of Test: 22 March 2022

Sponsor of the Test: Hansen Yunken Pty Ltd

Product Trade Name: Mitsubishi ALPOLIC NC

Manufacturer: Mitsubishi Chemical Infratec Co. Ltd

The specimen was a component of the ALPOLIC NC panel which included a penetration, see Figure 13.

The Sponsor of the test prepared the specimen for testing.

Tamaya (trading as Network Architectural) described the tested specimen as an aluminium composite panel comprised of the following layers:

- Layer 1: 28- μ m thick fluoropolymer coating;
- Layer 2: 0.5-mm thick aluminium alloy skin;
- Layer 3: 35- μ m thick adhesive film;
- Layer 4: 3-mm thick core comprised of aluminium hydroxide ($\text{Al}(\text{OH})_3$), calcium carbonate (CaCO_3) and additives.
- Layer 5: 35- μ m thick adhesive film;
- Layer 6: 0.5-mm thick aluminium alloy skin;
- Layer 7: 5- μ m thick polyester coating.

The aluminium alloy skin was adhered to the core with an adhesive film applied at an application rate of $0.057 \text{ m}^2/\text{L}$. The configuration of the specimen was a panel with a 200-mm x 200-mm square section cut out, offset by 50 mm in the axial plane and 100 mm in the horizontal plane.

Nominal total thickness of panel:	4 mm
Nominal total mass:	8.6 kg/m^2
Colour:	Silver [face] / grey [back]

The configuration of the test specimen assembly was determined by the Sponsor of the test. CSIRO was not involved in the design of the specimen configuration, or the selection of materials used to form the test specimen.

The specimen assembly was clamped onto the test rig's backing board in four places. The exposed face of the assembly for the test was the grey (back) panel with penetration in the lower left quadrant.

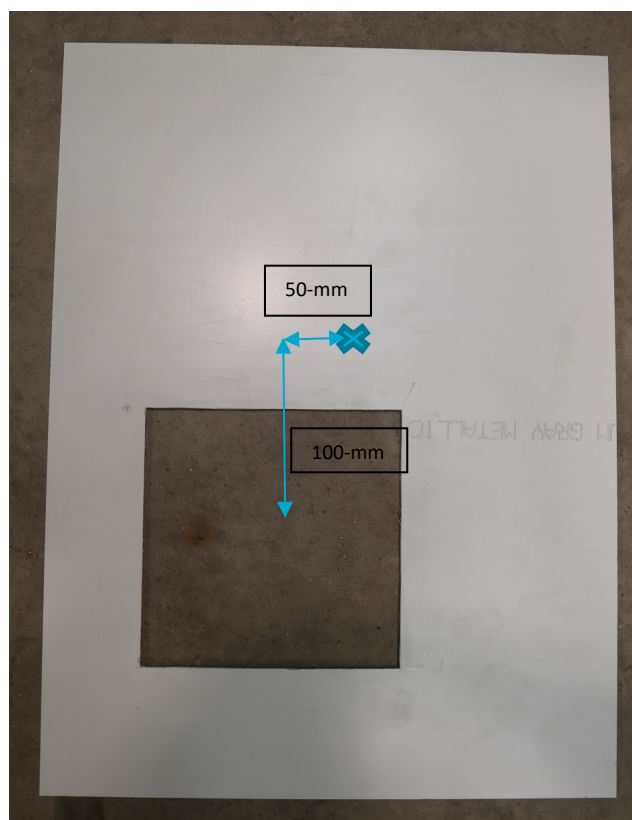


Figure 13 Aluminium composite panel test assembly

Test Supplementary Observations

The following supplementary observations were obtained during the testing:

Clause 5.3 Supplementary Observations	Specimen under test
Number of specimens tested	Six samples
Where all specimens did not ignite, the number of specimens that did ignite	None observed
Where flashing was encountered, and ignition was based on a 10-second flash	None observed
Where all specimens did not emit a rise of 1.4 kW/m ² during the prescribed period, the number of specimens for which such rise was recorded	None observed
Any observations of associated phenomena, such as transitory flaming, melting and production of flaming droplets, or inconsistent ignition behaviour	None observed
Where the test was performed on thin flexible materials, a statement that testing materials to the flammability test (see AS 1530.2) are also relevant to the assessment of fire hazard covering this type of material	Not applicable
Variable behaviour between different colours or patterns within a set of specimens of the same material or component	Not applicable



Figure 14 Aluminium composite panel test sample, ignition

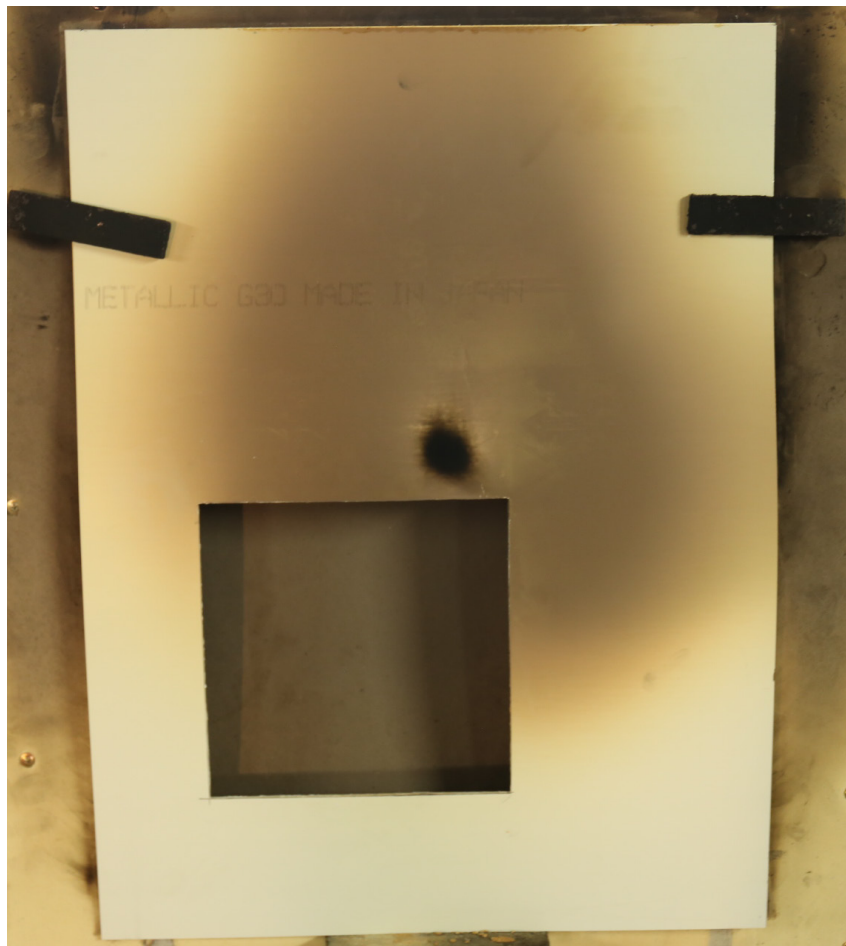


Figure 15 Aluminium composite panel test sample, completion of the test

3.6 CSIRO Report No. FNE 12893

Date of Test: 24 March 2022

Sponsor of the Test: Hansen Yunken Pty Ltd

Product Trade Name: Mitsubishi ALPOLIC NC

Manufacturer: Mitsubishi Chemical Infratec Co. Ltd

The configuration of the test specimen assembly was a 600-mm x 450-mm plain panel for the test, see Figure 16.

The Sponsor of the test prepared the specimen for testing.

Tamaya (trading as Network Architectural) described the tested specimen as an aluminium composite panel comprised of the following layers:

- Layer 1: 28- μ m thick fluoropolymer coating;
- Layer 2: 0.5-mm thick aluminium alloy skin;
- Layer 3: 35- μ m thick adhesive film;
- Layer 4: 3-mm thick core comprised of aluminium hydroxide ($\text{Al}(\text{OH})_3$), calcium carbonate (CaCO_3) and additives.
- Layer 5: 35- μ m thick adhesive film;
- Layer 6: 0.5-mm thick aluminium alloy skin;
- Layer 7: 5- μ m thick polyester coating.

The aluminium alloy skin was adhered to the core with an adhesive film applied at an application rate of 0.057 L/m².

Nominal total thickness of panel:	4 mm
Nominal total mass:	8.6 kg/m ²
Colour:	Silver [face] / grey [back]

The configuration of the test specimen assembly was a 600-mm x 450-mm plain panel and was determined by the Sponsor of the test. CSIRO was not involved in the design of the specimen configuration, or the selection of materials used to form the test specimen.

The specimen assembly was clamped onto the test rig's backing board in four places. The exposed face of the assembly for the test was the silver (face) panel.

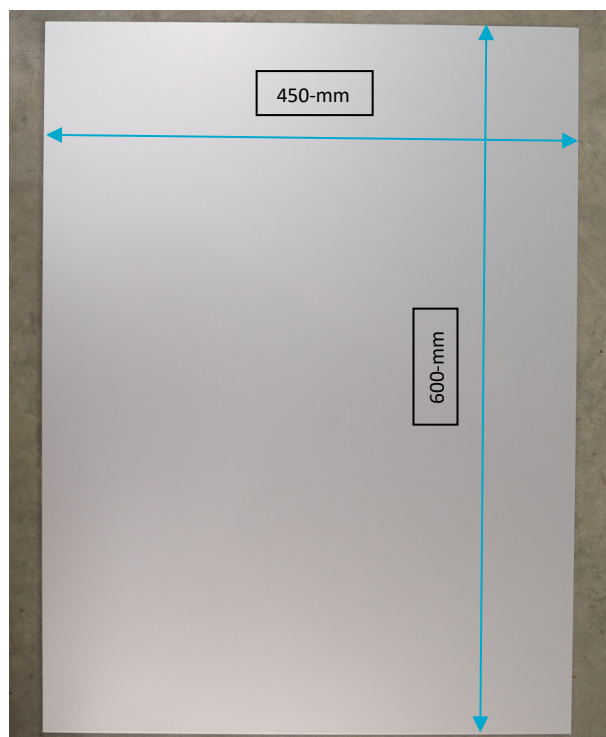


Figure 16 Aluminium composite panel test assembly

Test Supplementary Observations

The following supplementary observations were obtained during the testing:

Clause 5.3 Supplementary Observations	Specimen under test
Number of specimens tested	Six samples
Where all specimens did not ignite, the number of specimens that did ignite	None observed
Where flashing was encountered, and ignition was based on a 10-second flash	None observed
Where all specimens did not emit a rise of 1.4 kW/m ² during the prescribed period, the number of specimens for which such rise was recorded	None observed
Any observations of associated phenomena, such as transitory flaming, melting and production of flaming droplets, or inconsistent ignition behaviour	None observed
Where the test was performed on thin flexible materials, a statement that testing materials to the flammability test (see AS 1530.2) are also relevant to the assessment of fire hazard covering this type of material	Not applicable
Variable behaviour between different colours or patterns within a set of specimens of the same material or component	Not applicable

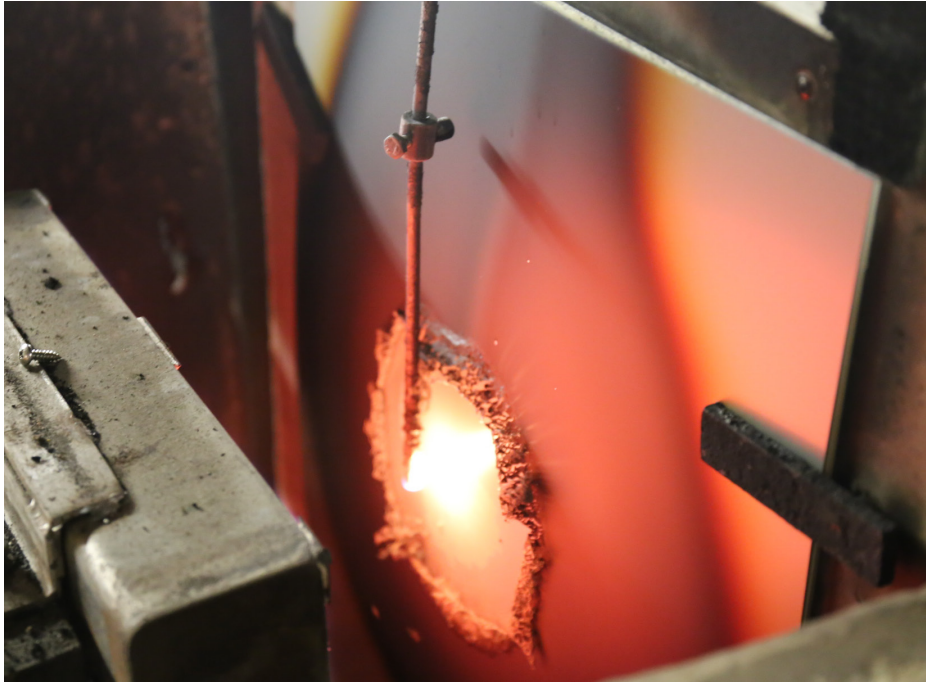


Figure 17 Aluminium composite panel test sample, ignition

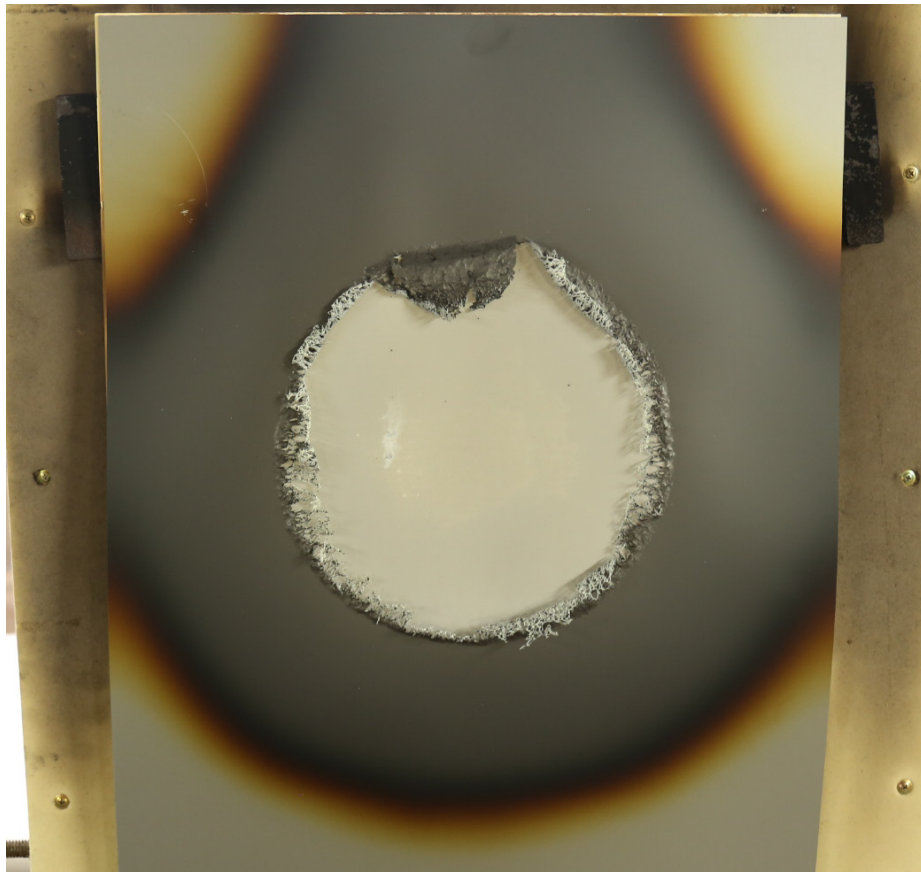


Figure 18 Aluminium composite panel test sample, completion of the test

3.7 CSIRO Report No. FNE 12894

Date of Test: 24 March 2022

Sponsor of the test: Hansen Yunken Pty Ltd

Product Trade Name: Mitsubishi ALPOLIC NC

Manufacturer: Mitsubishi Chemical Infratec Co. Ltd

The configuration of the test specimen assembly was a 600-mm x 450-mm plain panel for the test, see Figure 19.

The Sponsor of the test prepared the specimen for testing.

Tamaya (trading as Network Architectural) described the tested specimen as an aluminium composite panel comprised of the following layers:

- Layer 1: 28- μ m thick fluoropolymer coating;
- Layer 2: 0.5-mm thick aluminium alloy skin;
- Layer 3: 35- μ m thick adhesive film;
- Layer 4: 3-mm thick core comprised of aluminium hydroxide ($\text{Al}(\text{OH})_3$), calcium carbonate (CaCO_3) and additives.
- Layer 5: 35- μ m thick adhesive film;
- Layer 6: 0.5-mm thick aluminium alloy skin;
- Layer 7: 5- μ m thick polyester coating.

The aluminium alloy skin was adhered to the core with an adhesive film applied at an application rate of 0.057 L/m².

Nominal total thickness of panel:	4 mm
Nominal total mass:	8.6 kg/m ²
Colour:	Silver [face] / grey [back]

The configuration of the test specimen assembly was a 600-mm x 450-mm plain panel and was determined by the Sponsor of the test. CSIRO was not involved in the design of the specimen configuration, or the selection of materials used to form the test specimen.

The specimen assembly was clamped onto the test rig's backing board in four places. The exposed face of the assembly for the test was the grey (back) panel.

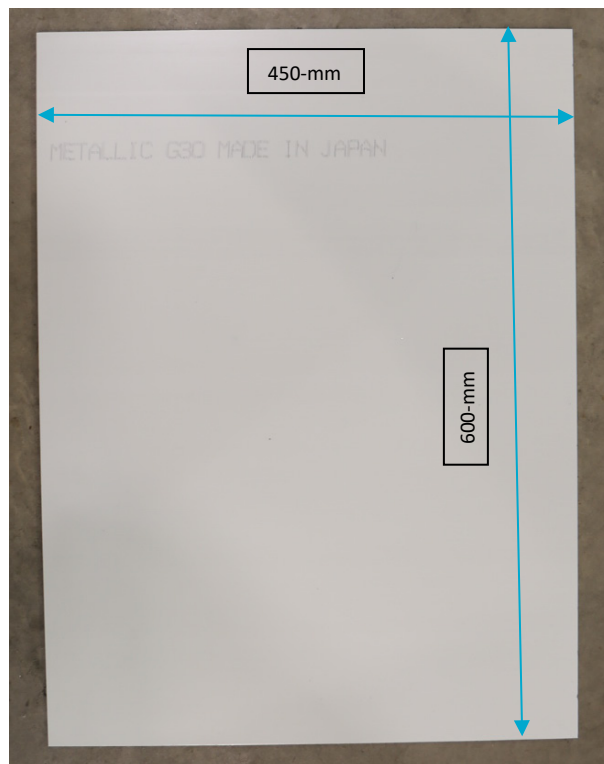


Figure 19 Aluminium composite panel test assembly

Test Supplementary Observations

The following supplementary observations were obtained during the testing:

Clause 5.3 Supplementary Observations	Specimen under test
Number of specimens tested	Six samples
Where all specimens did not ignite, the number of specimens that did ignite	None observed
Where flashing was encountered, and ignition was based on a 10-second flash	None observed
Where all specimens did not emit a rise of 1.4 kW/m ² during the prescribed period, the number of specimens for which such rise was recorded	None observed
Any observations of associated phenomena, such as transitory flaming, melting and production of flaming droplets, or inconsistent ignition behaviour	None observed
Where the test was performed on thin flexible materials, a statement that testing materials to the flammability test (see AS 1530.2) are also relevant to the assessment of fire hazard covering this type of material	Not applicable
Variable behaviour between different colours or patterns within a set of specimens of the same material or component	Not applicable



Figure 20 Aluminium composite panel test sample, ignition

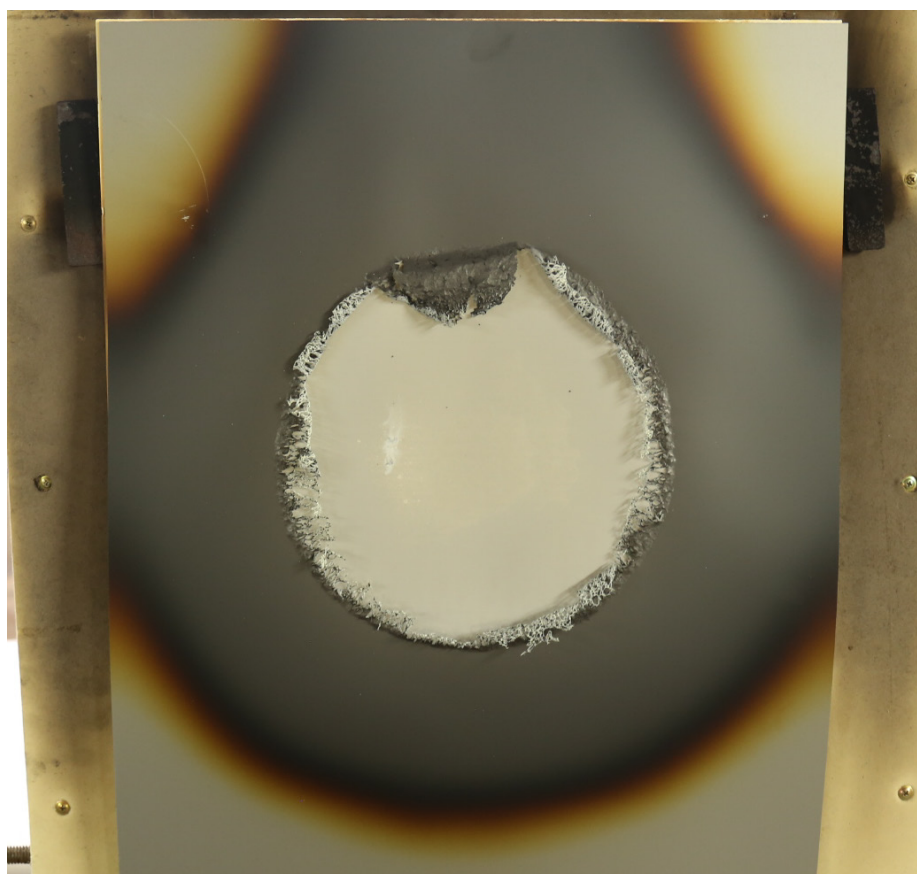


Figure 21 Aluminium composite panel test sample, completion of the test

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