PROFESSIONAL FIRE SAFETY TESTING

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AUSTRATUS ALUMINIUM BATTEN SYSTEM

TESTING REPORT AS ISO 9705:2003

IGNL-5001-06R I01R00

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CONDITIONS AND LIMITATIONS

This assessment report does not provide an endorsement by Ignis Labs Pty Ltd of the actual product evaluated.

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 hazards 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 relate only to the actual prototype test specimens, testing conditions and methodology described in the referenced documents, 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 is reviewed on or, before, the stated expiry date.

This report is prepared in good faith and with due care for information purposes only, and should not be relied upon as providing any warranty or guarantee. In particular, attention is drawn to the nature of the inspection and investigations undertaken and the limitations these impose in determining with accuracy the state of the building, its services or equipment and life safety.

Ignis Labs' involvement in the Project is limited to the role outlined in section 2 'Scope of Service' of the Letter. This report reflects that role. Any reliance on, or use of, this report for purposes outside the scope of service is at the user's own risk.

Ignis Labs shall not be held liable for any loss or damage resulting from any defect of the building or its services or equipment or for any non compliance of the building or its services or equipment with any legislative or operational requirement, whether or not such defect or non-compliance is referred to or reported upon in this report, unless such defect or non-compliance should have been apparent to a competent engineer undertaking the evaluation of the type undertaken for the purpose of preparation of this report.

Ignis Labs has carefully reviewed and applied to the best of our ability the requirements of local Legislation, the NCC and the International Fire Engineering Guidelines.

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1 INTRODUCTION

1.1 General

The purpose of this report is to document the room test undertaken by Ignis Labs on the Austratus aluminium batten system. The testing was undertaken in accordance with AS ISO 9705:2003 R2016 and reported in accordance with AS 5637.1:2015 with the exception that heat flux at the floor was not measured.

1.2 Subject Test Specimen

The tested system included a ceiling and wall specimen with the installation of the Austratus aluminium batten system. As described by the sponsor, the walls and ceiling were formed by four different types of battens including sizes of 30mm×40mm, 30mm×60mm, 30mm×90mm and 90mm×22mm aluminium battens with 30mm stainless stell spring clips into aluminium TCR rail to walls and suspended from stud ceiling. The battens were installed with varying spacings. A polyester insulation was installed behind the battens. The insulation was a nominal 18mm thickness and 600mm width.

FIGURE 1:
ALUMINIUM BATTEN

FIGURE 2:
SPECIMEN RAILS

FIGURE 3:

INSULATION APPLIED AT THE CEILING

1.3 Sponsor

Modinex Group

150 Toongarra Road

Ipswich QLD 4305

1.4 Test Number

The Ignis Labs reference test number is IGNL-5001-06R.

1.5 Test Date

The test was conducted on 28 January 2021.

1.6 Test Results

The specimen achieved the following performance requirements as defined in AS ISO 9705:2003 R2016, AS 5637.1:2015.

Criteria	Result
Group Number	1
SMOGRARC (in m^2s^{-2} x 1000)	2.45

2 DESCRIPTION OF SPECIMEN

2.1 General

The tested system included a ceiling and wall specimen with the installation of the Austratus aluminium batten system. As described by the sponsor, the walls and ceiling were formed by four different types of battens including sizes of 30mm×40mm, 30mm×60mm, 30mm×90mm and 90mm×22mm aluminium battens with 30mm stainless stell spring clips into aluminium TCR rail to walls and suspended from stud ceiling. The battens were installed with varying spacings.

Black insulation material was applied to the ceiling in between TCR rails behind the aluminium battens. The battens that applied on the ceiling and three walls were 30mm×40mm black and yellow aluminium battens. Different types of battens were applied to the corners between the ceiling and three walls. A polyester insulation was installed behind the battens. The insulation was a nominal 18mm thickness and 600mm width.

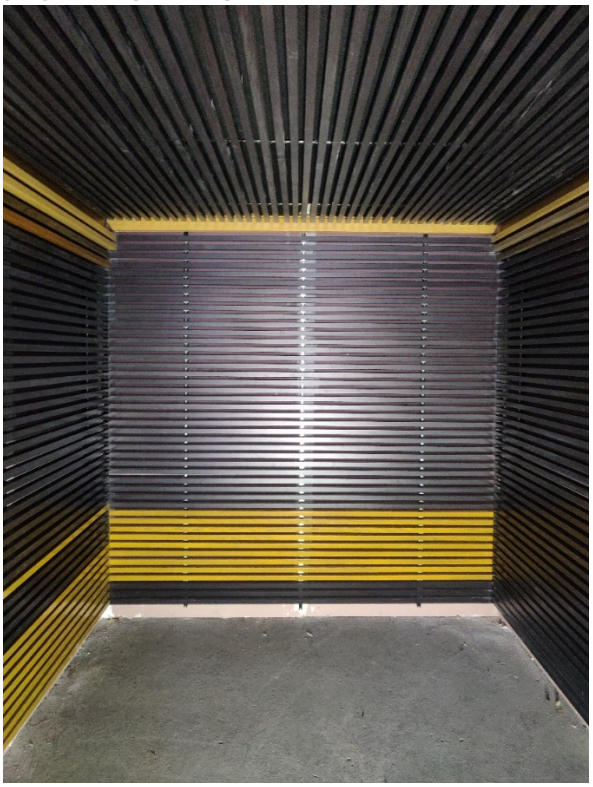
2.2 Selection, Construction and Installation of the Specimen

The construction of the specimen was organised and undertaken by the sponsor. Ignis Labs was not involved in the selection and installation of the specimen.

FIGURE 4:

SPECIMEN RAILS INSTALLATION

SPECIMEN INSTALLATION



3 TEST PROCEDURE

3.1 Statement of Compliance

The test was performance in accordance with the requirements of AS ISO 9705:2013 R2016 with the purpose of determining the fire spread risk of the tested panels.

3.2 Variations to the Method

No variations to the test criteria were recorded.

3.3 Pre-test Conditioning

Prior to construction, the components of the wall system were subjected to normal temperatures and humidity. The sample materials were not subjected to any conditioning except for being stored within a dry storage shed prior to installation.

3.4 Sampling / Specimen Selection

Ignis Labs was not involved in the selection of the materials. Modinex Group provided the specimens for testing.

3.5 Ambient Temperature

The temperature of the test area was 20.8°C at the commencement of the test.

3.6 Test Duration

The test was 1200 seconds which included 10 minutes of flaming of the burner at 100kW and then an additional 10 minutes of flaming of the burner at 300kW.

3.7 Instrumentation and Equipment

The equipment used for the test was in accordance with AS ISO 9705:2013 R2016 and is as detailed below:

The fire test room consisted of Rondo 90mm 1.15bmt steel studwork spaced at 600mm centres and associated noggins at 600mm. 75mm thick 60kg Rockwool insulation was friction filled within the studwork. The external side of the wall and ceiling was lined with two layers of 16mm fire grade plasterboard. The internal side included 1mm metal backpan, 15mm thick plywood and two layers of 16mm fire grade plasterboard. Without specimen lining, the room had an inner dimension of 3600mm long x 2400mm wide x 2400mm high with a doorway 800mm x 2000mm high centrally located in one of the shorter walls.

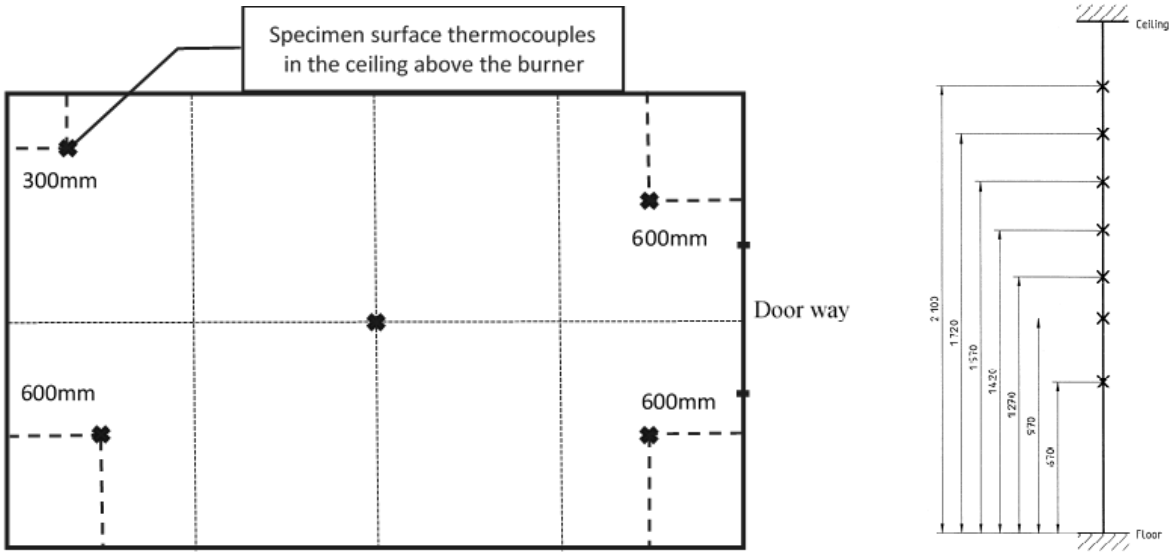
The ignition source was a propane gas fuelled box burner, whose specifications were in accordance with those given in AS ISO 9705:2003 R2016 Annex A. The burner was placed on the floor in the corner of the room, opposite the doorway, where two of the side walls of the burner were as close as possible to the specimen material. The gas flow during the test was controlled to provide an amount of gas equivalent to 100kW of power during the first ten minutes of heat exposure and 300kW of power during the second ten minutes of heat exposure.

The temperature within the room was measured via a series of thermocouples located within a tree nature

The location of the ceiling thermocouples as well as the thermocouple tree is detailed below.

FIGURE 5:

THERMOCOUPLE LOCATION



The products of combustion were collected in an exhaust hoot adjacent to the doorway, outside of the test room. The hood was connected to an exhaust duct 400mm in diameter, within the duct instruments to measure the conditions and properties of the combustion products during the test.

The volume flow rate was measured with a bidirectional pressure probe attached to a differential pressure transducer with a Type K thermocouple located adjacent to the probe.

An exhaust sampling probe sampled the combustion products which were analysed by a Servomex Servopro 4000 series analyser. Oxygen concentration during the test was determined by the paramagnetic oxygen analyser, whilst the carbon monoxide and carbon dioxide concentrations were determined within the Servopro 4000 analyser.

3.8 Calibration Test

A calibration test was carried out prior to the testing of the specimen. The gas burner was placed directly under and 100mm below the exhaust hood and the gas supply to the burner was adjusted such that the power output from the burner was 0 Kw for 2 minutes, then 100 kW for five minutes then 300 kW for a further five minutes, then 100kW for five minutes and finally 0kW for two minutes, after which time the calibration test was stopped. Data from instruments was collected and analysed every second.

4 TEST MEASUREMENTS

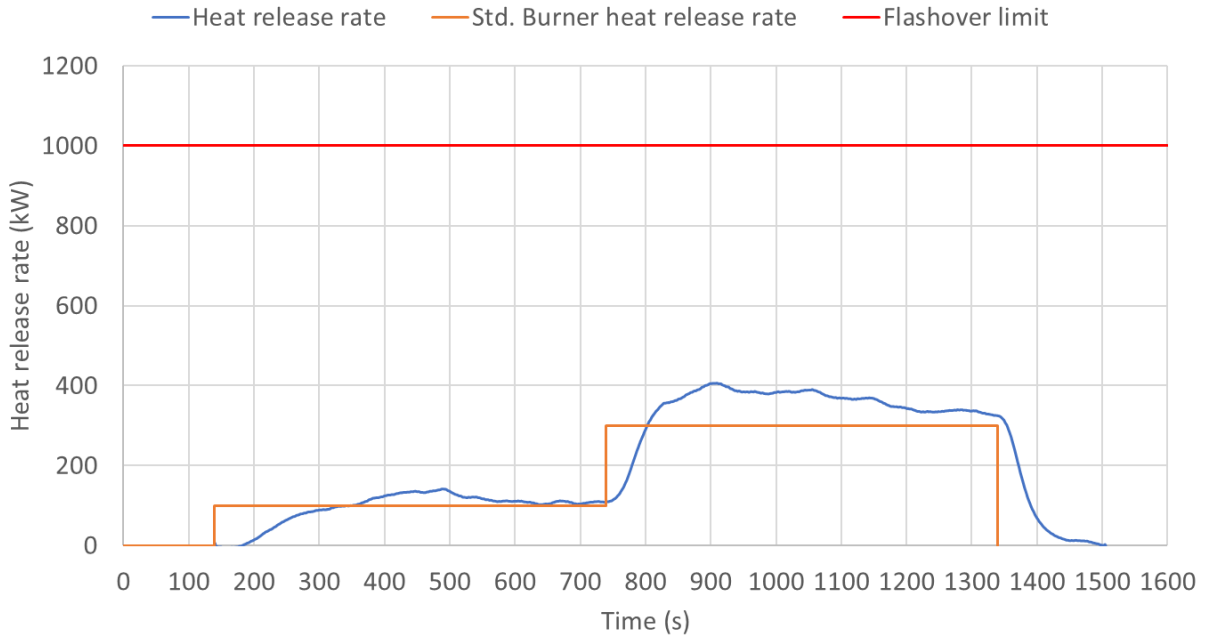
4.1 Initial Conditions

The horizontal wind speed at a horizontal distance of 1m away from the door opening was measured just prior to the test and was found being less than 0.5m/s and satisfies the requirements of AS ISO 9705:2003 R2016 Section 12.1.2. The ambient temperature in the region of the fire test room was 20.8˚C at the start of the test.

4.2 Heat Release Rate Measurements

The heat release rate during the test is shown in the figure below. The heat release stays below the flashover limit of 1MW during the whole test.

FIGURE 6:
HEAT RELEASE RATE MEASUREMENTS



4.3 Test Thermocouples

Based on the nature and intent of the tests, the thermal conditions within the room as measured by the thermocouples. The temperatures in the room for the two trees are detailed below. The test burn included a measurement for twenty minutes with the sandbox burner increased to 100kW output for 10 minutes and then increased to 300kW for an additional 10 minutes.

The thermocouple detail shows the impact of increasing the flame size. The figures below detail the thermocouple tree.

FIGURE 7:

THERMOCOUPLE MEASURMENTS – CONCEALED CEILING

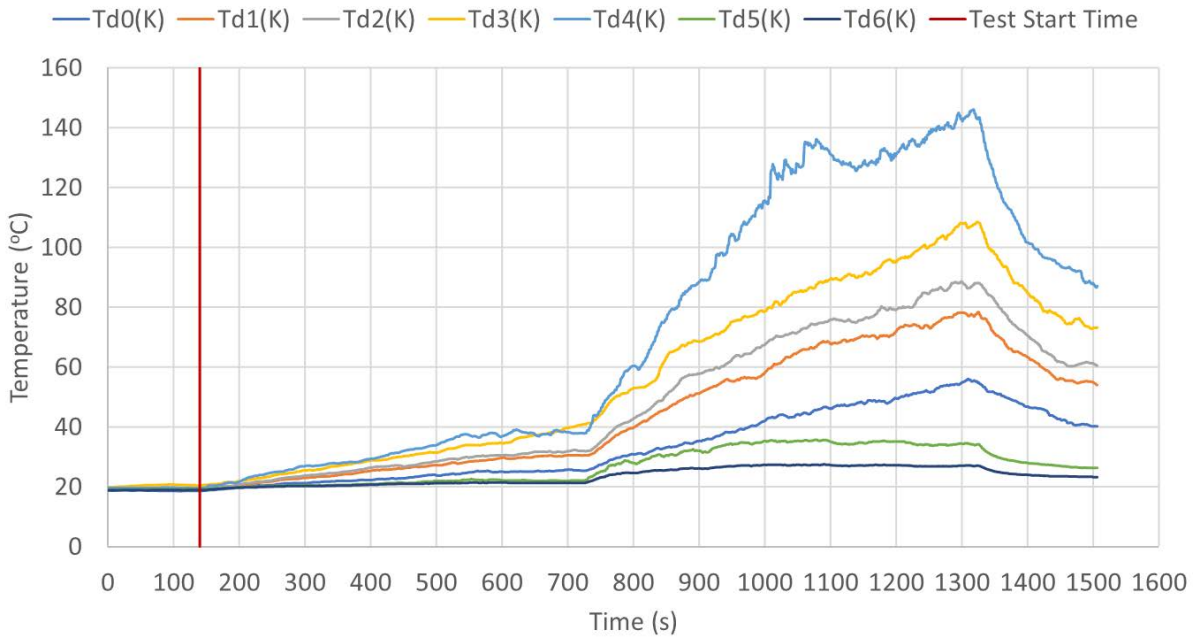
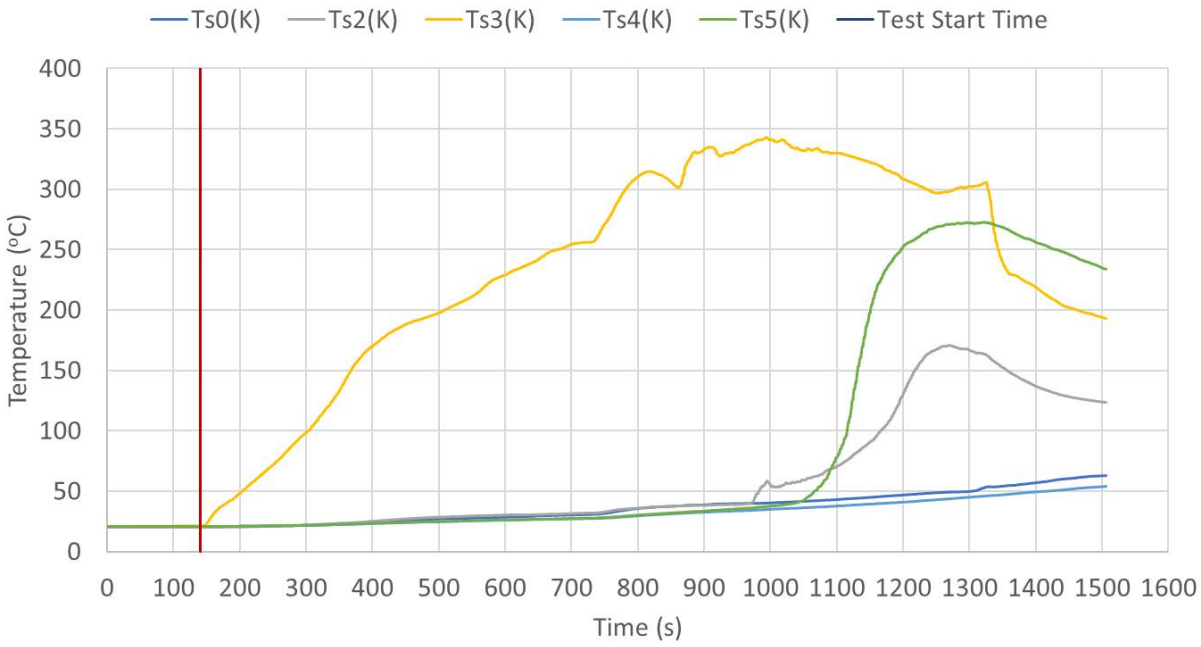


FIGURE 8:

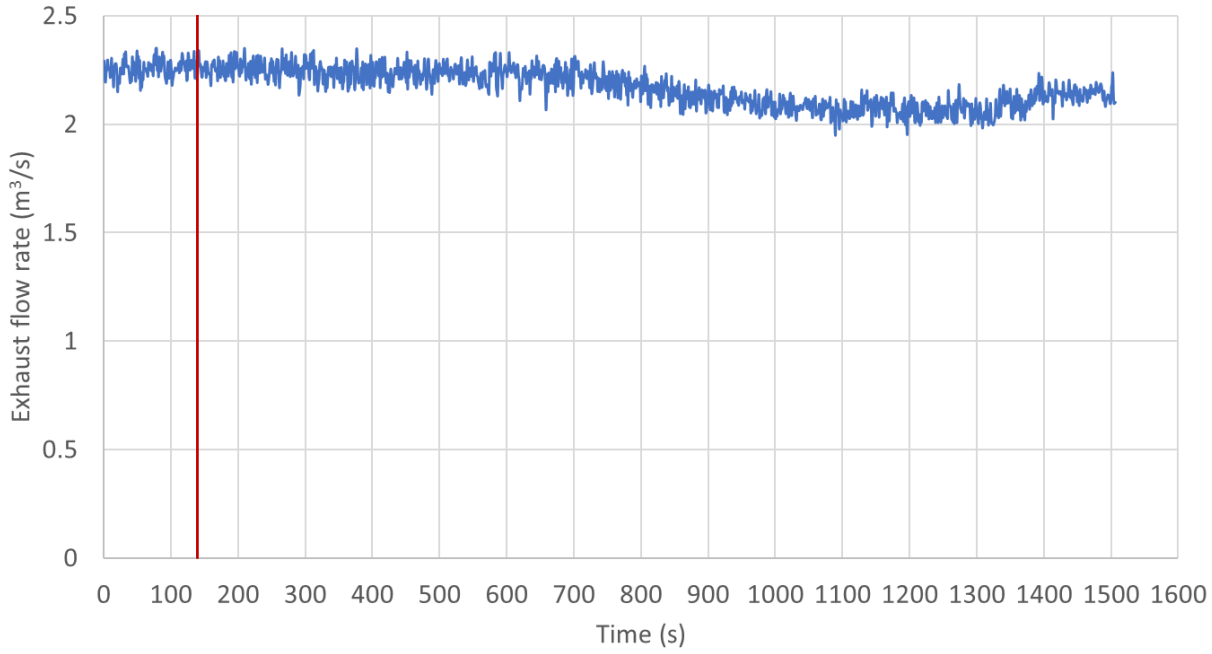
THERMOCOUPLE MEASURMENTS – THERMOCOUPLE TREE



4.4 Volume Flow Rate Measurements

FIGURE 9:

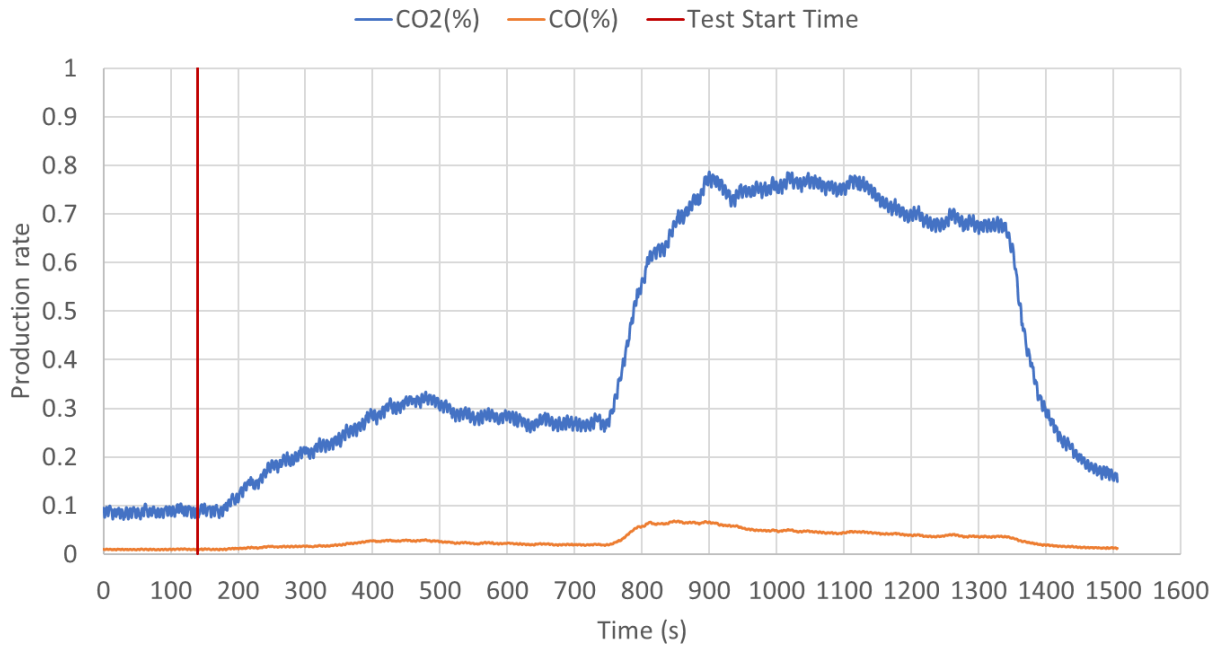
VOLUME FLOW RATE MEASUREMENTS



4.5 Carbon Monoxide and Carbon Dioxide Production

FIGURE 10:

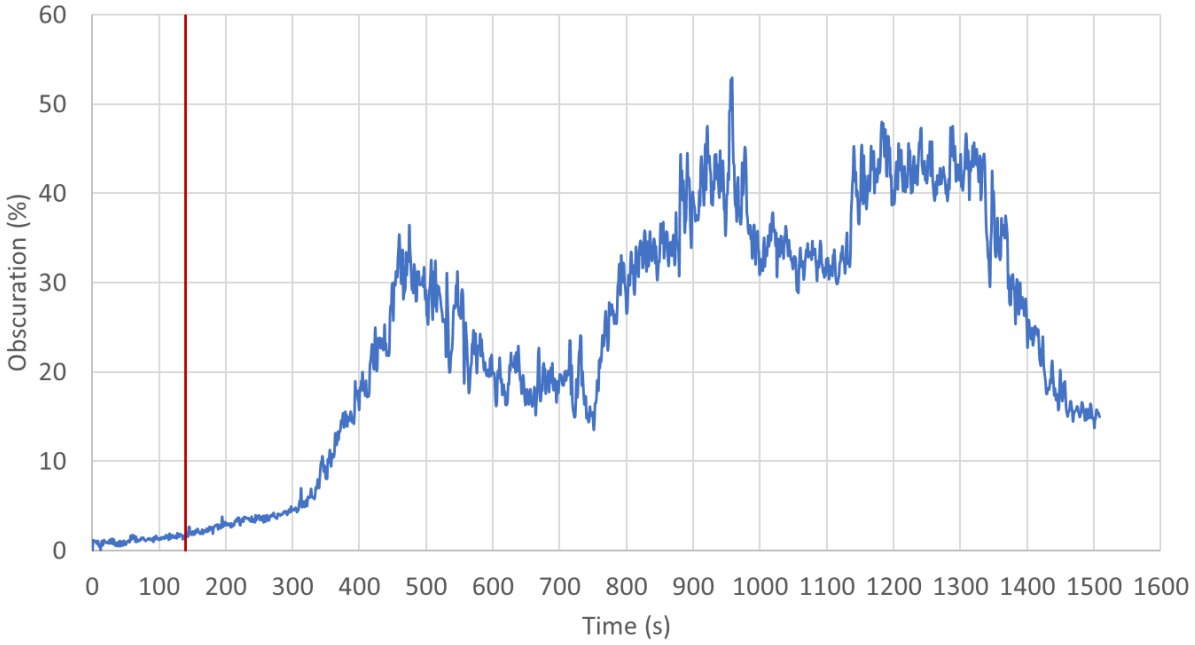
CARBON DIOXIDE AND CARBON MONOXIDE PRODUCTION



4.6 Light Obscuration Measurements

FIGURE 11:

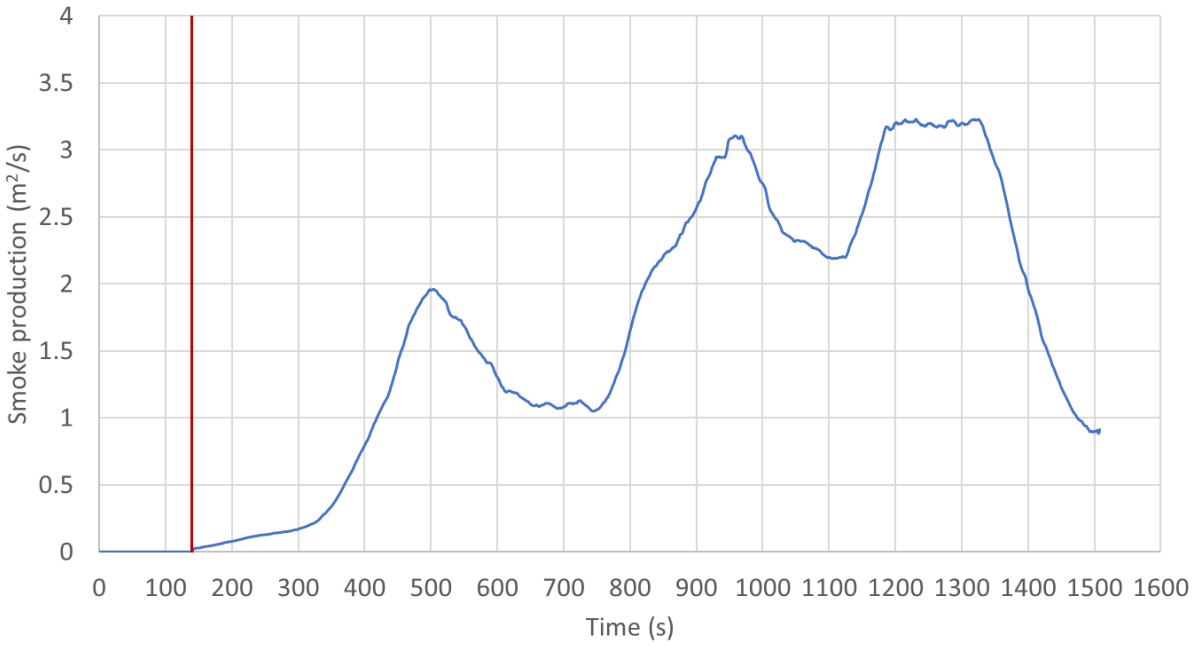
LIGHT OBSCURATION MEASUREMENTS



4.7 Smoke Production Measurements

FIGURE 12:

SMOKE PRODUCTION MEASUREMENTS



4.8 Critical Observations

The following observations were made during the fire-resistance test:

0:00	Test start.
2:20	The heat release rate of burner increased into 100kW.
3:35	Charring was observed on slats 450mm above the burner.
4:15	Light visible smoke layer was formed
5:00	Molten debris was observed on slats.
5:38	Molten debris was observed on floor surround the burner.
5:50	Smoke started to come out of the doorway.
6:00	The paint surface of batten behind the burner was burning.
6:55	The smoke became heavier and made the ceiling became invisible.
12:20	The heat release rate of burner increased into 300kW.
12:35	Smoke became lighter and the ceiling started to be visible.
	Flaming debris from ceiling was observed.
14:00	Sustained flaming was observed on ceiling.
16:40	No more flames were observed on ceiling.
24:00	Test stopped.

4.9 Test Images

FIGURE 13:

START OF THE TEST – 0KW

2:20 INTO THE TEST – 100KW

FIGURE 14:

4:38 INTO THE TEST – LIGHT VISIBLE SMOKE LAYER

5:38 INTO THE TEST – MOLTEN DEBRIS ON THE GROUND

FIGURE 15:

5:50 INTO THE TEST – SMOKE CAME OUT OF THE DOOR

12:20 INTO THE TEST – 300KW

FIGURE 16:

12:35 INTO THE TEST – FLAMING DEBRIS

14:00 INTO THE TEST – SUSTAINABLE FLAMES AT THE CEILING

FIGURE 17:

16:40 INTO THE TEST –NO FLAMES AT THE CEILING

24:00 INTO THE TEST – BEFORE THE STOP OF THE TEST

FIGURE 18:

ROOM POST THE TEST – OVERVIEW

5 PERFORMANCE CRITERIA AND TEST RESULTS

5.1 National Construction Code

The National Construction Code of Australia (NCC) and AS 5637.1:2015 detail the criteria of materials by Group Number, which indicates the amount of time taken for a material being tested to reach flashover under AS ISO 9705:2003 R2016 test conditions. AS 5637.1:2015 define flashover to be a heat release rate of 1000kW.

5.2 AS 5637.1:2015

AS 5637 sets out procedures for the assessment of internal wall and ceiling linings according to—

a) their tendency to ignite;
b) their tendency to release heat once ignition has occurred;
c) their tendency to cause flashover;
d) their tendency to release smoke; and
e) their contribution to fire growth,

and allows for determination of group number, smoke growth rate index ($SMOGRA_{RC}$) and, where required, average specific extinction area (ASEA).

The group number of a material shall be assigned as follows when tested in accordance with Clause 4.3 of the standard:

a) Group 1—material that does not reach flashover when exposed to 100 kW for 600 s followed by exposure to 300 kW for 600 s.
b) Group 2—material that reaches flashover following exposure to 300 kW within 600 s after not reaching flashover when exposed to 100 kW for 600 s.
c) Group 3—material that reaches flashover in more than 120 s but within 600 s when exposed to 100 kW.
d) Group 4—material that reaches flashover within 120 s when exposed to 100 kW.

The group number of a material shall be determined by either—

a) physical testing in accordance with in AS ISO 9705:2003 R2016; or
b) if the material has a confirmed correlation, prediction in accordance with Clause 4.4 using data obtained by testing the material at 50 kW/m^2 irradiance in the horizontal orientation with edge frame in accordance with ISO 5660-1:2015 or AS/NZS 3837:1998, as appropriate to the test conducted.

In accordance with AS ISO 9705:2003 preface, the standard is identical with and has been reproduced from ISO 9705:1993, Fire tests – Full scale room test for surface products.

The specimen achieved the following performance requirements as defined in AS ISO 9705:2003 R2016, AS 5637.1:2015.

Criteria	Result
Group Number	1
SMOGRARC (in m^2s^{-2} x 1000)	2.45

6 APPLICATION OF TEST RESULTS

6.1 Test Limitations

The results of this fire test 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 fire conditions. The results only relate to the behaviour of the specimen of the element of the construction under the particular conditions of the test, they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they necessarily reflect the actual behaviour in fires.

6.2 Variations from the Tested Specimen

This report details the methods of construction, test conditions and the results obtained when the specific element of construction described herein was tested following the procedure as outlined in AS ISO 9705:2003 R2016. Any significant variation with respect to size and construction details is not addressed by this report.

6.3 Uncertainty of Measurement

Because of the nature of fire hazard property testing and the consequent difficulty in quantifying the uncertainty of measurement of fire hazard properties, it is not possible to provide a stated degree of accuracy of the result.

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