WARRINGTONFIRE
AUSTRALIA
A Jensen Hughes Company

Reaction to fire test report

Test standard: Ad-hoc test based on ISO 13785-1:2002

Test sponsor: Cladding Safety Victoria (CSV)

System: AAC external façade cladding system

Job number: RTF240056

Test date: 29 July 2024 Revision: RR1.0

WARRINGTONFIRE
AUSTRALIA
A Jensen Hughes Company

Quality management

Revision	Date	Information about the report			
RR1.0	4 December 2025	Description	Initial issue.		
			Prepared by	Reviewed by	Authorised by
		Name	[redacted]	[redacted]	[redacted]
		Signature			

Warringtonfire* Australia Pty Ltd
ABN 81 050 241 524

*As used herein, The name "Warringtonfire" and its associated IP and branding is used by Warringtonfire Australia Pty Limited in Australia under licence from Warringtonfire Testing and Certification Limited (based in the UK) for a transitional period following the acquisition of Warringtonfire Australia Pty Limited. The Warringtonfire Testing and Certification Limited continues to own the rights to "Warringtonfire" and continues to operate the global "Warringtonfire business" outside of Australia.

Contents

1. Introduction

This report documents the findings of reaction to fire test for an AAC external façade cladding system performed on 29 July 2024. The test was based on the general principles of ISO 13785-1:2002.

Warringtonfire performed the test at the request of the test sponsor listed in Table 1.

Table 1 Test sponsor details

Test sponsor	Address
Cladding Safety Victoria (CSV)	717 Bourke Street Docklands, VIC 3808 Australia

2. Test specimen

2.1 Schedule of components

Table 2 describes the test specimen and lists the schedule of components. These were provided by the representatives of the test sponsor and surveyed by Warringtonfire. All measurements were done by Warringtonfire – unless indicated otherwise.

Detailed drawings of the test specimen are provided in Appendix B.

Table 2 Schedule of components

Item	Description	
Cladding		
1.	Item name	AAC cladding panels
	Product name	[redacted] 75 mm reinforced AAC Panels
	Manufacturer/ supplier	[redacted]
	Material	Autoclaved aerated concrete (AAC)
	Reinforcement	Single mesh reo
	Size	3000 mm long × 600 mm wide × 75 mm thick (cut to suit)
	Panel mass	67.5 kg
	Density	496 kg/m^3 (ambient)
	Batch number	2311171461 1704
2.	Item name	Calcium silicate board
	Product name	[redacted]
	Manufacturer	[redacted]
	Size	2440 mm long × 1220 mm wide × 20 mm thick (uncut)
	Batch number	BA900232 1809001818014001
3.	Item name	Fire rated plasterboard
	Product name	[redacted]
	Manufacturer	[redacted]
	Size	3600 mm long × 1200 mm wide × 13 mm thick
	Batch number	9314450006293
Framing		
	Item name	Tracks

Item	Description	
4.	Product name	[redacted]
	Manufacturer	[redacted]
	Size	92 mm wide × 36 mm flange × 1.15 BMT
	Batch number	932584201026
5.	Item name	Studs
	Product name	[redacted]
	Manufacturer	[redacted]
	Size	92 mm wide × 36 mm flange × 1.15 BMT
	Batch number	932584201031
6.	Item name	Noggings
	Product name	[redacted]
	Manufacturer	[redacted]
	Size	92 mm wide × 36 mm flange × 1.15 BMT
	Batch number	932584200860
Angles		
7.	Item name	Unequal angle
	Manufacturer	[redacted]
	Material	Galvanised steel Z275
	Size	1500 mm wide × 150 mm high × 175 mm deep × 0.55 BMT
	Installation	Installed below the cladding material.
Sealant/Adhesive		
8.	Item name	Adhesive
	Product name	[redacted]
	Batch number	3007433139000010
	Manufacturer	[redacted]
Fixings		
9.	Item name	Framing screws
	Description	10g × 16 mm, flathead, self-drilling screws
	Manufacturer	[redacted]
	Installation	Used to fix the 92 mm framing together.
10.	Item name	Plasterboard screws
	Description	6g × 32 mm, bugle head, drill point, fine thread screws
	Manufacturer	[redacted]
	Installation	Used to fix the Promat boards to the steel framing together at 300 mm centres.
11.	Item name	Panel screws
	Description	14g × 100 mm Bugle Head, batten CL4 Galvanised screws
	Manufacturer/ supplier	[redacted]
	Code number	BTSC14100GT

Item	Description		
	Installation	Used to fix the AAC panels to the steel framing at 250 mm max. centres.	
Installation method			
Specimen wall frame		The material mounting frame was the main support for the test specimen. It consisted of 92 mm steel framing (items 4, 5 and 6) fixed together using framing screws (item 9). The specimen wall frame consisted of steel framing (items 4, 5 and 6) fixed together using framing screws (item 9). It was clad on the back face with plasterboard (item 3) secured at 300 mm centres with board screws (item 10).	
Blanking walls		The test rig blanking walls consisted of three sperate assemblies of steel framing (items 4,5 and 6) fixed together using framing screws (item 9) and clad on the fire exposed side with calcium silicate board (item 2). The two sides and the back where fixed to one another to form an alcove nominally 1500 mm wide by 888 mm deep.	
Overall size		Back blanking wall	1500 mm wide × 2600 mm tall
		Side blanking walls	1000 mm wide × 2500 mm tall
		Specimen	1500 mm wide × 2100 mm tall
AAC cladding		AAC cladding panels (item 1) were installed horizontally and were secured to the steel framing (item 4 and 5) with panel screws (item 11) at 250 mm max centres and 50 mm from the panel's edge. Adhesive (item 8) was installed between the AAC cladding panels (item 1).	

3. Test procedure

Table 3 details the test procedure for this reaction to fire test.

Table 3 Test procedure

Item	Detail	
Statement of compliance	The ad-hoc test - based on ISO 13785-1:2002 - was undertaken to determine the reaction to fire properties of an external wall cladding material, exposed to heat from a simulated external fire. The test utilised a burner based on the requirements of ISO 13785-1:2002. The instrumentation used to collect and analyse the products of combustion was based on ISO 9705-1:2016.	
Supplementary standard	• AS ISO 9705:2003 (R2016) • ISO 9705-1:2016	
Sampling / specimen selection	The laboratory was not involved in sampling or selecting the test specimen for the reaction to fire test. The results obtained during the test only apply to the test samples as received and tested by Warringtonfire.	
Ambient laboratory temperature	Start of the test	13 °C
	Minimum temperature	13 °C
	Maximum temperature	14 °C
Initial horizontal wind speed	0.15 to 0.17 m/s (measured at a horizontal distance of 500 mm away from the façade face before the test).	
Test duration	60 minutes.	
Instrumentation and equipment	• 6 mineral insulated metal sheathed (MIMS) Type K thermocouples with an overall diameter of 1.5 mm with the measuring junction insulated from the sheath were positioned at various heights, 50 mm in front of the outer face of the test specimen along its vertical centreline. Refer to Figure 13 and Figure 14 in Appendix C for details on positioning. • 3 MIMS Type K thermocouples with an overall diameter of 1.5 mm with the measuring junction insulated from the sheath were positioned at various heights at mid-depth of the framing cavity of the test specimen. Refer to Figure 13 and Figure 14 in Appendix C for details on positioning. • The fire source was a propane (95% purity) gas fuelled box burner; 1.2 m wide × 0.1 m deep × 0.15 m tall. The burner was located on the floor in front of the specimen, with the back edge of the burner in line with the exposed face of the specimen. • The incident heat flux 50 mm above and in line with the exposed face of the test specimen was measured using a Schmidt-Boelter type heat flux gauge with a range of 0 - 50 kW/m^2. • The products of combustion were collected in an exhaust hood located centrally above the exposed face of the tested specimen. The hood was connected to an exhaust duct 400 mm in diameter, which had instruments inside to measure the conditions and properties of the combustion products during the test. The hood had specifications based on those given in AS ISO 9705:2003 (R2016), with the only differences being that all four sides had 1 m steel sheet extensions, and there was no fire test room. • The volume flow rate was determined using a bidirectional pressure probe attached to a differential pressure transmitter together with a type K MIMS thermocouple positioned near the probe. • Smoke obscuration measurements were made using a helium-neon laser smoke photometer, as outlined in Annex H of ISO 9705-1:2016. • The temperature of the exhaust stream near the light beam was measured using a type K MIMS thermocouple.	

Item	Detail
	• An exhaust sampling probe sampled the combustion products which were then analysed by a gas purity analyser. The oxygen concentration during the test was determined by a paramagnetic oxygen sensor and the carbon monoxide and carbon dioxide concentrations were determined using an infrared sensor. • The horizontal wind speed will be measured using a hot wire anemometer at a horizontal distance of 500 mm away from the centre of the exposed face of the tested specimen. • A Fourier Transform Infrared Spectroscopy (FTIR) gas analyser was connected to the exhaust duct, and operated by representatives of the test sponsor to sample the products of combustion during the test.
System response	• A step calibration test was carried out to determine the system response time. The gas burner was placed centrally and 1 m below the exhaust hood by subjecting it to a stepwise change in heat release shown in Table 4. Data from instruments was collected and analysed every 3 seconds. • At steady state conditions, the difference between the mean rate of heat release over 1 minute calculated from the measured oxygen consumption and that calculated from the metered gas output did not exceed ± 5% for each level of heat output – and therefore complied with the requirements of Section 10.1 of AS ISO 9705:2003 (R2016). • The system response time was determined by calculating the average time taken for the measured rate of heat release to be within 10% of the metered gas calculated rate of heat release. System response data is listed in Table 4 and the system response has been calculated to be 25 s
Test procedure	• At least two minutes of baseline data was collected prior to burner ignition. Temperature and heat flux data was collected at 5 s intervals, while the combustion products sampling data was collected at 3 s intervals. • The heat output from the burner was held at 100 kW for 15 minutes, then 300 kW for the following 25 minutes. The burner was then turned off and data was recorded for the following 20 minutes.

Table 4 Response time measurements during the step calibration test

Step	Target heat output (kW)	Metered gas output (kW)	Heat measured (kW)	Variance (%)	Response time (s)
1-2	100	99.2	100.0	0.8%	26
2-3	300	298.0	301.4	1.1%	21
3-4	100	99.5	99.5	0.0%	27

4. Test measurements and results

4.1 Test measurements

The measurements taken for the heat flux, volume flow rate, heat release rate, temperatures and light obscuration – along with the production rates of carbon monoxide and carbon dioxide – are summarised below.

Table 5 in Appendix A includes observations of any significant behaviour of the specimen.

Photographs of the specimen are included in Appendix D.

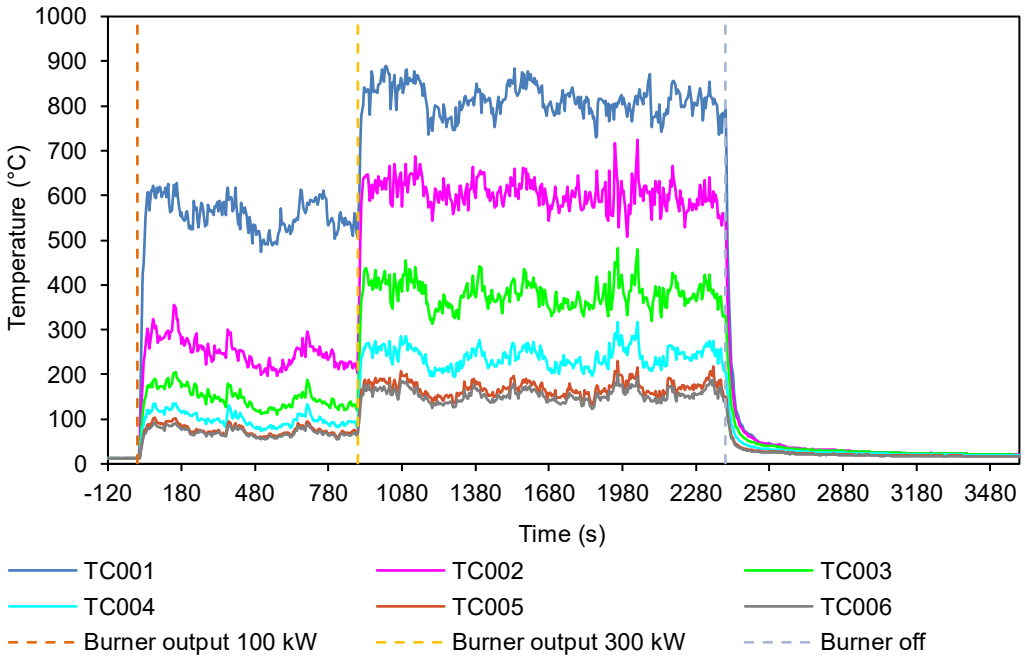

Figure 1 50 mm from the exposed face – Temperature vs time

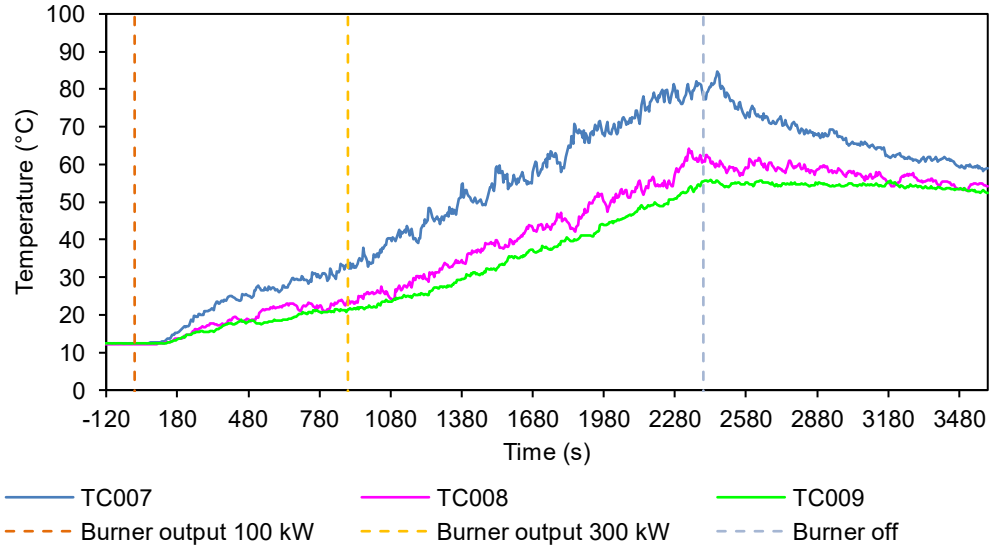

Figure 2 Cavity – Temperature vs time

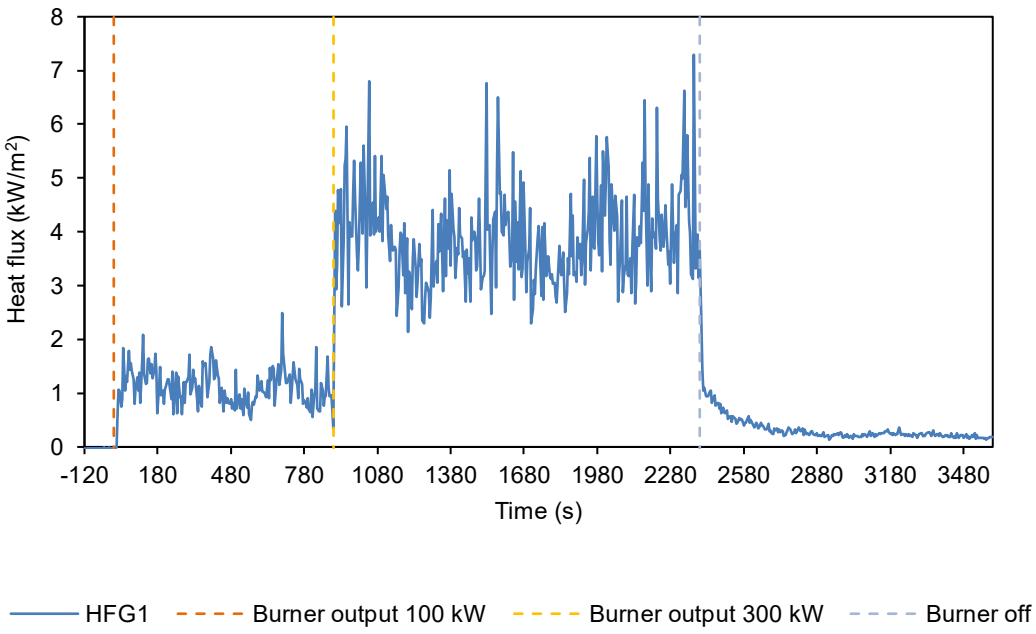

Figure 3 Heat flux vs time

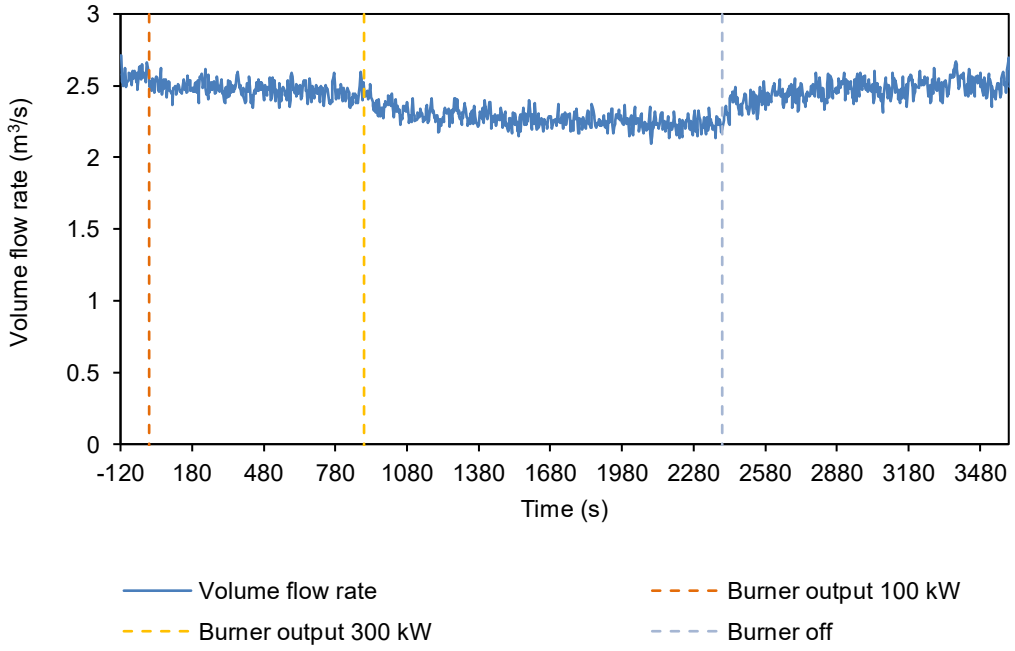

Figure 4 Volume flow rate in duct vs time

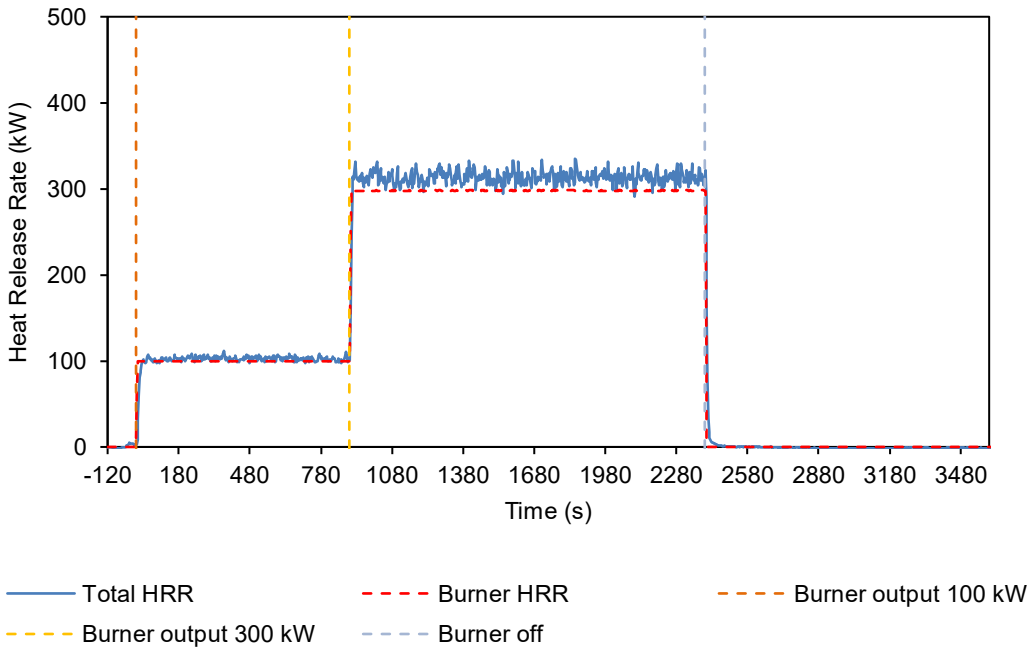

Figure 5 Heat release rate (HRR) of specimen and burner vs time

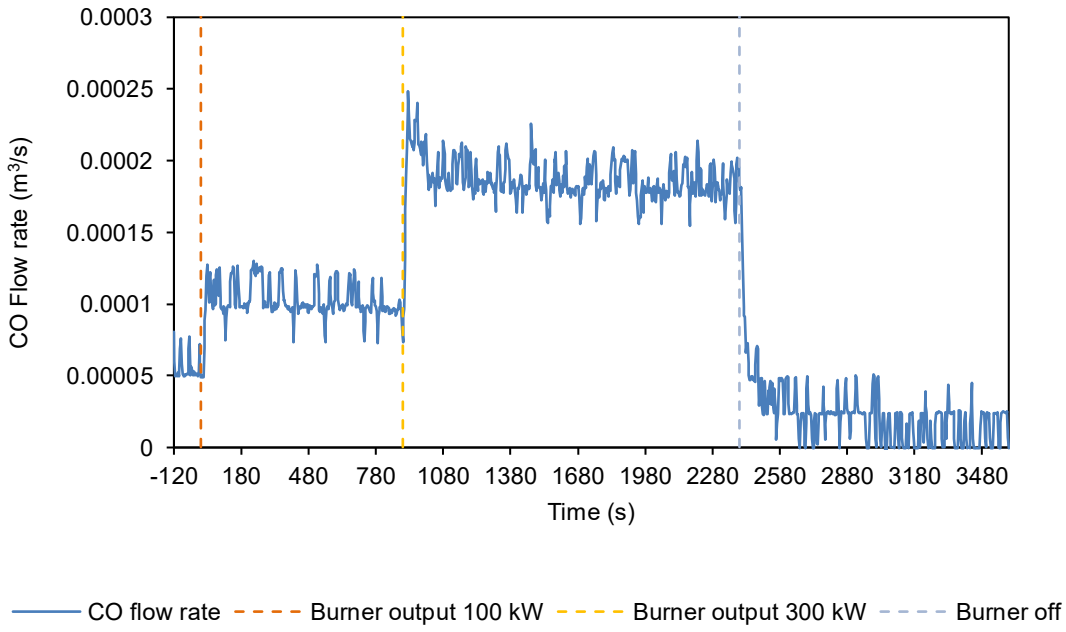

Figure 6 Production of carbon monoxide vs time, at reference temperature and pressure

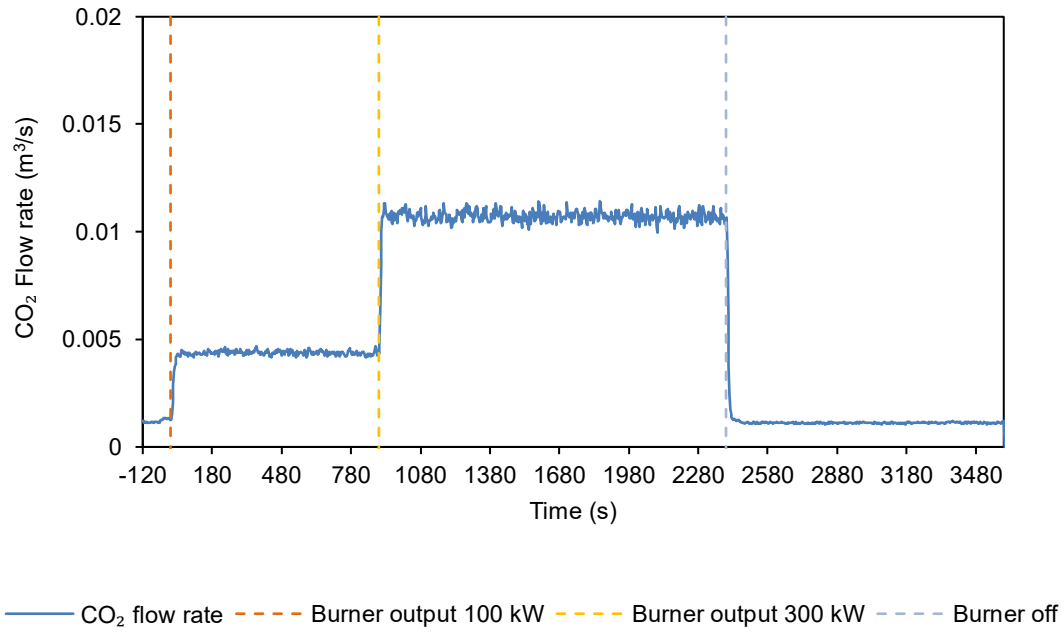

Figure 7 Production of carbon dioxide vs time, at reference temperature and pressure

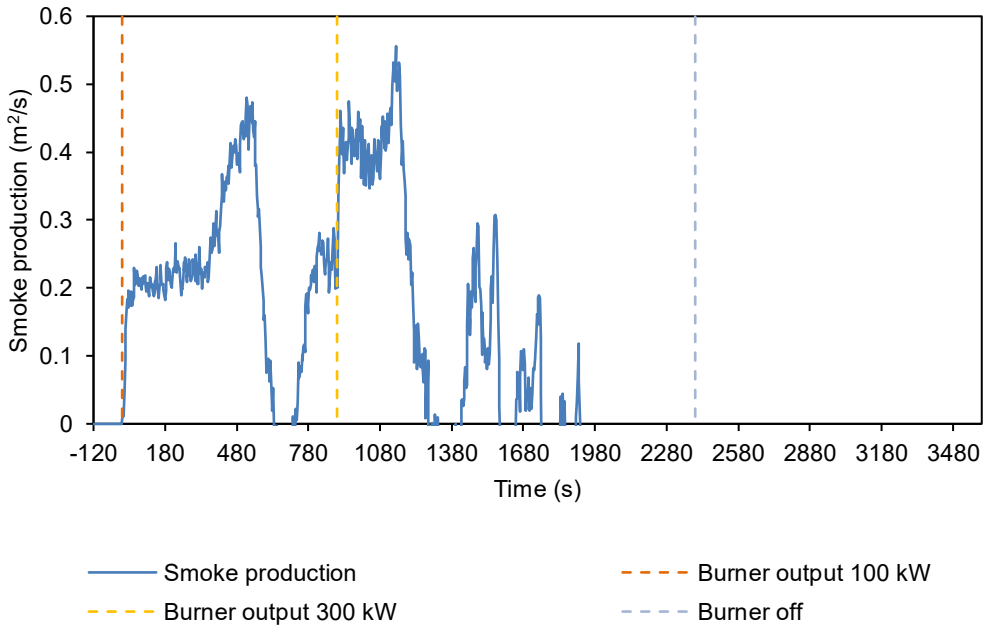

Figure 8 Production of light obscuring smoke vs time, at reference temperature and pressure

5. Application of test results

5.1 Test limitations

The results of these fire tests 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.

These results only relate to the behaviour of the specimen of the element of 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, and they do not necessarily reflect the actual behaviour in fires.

5.2 Variations from the tested specimen

This report details methods of construction, the test conditions and the results obtained when the specific element of construction described here was tested following the procedure outlined in Table 3. Any significant variation with respect to size, construction details, loads, stresses, edge or end conditions is not addressed by this report.

It is recommended that any proposed variation to the tested configuration should be referred to the test sponsor. They should then obtain appropriate documentary evidence of compliance from Warringtonfire or another accredited testing authority.

5.3 Uncertainty of measurements

Because of the nature of reaction to fire testing and the consequent difficulty in quantifying the uncertainty of measurements obtained from a reaction to fire test, it is not possible to provide a stated degree of accuracy of result.

Appendix A Test observations

Table 5 shows the observations of any significant behaviour of the specimen during the test.

Video recordings were also taken of the test from directly in front of the specimen and from an angle beside the specimen. A copy of the video recording is available upon request by contacting Cladding Safety Victoria. The video of the test should be viewed in conjunction with the contents of this report.

Table 5 Test observations

Time		Observation
Min	Sec	
-2	00	Data collection started.
0	00	The reaction to fire test was started with the burner ignited with a heat output set at 100 kW.
0	31	Discolouration started at the bottom section of the specimen.
1	10	Steel angle at the bottom of the specimen started to deform.
7	13	Charring started at the bottom of the plasterboard strips on the sides.
12	25	Slight discolouration appeared at the bottom section of the west side wall.
15	00	The heat output of the burner was increased to 300 kW.
18	42	Discolouration spread up to cover most of the specimen.
20	09	Some cracks appeared on the bottom west side of the specimen.
40	00	The burner was turned off.
60	00	The reaction to fire test was ended.

Appendix B Drawings of test assembly

The drawings of the test assembly in Figure 9 to Figure 12 were prepared by representatives of Warringtonfire. The leaders in the drawings represent the items listed in section 2.1. All measurements, unless specified, are in mm.

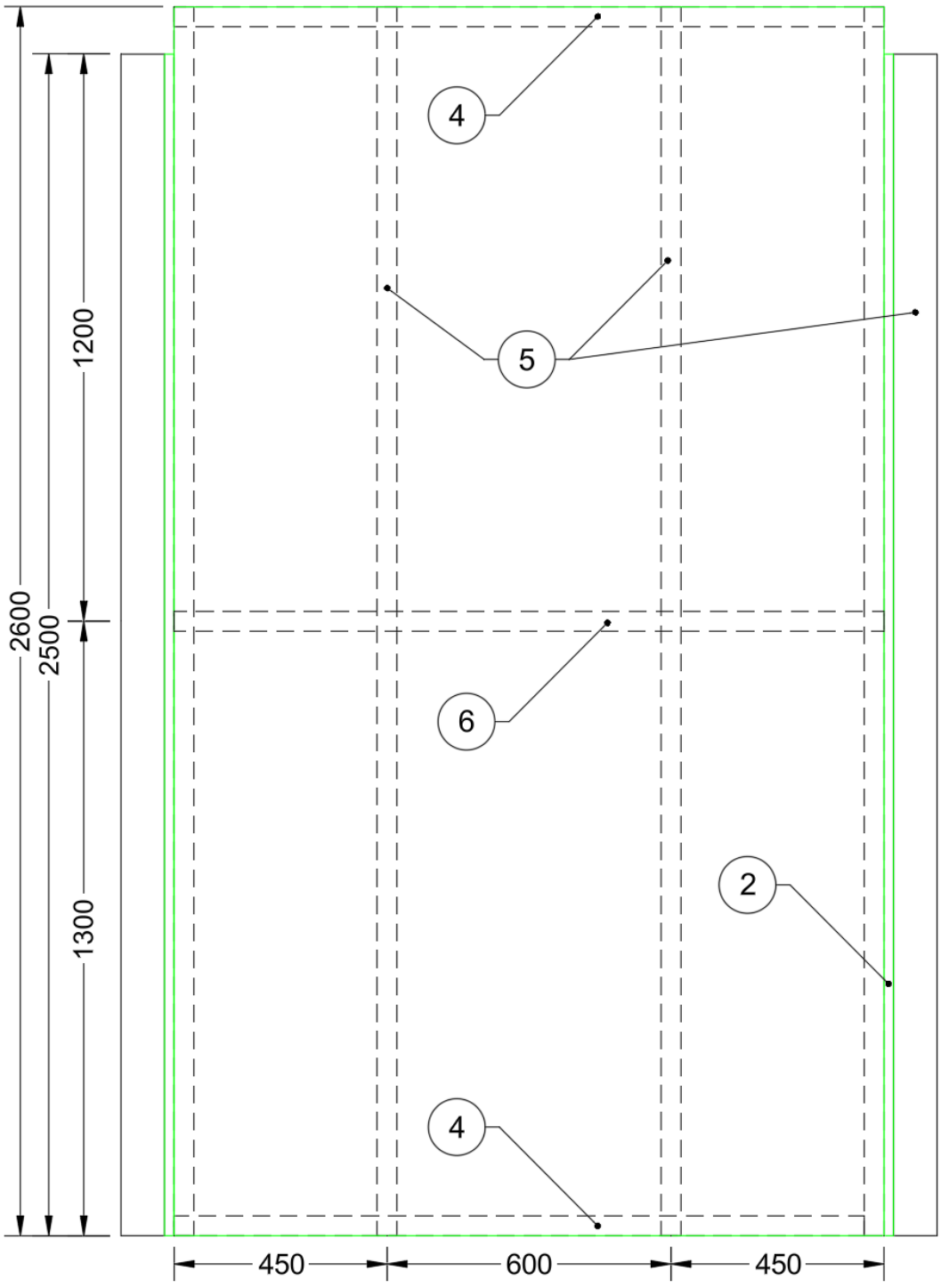

Figure 9 Elevation of rig support

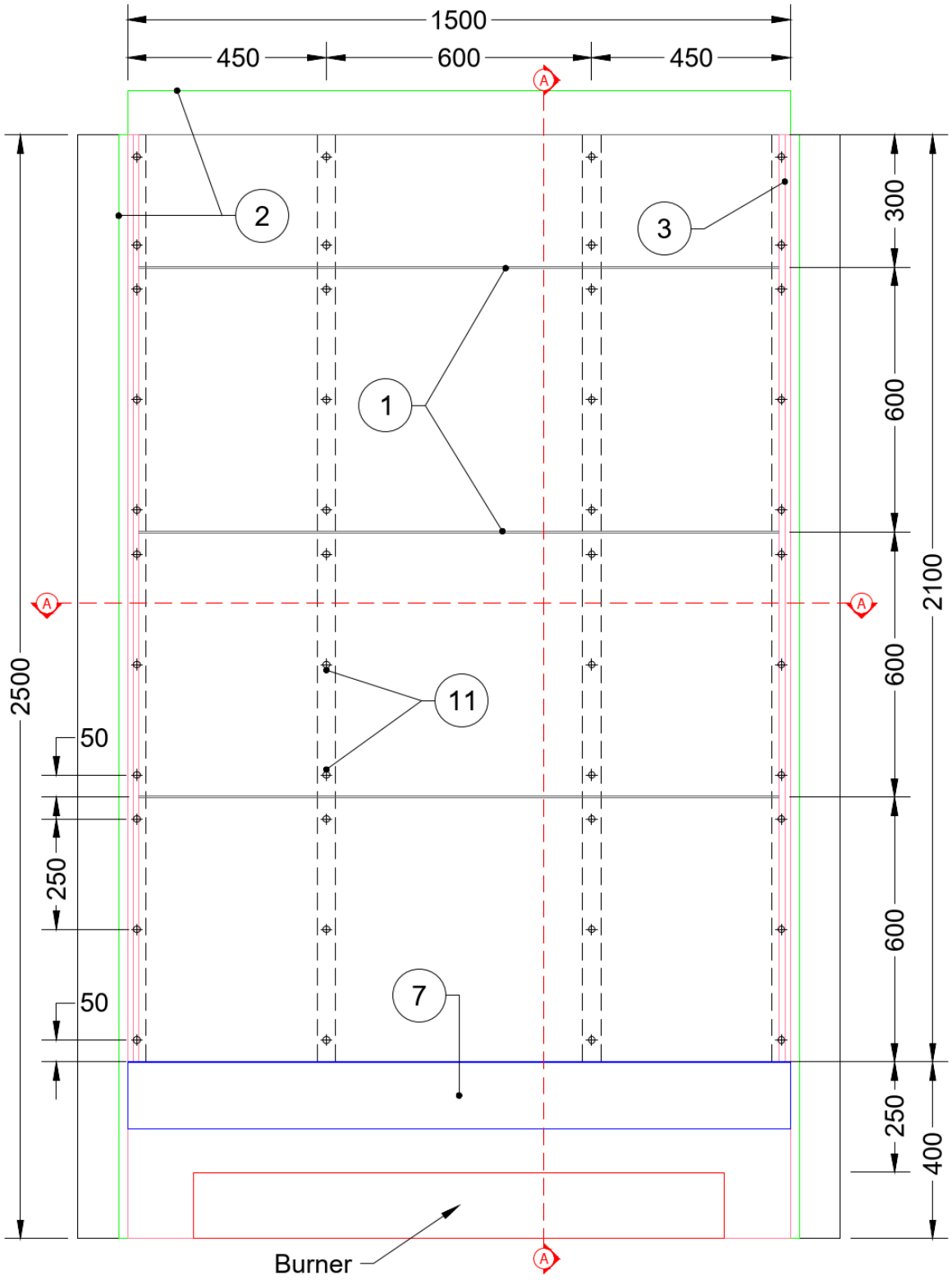

Figure 10 System assembly – Exposed side elevation

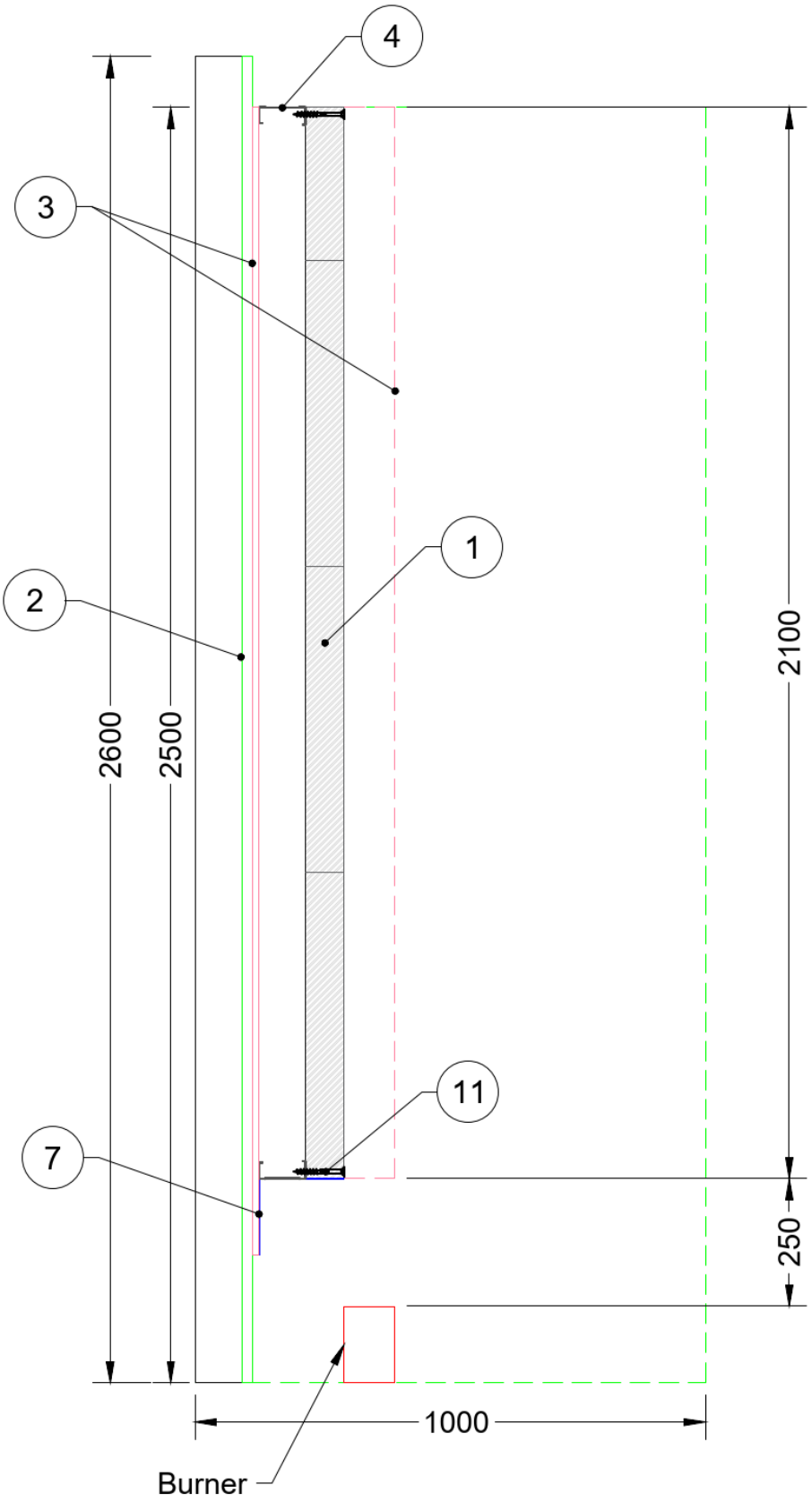

Figure 11 System assembly – Vertical cross-section A-A

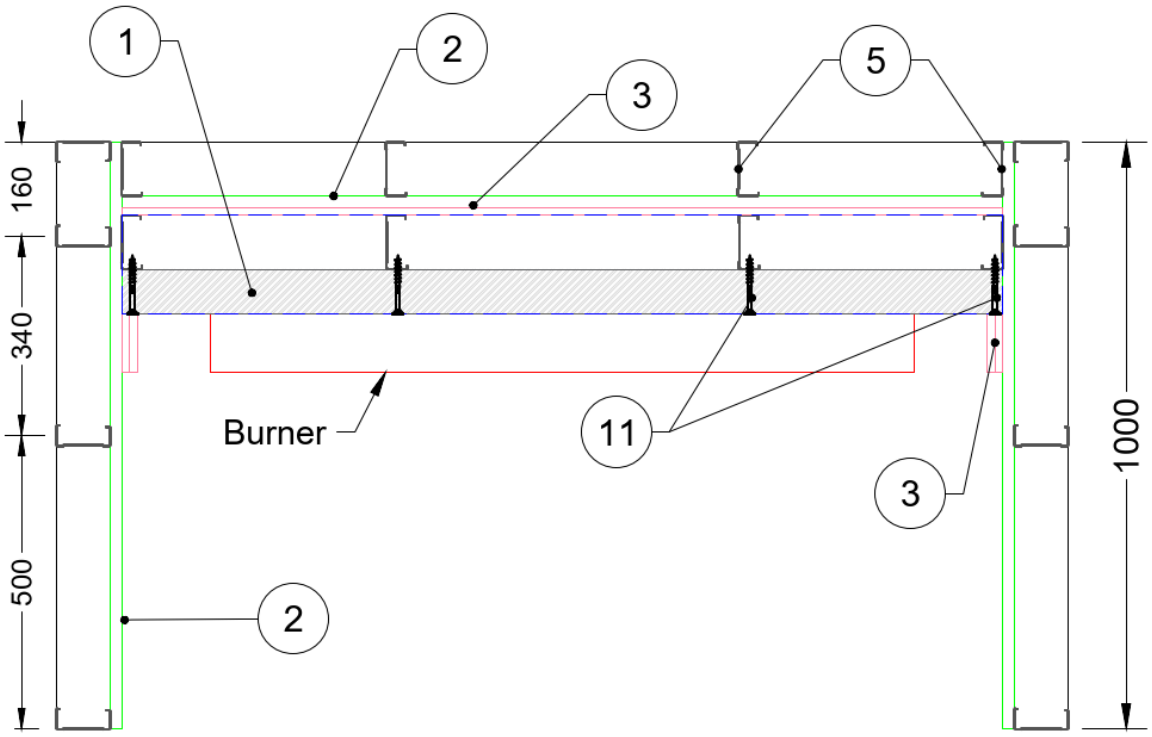

Figure 12 System assembly – Horizontal cross-section B-B

Appendix C Instrumentation locations

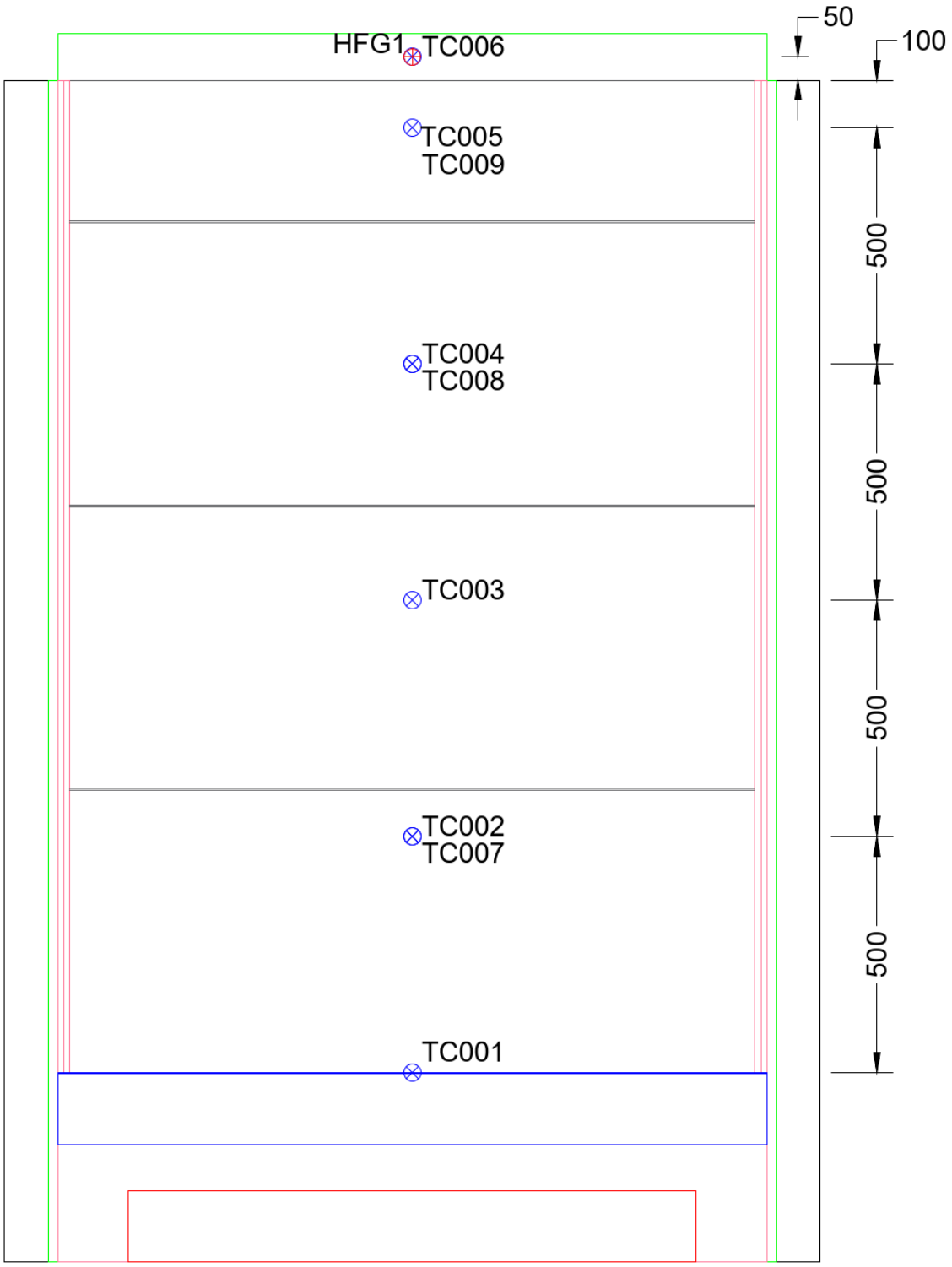

Figure 13 Instrumentation locations – Exposed side view

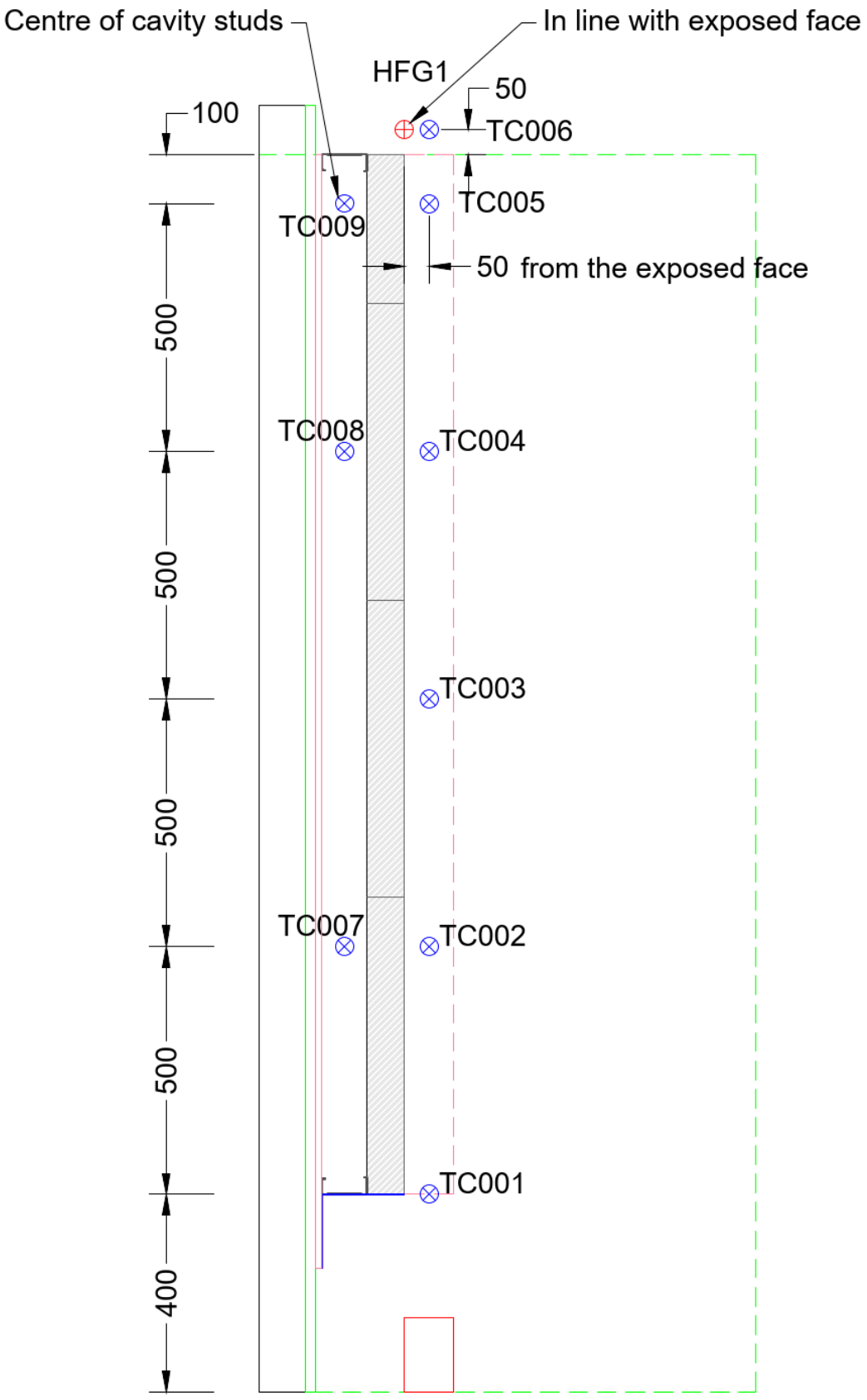

Figure 14 Instrumentation locations – Vertical cross-sectional view

Appendix D Photographs

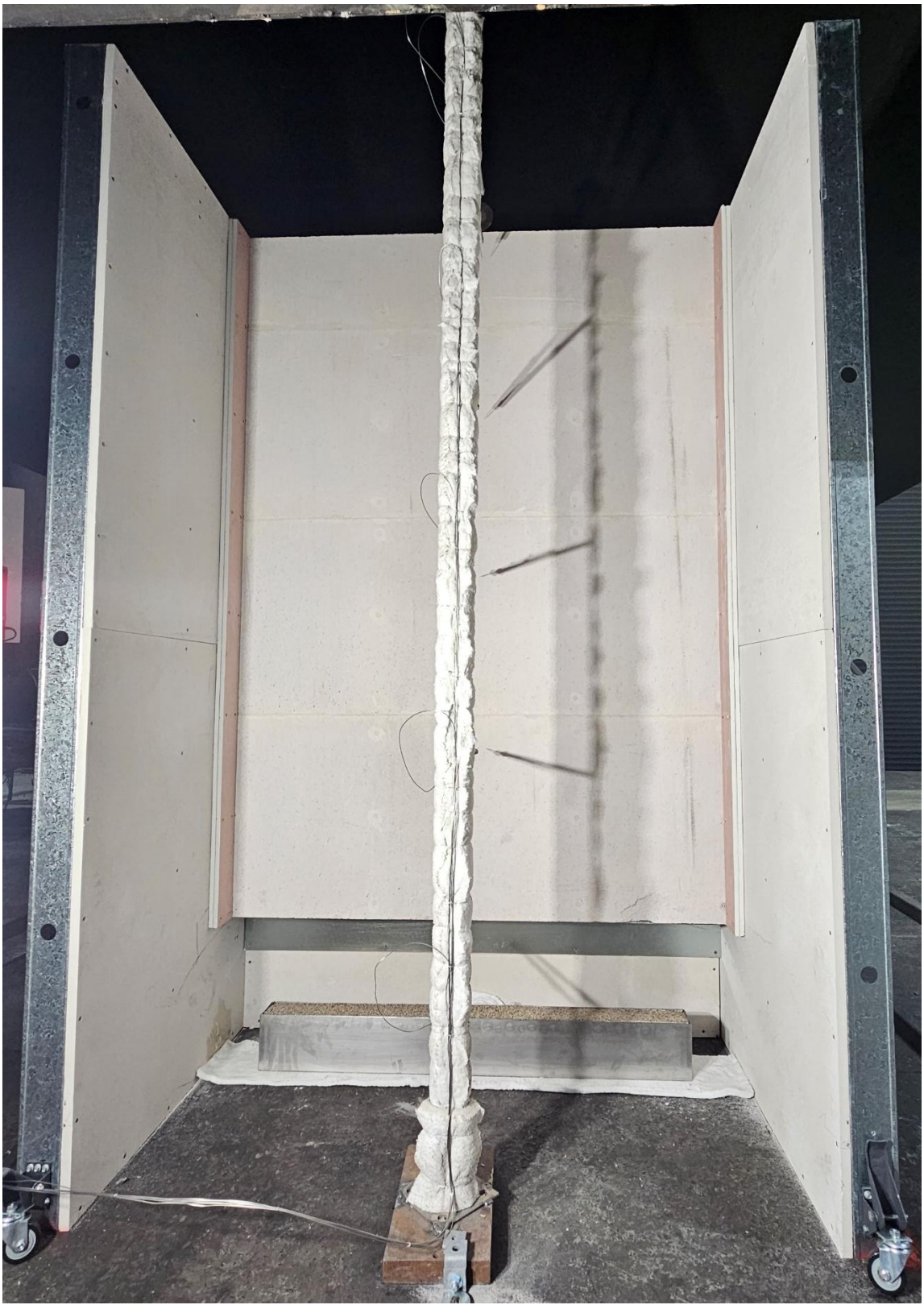

Figure 15 The specimen before the reaction to fire test – exposed side

Figure 16 The specimen before the reaction to fire test – unexposed side

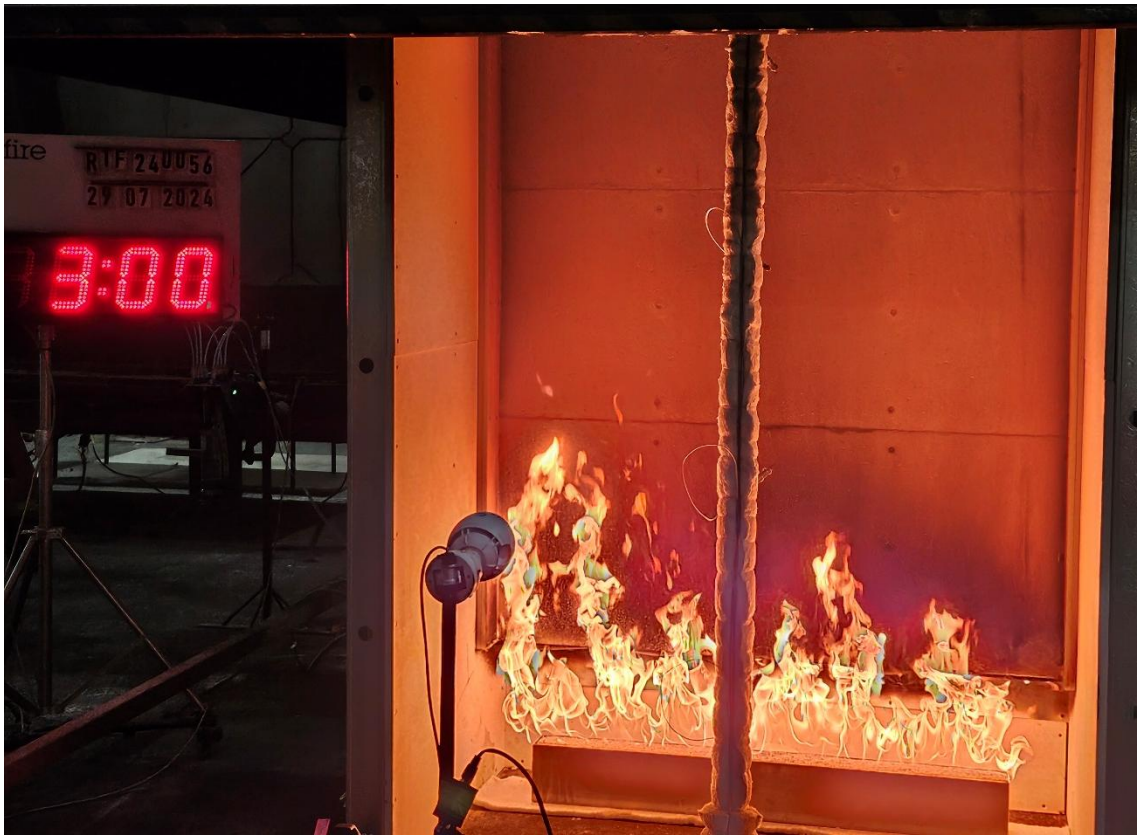

Figure 17 The specimen 3 minutes into the test (burner output at 100 kW)

Figure 18 The specimen 9 minutes 31 seconds into the test (burner output at 100 kW)

Figure 19 The specimen 14 minutes 59 seconds into the test (burner output at 100 kW)

Figure 20 The specimen 15 minutes 01 seconds into the test (burner output at 300 kW)

Figure 21 The specimen 23 minutes 36 seconds into the test (burner output at 300 kW)

Figure 22 The specimen 38 minutes 16 seconds into the test (burner output at 300 kW)

Figure 23 The specimen 40 minutes 17 seconds into the test (burner off)

Figure 24 The specimen 54 minutes 04 seconds into the test (burner off)

Figure 25 The specimen at end of the reaction to fire test – exposed side

Figure 26 The specimen after the reaction to fire test – unexposed side

WARRINGTONFIRE
AUSTRALIA
A Jensen Hughes Company

Warringtonfire Australia Pty Ltd
ABN 81 050 241 524

Perth

Suite 4.01, 256 Adelaide Terrace
Perth WA 6000
Australia
T: +61 8 9382 3844

Canberra

Unit 10, 71 Leichhardt Street
Kingston ACT 2604
Australia
T: +61 2 6260 8488

Melbourne

Level 4, 152 Elizabeth Street
Melbourne Vic 3000
Australia
T: +61 3 9767 1000

Sydney

Suite 802, Level 8, 383 Kent Street
Sydney NSW 2000
Australia
T: +61 2 9211 4333

Brisbane

Suite B, Level 6, 133 Mary Street
Brisbane Qld 4000
Australia
T: +61 7 3238 1700

Melbourne – NATA accredited laboratory

409-411 Hammond Road
Dandenong South Vic 3175
Australia
T: +61 3 9767 1000