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**THERMAL CLEARANCE TESTING OF THE PADESIGNS 1200  
GUILLOTINE APPLIANCE AND HEBEL POWERPANEL  
ENCLOSURE**

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## Revision Details

Revision	Date	Comments
0	29/11/2022	Preliminary report – awaiting payment and engineering drawings of appliance

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## **THERMAL CLEARANCE TESTING OF THE PADESIGNS 1200 GUILLOTINE APPLIANCE AND HEBEL POWERPANEL ENCLOSURE**

### **Report**

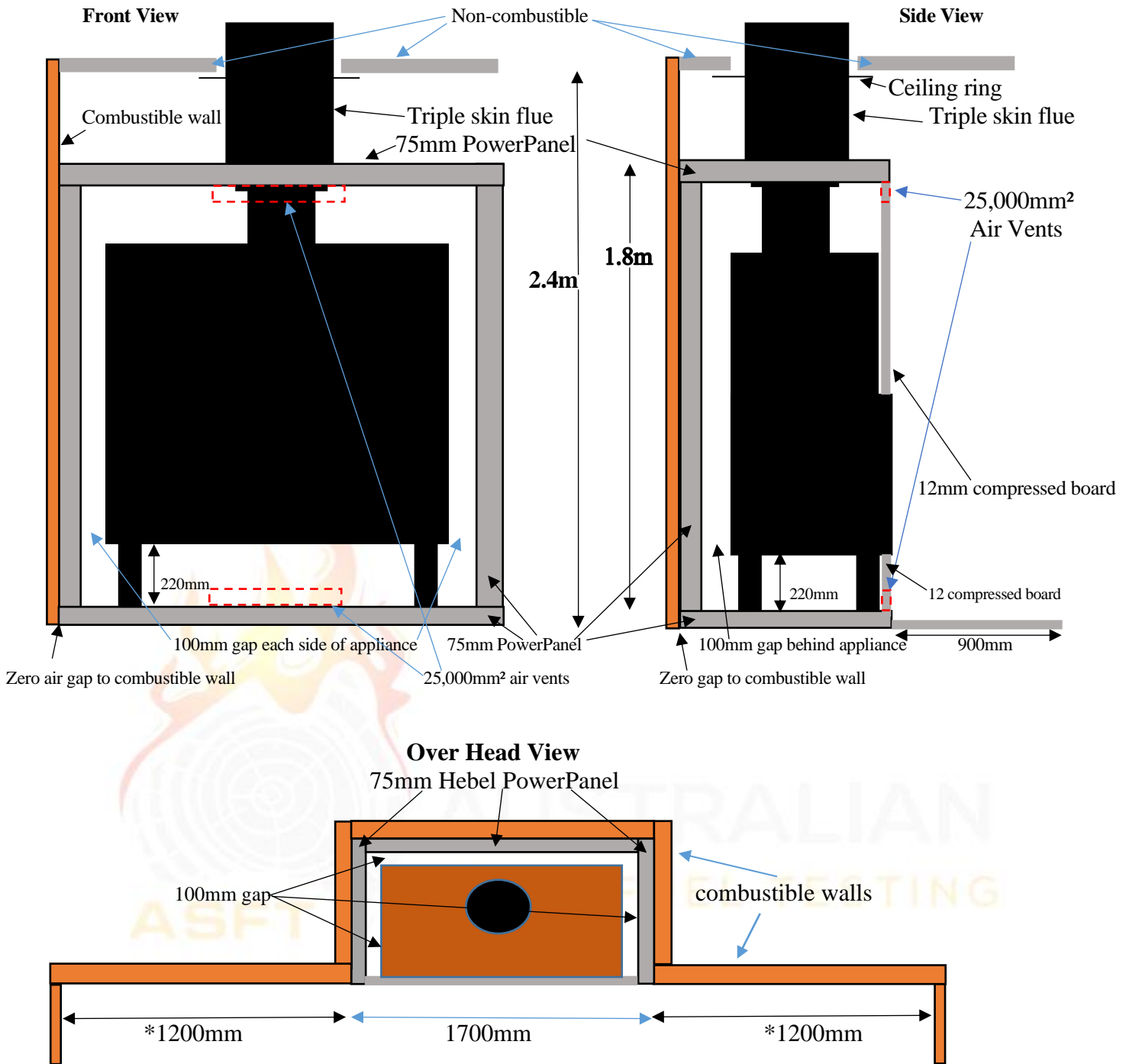
The PADesigns 1200 Guillotine appliance and Hebel PowerPanel enclosure were installed with a Flo-met SG-FLKIT 200-FS-B Flue Kit was tested in one position in a manner conforming to joint Australian/New Zealand Standard 2918:2018, Appendix B.

The appliance was installed with legs that raised the appliance 220mm above the hearth. A minimum 680mm deep x 1550mm wide x 75mm thick floor protector (Hebel PowerPanel) should be used under the appliance base when installing the appliance and a minimum 1700mm wide x 900mm deep x 27mm thick floor protector (compressed board) must be used in front of the enclosure base when installing the appliance (see joint AS/NZS 2918:2018 3.3.2). The floor protector should extend 900mm in front of the Hebel enclosure and be placed centrally in the 1700mm width. The Thermal resistivity of the floor protector is 0.59m<sup>2</sup>.K/W for 75mm Hebel PowerPanel. The Thermal resistivity of the floor protector is 0.12m<sup>2</sup>.K/W for 27mm thick compressed board sheets.

The appliance and Flue Combination should be installed at the following clearances:



- The rear and sides of the zero clearance enclosure consisted of 75mm Hebel PowerPanel.
- The front of the zero clearance enclosure consisted of 12mm compressed board.
- The Hebel enclosure was capped with 75mm Hebel PowerPanel to a height of 1800mm from the floor protector.
- The internal sides and rear of the Hebel PowerPanel enclosure must be installed a minimum of 100mm from the appliance.
- There must be a minimum 5mm gap from the front of the appliance to the compressed board.
- The PowerPanel enclosure must be vented below the appliance (75mm above the floor) and directly below the top of the Hebel enclosure. Each vent must be a minimum of 25,000mm<sup>2</sup> in size.
- The outer casing of the flue (300mm) must have a minimum 26.562mm<sup>2</sup> venting at the base of the flue. The inner galvanised casing of the flue (250mm) must be vented into the Hebel PowerPanel zero clearance box and be sealed to prevent venting into the outer flue casing.
- Non-combustible board must be used on the ceiling and extend a minimum of 1000mm in front of the flue outer casing and 700mm to the sides and rear from the flue outer casing unless it forms an abutment with a wall.
- No combustible material shall be used between the Hebel enclosure and ceiling penetration.
- The Flue penetration through the ceiling must have a minimum 25mm gap in all directions around the outer casing of the flue.
- The External rear wall of the Hebel PowerPanel zero clearance box can be placed against a combustible wall.
- The External side walls of the Hebel PowerPanel zero clearance box can be placed against a combustible wall.

The PADesigns 1200 Guillotine appliance and Hebel PowerPanel enclosure installed with a Flo-met SG-FLKIT 200-FS-B Flue Kit conforms to the requirements of the joint AS/NZS 2918:2018 Standard, Appendix B.



\*As per joint AS/NZS 2918:2018 Safety clearance 3.2.2 (b) a clearance of not less than 1200mm is required

Figure 1 – Clearance Diagram

			
<b>Signed</b>		<b>Approved</b>	
<b>Name</b>	Garry W. Mooney	<b>Name</b>	Steve Marland
<b>Title</b>	<i>Technical Officer</i>	<b>Title</b>	<i>Managing Director – Australian Solid Fuel Testing</i>
<b>Date</b>	29/11/2022	<b>Date</b>	29/11/2022

## 1. INTRODUCTION

Thermal Clearance testing of the Appliance and flue system took place on 23, 24, 25 and 28 November 2022 at the Australian Solid Fuel Testing Laboratory located at 3 Garden Street, Morwell, Victoria. The testing was performed by Mr G.W. Mooney and Mr S. Marland.

## 2. PROCEDURE

Testing was conducted as per Appendix B of AS/NZS2918;2018, Hot sites were located with the aid of an infra-red thermometer. Thermocouple tips were stapled onto the test surfaces, with black tape over the first 100 mm to facilitate consistent and accurate recording of temperatures. Thermocouple positions are shown in the table below:

### Position A – Parallel Position

Thermocouple No.	Position	Thermocouple No.	Position
1	Floor - 1300mm in front of centre	16	Floor – 150mm RHS of centre
2	Floor – 1200mm in front of centre	17	Floor – 300mm RHS of centre
3	Floor - 1050mm in front of centre	18	Floor – 450mm RHS of centre
4	Floor – 900mm in front of centre	19	Ceiling Ring – Inner front
5	Floor – 750mm in front of centre	20	Ceiling Ring – 25mm in front
6	Floor – 600mm in front of centre	21	Ceiling Ring – Inner side
7	Floor – 450mm in front of centre	22	Ceiling Ring – 25mm to side
8	Floor – 300mm in front of centre	23	Rear wall – 866mm from corner, 2185mm above the floor
9	Floor – 150mm in front of centre	24	Rear wall – 859mm from corner, 1158mm above the floor
10	Floor – Centre of flue	25	Rear wall – 859mm from corner, 738mm above the floor
11	Floor – 150mm behind centre	26	RHS wall, 385mm from corner, 737mm above the floor
12	Floor – 300mm behind centre	27	RHS wall, 410mm from corner, 2268mm above the floor
13	Floor – 450mm LHS of centre	28	RHS wall, 172mm from corner, 1751mm above the floor
14	Floor – 300mm LHS of centre	29	Rear wall – 843mm from corner, 1679mm above the floor
15	Floor – 150mm LHS of centre	30	Ambient temperature

TABLE 1

### **3. TEST FUEL**

Testing was conducted with Pinus Radiata as the test fuel which had a moisture content of 13.9% moisture. Each firewood piece was 300mm x 90mm x 40mm.

### **4. FLUE SYSTEM**

The flue system used during testing was a Flo-met SG-FLKIT 200-FS-B Flue Kit incorporating a 515mm ceiling ring with a 15mm air gap between the ceiling and the ceiling ring which was manufactured by Floate Metal Fabrications Pty Ltd. This flue system has not been tested to joint AS/NZS 2918:2018, Appendix F. The flue height was  $4.6 \pm 0.1$ m from the floor protector. Appendix 1 shows details of the flue system.

### **5. RESULTS**

#### **5.1 High Fire Test**

The appliance was fired in accordance with Section B9.1 of AS/NZS2918:2018. The level of fuel was maintained between 50-75% of the full volume level of the fuel chamber during the High Fire test.

The average fuel load for initiating the High Fire tests was 24.6kg with an average refuelling rate of 2.8kg/10 minutes.

During High Fire testing it was found that the highest surface temperatures occurred when the Primary air set @ 40% (~2011mm<sup>2</sup>) and secondary air set @ 50% (~665mm<sup>2</sup>).

#### **5.2 Flash Fire Test**

Immediately after the High Fire test was completed, sufficient embers were removed to bring the fire bed to a level of 15-25% of the fuel chamber volume. The appliance was then fired in accordance with Section B9.2 of AS/NZS2918:2018.

The average fuel load for initiating the Flash Fire tests was 17.4kg.

The highest temperature rises were achieved by having the Primary air set @ 40% (~2011mm<sup>2</sup>) and secondary air set @ 50% (~665mm<sup>2</sup>) with the door raised to create a 10mm air gap.

### 5.3 Ambient and Test Surface Temperatures

The Tables below show the Ambient temperatures and test surfaces temperatures during testing of the appliance and flue combination:

#### *Ambient Temperature Range °C*

Position	High Fire	Flash Fire
A	10.8 – 29.0	23.7 – 31.7

#### *Maximum Surface Temperature Rise above Ambient - Position A*

Position	Thermocouple Number	High Fire Test (°C)	Thermocouple Number	Flash Fire Test (°C)
Floor	5	57.7	5	68.7
Ceiling	20	45.0	20	55.6
Rear Wall	29	61.9	29	68.8
Side Wall	28	59.6	28	59.5

### 5.4 Uncertainty of Measurement Statement

- 5.5.1 The uncertainty of distance measurement for determining clearance distances was not greater than  $\pm 3\text{mm}$ .
- 5.5.2 The uncertainty of temperature measurement during the entire test period was a maximum of  $\pm 2^\circ\text{C}$  at a 95% confidence level.



## 6. APPLIANCE CONSTRUCTION DETAILS

The test results reported directly relate to the appliance/flue system tested. The details of the appliance given in this section include features which may affect safety clearances. Any change in the design/construction of this appliance or flue may invalidate this report. Below are the constructions details of the appliance:

Appliance Model Name: <b>1200 Guillotine</b>		Serial No: <b>000025/2022</b>
Manufacturer: <b>PA Designs</b>		
Overall Height: <b>1582mm</b>	Overall Depth: <b>612mm</b>	Overall Width: <b>1470mm</b>
Top Plate Width: <b>1272mm</b>	Top Plate Depth: <b>335-453mm</b>	Top Plate Thickness: <b>4mm</b>
Appliance Leg Height: <b>210mm</b>	Depth: <b>70mm</b>	Width: <b>70mm</b>
Appliance Feet Height: <b>Adjustable to 55mm</b> Diameter: <b>50mm</b>		
Usable Firebox Height: <b>410mm</b>	Width: <b>1178mm</b>	Depth: <b>397mm</b>
Usable Firebox Volume: <b>203.4 Litres</b>		
Firebox Material Type/Seam Fully Welded: <b>3.5mm steel fully welded</b>		
Firebrick Type: <b>Fully lined 25mm ceramic</b>		
Main Door Opening Height: <b>335mm</b>	Width: <b>1115mm</b>	
Door Height: <b>435mm</b>	Width: <b>1205mm</b>	Depth: <b>35mm</b>
Door glass Height: <b>400mm</b>	Width: <b>1203mm</b>	
Primary Air Location: <b>Under grate</b>		
Dimension of Primary Air: <b>1 hole @ 80mm diameter Butterfly control</b>		<b>Zero when fully closed</b>
Area of Primary (mm <sup>2</sup> ): <b>5,027.2mm<sup>2</sup></b>		
Secondary/Tertiary Air Location: <b>1 Tube running left to right at top and in the centre of the firebox</b>		
Dimension of Secondary/Tertiary Air: <b>16×6mm holes facing towards front, 16×6mm holes facing towards rear and 15×6mm holes downward</b>		
Area of Secondary/Tertiary Air (mm <sup>2</sup> ): <b>1,329.1mm<sup>2</sup></b>		
Baffle Plate size: <b>2 @ 1210×172×30mm ceramic. 1 front and 1 rear of secondary air tube</b>		
Flue Dimensions: <b>177.8mm</b>		
Spigot Dimensions:	OD: <b>196mm</b>	ID: <b>179mm</b>
Spigot to Rear of Appliance: <b>108mm</b>		
Rear Internal to External Heat Shield: <b>N/A</b>		
Firebox to Side External Heat Shield: <b>N/A</b>		
Heat Shield Material Type: <b>N/A</b>		
Water Heater Fitted: <b>No</b>		
Fan Location/Speeds: <b>No</b>		
Catalytic Combustor fitted: <b>No</b>		
Grate: <b>Yes</b>		
<b>NOTE: Accuracy of measurement is ±5% of the measured value</b>		



## 7. CONCLUSION

The PADesigns 1200 Guillotine appliance and Hebel PowerPanel enclosure installed with a Flo-met SG-FLKIT 200-FS-B Flue Kit, conforms to the requirements of Australian/New Zealand Standard 2918:2018, with respect to floor, ceiling, side wall and rear wall surface temperatures, when tested in the test position shown in Figure 1 of this report in accordance with Appendix B of AS/NZS2918:2018.



## APPENDIX 1:

### 200mm Triple flue kit – 200mm stainless steel active with 250mm & 300mm galvanized casings

