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THERMAL CLEARANCE TESTING OF THE QUADRA-FIRE EXPLORER 3 FREE STANDING APPLIANCE

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Revision Details

Revision	Date	Comments
0	10/01/2019	Preliminary report – awaiting payment and engineering drawings of appliance
1	29/04/2019	Issue of NATA endorsed report

THERMAL CLEARANCE TESTING OF THE QUADRA-FIRE EXPLORER 3 FREE-STANDING APPLIANCE

Report

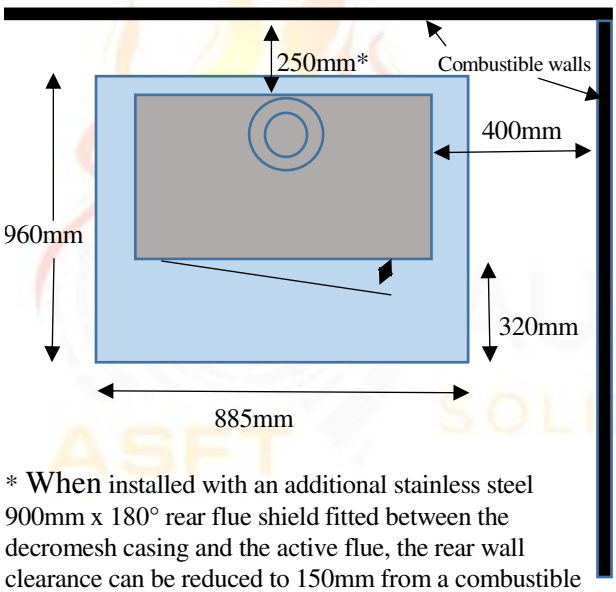
The Quadra-Fire Explorer 3 Free-standing appliance installed with a Wildcat 6" triple flue kit with 8" decromesh casing and optional rear flue shield installed between the decromesh casing and the active flue was tested in two positions in a manner conforming to joint Australian/New Zealand Standard 2918:2018, Appendix B.

A minimum 960mm deep x 885mm wide x 6mm thick floor protector (compressed board) should be used under and in front of the appliance base when installing the appliance (see joint AS/NZS 2918:2018 3.3.2). The floor protector should extend 320mm in front of the appliance door and be placed centrally in the 885mm width. The Thermal resistivity of the floor protector is 0.08m².K/W for 6mm thick sheets.

The Quadra-Fire Explorer 3 Free-Standing solid fuel appliance installed with a Wildcat 6" triple flue kit with 8" decromesh casing with optional rear flue shield installed between the decromesh casing and the active flue the appliance conforms to the requirements of the joint AS/NZS 2918:2018 Standard, Appendix B.

The appliance and flue system were tested at the following clearances;

Position A – Parallel position



* When installed with an additional stainless steel 900mm x 180° rear flue shield fitted between the decromesh casing and the active flue, the rear wall clearance can be reduced to 150mm from a combustible wall.

Position B – Corner position

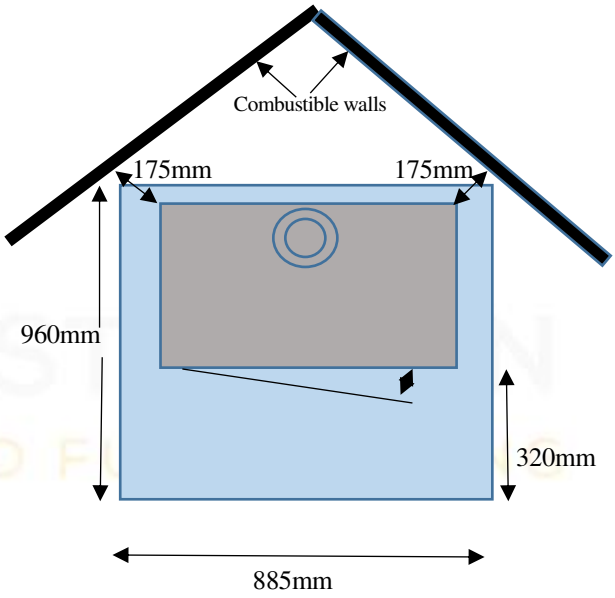


Figure 1 – Clearance Diagram

Signed		**Approved**	
Name	Garry W. Mooney	**Name**	Steve Marland
Title	*Technical Officer*	**Title**	*Managing Director – Australian Solid Fuel Testing*
Date	29/04/2019	**Date**	29/04/2019

1. INTRODUCTION

Thermal Clearance testing of the Quadra-Fire Explorer 3 appliance and flue system took place on January 8 & 9, 2019 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 – 586mm from corner, 776mm above the floor
9	Floor – 150mm in front of centre	24	Rear wall – 739mm from corner, 948mm above the floor
10	Floor – Centre of flue	25	Rear wall – 691mm from corner, 1058mm above the floor
11	Floor – 150mm behind centre	26	RHS wall, 1065mm from corner, 542mm above the floor
12	Floor – 300mm behind centre	27	RHS wall, 448mm from corner, 629mm above the floor
13	Floor – 450mm LHS of centre	28	RHS wall, 483mm from corner, 910mm above the floor
14	Floor – 300mm LHS of centre	29	Rear wall – 551mm from corner, 988mm above the floor
15	Floor – 150mm LHS of centre	30	Ambient temperature

Position B – Corner Position

Thermocouple No.	Position	**Thermocouple No.**	Position
19	Ceiling Ring – Inner front	25	LHS wall – 719mm from corner, 719mm above the floor
20	Ceiling Ring – 25mm in front	26	RHS wall, 797mm from corner, 656mm above the floor
21	Ceiling Ring – Inner side	27	RHS wall, 920mm from corner, 593mm above the floor
22	Ceiling Ring – 25mm to side	28	RHS wall, 790mm from corner, 932mm above the floor
23	LHS wall – 894mm from corner, 585mm above the floor	29	LHS wall, 809mm from corner, 640mm above the floor
24	LHS wall – 737mm from corner, 945mm above the floor	30	Ambient temperature

TABLE 1

3. TEST FUEL

Testing was conducted with Pinus Radiata as the test fuel which had a moisture content of 10.2% moisture. Each firewood piece was 300mm x 100mm x 40mm.

4. FLUE SYSTEM

The flue system used during testing was a Wildcat 6" triple flue kit with 8" decromesh casing and optional rear flue shield was supplied by Wildcat Industries (Aust) Pty Ltd. This flue system has not been tested to joint AS/NZS 2918:2018, Appendix F. The flue height was 4.6 ± 0.1m 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 12.0kg with an average refuelling rate of 1.2kg/10 minutes.

During High Fire testing it was found that the highest surface temperatures occurred when the primary air control of the appliance was fully open.

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 9.9kg.

The highest temperature rises were achieved by leaving the main door resting against the door catch and the ash pan door open with the primary air fully open.

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℃

Position	High Fire	Flash Fire
A	10.5 – 24.3	21.2 – 31.6
B	21.8 – 27.8	22.1 – 27.1

Maximum Surface Temperature Rise above Ambient - Position A

Position	Thermocouple Number	High Fire Test (°C)	Thermocouple Number	Flash Fire Test (°C)
Floor	3	60.7	3	56.6
Ceiling	19	22.9	19	27.7
Rear Wall	29	60.3	23	52.2
Side Wall	27	60.7	27	76.9

Maximum Surface Temperature Rise above Ambient - Position B

Position	Thermocouple Number	High Fire Test (°C)	Thermocouple Number	Flash Fire Test (°C)
Ceiling	19	25.5	19	29.7
RHS Wall	26	62.2	26	74.9
LHS Wall	24	60.0	24	79.3

5.4 Uncertainty of Measurement Statement

5.5.1 The uncertainty of distance measurement for determining clearance distances was not greater than ± 3mm.

5.5.2 The uncertainty of temperature measurement during the entire test period was a maximum of ± 2°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: **Quadra-Fire Explorer III** Serial No: **CV06301407**
Manufacturer: **Hearth & Home Technologies**
Overall Height: **805mm** Overall Depth: **643mm** Overall Width: **765mm**
Top Plate Width: **765mm** Top Plate Depth: **465mm** Top Plate Thickness: **8mm**
Appliance legs Height: **210mm** Depth: **2×35 - 75mm & 2×35 - 110mm** Width: **2×35 - 70mm & 2×35 -95mm**
Usable Firebox Height: **314 - 324mm** Width: **562mm** Depth: **405mm**
Usable Firebox Volume: **71.43 Litres**
Firebox Material Type/Seam Fully Welded: **Fully welded 5mm steel**
Firebrick Type: **Fully lined up to 230mm with 30mm thick ceramic**
Main Door Opening Height: **330mm** Width: **485mm**
Door Height: **433mm** Width: **596mm** Depth: **30mm**
Door glass Height: **330mm** Width: **510mm**
Fuel loading door on top of appliance: **543×272×8mm**
Primary Air Location: **Below firebox at front**
Dimension of Primary Air: **1 bullet shaped slot @ 76mm long x 13 – 38mm wide**
Area of Primary (mm^2): **2310mm^2**
Fitted with 20 minute delayed timer for primary air
Boost Air Location: **Above door at front of firebox 19 holes 7.94mm dia and Below door at front of firebox facing in, 1 hole 12.65mm dia & 7 holes 9.46mm dia**
Dimensions of Boost Air: **1 hole 12.65mm, 7 holes 9.46mm and 19 holes 7.94mm diameter**
Area of Boost Air: **1558.66mm^2**
Secondary/Tertiary Air Location: **3 tubes below baffle, 2 tubes with 17×4.76mm holes each. Front tube 25×4.76mm holes. All holes facing forward**
Dimension of Secondary/Tertiary Air: **59×4.76mm**
Area of Secondary/Tertiary Air (mm^2): **1050**mm^2
Baffle Plate size: **627×347×20 - 90mm**
Flue Dimensions: **152mm**
Spigot Dimensions: OD: **162mm** ID: **155mm**
Spigot to Rear of Appliance: **22mm**
Rear Internal to External Heat Shield: **57mm**
Firebox to Side External Heat Shield: **N/A**
Heat Shield Material Type: **1.2mm steel**
Water Heater Fitted: **No**
Fan Location/Speeds: **No**
Catalytic Combustor fitted: **No**
Grate: **No**
Ash pan fitted
NOTE: Accuracy of measurement is ±5% of the measured value

7. CONCLUSION

The Quadra-Fire Explorer 3 Free-standing appliance installed with a Wildcat 6" triple flue kit with 8" decromesh casing and optional rear flue shield, 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 positions shown in Figure 1 of this report in accordance with Appendix B of AS/NZS2918;2018.

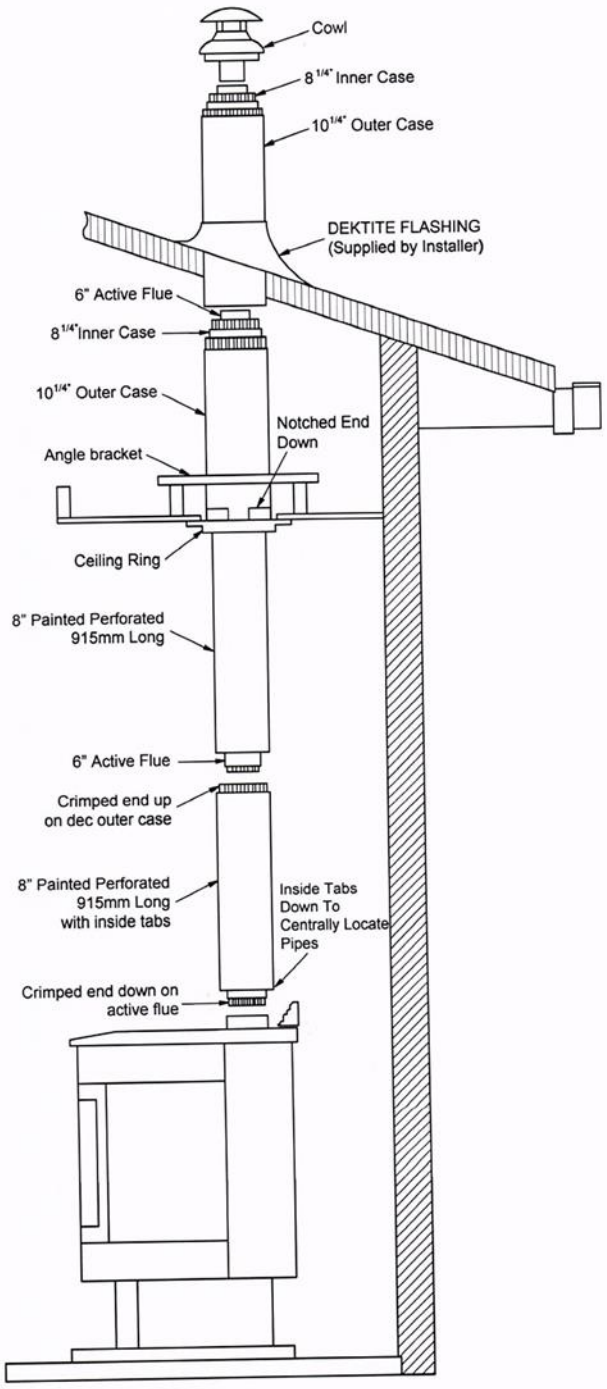
APPENDIX 1:

Wildcat INDUSTRIES (Aust) P/L

Freestanding Triple Skin Flue Kit Perforated 6" - 8" - 10" System

QTY	DESCRIPTION
4	6" Stainless Steel Inner Flue 915mm Long
1	7¾" Painted Perforated 915mm Long
1	7¾" Painted Perforated 915mm Long with in-tabs
2	8" Galvanized Inner Flue Casing 915mm Long
1	10" Galvanized Notched Outer Flue Casing 915mm Long
1	10" Galvanized Outer Flue Casing 915mm Long
1	Cowl
1	Ceiling Ring
2	75 x 25 Angles 915mm Long
1	Installation Guide

CARTON SPECIFICATIONS	
Height	460mm
Width	460mm
Length	1150mm
Weight	32kg



WILDCAT INDUSTRIES
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ABN 84 112 862 718
www.wildcatindustries.com.au

MUST ONLY BE INSTALLED BY AN AUTHORISED PERSON IN COMPLIANCE WITH AS 2918

Freestanding 10 Triple Skin Instruction page