

Certification Test Report

Sherwood Industries Ltd.

Pellet Stove Insert

Model: M55

Prepared for: Sherwood Industries Ltd.
6782 Oldfield Road
Saanichton, BC V8M 2A3
CANADA

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Test Period: October 15-18, 2010

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Section 5

Sampling Procedures and Test Results

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INTRODUCTION

Sherwood Industries Ltd. retained OMNI-Test Laboratories, Inc. (*OMNI*) to perform U.S. Environmental Protection Agency (EPA) certification testing on the M55. The M55 is a pellet-fired insert room heater.

The testing was performed at *OMNI*'s testing facility in Portland, Oregon. The unit was received in good condition and logged in at the *OMNI*'s testing facility on October 13, 2010. It was assigned and labeled with *OMNI* ID #1611. *OMNI* representative Sebastian Button and Aaron Kravitz conducted the certification testing and completed all testing by October 18, 2010. A testing contract, including provisions for Random Compliance Audit (RCA) testing, has been signed by Stuart O'Connor of Sherwood Industries Ltd. and is on file at *OMNI*.

The M55 was tested in accordance with the U.S. EPA 40 CFR Part 60, Subpart AAA – Standard of Performance for Residential Wood Heaters (Appendix A, Methods 28 and 5H). Particulate emissions were measured using a Method 5H sampling train consisting of a heated front filter, an iced impinger train, and a rear filter. The weighted average emissions of the four test runs indicate a particulate emission rate of 1.0 g/hr. Test runs were conducted in each of four burn rate categories (<0.80 kg/hr; 0.80-1.25 kg/hr; 1.25-1.90 kg/hr; and maximum). Emissions for each of the individual test runs did not exceed the cap. The M55 results are within the emission limit of 7.5 g/hr for non-catalytic affected facilities manufactured on or after July 1, 1990, or sold at retail on or after July 1, 1992.

Model M55 has a demonstrated weighted average thermal efficiency calculated at 83.4%, which exceeds the EPA default for pellet stoves.

This report is organized in accordance with the EPA-recommended outline and is summarized in the Table of Contents immediately preceding this report. The results in this report are limited to the item submitted.

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Table 1.1 – Particulate Emissions

Run	Burn Rate (kg/hr dry)	Method 5H Emissions (g/hr)
1	2.25	0.91
2	0.62	1.12
3	1.48	0.92
4	0.92	1.14
Weighted particulate emission average of four test runs: 1.0 g/hr		

Table 1.2 – Test Facility Conditions

Run	Room Temperature (°F)		Barometric Pressure (Hg)		Air Velocity (ft/min)	
	Before	After	Before	After	Before	After
1	30.36	30.36	62	66	<50	<50
2	30.36	30.28	65	67	<50	<50
3	30.32	30.38	63	66	<50	<50
4	30.32	30.32	66	68	<50	<50

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Table 1.3.1 – Fuel Measurement Summary – PRETEST

Run	Beginning Fuel Weight (lbs)	Ending Fuel Weight (lbs)
1	41.6	34.5
2	23.7	21.9
3	41.3	36.1
4	29.5	26.8

Table 1.3.2 – Fuel Measurement Summary – TEST

Run	Beginning Fuel Weight (lbs)	Fuel Moisture Content (Dry basis - %)	Ending Fuel Weight (lbs)
1	10.2	3.0	0.0
2	2.8	3.0	0.0
3	6.7	3.0	0.0
4	4.2	3.0	0.0

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Table 1.4 – Dilution Tunnel Gas Measurements and Sampling Data Summary

Run	Length of Test (min)	Average Dilution Tunnel Gas Measurements		
		Velocity (ft/sec)	Flow Rate (dscf/min)	Temperature (°F)
1	120	13.0	138.8	109.5
2	120	12.7	141.1	85.2
3	120	12.6	136.0	101.8
4	120	12.7	137.3	97.2

Table 1.5 - Heater Operation Data (Average Temperature Data)

Run	Beginning Surface Temperature Average ^a	Ending Surface Temperature Average ^a	Surface Delta T ^b
1	625	661	36
2	281	266	15
3	507	518	11
4	376	367	9

a. All temperatures are in °F.
 b. Represents the difference between beginning and ending average surface temperature.

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Table 1.6 – Pretest Configuration

Run	Stove Temperature Control	Feed Adjuster	Temperature Control	Time (min)
1	Heat Setting 5	N/A	N/A	80
2	Heat Setting 1	N/A	N/A	80
3	Heat Setting 3	N/A	N/A	84
4	Heat Setting 2	N/A	N/A	80

Table 1.7 – Test Configuration

Run	Stove Temperature Control	Feed Adjuster	Temperature Control	Time (min)
1	Heat Setting 5	N/A	N/A	120
2	Heat Setting 1	N/A	N/A	120
3	Heat Setting 3	N/A	N/A	120
4	Heat Setting 2	N/A	N/A	120

Table 1.8 – Run Data

Run	Average Dry Burn Rate (kg/hr)	Initial (Induced) Draft (in H ₂ O)	Average Draft (in H ₂ O)	Run Time (min)
1	2.25	0	-0.04	120
2	0.62	0	-0.04	120
3	1.48	0	-0.03	120
4	0.92	0	-0.03	120

TEST RESULTS AND DISCUSSION

A total of four test runs were conducted in the following categories: one in the <0.80 kg/hr dry category, one in the 0.80 to 1.25 kg/hr dry category, one in the 1.25 to 1.90 kg/hr dry category, and one at maximum.

The weighted particulate emission rate was measured to be **1.0 g/hr**.

The proportionality results for all four test runs were acceptable. Quality check results for each test run are presented in Section 2 of this report.