

Certification Test Report

Sherwood Industries Ltd.

Pellet Fireplace Insert

Model: Empress

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

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Test Period: April 9-13, 2009

Report Date: April 2009

Report Number: 268-S-14-8.3

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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 Empress. The Empress is a pellet-fired fireplace insert.

The testing was performed at *OMNI*'s testing facility in Portland, Oregon. The altitude of the laboratory is 30 feet above sea level. The unit was received in good condition and logged in at the *OMNI*'s testing facility on March 24, 2009. It was assigned and labeled with *OMNI* ID #1402. *OMNI* representative Ken Morgan conducted the certification testing and completed all testing by April 13, 2009. A testing contract, including provisions for Random Compliance Audit (RCA) testing, has been signed by Brian Drescher of Sherwood Industries Ltd. and is on file at *OMNI*.

The Empress 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 5G). Particulate emissions were measured using a Method 5G sampling train consisting of two filters (front and back). The weighted average emissions of the four test runs indicate a particulate emission level of 1.3 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 Empress 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.

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 5G Emissions (g/hr)
1	1.88	1.87
2	0.65	1.98
3	1.23	0.63
4	1.48	0.86
Weighted particulate emission average of four test runs: 1.3 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	75	77	29.96	29.95	<50	<50
2	71	72	30.05	30.05	<50	<50
3	72	71	30.26	30.27	<50	<50
4	72	72	30.27	30.24	<50	<50

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Table 1.3.1 – Fuel Measurement Summary – PRETEST

Run	Beginning Fuel Weight (lbs)	Ending Fuel Weight (lbs)
1	29.1	24.2
2	22.8	21.1
3	17.2	14.2
4	16.9	13.6

Table 1.3.2 – Fuel Measurement Summary – TEST

Run	Beginning Fuel Weight (lbs)	Fuel Moisture Content (Dry basis - %)	Ending Fuel Weight (lbs)
1	8.4	1.3	0.0
2	2.9	1.3	0.0
3	5.5	1.3	0.0
4	6.6	1.3	0.0

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	14.07	142.2	130.7
2	120	13.81	148.6	96.3
3	120	13.06	138.9	106.9
4	120	12.60	133.1	110.8

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	505.8	510.6	5
2	287.4	281.6	6
3	406.0	417.6	12
4	482.8	469.0	14

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

Table 1.6 – Pretest Configuration

Run	Stove Temperature Control	Feed Adjuster	Temperature Control	Time (min)
1	Setting 5 of 5	N/A	N/A	63
2	Setting 1 of 5	N/A	N/A	67
3	Setting 3 of 5	N/A	N/A	60
4	Setting 4 of 5	N/A	N/A	60

Table 1.7 – Test Configuration

Run	Stove Temperature Control	Feed Adjuster	Temperature Control	Time (min)
1	Setting 5 of 5	N/A	N/A	120
2	Setting 1 of 5	N/A	N/A	120
3	Setting 3 of 5	N/A	N/A	120
4	Setting 4 of 5	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	1.88	0	-0.057	120
2	0.65	0	-0.034	120
3	1.23	0	-0.049	120
4	1.48	0	-0.056	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 level was measured to be 1.3 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.