Non-Confidential Business Information (Non-CBI)

Certification Test Report

Glen Dimplex Americas

Model: Nectre N65

Prepared for:	Glen Dimplex Americas 1367 Industrial Rd Cambridge, ON N3H4W3 CANADA
Prepared by:	OMNI-Test Laboratories, Inc. 13327 NE Airport Way Portland, OR 97230 (503) 643-3788
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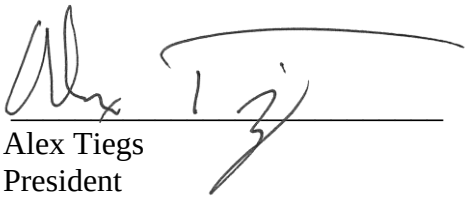
AUTHORIZED SIGNATORIES

This report has been reviewed and approved by the following authorized signatories:

Evaluator:

Bruce Davis
Technician

Reviewer:



Alex Tiegs
President

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INTRODUCTION

Glen Dimplex Americas retained *OMNI* to perform U.S. Environmental Protection Agency (EPA) certification testing on the Nectre N65 (N65) Freestanding woodstove. The Nectre N65 Freestanding wood stove is a Non-Catalytic-type room heater. The firebox is constructed of mild steel. Usable firebox volume was measured to be 1.47 cubic feet and the stove is vented through 6" flue collar located on the stove top.

Testing was performed at Nelke Consulting, altitude of the laboratory is 500 feet above sea level. The unit was received in good condition and logged in on 7/15/19, then assigned and labeled with *OMNI* ID #2380. *OMNI* representative Bruce Davis conducted the certification testing and completed all testing by July 17, 2019.

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

SAMPLING PROCEDURE

The Nectre N65 wood stove was tested in accordance with the U.S. EPA 40 CFR Part 60, Subpart AAA – Standards of Performance for New Residential Wood Heaters using ASTM E2515, EPA Alt-125, and ASTM E3053. Particulate emissions were measured using sampling trains consisting of two Teflon coated 47mm filters (front and back). See Appendix A for details on EPA Alt-125.

The model Nectre N65 was tested for thermal efficiency and carbon monoxide (CO) emissions in accordance with CSA B415.1-10 using Maple cordwood.

SUMMARY OF RESULTS

The weighted average emissions of the three test runs included in the results indicate a particulate emission rate of 1.98 grams per hour. Particulate emissions used in the weighted average were sampled on only one of the high burn fuel loads, test 3 was conducted to generate a coal bed for test number 4. The Nectre 65 results are within the emission limit of 2.5 g/h for affected facilities tested with cordwood, manufactured on or after May 15, 2020.

The proportionality results for all 3 test runs were acceptable. Quality check results for each test run are presented in Section 2 of this report.

INDIVIDUAL RUN SUMMARIES

Run 1 - Test procedures followed to produce a high burn rate with a primary air setting of fully open. Observed burn rate was calculated at 5.81 kg/hr. Emissions results were calculated using particulate sampling from kindling, start-up fuel, and test fuel load combined (cold to hot). Burn rate, and efficiency were calculated using data from the test fuel load only (hot to hot). No sampling anomalies occurred; this test run was determined to be valid for inclusion in the weighted average.

Run 2 - Test procedures were followed to produce a medium burn rate with a primary air setting of 0.04" from full closed. Observed burn rate was calculated at 1.21 kg/hr. Emissions and efficiency results were calculated using a hot to hot burn cycle, a coal bed generated by the high burn procedure was used. No sampling anomalies occurred; this test run was determined to be valid for inclusion in the weighted average.

Run 3 - Test procedures followed to produce a high burn rate with a primary air setting of fully open. Observed burn rate was calculated at 5.25 kg/hr. Burn rate, was calculated using data from the test fuel load only (hot to hot). No sampling occurred during this test; it was conducted to generate a coal bed for test number 4.

Run 4 - Test procedures were followed to produce a low burn rate with a primary air setting of fully closed. Observed burn rate was calculated at 1.09 kg/hr. Emissions and efficiency results were calculated using a hot to hot burn cycle, a coal bed generated by the high burn conducted in test three was used. No sampling anomalies occurred; this test run was determined to be valid for inclusion in the weighted average.

Table 1 – Particulate Emissions

Run	**Burn Rate** Calculated from a Hot to Hot burn cycle (kg/h dry)	**ASTM E2515 Emissions** (g/h)	**ASTM E3053 Weighting Factor** (%)	**ASTM E3053 Weighted Emissions** (g/h)
1	5.81	[1]5.26	20	1.052
2	1.21	0.53	40	0.212
4	1.09	1.80	40	0.720
The sum of weighted particulate emission of 3 test runs, tests 1,2, and 4: 1.052 + 0.212 + 0.720 = **1.98** grams per hour.				

Note: [1] Based on a cold start including kindling and start-up fuel.

Table 2 – Particulate Emissions (First Hour)

Run	**ASTM E2515 Emissions – First Hour** (g/h)
1	1.32
2	1.54
4	8.82

Table 3 – B415.1 Efficiency and CO Emissions

Run	Heat Output (BTU/h)	HHV Efficiency (%)	LHV Efficiency (%)	CO Emissions (g/MJ Output)	CO Emissions (g/kg Dry Fuel)	CO Emissions (g/min)
1	68,531	61.0	65.2	1.85	22.57	2.233
2	15,900	69.6	74.5	2.42	33.65	0.676
4	14,108	68.2	73.0	3.49	47.46	0.864
Weighted average HHV efficiency of three test runs: 12.20 + 27.84 + 27.28 = **67.3%**. Average CO Emissions of three tests: (2.233 + 0.676 + 0.864) / 3 = **1.258 g/min**						

Table 4 – Test Facility Conditions

Run	Room Temperature (°F)		Barometric Pressure (Hg)		Air Velocity (ft/min)	
	Before	**After**	**Before**	**After**	**Before**	**After**
1	72	80	29.94	29.95	<50	<50
2	77	85	29.92	29.94	<50	<50
3	77	85	29.96	29.93	<50	<50
4	82	66	29.34	29.39	<50	<50

Table 5 – Kindling and Start-up Fuel Description Summary
Maple Cordwood

Run	**Kindling Weight Wet Basis** (lbs)	**Start-up Fuel Weight Wet Basis** (lbs)	**Residual Start-up fuel weight (lbs)**
1	2.80	4.20	1.5
3	2.80	4.40	1.6

Note: Test 3 was a high burn used to create a coal bed for test number 4, no particulate sampling occurred during this test.

Table 6 – Fuel Measurement and Cordwood Description Summary – TEST
Maple Cordwood

Run	Test Fuel Wet Basis (lbs)	Firebox Volume (ft^3)	Fuel Loading Density Wet Basis (lbs/ft^3)	Test Fuel Dry Basis (lbs)	Test Fuel Consumed During Test Dry Basis (lbs)	Piece Length (in)
1	14.00	1.47	9.5	14.00 + 5.92	14.7	3@12.5 2@11.0
2	17.40	1.47	11.8	14.4	14.4	3@12.5 2@11.0
3	14.70	1.47	10.0	12.2 + 6.15	15.1	3@12.5 2@11.0
4	17.70	1.47	12.0	14.61	14.6	3@12.5 2@11.0

Table 7 – 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	79	20.48	202.6	157
2	325	21.54	231.2	108
4	365	20.02	218.7	98

Table 10 – Test Configurations

Run	Startup Procedures	Combustion Air
1	Fuel Loading: Kindling and start-up fuel loaded together, a torch was used for 40 seconds to establish a fire. At 30 minutes placed fuel load into the firebox and closed the loading door. Loading required less than 1 minute to complete. Door: For kindling and start-up fuel, loading door was closed by 2.30 minutes. Test fuel load; fuel loading door was closed by 1:30 minute. Primary Air: Air control fully open for the entire test. Fan: N/A Bypass: N/A	Fully open for entire test.
2	Fuel Loading: Test fuel loaded onto coal bed generated by test number 1 by 52 seconds. Door: Closed by 5:00 minutes. Primary Air: Fully open, then set to 0.04" from full closed by 8.5 minutes. Fan: N/A Bypass: N/A	Fully open for first 8.5 minutes, then set to 0.04" from full closed.
3	Fuel Loading: Kindling and start-up fuel loaded together, a torch was used for 45 seconds to establish a fire. At 34 minutes placed fuel load into the firebox and closed the loading door. Loading required less than 1 minute to complete. Door: For kindling and start-up fuel, loading door was closed by 2.30 minutes. Test fuel load; fuel loading door was closed by 1:30 minute. Primary Air: Air control fully open for the entire test. Fan: N/A Bypass: N/A	Fully open for entire test.
4	Fuel Loading: Test fuel loaded onto coal bed generated by test number 3 by 80 seconds. Door: Closed by 6:20 minutes. Primary Air: Fully open, then set to full closed by 13.0 minutes. Fan: N/A Bypass: N/A	Fully open for first 13.0 minutes, then set to fully closed.

Section 2

Photographs/Appliance Description/Drawings

Glen Dimplex Americas
Model N65
Test Dates: July 16, 2019 – July 17, 2019

Banded Stove Post Test Front Left View

Banded Stove Post Test Rear View

Banded Stove Post Test Front Right View

Glen Dimplex Americas
Model N65

Run 1 – Kindling and start-up fuel

Run 1 – Kindling and start-up fuel

Run 1 – Ignition of kindling

Run 1 – Fuel load

Glen Dimplex Americas
Model N65

Run 1 – Test Fuel Load In Stove

Run 1 – Remaining Coal After Test

Run 2 – Test Fuel Load

Missing File

Run 2 – Test Fuel Loaded into Stove

Run 2 – Remaining Coal After Test

Run 3 – Kindling and start-up fuel

Run 3 – Test Fuel Load

Run 3 – Test Fuel Loaded into Stove

Run 3 - Remaining Coal After Test

Run 4 – Test Fuel Load

Run 4 – Test Fuel Loaded into Stove

Run 4 – Remaining Coal After Test

WOOD HEATER DESCRIPTION

Appliance Manufacturer: Glen Dimplex Americas

Wood Stove Model: Nectre N65

Type: Freestanding Wood Fired Room Heater

WOOD HEATER INFORMATION

Materials of Construction: The unit is constructed primarily of mild steel. The firebox is lined with 1" thick Vermiculite boards that measures 10.6" x 6.9" on the back-firebox wall, additional boards are used on the sides of the firebox. The feed door has a 16.97 x 12.80 glass panel and 1/2" fiberglass rope gasket.

Air Introduction System: Primary air is controlled by a single slide plate located above the fuel loading door. Secondary air has no user control and enters the firebox through openings located on the bottom side of the lower baffle.

Combustion Control Mechanisms: Combustion air control mechanism is a single slide plate that covers three 1.1 x 1.0" openings.
Combustor: N/A

Internal Baffles: Two separate baffles are used in the top of the firebox, the first is mounted at a 119-degree angle and is fitted with secondary air channels. A ceramic blanket rests on top of the baffle. The upper baffle is a 0.24" steel plate that is mounted directly under the flue outlet.

Other Features: N/A

Flue Outlet: The 6" diameter flue outlet is located at the rear of the top of the appliance.

WOOD HEATER OPERATING INSTRUCTIONS

Specific Written Instructions: See Section 4 of this report. All markings and instruction materials were reviewed for content prior to printing.

Section 3

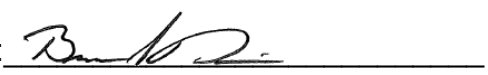
Test Data by Run

Conditioning Data - ASTM E2780/ ASTM E2515

Manufacturer:	Glen Dimplex
Model:	Nectre 65
Tracking No.:	2380
Project No.:	0568WS001E
Test Date:	March - June 2019
Technician:	Nelke Consulting
Operation Category:	I - IV

Elapsed Time (hr)	Flue Gas Temp (° F)	
0	580.0	
1	385.0	
2	272.0	
3	219.0	
4	188.0	
5	258.0	
6	204.0	
7	182.0	
8	565.1	
9	546.0	
10	403.0	
11	304.0	
12	275.0	
13	226.0	
14	491.0	
15	567.0	
16	435.0	
17	320.0	
18	273.0	
19	250.0	
20	482.0	
21	598.0	
22	361.0	
23	289.0	
24	240.0	
25	201.0	

Elapsed Time (hr)	Flue Gas Temp (° F)	
26	178.0	
27	572.4	
28	732.0	
29	542.0	
30	423.0	
31	359.0	
32	327.0	
33	465.5	
34	600.0	
35	406.0	
36	331.0	
37	279.0	
38	220.0	
39	187.0	
40	474.3	
41	614.0	
42	408.0	
43	326.0	
44	258.0	
45	240.0	
46	421.5	
47	616.0	
48	402.0	
49	303.0	
50	243.0	

Technician Signature: 

N65 High Burn Procedure

Kindling:

Kindling weight in total should be 2.5lbs (±0.5bs) nine pieces in total, 10.5 – 12.5'' in length. Making sure the weight doesn't exceed what's allowed per the standard.

Start-up Fuel:

The start-up fuel consists of five pieces of equal size with a total weight of 3.5lbs (±0.5lbs) and a length of 10.5 – 12.5''.

Test Fuel:

The test fuel consists of five pieces with a nominal length of 11.5''. Follow the fuel sheet guideline for specific weights of the core and remainder loads.

Test fuel:

Start-up Procedure:

The start-up fuel is comprised of five layers as follows.

Bottom: Two start-up pieces East/West

2nd: Three start-up pieces North/South

3rd: Three kindling pieces East/West

4th: Three kindling North/South

5th: Three kindling East/West

Top: 0.3lbs – 0.4lbs of small kindling pieces stacked in the middle as shown in the picture below, (3-4 Layers).

Kindling and Start-up:

Use a torch for 40 seconds to one minute to ignite the fuel, focusing the torch on the top middle portion of the load (all the smaller pieces). The door should remain open for 2-4 minutes at 3’’.

The test load should be loaded at the bottom end of the allowable coal bed within 0.2lbs.

When loading, use the heaviest of the test pieces to gently level the remaining fuel. Place the heaviest piece in an east/west direction at the front of the stove with one more piece behind, 11.75'' – 12''. The next two pieces are to be in a north/south direction, 10.5'' to insure a good fit. The final piece is at the rear on top in an east west direction just off the wall, 11.75'' – 12''. Be sure there are gaps between all fuel pieces for proper air flow. See test fuel picture for example. The door should be open ≤ two minutes. Once it's loaded, close the door if the fuel takes off immediately.

End the test at the high end of the allowable remaining weight.

N65 Medium and Low Procedure

Test Fuel:

Follow the guidelines of the cordwood standard (E3053-17) for correct moisture and weight ratios for the core and sub loads. There are 6 pieces in total. The nominal length is 11.5''.

Coal Bed:

The coal bed will always result in running a high burn. There may be large pieces of fuel left after the high burn. As soon as the high burn has been complete, move the larger raw pieces toward the middle of the firebox stacked up to help get rid of any raw fuel. Load the test fuel at the very low end of the coal bed within 0.2lbs. This allows more room to place the fuel.

Fuel Loading & Settings:

Level the coal bed before you start sampling. If there happens to be any raw pieces left over, place them in the middle of the firebox. There should be gaps between all fuel pieces making sure there is plenty of space for air flow. The first two bottom pieces are to be placed in an east/west direction having the heaviest piece in the very rear of the stove, 11.75'' – 12'' The next layer consists of two

pieces in a north/south direction at 10.5'' to insure a good fit. The final layer consists of two pieces in an east west direction these pieces should be the lightest, 11.75'' – 12''. See the fuel load picture for reference. The door should be open 4-5 minutes. Keep the primary control open for 10-15 minutes. If you see the combustion getting noticeably dirtier, set the control at the desired setting.

Settings:

The setting for the low is all the way closed.

The setting for the medium burn is 0.04'' from the heat shield to the end of primary control, see picture below.

Moving Fuel Load:

It may be necessary to move the fuel load at some point during the medium and low burns. Keep an eye on weight drop and stack draft to determine when to move the fuel if needed.

Run 1

High Burn 1-minute data

Emissions Results (Cold to Hot Cycle)

Wood Heater Test Data

Run: 1

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 16-Jul-19
Beginning Clock Time: 10:29

Total Sampling Time: 79 min
Recording Interval: 1 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

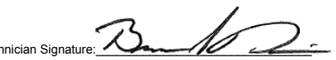
Barometric Pressure:

Begin	Middle	End	Average
29.94		29.95	29.95 0

OMNI Equipment Numbers: _____

PM Control Modules: 371, 372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.265 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 20.48 ft/sec.
Initial Tunnel Flow: 232.5 scfm
Average Tunnel Flow: 202.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ 7 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 5 in. Hg
Average Test Piece Fuel Moisture: 20.37 Dry Basis %

Technician Signature: 

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.080	0.092	0.108	0.090	0.074	0.110	0.108	0.094	0.108	"H2O
Temp:	78	78	78	78	78	78	78	78	79	°F

V_{strav} 19.76 ft/sec V_{scent} 22.01 ft/sec F_p 0.898

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data	
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface		Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient		CO_2 (%)	CO (%)
0	0.000	0.000			1.71	73	0.41	0.97	72	-0.1	76	0.110			7.0		70	69	69	69	70	69		72	85	60	84	62	72		0.03	0
1	0.151	0.151	0.15	0.15	2.05	74	-0.81	1.58	72	0	92	0.110	88	84	6.9	-0.1	85	69	69	77	77	75		196	83	54	83	55	72		0.43	0.03
2	0.307	0.310	0.16	0.16	2.01	74	-0.86	1.50	72	0	117	0.110	93	91	6.7	-0.2	107	69	70	104	101	90		340	85	53	84	54	71		2.33	0.04
3	0.461	0.467	0.15	0.16	1.99	74	-0.87	1.48	72	-0.1	111	0.110	92	89	6.4	-0.3	168	69	70	146	137	118		492	87	53	85	54	71		3.78	0.09
4	0.616	0.624	0.16	0.16	1.99	74	-0.83	1.63	72	-0.4	110	0.100	97	93	6.3	-0.1	215	69	70	185	164	141		506	87	53	85	54	72		7.11	0.09
5	0.769	0.789	0.15	0.17	1.99	74	-0.86	1.63	72	-0.2	108	0.110	91	93	6.2	-0.1	236	69	70	204	179	152		469	87	52	85	54	72		6.3	0.07
6	0.923	0.954	0.15	0.17	1.96	74	-0.82	1.62	72	-0.4	114	0.110	92	94	6.0	-0.2	264	69	70	224	210	167		514	87	52	85	54	71		5.76	0.09
7	1.076	1.118	0.15	0.16	1.94	74	-0.84	1.59	72	-0.2	119	0.110	92	94	5.8	-0.2	288	69	71	254	238	184		555	88	52	85	54	71		6.76	0.09
8	1.230	1.281	0.15	0.16	2.01	74	-0.9	1.59	72	-0.1	122	0.110	93	93	5.6	-0.2	313	69	71	274	269	199		573	88	52	85	54	71		7.79	0.07
9	1.386	1.445	0.16	0.16	2.07	74	-0.98	1.63	73	-0.1	128	0.100	99	99	5.4	-0.2	356	69	72	300	300	219		624	89	52	86	54	72		7.93	0.08
10	1.544	1.610	0.16	0.17	2.07	74	-1	1.62	72	-0.1	131	0.100	100	100	5.2	-0.2	385	69	73	323	324	235		639	90	52	86	53	73		8.99	0.06
11	1.701	1.773	0.16	0.16	2.09	74	-0.98	1.61	73	-0.2	135	0.100	100	99	5.0	-0.2	417	69	74	355	353	254		664	90	52	86	53	73		9.2	0.04
12	1.859	1.936	0.16	0.16	2.05	74	-0.99	1.59	73	-0.5	144	0.100	102	99	4.7	-0.3	476	69	75	400	385	281		727	90	52	87	53	73		9.86	0.04
13	2.016	2.099	0.16	0.16	2.08	74	-1	1.55	73	-0.5	145	0.100	101	100	4.4	-0.3	513	70	76	463	427	310		728	90	52	87	53	72		11.69	0.06
14	2.172	2.260	0.16	0.16	2.05	74	-0.99	1.70	73	-0.3	147	0.100	100	98	4.2	-0.2	536	70	78	503	442	326		722	90	52	87	53	73		11.06	0.04
15	2.330	2.425	0.16	0.17	2.07	74	-0.98	1.62	73	-0.6	149	0.100	102	101	3.9	-0.28	556	70	79	544	458	341		734	90	52	88	53	74		11.41	0.05
16	2.486	2.590	0.16	0.17	2.05	74	-0.98	1.62	73	-0.3	149	0.100	101	101	3.7	-0.22	571	70	81	582	477	356		740	90	52	86	53	73		11.51	0.05
17	2.643	2.754	0.16	0.16	2.05	74	-0.96	1.62	73	-0.5	146	0.110	96	96	3.5	-0.2	580	70	83	602	491	365		702	90	53	84	53	73		11.22	0.06
18	2.800	2.918	0.16	0.16	2.06	74	-1	1.60	73	-0.3	144	0.100	101	100	3.3	-0.24	578	70	86	609	496	368		686	90	53	83	53	74		9.06	0.06
19	2.956	3.082	0.16	0.16	2.04	74	-0.98	1.61	73	-0.4	144	0.100	100	100	3.1	-0.16	590	70	89	622	500	374		694	90	53	83	53	72		9.09	0.08
20	3.113	3.245	0.16	0.16	2.04	74	-0.98	1.59	73	-0.3	144	0.100	101	99	2.9	-0.2	598	71	92	629	503	379		691	90	53	83	53	74		9.24	0.08
21	3.269	3.408	0.16	0.16	2.04	75	-0.98	1.58	73	-0.4	143	0.100	100	99	2.7	-0.18	603	71	95	625	505	380		679	90	53	83	53	72		8.79	0.08
22	3.426	3.571	0.16	0.16	2.02	75	-0.98	1.57	73	-0.6	141	0.100	100	99	2.6	-0.12	605	71	99	620	509	381		663	89	53	83	53	73		8.11	0.09
23	3.581	3.733	0.16	0.16	2.05	75	-0.97	1.57	73	-0.6	140	0.110	94	94	2.4	-0.2	607	72	102	614	513	382		658	89	53	84	53	72		7.91	0.1
24	3.737	3.895	0.16	0.16	2.03	75	-0.97	1.58	73	-0.5	139	0.100	100	98	2.2	-0.16	605	72	106	604	517	381		653	89	54	84	54	74		7.66	0.11
25	3.894	4.058	0.16	0.16	2.03	75	-0.95	1.57	73	-0.3	136	0.110	95	94	2.1	-0.14	597	73	109	592	518	378		628	89	54	84	54	73		7.09	0.16
26	4.050	4.220	0.16	0.16	2.04	75	-0.97	1.56	73	-0.4	135	0.100	99	98	2.0	-0.1	595	73	113	582	519	376		615	88	54	85	54	73		6.49	0.24
27	4.206	4.382	0.16	0.16	2.01	75	-0.98	1.57	74	-0.3	134	0.110	95	93	1.9	-0.1	590	74	117	576	521	376		613	88	54	85	54	73		6.48	0.21
28	4.363	4.544	0.16	0.16	2.04	75	-0.98	1.56	74	-0.2	134	0.100	100	98	1.7	-0.2	589	75	121	574	524	377		613	88	54	85	54	73		6.51	0.18
29	4.518	4.706	0.15	0.16	2.03	75	-0.95	1.56	74	-0.5	133	0.110	94	93	1.6	-0.1	588	76	125	573	526	378		612	88	54	85	54	74		6.46	0.16
30	4.674	4.868	0.16	0.16	2.01	75	-0.93	1.57	74	-0.5	132	0.110	94	93	1.5	-0.1	582	77	128	572	529	378		606	88	54	85	54	74		6.36	0.15
31	4.830	5.031	0.16	0.16	2.04	75	-0.95	1.59	74	-0.4	145	0.110	95	95	13.9	12.4	557	78	132	544	506	363		490	89	55	86	54	74		5.57	0.15
32	4.986	5.195	0.16	0.16	2.02	75	-0.95	1.59	74	-0.2	141	0.110	95	95	13.7	-0.24	569	80	136	520	495	360		591	89	55	86	54	75		4.6	0.84
33	5.143	5.358	0.16	0.16	2.03	76	-0.96	1.59	74	-0.6	152	0.100	101	100	13.3	-0.36	624	81	139	512	508	373		746	90	55	86	55	74		8.61	0.7
34	5.298	5.521	0.16	0.16	2.02	76	-0.94	1.57	74	-0.4	161	0.110	96	96	13.0	-0.3	670	83	143	529	527	390		814	91	55	86	55	75		11.79	0.28
35	5.453	5.685	0.16	0.16	2.00	76	-1	1.61	74	-0.7	171	0.100	101	102	12.6	-0.4	719	84	146	557	555	412		897	91	55	86	55	76		14.18	0.23
36	5.609	5.848	0.16	0.16	2.00	76	-1.08	1.53	74	-0.5	177	0.100	103	102	12.2	-0.4	770	86	149	592	586	437		927	90	55	86	55	75		15.65	0.43

Wood Heater Test Data

Run: 1

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 16-Jul-19
Beginning Clock Time: 10:29

Total Sampling Time: 79 min
Recording Interval: 1 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	29.94		29.95	29.95 0

OMNI Equipment Numbers: _____

PM Control Modules: 371, 372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.265 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 20.48 ft/sec.
Initial Tunnel Flow: 232.5 scfm
Average Tunnel Flow: 202.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ 7 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 5 in. Hg
Average Test Piece Fuel Moisture: 20.37 Dry Basis %

Technician Signature: 

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.080	0.092	0.108	0.090	0.074	0.110	0.108	0.094	0.108	"H2O
Temp:	78	78	78	78	78	78	78	78	79	°F

V_{strav} 19.76 ft/sec V_{scent} 22.01 ft/sec F_p 0.898

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data	
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface		Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient		CO_2 (%)	CO (%)
37	5.764	6.012	0.16	0.16	2.05	76	-1.23	1.62	74	-0.7	183	0.100	102	103	11.8	-0.4	817	88	151	622	620	460		955	91	55	88	55	76		16.21	0.79
38	5.921	6.176	0.16	0.16	2.02	76	-1.3	1.59	74	-0.7	185	0.100	104	103	11.4	-0.4	851	89	154	649	650	479		980	92	56	88	55	75		16.25	0.7
39	6.077	6.339	0.16	0.16	2.05	76	-1.28	1.58	75	-1	190	0.100	104	103	11.0	-0.4	887	91	157	675	679	498		990	91	56	90	56	75		16.27	0.58
40	6.233	6.501	0.16	0.16	2.03	76	-1.29	1.55	75	-1	192	0.100	104	102	10.6	-0.4	910	93	159	703	705	514		995	90	56	91	56	75		16.13	0.44
41	6.389	6.663	0.16	0.16	2.04	76	-1.33	1.55	75	-0.8	192	0.100	104	102	10.2	-0.4	926	95	162	721	727	526		1001	87	56	91	56	76		16.03	0.28
42	6.545	6.829	0.16	0.17	2.03	77	-1.31	1.65	75	-0.9	193	0.100	104	105	9.9	-0.3	954	96	165	739	747	540		1007	86	56	91	56	76		15.86	0.23
43	6.701	6.996	0.16	0.17	2.02	77	-1.32	1.66	75	-1	194	0.100	104	106	9.5	-0.4	957	98	168	763	767	551		1001	87	57	91	56	75		15.75	0.17
44	6.857	7.163	0.16	0.17	2.03	77	-1.37	1.66	75	-1.1	192	0.100	104	105	9.1	-0.4	975	100	171	784	784	563		992	88	57	90	56	75		15.53	0.1
45	7.012	7.330	0.15	0.17	2.02	77	-1.36	1.63	75	-1.1	190	0.090	108	111	8.8	-0.3	976	102	174	799	797	570		981	90	57	89	57	74		15.33	0.08
46	7.168	7.496	0.16	0.17	2.00	77	-1.37	1.63	75	-1	192	0.100	104	105	8.5	-0.3	991	104	177	811	806	578		973	88	57	88	57	78		14.97	0.05
47	7.324	7.661	0.16	0.16	2.02	77	-1.37	1.64	75	-0.8	190	0.090	109	110	8.2	-0.3	1001	106	181	822	814	585		967	85	57	88	57	76		14.7	0.04
48	7.479	7.827	0.16	0.17	2.01	77	-1.35	1.62	75	-1.1	188	0.090	108	110	7.8	-0.38	1007	108	184	831	820	590		959	83	57	88	57	76		14.42	0.04
49	7.635	7.992	0.16	0.17	1.99	77	-1.35	1.63	75	-1.1	188	0.100	103	104	7.6	-0.22	999	111	188	839	826	593		949	81	58	89	57	76		14.09	0.03
50	7.790	8.157	0.16	0.17	2.02	77	-1.4	1.63	76	-0.9	186	0.100	102	104	7.2	-0.4	1000	113	192	848	831	597		939	81	58	88	57	76		13.77	0.04
51	7.944	8.322	0.15	0.16	1.96	78	-1.56	1.62	76	-0.8	186	0.100	102	104	7.0	-0.2	1003	115	196	860	834	602		929	82	58	87	58	76		13.47	0.04
52	8.100	8.487	0.16	0.17	2.02	78	-1.95	1.62	76	-1	184	0.100	103	103	6.7	-0.3	991	118	200	871	836	603		919	82	58	87	58	76		13.08	0.06
53	8.255	8.653	0.16	0.17	1.98	78	-2.13	1.61	76	-1.1	181	0.100	102	104	6.4	-0.3	991	120	205	879	837	606		912	81	58	86	58	77		12.78	0.09
54	8.408	8.818	0.15	0.16	1.95	78	-2.19	1.61	76	-0.9	182	0.090	106	109	6.1	-0.3	986	123	209	883	838	608		903	82	58	86	58	78		12.49	0.1
55	8.564	8.983	0.16	0.17	2.00	78	-2.32	1.61	76	-0.9	178	0.100	102	103	5.9	-0.2	980	125	214	884	840	609		897	83	59	85	58	77		12.48	0.1
56	8.719	9.148	0.15	0.16	2.00	78	-2.33	1.61	76	-0.9	181	0.100	102	103	5.6	-0.3	979	127	218	880	841	609		893	84	59	85	58	77		12.32	0.1
57	8.874	9.312	0.16	0.16	2.05	78	-2.43	1.61	76	-1.1	178	0.100	102	102	5.4	-0.2	977	130	223	877	841	610		897	84	59	85	58	78		12.17	0.12
58	9.030	9.478	0.16	0.17	2.03	78	-2.73	1.63	76	-0.9	178	0.100	102	103	5.1	-0.3	971	132	228	882	842	611		895	85	59	82	58	76		12.19	0.16
59	9.184	9.644	0.15	0.17	1.95	79	-3.14	1.63	76	-1.1	178	0.100	101	103	4.9	-0.22	966	135	233	889	844	613		889	85	59	80	59	77		12.09	0.15
60	9.339	9.809	0.16	0.16	1.97	79	-3.8	1.63	76	-0.8	174	0.090	107	108	4.6	-0.28	965	137	237	898	847	617		881	84	59	80	59	77		11.93	0.12
61	9.495	9.974	0.16	0.17	2.02	79	-1.17	1.63	77	-1.1	173	0.100	102	102	4.4	-0.2	961	140	242	908	849	620		872	80	59	80	59	76		11.74	0.09
62	9.649	10.139	0.15	0.16	1.77	79	-4.39	1.62	77	-1.1	170	0.100	100	102	4.1	-0.3	960	143	247	921	856	625		863	83	60	79	59	75		11.58	0.06
63	9.799	10.304	0.15	0.17	1.92	79	-5.42	1.61	77	-0.8	169	0.100	97	102	4.0	-0.14	957	145	252	924	864	628		853	83	60	80	59	77		11.44	0.03
64	9.957	10.469	0.16	0.16	2.02	79	-0.95	1.62	77	-1.1	170	0.100	103	102	3.7	-0.26	957	148	257	923	870	631		841	83	60	80	59	78		11.15	0.02
65	10.114	10.634	0.16	0.17	2.04	79	-0.96	1.60	77	-1	169	0.100	102	102	3.5	-0.2	947	151	262	924	877	632		832	85	60	81	59	78		10.85	0.01
66	10.270	10.799	0.16	0.16	2.03	79	-1	1.60	77	-0.9	166	0.100	101	102	3.3	-0.2	942	153	267	927	882	634		826	86	60	82	60	78		10.66	0
67	10.427	10.963	0.16	0.16	2.03	79	-0.98	1.60	77	-1	165	0.100	102	101	3.1	-0.2	935	156	272	930	884	635		820	86	60	82	60	78		10.48	0
68	10.583	11.128	0.16	0.17	2.02	80	-0.98	1.61	77	-1	165	0.100	101	102	2.9	-0.2	927	159	276	933	888	637		817	87	60	83	60	79		10.28	0
69	10.740	11.293	0.16	0.16	2.01	80	-1	1.60	77	-1.1	165	0.100	101	102	2.7	-0.2	923	161	282	933	889	638		810	87	60	83	60	79		10.12	0
70	10.897	11.458	0.16	0.17	2.04	80	-0.96	1.62	77	-1.1	163	0.100	101	101	2.6	-0.1	924	164	287	938	891	641		803	89	61	83	60	79		9.91	0
71	11.054	11.625	0.16	0.17	2.03	80	-0.95	1.66	77	-0.8	161	0.100	101	103	2.4	-0.2	913	167	292	944	891	641		793	91	61	84	60	78		9.33	0
72	11.212	11.794	0.16	0.17	2.04	80	-0.91	1.67	78	-0.8	162	0.100	102	104	2.2	-0.2	909	170	297	958	900	647		792	89	61	84	60	78		8.87	0
73	11.369	11.962	0.16	0.17	2.04	80	-0.92	1.67	78	-1	158	0.100	101	103	2.1	-0.1	897	172	301	956	895	644		779	88	61	84	61	78		8.87	0

Wood Heater Test Data

Run: 1

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 16-Jul-19
Beginning Clock Time: 10:29

Total Sampling Time: 79 min
Recording Interval: 1 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	29.94		29.95	29.95 0

OMNI Equipment Numbers: _____

PM Control Modules: 371, 372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.265 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 20.48 ft/sec.
Initial Tunnel Flow: 232.5 scfm
Average Tunnel Flow: 202.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ 7 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 5 in. Hg
Average Test Piece Fuel Moisture: 20.37 Dry Basis %

Technician Signature: 

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.080	0.092	0.108	0.090	0.074	0.110	0.108	0.094	0.108	"H2O
Temp:	78	78	78	78	78	78	78	78	79	°F

V_{strav} 19.76 ft/sec V_{scent} 22.01 ft/sec F_p 0.898

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface		Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient		CO_2 (%)	CO (%)
74	11.526	12.126	0.16	0.16	2.03	80	-0.9	1.61	78	-1	157	0.100	101	100	1.9	-0.2	894	174	305	944	885	640		773	88	61	84	61	77		8.3	0
75	11.683	12.291	0.16	0.17	2.05	80	-0.9	1.61	78	-1	156	0.100	101	101	1.8	-0.1	884	177	310	935	876	636		770	88	61	84	61	78		7.75	0
76	11.841	12.456	0.16	0.16	2.03	81	-0.93	1.61	78	-0.9	154	0.100	101	101	1.7	-0.1	877	180	313	926	868	633		756	88	61	84	61	76		7.6	0
77	11.999	12.621	0.16	0.17	2.05	81	-0.92	1.62	78	-0.7	152	0.100	101	100	1.6	-0.1	865	183	317	917	858	628		744	88	61	84	61	79		7.24	0
78	12.157	12.787	0.16	0.17	2.04	81	-0.92	1.62	78	-1	151	0.100	101	101	1.5	-0.1	853	185	320	907	850	623		731	88	61	84	61	80		6.91	0
79	12.315	12.953	0.16	0.17	2.06	81	-0.9	1.61	78	-0.8	151	0.100	101	101	1.4	-0.1	852	187	323	898	843	621		725	88	61	84	61	80		6.61	0
Avg/Tot	12.315	12.953	0.16	0.16	2.02	77		1.60	75		157	0.102	100	100								551.2				56	85	56	75	#DIV/0!		

Wood Heater Lab Data - ASTM E2780 / ASTM E2515

Manufacturer:	Glen Dimplex	Equipment Numbers:	
Model:	Nectre 65		
Tracking No.:	2380		
Project No.:	0568WS001E		
Run #:	1		
Date:	7/16/19		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	T162S	82.9	81.9	1.0
C. Rear filter catch	Filter				0.0
D. Probe catch*	Probe				0.0
E. Filter seals catch*	Seals				0.0

Sub-Total | Total Particulate, mg: | 1.0

TRAIN 1 (Post First Hour Change-out)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	T157AP	166.2	162.5	3.7
C. Rear filter catch	Filter	T163S	79.2	79.2	0.0
D. Probe catch*	Probe	2	115017.2	115016.4	0.8
E. Filter seals catch*	Seals	R823	3371.3	3371.2	0.1

Sub-Total | Total Particulate, mg: | 4.6

Train 1 Aggregate | Total Particulate, mg: | **5.6**

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T157BP	168.2	164.0	4.2
B. Rear filter catch	Filter				0.0
C. Probe catch*	Probe	OES3	114769.8	114769.3	0.5
D. Filter seals catch*	Seals	R824	3366.4	3366.0	0.4

Total Particulate, mg: | **5.1**

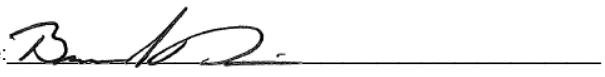
AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter				0.0

Total Particulate, mg: | **0.0**

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Technician Signature: 

Wood Heater Test Results - ASTM E2780 / ASTM E2515

Manufacturer: Glen Dimplex
Model: Nectre 65
Project No.: 0568WS001E
Tracking No.: 2380
Run: 1
Test Date: 07/16/19

Burn Rate	**3.53 kg/hr dry**
Average Tunnel Temperature	157 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	20.48 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	12153.7 dscf/hour
Average Delta p	0.102 inches H20
Total Time of Test	79 minutes

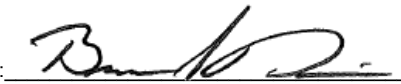
	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	0.000 cubic feet	12.315 cubic feet	12.953 cubic feet	9.339 cubic feet
Average Gas Meter Temperature	75 degrees Fahrenheit	77 degrees Fahrenheit	75 degrees Fahrenheit	76 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	0.000 dscf	12.085 dscf	12.704 dscf	9.182 dscf
Total Particulates - m_n	0 mg	5.6 mg	5.1 mg	1 mg
Particulate Concentration (dry-standard) - C_r/C_s	0.000000 grams/dscf	0.00046 grams/dscf	0.00040 grams/dscf	0.00011 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	7.42 grams	6.42 grams	1.32 grams
Particulate Emission Rate	0.00 grams/hour	5.63 grams/hour	4.88 grams/hour	1.32 grams/hour
Emissions Factor		1.60 g/kg	1.38 g/kg	1.46 g/kg
Difference from Average Total Particulate Emissions		0.50 grams	0.50 grams	
	Dual Train Comparison Results Are Acceptable			

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	6.92 grams
Particulate Emission Rate	**5.26 grams/hour**
Emissions Factor	1.49 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	1.32 grams
Particulate Emission Rate	1.32 grams/hour
Emissions Factor	1.46 grams/kg
7.5% of Average Total Particulate Emissions	0.52 grams

QUALITY CHECKS

Filter Temps < 90 °F	NOT ACCEPTABLE
Filter Face Velocity (47 mm)	OK
Dryer Exit Temp < 80F	OK
Leakage Rate	OK
Ambient Temp (55-90°F)	OK
Negative Probe Weight Eval.	OK
Pro-Rate Variation	OK

Technician Signature: 

Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method - May 10, 2017 Version
Cordwood Fuel Load Calculators - 10 lb/ft^3 Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	1.47	ft^3				
Total Nom. Load Wt. Target	14.70	lb				
Total Load Wt. Allowable Range	14.00	to	15.40	lb		
Core Target Wt. Allowable Range	6.60	to	9.60	lb		
Remainder Load Wt. Allowable Range	5.10	to	8.10	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	2.20	to	3.70	lb		2.95
Remainder Load Pc. Wt. Allowable Range	1.50	to	8.10	lb		4.80
	Pc. #					
Core Load Piece Wt. Actual	1	3.10	lb	In Range		
	2	2.50	lb	In Range		
	3	2.30	lb	In Range		
Core Load Total. Wt. Actual		7.90	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	2.60	lb	In Range		
(1 to 3 Pcs.)	2	3.50	lb	In Range		
	3		lb	NA		
Remainder Load Tot. Wt. Act		6.10	lb	In Range		
Total Load Wt. Actual		14.00	lb	In Range		
Core % of Total Wt.		56%		In Range	45-65%	
Remainder % of Total Wt.		44%		In Range	35-55%	
Actual Load % of Nominal Target		95%		In Range	95-105%	
Actual Fuel Load Density		9.5	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		2.80	lb			
Actual Kindling Wt.		2.80	lb	In Range	20.0%	
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		4.20	lb			
Actual Start-up Fuel Wt.		4.20	lb	In Range	30.0%	
Allowable Residual Start-up Fuel Wt. Range	1.4	to	2.8	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		1.5	lb	In Range		2.1
Total Wt. All Fuel Added (wet basis)		21.00	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	1.3	to	1.5	lb		1.4
Actual Fuel Load Ending Wt.		1.4	lb	In Range		

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
20.7	19.9	20.3	20.3	In Range	2.58	lb	1.17	kg
18.2	18.1	19.5	18.6	In Range	2.11	lb	0.96	kg
18	18.4	18	18.1	In Range	1.95	lb	0.88	kg
27.7	22	28	25.9	In Range	2.07	lb	0.94	kg
18.6	18	20.2	18.9	In Range	2.94	lb	1.33	kg
			NA	NA	NA	lb	NA	kg

Total Load Ave. MC (%-dry basis)	20.3	In Range	
Total Load Ave. MC % (wet basis)	16.9		
Total Test Load Weight (dry basis) →		11.64 lb	5.28 kg

Kindling Moisture (%-dry basis)

11.3	11.9	11.9	11.7	In Range	2.51	lb	1.14	kg

Start-up Fuel Moisture Readings (%-dry basis)

21	24	25	23.3	In Range	3.41	lb	1.54	kg

Total Wt. All Fuel Added (dry basis) →		17.55 lb	7.96 kg
Total Wt. All Fuel Burned (dry basis) →		14.7 lb	6.6 kg

OMNI-Test Laboratories, Inc.

Wood Heater Run Sheets

Client: Glen Dimplex Project Number: 0568WS001E Run Number: 1
Model: Nectre 65 Tracking Number: 2380 Date: 7/16/13
Test Crew: BDavis
OMNI Equipment ID numbers:

Wood Heater Run Notes

Air Control Settings

Primary: Fully open

Secondary: fixed

Tertiary/Pilot: N/A

Fan: N/A

Preburn Notes

Time	Notes
0	7.0 lbs Start up fuel
	40 seconds of torch to light fuel
	door cracked open 3" until 2.5 min.
30	Tared 1.5 lbs and loaded fuel load

Test Notes

Sketch test fuel configuration:

See photo

Start up procedures & Timeline:

Bypass: N/A
Fuel loaded by: 60 seconds
Door closed at: 90 Seconds
Primary air: Fully open entire test

Notes: N/A

Time	Notes
60	Changed front filter in train A.

Technician Signature: BD Date: 8/12/13

OMNI-Test Laboratories, Inc.

Wood Heater Run Sheets

Client: Glen Dimplex Project Number: 0568WS001E Run Number: 1
Model: Nectre 65 Tracking Number: 2380 Date: 7/14/19
Test Crew: B Adams
OMNI Equipment ID numbers:

Wood Heater Supplemental Data

Start Time: 10:29
Stop Time: 11:48

Booth #: N/A

Stack Gas Leak Check:
Initial: good Final: good

Sample Train Leak Check:
A: 00 @ 7" "Hg
B: 00 @ 5 "Hg

Calibrations: Span Gas CO_2: 10.08 CO: 2.53

	Pre Test		Post Test	
	Zero	Span	Zero	Span
Time	10:10	10:10	See End of Run 2	
CO_2	0.00	10.09		
CO	0.00	2.52		

Air Velocity (ft/min): Initial: ≤ 50 Final: ≤ 50
Scale Audit (lbs): Initial: 10.0 Final: 10.0
Pitot Tube Leak Test: Initial: good Final: good
Stack Diameter (in): 6"
Induced Draft: 0.0
% Smoke Capture: 100%
Flue Pipe Cleaned Prior to First Test in Series:
Date: 7/15/19 Initials: BC

	Initial	Middle	Ending
P_b (in/Hg)	29.94		29.95
RH (%)	32		34
Ambient (°F)	72		80

Tunnel Traverse

Microtector Reading	dP (in H_2O)	T(°F)
	.080	78
	.092	78
	.108	78
	.090	78
	.074	78
	.110	78
	.108	78
	.094	78
Center:		
	.108	74

Tunnel Static Pressure (in H_2O):	
Beginning of Test	End of Test
-.265	-.265

Background Filter Volume: N/A

Technician Signature: [signature]
Date: 8/12/19

Run 1

High Burn 10-minute data

Efficiency and Heat Output Results
Kindling and start-up fuel removed from calculations

Wood Heater Test Data

Run: 1

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 16-Jul-19
Beginning Clock Time: 10:29

Total Sampling Time: 48 min
Recording Interval: 1 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
29.94		29.95	29.95 0

OMNI Equipment Numbers: _____

PM Control Modules: 371, 372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.265 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: #DIV/0! ft/sec.
Initial Tunnel Flow: #DIV/0! scfm
Average Tunnel Flow: #DIV/0! scfm
Post-Test Leak Check (1): 0.000 cfm @ 7 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 5 in. Hg
Average Test Piece Fuel Moisture: 20.37 Dry Basis %

Technician Signature:

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP										"H2O
Temp:										°F

V_{strav} _____ ft/sec V_{scent} _____ ft/sec F_p _____

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data	
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface		Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient		CO_2 (%)	CO (%)
0															12.6		557	78	132	544	506	363		490	89	55	86	54	74		5.57	0.15
1															12.3		569	80	136	520	495	360		591	89	55	86	54	75		4.6	0.84
2															11.9		624	81	139	512	508	373		746	90	55	86	55	74		8.61	0.7
3															11.6		670	83	143	529	527	390		814	91	55	86	55	75		11.79	0.28
4															11.2		719	84	146	557	555	412		897	91	55	86	55	76		14.18	0.23
5															10.8		770	86	149	592	586	437		927	90	55	86	55	75		15.65	0.43
6															10.4		817	88	151	622	620	460		955	91	55	88	55	76		16.21	0.79
7															10.0		851	89	154	649	650	479		980	92	56	88	55	75		16.25	0.7
8															9.6		887	91	157	675	679	498		990	91	56	90	56	75		16.27	0.58
9															9.2		910	93	159	703	705	514		995	90	56	91	56	75		16.13	0.44
10															8.8		926	95	162	721	727	526		1001	87	56	91	56	76		16.03	0.28
11															8.5		954	96	165	739	747	540		1007	86	56	91	56	76		15.86	0.23
12															8.1		957	98	168	763	767	551		1001	87	57	91	56	75		15.75	0.17
13															7.7		975	100	171	784	784	563		992	88	57	90	56	75		15.53	0.1
14															7.4		976	102	174	799	797	570		981	90	57	89	57	74		15.33	0.08
15															7.1		991	104	177	811	806	578		973	88	57	88	57	78		14.97	0.05
16															6.8		1001	106	181	822	814	585		967	85	57	88	57	76		14.7	0.04
17															6.4		1007	108	184	831	820	590		959	83	57	88	57	76		14.42	0.04
18															6.2		999	111	188	839	826	593		949	81	58	89	57	76		14.09	0.03
19															5.8		1000	113	192	848	831	597		939	81	58	88	57	76		13.77	0.04
20															5.6		1003	115	196	860	834	602		929	82	58	87	58	76		13.47	0.04
21															5.3		991	118	200	871	836	603		919	82	58	87	58	76		13.08	0.06
22															5.0		991	120	205	879	837	606		912	81	58	86	58	77		12.78	0.09
23															4.7		986	123	209	883	838	608		903	82	58	86	58	78		12.49	0.1
24															4.5		980	125	214	884	840	609		897	83	59	85	58	77		12.48	0.1
25															4.2		979	127	218	880	841	609		893	84	59	85	58	77		12.32	0.1
26															4.0		977	130	223	877	841	610		897	84	59	85	58	78		12.17	0.12
27															3.7		971	132	228	882	842	611		895	85	59	82	58	76		12.19	0.16
28															3.5		966	135	233	889	844	613		889	85	59	80	59	77		12.09	0.15
29															3.2		965	137	237	898	847	617		881	84	59	80	59	77		11.93	0.12
30															3.0		961	140	242	908	849	620		872	80	59	80	59	76		11.74	0.09
31															2.7		960	143	247	921	856	625		863	83	60	79	59	75		11.58	0.06
32															2.6		957	145	252	924	864	628		853	83	60	80	59	77		11.44	0.03
33															2.3		957	148	257	923	870	631		841	83	60	80	59	78		11.15	0.02
34															2.1		947	151	262	924	877	632		832	85	60	81	59	78		10.85	0.01
35															1.9		942	153	267	927	882	634		826	86	60	82	60	78		10.66	0
36															1.7		935	156	272	930	884	635		820	86	60	82	60	78		10.48	0

Wood Heater Test Data

Run: 1

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 16-Jul-19
Beginning Clock Time: 10:29

Total Sampling Time: 48 min
Recording Interval: 1 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	29.94		29.95	29.95 0

OMNI Equipment Numbers: _____

PM Control Modules: 371, 372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.265 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: #DIV/0! ft/sec.
Initial Tunnel Flow: #DIV/0! scfm
Average Tunnel Flow: #DIV/0! scfm
Post-Test Leak Check (1): 0.000 cfm @ 7 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 5 in. Hg
Average Test Piece Fuel Moisture: 20.37 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP										"H2O
Temp:										°F

V_{strav} _____ ft/sec V_{scent} _____ ft/sec F_p _____

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface		Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient		CO_2 (%)	CO (%)
37															1.5		927	159	276	933	888	637		817	87	60	83	60	79		10.28	0
38															1.3		923	161	282	933	889	638		810	87	60	83	60	79		10.12	0
39															1.2		924	164	287	938	891	641		803	89	61	83	60	79		9.91	0
40															1.0		913	167	292	944	891	641		793	91	61	84	60	78		9.33	0
41															0.8		909	170	297	958	900	647		792	89	61	84	60	78		8.87	0
42															0.7		897	172	301	956	895	644		779	88	61	84	61	78		8.87	0
43															0.5		894	174	305	944	885	640		773	88	61	84	61	77		8.3	0
44															0.4		884	177	310	935	876	636		770	88	61	84	61	78		7.75	0
45															0.3		877	180	313	926	868	633		756	88	61	84	61	76		7.6	0
46															0.2		865	183	317	917	858	628		744	88	61	84	61	79		7.24	0
47															0.1		853	185	320	907	850	623		731	88	61	84	61	80		6.91	0
48															0.0		852	187	323	898	843	621		725	88	61	84	61	80		6.61	0
Avg/Tot	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!								257.2				58	85	58	77	#DIV/0!		

Wood Heater Test Results - ASTM E2780 / ASTM E2515

Manufacturer: Glen Dimplex
Model: Nectre 65
Project No.: 0568WS001E
Tracking No.: 2380
Run: 1
Test Date: 07/16/19

Burn Rate	**5.81 kg/hr dry**
Total Time of Test	48 minutes

	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
	#DIV/0!			

FINAL AVERAGE RESULTS

QUALITY CHECKS

Ambient Temp (55-90°F)	OK

Technician Signature: _____

Wood Heater Efficiency Results - CSA B415.1

Manufacturer: Glen Dimplex
Model: Nectre 65
Date: 07/16/19
Run: 1
Control #: 0568WS001E
Test Duration: 48
Output Category: IV

Technician Signature: 

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	61.0%	65.2%
Combustion Efficiency	98.6%	98.6%
Heat Transfer Efficiency	62%	66.2%

Output Rate (kJ/h)	72,244	68,531	**(Btu/h)**
Burn Rate (kg/h)	5.94	13.08	**(lb/h)**
Input (kJ/h)	118,495	112,405	**(Btu/h)**

Test Load Weight (dry kg)	4.75	10.47	**dry lb**
MC wet (%)	16.92512184		
MC dry (%)	20.37		
Particulate (g)	#DIV/0!		
CO (g)	107		
Test Duration (h)	0.80		

Emissions	**Particulate**	**CO**
g/MJ Output	#DIV/0!	1.85
g/kg Dry Fuel	#DIV/0!	22.57
g/h	#DIV/0!	133.98
lb/MM Btu Output	#DIV/0!	4.31

Air/Fuel Ratio (A/F)	9.14

VERSION: **2.2** **12/14/2009**

Run 2

Medium Burn

Wood Heater Test Data

Run: 2

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 16-Jul-19
Beginning Clock Time: 12:08

Total Sampling Time: 325 min
Recording Interval: 5 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	29.92		29.94	29.93 0

OMNI Equipment Numbers: _____

PM Control Modules: 371, 372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.273 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 21.54 ft/sec.
Initial Tunnel Flow: 234.6 scfm
Average Tunnel Flow: 231.2 scfm
Post-Test Leak Check (1): 0.000 cfm @ 5 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 6 in. Hg
Average Test Piece Fuel Moisture: 20.83 Dry Basis %

Technician Signature: 

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.080	0.104	0.114	0.100	0.080	0.104	0.108	0.101	0.110	"H2O
Temp:	93	93	93	93	93	93	93	93	93	°F

V_{strav} 21.43 ft/sec V_{scent} 22.50 ft/sec F_p 0.952

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)														Stack Gas Data	
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface		Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient		CO_2 (%)	CO (%)
0	0.000	0.000			0.79	82	0.75	0.76	79	0	132	0.100			17.4		644	227	317	693	666	509		498	80	66	78	68	77		2.69	0.15
5	0.677	0.779	0.14	0.16	2.02	82	-1.04	1.63	79	-0.5	256	0.090	106	116	16.2	-1.2	657	229	315	720	644	513		869	91	61	90	61	79		8.48	0.26
10	1.465	1.611	0.16	0.17	2.07	82	-0.87	1.64	79	-0.5	143	0.100	108	108	14.6	-1.6	831	90	304	770	692	537		717	80	61	85	61	80		14.78	0.72
15	2.256	2.442	0.16	0.17	2.06	82	-0.9	1.60	79	-0.3	131	0.100	107	107	13.5	-1.06	837	94	297	780	715	545		658	85	61	86	61	81		16.12	0.47
20	3.045	3.266	0.16	0.16	2.03	83	-0.89	1.59	80	-0.3	127	0.100	106	105	12.8	-0.74	843	95	294	773	712	543		625	88	61	87	61	80		14.79	0.04
25	3.832	4.088	0.16	0.16	2.02	83	-0.86	1.58	80	-0.4	126	0.110	101	100	11.8	-1	869	95	292	787	757	560		645	91	61	87	61	81		16.09	0.18
30	4.620	4.906	0.16	0.16	2.04	83	-0.86	1.58	80	-0.4	126	0.100	106	104	10.9	-0.9	903	94	290	794	779	572		650	88	62	87	62	81		16.32	0.1
35	5.408	5.742	0.16	0.17	2.04	83	-0.88	1.66	80	-0.4	125	0.110	101	102	10.1	-0.8	918	95	289	812	795	582		646	91	62	87	62	81		16.35	0.1
40	6.194	6.582	0.16	0.17	2.04	84	-0.88	1.66	81	-0.8	125	0.110	100	102	9.3	-0.8	928	95	288	824	798	587		636	90	63	86	62	81		15.68	0.05
45	6.982	7.421	0.16	0.17	2.04	84	-0.85	1.67	81	-0.6	123	0.110	101	102	8.6	-0.74	917	95	287	824	799	584		616	83	64	86	63	82		14.72	0
50	7.772	8.264	0.16	0.17	2.04	84	-0.82	1.67	82	-0.9	121	0.100	106	107	7.9	-0.66	889	91	287	823	794	577		600	84	64	86	63	79		13.83	0
55	8.562	9.109	0.16	0.17	2.05	85	-0.85	1.67	82	-0.7	121	0.100	105	107	7.2	-0.7	882	95	285	827	791	576		601	84	64	86	64	81		14.18	0
60	9.351	9.951	0.16	0.17	2.05	85	-0.84	1.66	82	-0.8	121	0.100	105	106	6.6	-0.6	880	94	284	822	805	577		606	85	65	87	64	83		14.58	0.05
65	10.142	10.793	0.16	0.17	2.04	85	-0.82	1.59	82	-0.8	124	0.110	101	102	5.9	-0.7	894	94	282	813	829	582		613	86	65	87	64	85		14.78	0.19
70	10.932	11.620	0.16	0.17	2.04	85	-0.84	1.59	82	-0.8	121	0.110	100	100	5.3	-0.6	887	93	281	816	830	581		599	87	66	87	65	83		13.94	0.03
75	11.722	12.447	0.16	0.17	2.05	86	-0.84	1.61	83	-0.8	121	0.110	100	100	4.7	-0.6	886	94	280	805	819	577		586	88	66	87	65	84		13.15	0.02
80	12.513	13.275	0.16	0.17	2.03	86	-0.85	1.61	83	-0.6	120	0.110	100	100	4.3	-0.4	854	93	280	796	783	561		566	88	66	86	65	83		12.38	0
85	13.304	14.106	0.16	0.17	2.03	86	-0.82	1.61	83	-0.8	118	0.110	100	100	3.9	-0.4	821	93	280	775	767	547		542	88	67	86	66	85		10.66	0.07
90	14.096	14.938	0.16	0.17	2.05	86	-0.81	1.61	83	-0.6	116	0.110	100	100	3.5	-0.4	772	93	278	743	753	528		509	88	67	86	66	83		9.3	0.29
95	14.888	15.772	0.16	0.17	2.04	86	-0.83	1.62	84	-0.7	113	0.100	105	104	3.3	-0.2	731	92	275	711	729	508		489	88	67	86	66	84		8.85	0.37
100	15.681	16.606	0.16	0.17	2.05	87	-0.85	1.63	84	-0.8	109	0.110	99	99	3.0	-0.3	702	91	270	686	709	492		478	87	68	86	67	80		8.75	0.36
105	16.474	17.443	0.16	0.17	2.05	87	-0.85	1.64	84	-0.7	107	0.110	99	99	2.8	-0.2	682	92	265	669	695	481		471	87	68	86	67	80		8.43	0.37
110	17.269	18.282	0.16	0.17	2.04	87	-0.85	1.63	84	-0.9	106	0.110	99	99	2.6	-0.2	660	89	259	653	679	468		453	86	68	85	67	80		7.89	0.34
115	18.064	19.121	0.16	0.17	2.06	87	-0.84	1.63	84	-0.6	103	0.110	99	99	2.5	-0.1	628	91	254	632	642	449		418	86	68	85	67	82		6.14	0.46
120	18.859	19.959	0.16	0.17	2.03	87	-0.85	1.63	84	-0.6	102	0.110	99	99	2.4	-0.1	595	91	249	610	611	431		401	85	68	85	67	79		6.01	0.45
125	19.653	20.798	0.16	0.17	2.06	87	-0.83	1.63	84	-0.7	102	0.110	99	99	2.3	-0.1	575	90	243	590	586	417		386	85	68	85	68	80		5.48	0.5
130	20.448	21.637	0.16	0.17	2.04	86	-0.83	1.63	84	-0.7	100	0.110	99	99	2.2	-0.1	550	90	238	570	566	403		375	86	68	85	68	80		5.39	0.5
135	21.242	22.474	0.16	0.17	2.06	86	-0.86	1.62	84	-0.6	98	0.110	99	99	2.1	-0.1	532	88	232	552	548	390		365	87	69	85	68	80		5.2	0.49
140	22.037	23.313	0.16	0.17	2.04	86	-0.83	1.64	84	-0.7	97	0.110	99	99	2.0	-0.1	513	88	225	536	532	379		357	86	69	85	69	80		5.11	0.49
145	22.832	24.153	0.16	0.17	2.06	86	-0.86	1.64	84	-0.8	98	0.110	99	99	2.0	0	502	89	220	520	518	370		349	86	69	85	69	81		5.17	0.48
150	23.626	24.992	0.16	0.17	2.04	86	-0.82	1.64	84	-0.6	97	0.110	99	99	1.9	-0.06	490	88	215	509	506	362		344	85	69	84	69	79		5.11	0.47
155	24.421	25.830	0.16	0.17	2.04	86	-0.84	1.64	84	-0.8	94	0.110	99	98	1.8	-0.14	479	88	211	498	497	355		340	85	70	85	70	80		5.08	0.5
160	25.214	26.670	0.16	0.17	2.04	86	-0.81	1.62	84	-0.8	99	0.110	99	99	1.8	0	470	88	207	488	490	349		339	85	70	85	70	84		5.11	0.51
165	26.007	27.507	0.16	0.17	2.04	86	-0.81	1.62	84	-0.5	100	0.110	99	99	1.7	-0.1	462	89	204	481	484	344		336	86	70	85	71	83		5.09	0.51
170	26.799	28.343	0.16	0.17	2.04	86	-0.83	1.63	84	-0.8	100	0.110	99	99	1.6	-0.1	455	89	201	474	480	340		332	86	71	85	71	83		4.99	0.51
175	27.592	29.180	0.16	0.17	2.03	86	-0.85	1.63	84	-0.5	100	0.110	99	99	1.5	-0.1	449	89	199	468	475	336		330	86	71	85	71	82		4.98	0.5
180	28.385	30.017	0.16	0.17	2.04	86	-0.83	1.62	84	-0.7	99	0.110	99	99	1.5	0	441	88	197	458	468	330		323	86	72	85	72	82		4.39	0.46

Wood Heater Test Data

Run: 2

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 16-Jul-19
Beginning Clock Time: 12:08

Total Sampling Time: 325 min
Recording Interval: 5 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure: Begin 29.92 Middle _____ End 29.94 Average 29.93 0

OMNI Equipment Numbers: _____

PM Control Modules: 371, 372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.273 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 21.54 ft/sec.
Initial Tunnel Flow: 234.6 scfm
Average Tunnel Flow: 231.2 scfm
Post-Test Leak Check (1): 0.000 cfm @ 5 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 6 in. Hg
Average Test Piece Fuel Moisture: 20.83 Dry Basis %

Technician Signature: 

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.080	0.104	0.114	0.100	0.080	0.104	0.108	0.101	0.110	"H2O
Temp:	93	93	93	93	93	93	93	93	93	°F

V_{strav} 21.43 ft/sec V_{scent} 22.50 ft/sec F_p 0.952

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface		Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient		CO_2 (%)	CO (%)
185	29.177	30.854	0.16	0.17	2.03	86	-0.85	1.62	84	-0.6	99	0.110	99	99	1.4	-0.1	434	88	195	450	459	325		318	86	72	85	72	82		4.32	0.47
190	29.969	31.690	0.16	0.17	2.03	86	-0.84	1.62	84	-0.6	98	0.110	98	98	1.3	-0.1	428	88	193	442	452	321		315	86	73	85	73	81		4.31	0.47
195	30.761	32.525	0.16	0.17	2.04	86	-0.85	1.61	84	-0.7	99	0.110	99	98	1.2	-0.1	422	89	190	435	447	317		315	86	73	85	73	83		4.47	0.46
200	31.554	33.360	0.16	0.17	2.03	86	-0.83	1.62	84	-0.7	98	0.110	99	98	1.2	0	418	88	189	429	442	313		312	86	73	85	73	81		4.23	0.47
205	32.347	34.195	0.16	0.17	2.04	86	-0.85	1.61	84	-0.7	99	0.110	99	98	1.1	-0.1	413	89	187	423	436	310		310	86	74	85	74	81		4.22	0.49
210	33.138	35.028	0.16	0.17	2.03	86	-0.81	1.62	84	-0.8	99	0.110	98	98	1.1	0	408	88	185	417	431	306		305	86	74	85	74	82		3.98	0.48
215	33.931	35.863	0.16	0.17	2.02	86	-0.83	1.62	84	-0.7	98	0.110	99	98	1.0	-0.1	401	88	184	410	425	302		301	86	74	85	75	83		3.81	0.45
220	34.723	36.699	0.16	0.17	2.04	86	-0.82	1.63	84	-0.8	98	0.110	98	98	0.9	-0.1	395	88	182	403	418	297		296	86	74	85	75	85		3.75	0.43
225	35.515	37.534	0.16	0.17	2.03	86	-0.82	1.62	84	-0.8	98	0.110	98	98	0.9	0	388	88	180	397	411	293		291	86	75	85	75	81		3.63	0.43
230	36.308	38.370	0.16	0.17	2.04	86	-0.82	1.61	84	-0.8	98	0.110	99	98	0.8	-0.1	381	88	179	390	404	288		287	85	75	85	75	82		3.51	0.44
235	37.100	39.207	0.16	0.17	2.04	86	-0.82	1.61	85	-0.6	98	0.110	98	98	0.8	0	376	88	177	384	399	285		283	86	75	85	76	85		3.39	0.45
240	37.892	40.041	0.16	0.17	2.02	86	-0.81	1.61	85	-0.6	98	0.110	98	98	0.7	-0.1	368	88	175	377	392	280		279	86	75	85	76	86		3.31	0.46
245	38.686	40.877	0.16	0.17	2.04	87	-0.81	1.61	85	-0.9	98	0.110	99	98	0.7	0	362	88	174	372	385	276		274	86	76	85	76	84		3.17	0.45
250	39.477	41.712	0.16	0.17	2.04	87	-0.83	1.61	85	-0.7	97	0.110	98	98	0.7	0	355	88	173	367	379	272		267	86	76	85	77	84		2.95	0.37
255	40.270	42.549	0.16	0.17	2.03	87	-0.84	1.61	85	-0.6	97	0.110	98	98	0.6	-0.1	349	88	171	362	370	268		261	86	76	85	77	81		2.9	0.35
260	41.064	43.385	0.16	0.17	2.04	87	-0.85	1.61	85	-0.6	96	0.110	98	98	0.6	0	342	88	169	357	363	264		259	85	76	85	77	85		2.92	0.35
265	41.858	44.221	0.16	0.17	2.03	87	-0.84	1.61	85	-0.7	96	0.110	98	98	0.5	-0.1	336	89	168	352	357	260		255	85	77	85	77	84		2.93	0.37
270	42.651	45.057	0.16	0.17	2.04	87	-0.81	1.61	85	-0.5	96	0.110	98	98	0.5	0	332	88	167	347	352	257		254	85	77	85	78	84		2.93	0.37
275	43.444	45.893	0.16	0.17	2.03	87	-0.83	1.61	85	-0.6	97	0.110	98	98	0.4	-0.1	329	88	165	343	347	254		252	85	77	85	78	85		2.93	0.37
280	44.238	46.729	0.16	0.17	2.04	87	-0.82	1.61	85	-0.7	96	0.110	98	98	0.4	0	325	88	164	339	343	252		252	85	77	85	78	84		2.97	0.38
285	45.030	47.565	0.16	0.17	2.04	87	-0.85	1.61	86	-0.8	96	0.110	98	98	0.4	0	323	88	163	336	339	250		251	85	77	85	78	82		2.86	0.38
290	45.824	48.401	0.16	0.17	2.04	87	-0.85	1.62	85	-0.9	95	0.110	98	98	0.3	-0.1	319	88	162	332	335	247		248	85	78	85	78	85		2.79	0.39
295	46.618	49.237	0.16	0.17	2.05	88	-0.82	1.61	86	-0.7	95	0.110	98	98	0.3	0	316	88	162	328	332	245		246	85	78	85	79	82		2.72	0.37
300	47.413	50.074	0.16	0.17	2.03	88	-0.85	1.62	85	-0.7	95	0.110	98	98	0.2	-0.1	312	88	161	324	328	243		244	85	78	85	79	84		2.79	0.38
305	48.207	50.911	0.16	0.17	2.04	87	-0.8	1.62	85	-0.5	94	0.110	98	98	0.2	0	309	87	161	321	324	240		242	85	78	85	79	85		2.69	0.37
310	49.002	51.747	0.16	0.17	2.03	87	-0.84	1.62	85	-0.6	94	0.110	98	98	0.1	-0.1	305	88	160	318	321	238		240	86	78	85	79	84		2.63	0.34
315	49.796	52.583	0.16	0.17	2.05	87	-0.81	1.61	85	-0.6	93	0.110	98	98	0.1	0	302	87	160	315	317	236		238	86	78	85	79	81		2.55	0.33
320	50.589	53.419	0.16	0.17	2.03	87	-0.82	1.61	85	-0.7	93	0.110	98	98	0.1	0	296	87	159	311	314	233		236	86	78	84	79	83		2.5	0.31
325	51.385	54.255	0.16	0.17	2.02	87	-0.84	1.62	85	-0.6	93	0.110	98	98	0.0	-0.1	295	87	159	308	310	232		233	86	78	85	79	85		2.4	0.31
Avg/Tot	51.385	54.255	0.16	0.17	2.02	86		1.61	83		108	0.108	100	100								277.6				71	85	71	82	#DIV/0!		

Wood Heater Lab Data

Manufacturer:	Glen Dimplex	Equipment Numbers:	
Model:	Nectre 65		
Tracking No.:	2380		
Project No.:	0568WS001E		
Run #:	2		
Date:	7/16/19		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	T164S	80.0	79.0	1.0
C. Rear filter catch	Filter				0.0
D. Probe catch*	Probe				0.0
E. Filter seals catch*	Seals				0.0

Sub-Total | Total Particulate, mg: | 1.0

TRAIN 1 (Post First Hour Change-out)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	T158AP	162.7	163.0	-0.3
C. Rear filter catch	Filter				0.0
D. Probe catch*	Probe	3	116012.7	116011.8	0.9
E. Filter seals catch*	Seals	R826	3348.8	3348.7	0.1

Sub-Total | Total Particulate, mg: | 0.7

Train 1 Aggregate | Total Particulate, mg: | **1.7**

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T159BP	165.4	164.6	0.8
B. Rear filter catch	Filter				0.0
C. Probe catch*	Probe	28	114751.2	114749.9	1.3
D. Filter seals catch*	Seals	R827	3534.4	3534.3	0.1

Total Particulate, mg: | **2.2**

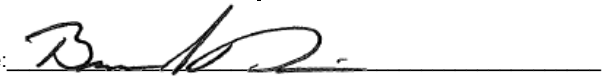
AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter				0.0

Total Particulate, mg: | **0.0**

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Technician Signature: 

Wood Heater Test Results

Manufacturer: Glen Dimplex
Model: Nectre 65
Project No.: 0568WS001E
Tracking No.: 2380
Run: 2
Test Date: 07/16/19

Burn Rate	**1.21 kg/hr dry**
Average Tunnel Temperature	108 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	21.54 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	13870.3 dscf/hour
Average Delta p	0.108 inches H20
Total Time of Test	325 minutes

	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	0.000 cubic feet	51.385 cubic feet	54.255 cubic feet	9.351 cubic feet
Average Gas Meter Temperature	82 degrees Fahrenheit	86 degrees Fahrenheit	83 degrees Fahrenheit	86 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	0.000 dscf	49.553 dscf	52.333 dscf	9.019 dscf
Total Particulates - m_n	0 mg	1.7 mg	2.2 mg	1 mg
Particulate Concentration (dry-standard) - C_r/C_s	0.000000 grams/dscf	0.00003 grams/dscf	0.00004 grams/dscf	0.00011 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	2.58 grams	3.16 grams	1.54 grams
Particulate Emission Rate	0.00 grams/hour	0.48 grams/hour	0.58 grams/hour	1.54 grams/hour
Emissions Factor		0.39 g/kg	0.48 g/kg	0.38 g/kg
Difference from Average Total Particulate Emissions		0.29 grams	0.29 grams	
	Dual Train Comparison Results Are Acceptable			

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	2.87 grams
Particulate Emission Rate	**0.53 grams/hour**
Emissions Factor	0.44 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	1.54 grams
Particulate Emission Rate	1.54 grams/hour
Emissions Factor	0.38 grams/kg
7.5% of Average Total Particulate Emissions	0.22 grams

QUALITY CHECKS

Filter Temps < 90 °F	NOT ACCEPTABLE
Filter Face Velocity (47 mm)	OK
Dryer Exit Temp < 80F	OK
Leakage Rate	OK
Ambient Temp (55-90°F)	OK
Negative Probe Weight Eval.	OK
Pro-Rate Variation	OK

Technician Signature: 

Wood Heater Efficiency Results - CSA B415.1

Manufacturer: Glen Dimplex
Model: Nectre 65
Date: 07/16/19
Run: 2
Control #: 0568WS001E
Test Duration: 325
Output Category: II

Technician Signature: 

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	69.6%	74.5%
Combustion Efficiency	97.9%	97.9%
Heat Transfer Efficiency	71%	76.1%

Output Rate (kJ/h)	16,761	15,900	**(Btu/h)**
Burn Rate (kg/h)	1.21	2.66	**(lb/h)**
Input (kJ/h)	24,077	22,839	**(Btu/h)**

Test Load Weight (dry kg)	6.53	14.40	**dry lb**
MC wet (%)	17.23757414		
MC dry (%)	20.83		
Particulate (g)	2.87		
CO (g)	220		
Test Duration (h)	5.42		

Emissions	Particulate	CO
g/MJ Output	0.03	2.42
g/kg Dry Fuel	0.44	33.65
g/h	0.53	40.58
lb/MM Btu Output	0.07	5.63

Air/Fuel Ratio (A/F)	14.23

VERSION: **2.2** **12/14/2009**

Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method - May 10, 2017 Version

Cordwood Fuel Load Calculators - 12 lb/ft^3 Nominal Load Density

Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight

Values to be input manually

For Usable Firebox Volumes up to 3.0 ft^3 - Low and Medium Fire

Nominal Required Load Density (wet basis)	12	lb/ft^3				
Usable Firebox Volume	1.47	ft^3				
Total Nom. Load Wt. Target	17.64	lb				
Total Load Wt. Allowable Range	16.76	to	18.52	lb		
Core Target Wt. Allowable Range	7.938	to	11.47	lb		
Remainder Load Wt. Allowable Range	6.17	to	9.70	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	2.65	to	4.41	lb		3.53
Remainder Load Pc. Wt. Allowable Range	1.76	to	5.29	lb		3.53
	Pc. #					
Core Load Piece Wt. Actual	1	3.10	lb	In Range		
	2	3.30	lb	In Range		
	3	2.90	lb	In Range		
Core Load Total. Wt. Actual		9.30	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	4.00	lb	In Range		
(2 or 3 Pcs.)	2	2.10	lb	In Range		
	3	2.00	lb	In Range		
Remainder Load Piece Weight Ratio - Small/Large		50%		In Range		≤ 67%
Remainder Load Tot. Wt. Act		8.10	lb	In Range		
Total Load Wt. Actual		17.40	lb	In Range		
Core % of Total Wt.		53%		In Range		45-65%
Remainder % of Total Wt.		47%		In Range		35-55%
Actual Load % of Nominal Target		99%		In Range		95-105%
Actual Fuel Load Density		11.8	lb/ft^3			
Allowable Charcoal Bed Wt. Range (lb)	1.8	to	3.4			Mid-Point
Actual Charcoal Bed Wt.		1.8	lb	In Range		2.6
Actual Fuel Load Ending Wt.		0.0	lb	Valid Test		≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		17.4	lb			

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
18	18	20.8	18.9	In Range	2.61	lb	1.18	kg
23.7	22.3	18	21.3	In Range	2.72	lb	1.23	kg
21.3	20.9	21.1	21.1	In Range	2.39	lb	1.09	kg
18	20.3	19.6	19.3	In Range	3.35	lb	1.52	kg
26.9	19	21.3	22.4	In Range	1.72	lb	0.78	kg
19.2	27.1	19.4	21.9	In Range	1.64	lb	0.74	kg
Total Load Ave. MC % (dry basis)			20.6	In Range				
Total Load Ave. MC % (wet basis)			17.1					
Total Test Load Weight (dry basis) →					14.43	lb	6.55	kg
Total Fuel Weight Burned During Test Run (dry basis)					14.4	lb	6.55	kg

OMNI-Test Laboratories, Inc.

Wood Heater Run Sheets

Client: Glen Dimplex Project Number: 0568WS001E Run Number: 2
Model: Nectre 65 Tracking Number: 2380 Date: 5/16/19
Test Crew: B Davis
OMNI Equipment ID numbers:

Wood Heater Run Notes

Air Control Settings

Primary: 0.04" from full closed

Secondary: fixed

Tertiary/Pilot: N/A

Fan: N/A

Preburn Notes

Time	Notes
N/A	

Test Notes

Sketch test fuel configuration: See photo

Start up procedures & Timeline:

Bypass: N/A
Fuel loaded by: 52 Seconds
Door closed at: 5:00 (cracked 3" open)
Primary air: fully open until 8:30 then set to full closed test setting
Notes:

Time	Notes
60	changed front filter in tray A.

Technician Signature: BD Date: 8/12/19

Wood Heater Run Sheets

Client: Glen Dimplex Project Number: 0568WS001E Run Number: 2
Model: Nectre 65 Tracking Number: 2380 Date: _____
Test Crew: _____
OMNI Equipment ID numbers: _____

Wood Heater Fuel Data

Fuel: Douglas fir, untreated and air dried, standard grade or better dimensional lumber

Pre-Burn Fuel

Calibration: Cal Value (1) = 12% Actual Reading _____
Cal Value (2) = 22% Actual Reading _____

Piece:	Length:	Reading:	Piece:	Length:	Reading:
1	_____ in	_____	7	_____ in	_____
2	_____ in	_____	8	_____ in	_____
3	_____ in	_____	9	_____ in	_____
4	_____ in	_____	10	_____ in	_____
5	_____ in	_____	11	_____ in	_____
6	_____ in	_____	12	_____ in	_____

Total Pre-Burn Fuel Weight: _____ Pre-Burn Fuel Average Moisture: _____

Time (clock): _____ Room Temperature (F): _____ Initials: _____

Test Fuel

Firebox Volume (ft^3): _____ Test Fuel Piece Length (in): _____
Load Weight Range (lb): _____ Total Wet Fuel Load Weight (lb): _____

Fuel Type & Amount: 2 x 4: _____ 4 x 4: _____
Weight (with spacers): _____ Weight (with spacers): _____

Piece:	Weight (lbs):	Moisture Readings (%DB):			Fuel Type:
1	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____
6	_____	_____	_____	_____	_____
7	_____	_____	_____	_____	_____

Spacer Moisture Readings (%DB)

_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

Time (clock): _____ Room Temperature (F): _____ Initials: _____

Technician Signature: _____ Date: _____

Run 3
High Burn 1-minute data

Non-Sampling High Burn

Wood Heater Test Data

Run: 3

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 77/17/19
Beginning Clock Time: 09:24

Total Sampling Time: 91 min
Recording Interval: 1 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	29.96		29.93	29.95 0

OMNI Equipment Numbers: _____

PM Control Modules: _____
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.273 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: #DIV/0! ft/sec.
Initial Tunnel Flow: #DIV/0! scfm
Average Tunnel Flow: #DIV/0! scfm
Post-Test Leak Check (1): _____ cfm @ _____ in. Hg
Post-Test Leak Check (2): _____ cfm @ _____ in. Hg
Average Test Piece Fuel Moisture: 20.82 Dry Basis %

Technician Signature: 

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP										"H2O
Temp:										°F

V_{strav} _____ ft/sec V_{scent} _____ ft/sec F_p _____

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
0															7.2		67	66	67	67	67	67		68					67			
1															7.1		78	66	67	77	73	72		191					66			
2															6.9		120	66	67	132	93	96		370					67			
3															6.7		147	66	67	180	119	116		418					67			
4															6.4		178	66	67	190	140	128		429					68			
5															6.5		208	66	67	198	156	139		446					68			
6															6.3		249	66	68	212	172	153		499					67			
7															6.1		308	66	68	256	198	179		605					68			
8															5.9		375	66	68	312	246	213		670					68			
9															5.6		432	66	69	375	307	250		739					67			
10															5.3		487	66	70	431	361	283		774					68			
11															4.9		535	66	71	503	424	320		780					68			
12															4.6		583	66	72	558	468	349		796					67			
13															4.4		612	66	73	592	494	367		769					67			
14															4.1		620	66	75	608	512	376		737					69			
15															3.9		614	66	76	603	519	376		690					68			
16															3.8		609	67	79	594	521	374		672					69			
17															3.6		606	67	81	597	523	375		660					68			
18															3.4		599	67	84	601	523	375		648					67			
19															3.3		592	67	88	606	524	375		637					68			
20															3.1		593	67	91	605	523	376		628					68			
21															3.0		580	67	94	600	517	372		604					68			
22															2.9		576	68	98	593	513	370		590					68			
23															2.7		564	68	102	586	510	366		581					69			
24															2.6		561	69	106	582	507	365		569					68			
25															2.5		555	69	110	577	505	363		563					68			
26															2.4		550	70	113	575	506	363		563					67			
27															2.3		545	71	117	572	508	363		569					67			
28															2.2		543	71	120	573	511	364		570					69			
29															2.1		543	72	124	574	514	365		568					69			
30															2.0		540	73	127	573	517	366		564					68			
31															1.9		538	74	131	572	518	367		561					68			
32															1.8		541	76	134	571	518	368		551					68			
33															1.7		538	77	137	569	518	368		546					69			
34															1.6		533	78	140	566	518	367		545					69			
35															8.8		521	80	143	547	506	359		435					69			
36															14.2		532	81	146	563	523	369		669					69			

Wood Heater Test Data

Run: 3

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 77/17/19
Beginning Clock Time: 09:24

Total Sampling Time: 91 min
Recording Interval: 1 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	29.96		29.93	29.95 0

OMNI Equipment Numbers: _____

PM Control Modules: _____
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.273 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: #DIV/0! ft/sec.
Initial Tunnel Flow: #DIV/0! scfm
Average Tunnel Flow: #DIV/0! scfm
Post-Test Leak Check (1): _____ cfm @ _____ in. Hg
Post-Test Leak Check (2): _____ cfm @ _____ in. Hg
Average Test Piece Fuel Moisture: 20.82 Dry Basis %

Technician Signature: 

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
Initial dP									
Temp:									

"H2O
°F

V_{strav} _____ ft/sec V_{scent} _____ ft/sec F_p _____

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
37															13.8		608	83	149	600	539	396		880					70			
38															13.3		679	85	151	632	563	422		917					70			
39															13.0		728	86	154	650	590	442		956					71			
40															12.6		772	88	156	669	610	459		957					70			
41															12.2		800	90	159	704	626	476		968					70			
42															11.8		828	92	161	729	644	491		938					71			
43															11.4		847	94	164	749	663	503		926					71			
44															11.1		867	96	167	767	679	515		917					69			
45															10.8		888	98	170	787	693	527		916					71			
46															10.5		904	100	173	802	704	537		909					70			
47															10.2		917	102	176	812	718	545		910					70			
48															9.9		931	104	180	821	732	554		905					71			
49															9.6		934	105	183	826	745	559		900					72			
50															9.3		940	107	187	833	760	565		899					72			
51															9.0		948	109	190	840	771	572		896					73			
52															8.7		950	111	194	847	783	577		893					73			
53															8.5		953	113	199	853	795	583		887					73			
54															8.2		955	114	203	857	805	587		882					69			
55															7.9		954	116	207	863	813	591		879					71			
56															7.6		957	118	211	867	822	595		874					70			
57															7.4		965	119	216	871	828	600		872					71			
58															7.1		955	120	219	874	834	600		867					71			
59															6.8		957	121	224	878	839	604		867					70			
60															6.6		961	123	228	883	842	607		865					72			
61															6.4		969	124	232	888	846	612		862					73			
62															6.1		967	126	236	891	848	614		859					73			
63															5.9		962	127	239	894	851	615		855					75			
64															5.6		971	128	244	896	853	618		852					75			
65															5.4		966	130	248	897	855	619		847					73			
66															5.2		960	131	251	900	857	620		842					74			
67															5.0		958	132	255	902	859	621		837					74			
68															4.8		954	134	258	902	859	621		833					74			
69															4.6		949	135	262	904	860	622		827					73			
70															4.4		945	136	265	905	860	622		816					75			
71															4.2		937	137	268	905	861	622		816					75			
72															4.0		934	139	271	905	862	622		809					75			
73															3.8		930	140	274	904	862	622		804					74			

Wood Heater Test Data

Run: 3

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 77/17/19
Beginning Clock Time: 09:24

Total Sampling Time: 91 min
Recording Interval: 1 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	29.96		29.93	29.95 0

OMNI Equipment Numbers: _____

PM Control Modules: _____
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.273 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: #DIV/0! ft/sec.
Initial Tunnel Flow: #DIV/0! scfm
Average Tunnel Flow: #DIV/0! scfm
Post-Test Leak Check (1): _____ cfm @ _____ in. Hg
Post-Test Leak Check (2): _____ cfm @ _____ in. Hg
Average Test Piece Fuel Moisture: 20.82 Dry Basis %

Technician Signature: 

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP										"H2O
Temp:										°F

V_{strav} _____ ft/sec V_{scent} _____ ft/sec F_p _____

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data			
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
74															3.7		920	141	277	905	863	621		801					75			
75															3.5		917	143	281	907	865	623		794					75			
76															3.3		915	144	284	910	867	624		792					75			
77															3.1		908	146	287	910	869	624		789					77			
78															3.0		902	147	290	905	870	623		782					76			
79															2.9		902	148	293	901	869	623		773					76			
80															2.7		889	150	295	909	867	622		766					75			
81															2.6		877	152	298	911	862	620		758					76			
82															2.4		873	153	300	911	857	619		750					74			
83															2.3		866	155	303	908	853	617		745					75			
84															2.2		858	156	305	901	849	614		742					75			
85															2.1		857	158	307	890	844	611		739					77			
86															2.0		851	160	309	884	838	608		730					77			
87															1.9		839	161	310	878	832	604		720					77			
88															1.8		832	163	311	871	825	600		711					74			
89															1.8		825	165	313	864	817	597		704					75			
90															1.6		814	166	314	856	811	592		697					76			
91															1.6		807	168	315	849	804	589		691					76			
Avg/Tot	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!								521.8				#DIV/0!	#DIV/0!	#DIV/0!	71	#DIV/0!		

Wood Heater Test Results

Manufacturer: Glen Dimplex
Model: Nectre 65
Project No.: 0568WS001E
Tracking No.: 2380
Run: 3
Test Date: 77/17/19

Burn Rate	**5.25 kg/hr dry**
Total Time of Test	55 minutes

	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
	#DIV/0!			

FINAL AVERAGE RESULTS

QUALITY CHECKS

Ambient Temp (55-90°F)	OK

Technician Signature: _____

Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method - May 10, 2017 Version
Cordwood Fuel Load Calculators - 10 lb/ft^3 Nominal Load Density
Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight
Values to be input manually

For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	1.47	ft^3				
Total Nom. Load Wt. Target	14.70	lb				
Total Load Wt. Allowable Range	14.00	to	15.40	lb		
Core Target Wt. Allowable Range	6.60	to	9.60	lb		
Remainder Load Wt. Allowable Range	5.10	to	8.10	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	2.20	to	3.70	lb		2.95
Remainder Load Pc. Wt. Allowable Range	1.50	to	8.10	lb		4.80
	Pc. #					
Core Load Piece Wt. Actual	1	2.20	lb	In Range		
	2	2.90	lb	In Range		
	3	2.80	lb	In Range		
Core Load Total. Wt. Actual		7.90	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	2.50	lb	In Range		
(1 to 3 Pcs.)	2	4.30	lb	In Range		
	3		lb	NA		
Remainder Load Tot. Wt. Act		6.80	lb	In Range		
Total Load Wt. Actual		14.70	lb	In Range		
Core % of Total Wt.		54%		In Range	45-65%	
Remainder % of Total Wt.		46%		In Range	35-55%	
Actual Load % of Nominal Target		100%		In Range	95-105%	
Actual Fuel Load Density		10.0	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		2.94	lb			
Actual Kindling Wt.		2.80	lb	In Range	19.0%	
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		4.41	lb			
Actual Start-up Fuel Wt.		4.40	lb	In Range	29.9%	
Allowable Residual Start-up Fuel Wt. Range	1.5	to	2.9	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		1.6	lb	In Range		2.2
Total Wt. All Fuel Added (wet basis)		21.90	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	1.3	to	1.6	lb		1.5
Actual Fuel Load Ending Wt.		1.6	lb	In Range		

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
24.3	22.3	25.5	24.0	In Range	1.77	lb	0.80	kg
18.7	18.7	18.4	18.6	In Range	2.45	lb	1.11	kg
28	19.8	18.8	22.2	In Range	2.29	lb	1.04	kg
18.4	21.7	19.4	19.8	In Range	2.09	lb	0.95	kg
18.1	19.8	20.4	19.4	In Range	3.60	lb	1.63	kg
			NA	NA	NA	lb	NA	kg

Total Load Ave. MC (%-dry basis)	20.5	In Range			
Total Load Ave. MC % (wet basis)	17.0				
Total Test Load Weight (dry basis) →			12.20	lb	5.53 kg
Kindling Moisture (%-dry basis)					
12 9.8 11.4	11.1	In Range	2.52	lb	1.14 kg
Start-up Fuel Moisture Readings (%-dry basis)					
18 21 25	21.3	In Range	3.63	lb	1.64 kg
Total Wt. All Fuel Added (dry basis) →			18.34	lb	8.32 kg
Total Wt. All Fuel Burned (dry basis) →			15.1	lb	6.9 kg

OMNI-Test Laboratories, Inc.

Wood Heater Run Sheets

Client: Glen Dimplex Project Number: 0568WS001E Run Number: 3
Model: Nectre 65 Tracking Number: 2380 Date: 7/17/19
Test Crew: B Davis
OMNI Equipment ID numbers:

Wood Heater Run Notes

Air Control Settings

Primary: Fully open

Secondary: fixed

Tertiary/Pilot: N/A

Fan: N/A

Preburn Notes

Time	Notes
0	loaded 7.2 lbs, used torch for 45 seconds, top down lighting.
34	TAred 1.5 and loaded test load

Test Notes

Sketch test fuel configuration:
Maple test fuel used on All test Runs
See photo

Start up procedures & Timeline:

Bypass: N/A
Fuel loaded by: by 60 second
Door closed at: 90 seconds
Primary air: fully open entire test

Notes:

Time	Notes
0	Non-sampling hyL burn.

Technician Signature: Date: 8/12/19

Run 4

Low Burn

Wood Heater Test Data

Run: 4

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 17-Jul-19
Beginning Clock Time: 11:19

Total Sampling Time: 365 min
Recording Interval: 5 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	29.96		29.93	29.95 0

OMNI Equipment Numbers: _____

PM Control Modules: 371, 372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 20.02 ft/sec.
Initial Tunnel Flow: 221.6 scfm
Average Tunnel Flow: 218.7 scfm
Post-Test Leak Check (1): 0.000 cfm @ 6 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 6 in. Hg
Average Test Piece Fuel Moisture: 20.88 Dry Basis %

Technician Signature: _____

Velocity Traverse Data										
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.056	0.104	0.102	0.088	0.060	0.102	0.098	0.088	0.100	"H2O
Temp:	83	83	83	83	83	83	83	83	83	83

V_{strav} 19.90 ft/sec V_{scent} 21.25 ft/sec F_p 0.937

	Particulate Sampling Data													Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface		Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
0	0.000	0.000			2.21	76	-1.06	1.62	74	-1	130	0.090			17.7		591	213	290	632	617	469		456	86	66	85	65	77	0.045	2.74	0.26
5	0.780	0.802	0.16	0.16	2.04	77	-0.98	1.64	74	-2.5	153	0.090	108	107	17.3	-0.36	497	215	285	507	509	403		392	88	53	81	51	75	0.043	1.7	0.26
10	1.559	1.624	0.16	0.16	2.01	77	-0.93	1.62	74	-0.6	148	0.090	107	109	16.4	-0.94	609	218	274	593	527	444		778	87	53	81	51	76	0.071	11.98	0.12
15	2.335	2.438	0.16	0.16	2.00	77	-0.97	1.55	74	-0.6	119	0.090	104	105	14.9	-1.5	754	219	257	633	621	497		632	86	52	82	50	73	0.067	9.92	0.65
20	3.118	3.247	0.16	0.16	2.10	77	-0.95	1.61	75	-0.7	110	0.090	105	104	14.2	-0.7	721	217	249	565	606	472		555	83	52	82	50	73	0.059	10.64	0.38
25	3.915	4.070	0.16	0.16	2.11	77	-0.95	1.59	75	-0.5	112	0.090	107	106	13.4	-0.8	769	214	246	574	675	496		596	84	53	85	51	73	0.062	13.62	0.26
30	4.710	4.891	0.16	0.16	2.08	77	-0.94	1.59	75	-0.5	110	0.100	101	100	12.5	-0.9	810	209	243	612	726	520		608	87	53	86	51	73	0.063	13.94	0.45
35	5.505	5.711	0.16	0.16	2.10	78	-0.95	1.59	75	-0.6	114	0.090	106	105	11.6	-0.9	856	203	242	641	741	537		625	89	54	85	51	72	0.063	14.71	0.4
40	6.299	6.530	0.16	0.16	2.07	78	-0.95	1.59	75	-0.7	114	0.090	106	105	10.8	-0.8	884	197	243	666	758	550		630	89	54	86	52	74	0.063	14.8	0.39
45	7.093	7.350	0.16	0.16	2.08	78	-0.96	1.59	75	-0.6	115	0.090	106	105	10.0	-0.8	895	192	244	693	769	559		621	89	55	86	53	74	0.062	14.81	0.31
50	7.885	8.171	0.16	0.16	2.07	78	-0.93	1.60	75	-0.4	115	0.100	101	100	9.2	-0.8	891	186	246	730	780	567		618	88	55	86	53	76	0.061	14.89	0.22
55	8.677	8.991	0.16	0.16	2.06	78	-0.92	1.59	75	-0.7	116	0.090	106	106	8.4	-0.8	897	181	248	780	793	580		605	88	55	86	54	77	0.060	14.67	0.18
60	9.470	9.811	0.16	0.16	2.08	79	-0.91	1.59	76	-0.6	114	0.090	106	105	7.7	-0.7	873	176	250	785	807	578		581	88	56	86	54	75	0.057	13.57	0.04
65	10.264	10.636	0.16	0.17	2.06	79	-0.88	1.62	76	-0.4	113	0.090	106	106	7.1	-0.6	861	172	252	774	799	572		575	87	57	86	55	76	0.057	13.09	0.22
70	11.059	11.470	0.16	0.17	2.09	79	-0.92	1.62	77	-0.4	110	0.100	100	101	6.6	-0.5	837	168	254	769	779	561		543	87	57	86	55	77	0.054	11.35	0.04
75	11.854	12.306	0.16	0.17	2.07	80	-0.89	1.64	77	-0.4	110	0.100	100	101	6.1	-0.5	807	164	255	742	760	546		526	89	57	85	55	77	0.052	10.76	0.06
80	12.650	13.142	0.16	0.17	2.10	80	-0.88	1.64	77	-0.5	109	0.100	100	101	5.7	-0.4	790	161	254	721	761	537		522	88	58	86	56	76	0.052	10.87	0.06
85	13.446	13.979	0.16	0.17	2.07	80	-0.91	1.64	78	-0.6	108	0.100	100	101	5.3	-0.4	764	158	252	706	751	526		506	87	58	85	56	76	0.050	10.43	0.06
90	14.242	14.817	0.16	0.17	2.10	80	-0.88	1.64	78	-0.5	106	0.100	100	101	5.0	-0.3	746	156	250	697	731	516		498	87	58	85	56	76	0.049	10.04	0.05
95	15.039	15.652	0.16	0.17	2.07	81	-0.88	1.62	78	-0.4	105	0.100	100	100	4.6	-0.4	734	154	246	685	716	507		492	87	59	85	57	76	0.049	9.62	0.11
100	15.837	16.482	0.16	0.17	2.09	81	-0.91	1.61	78	-0.6	105	0.100	100	100	4.3	-0.3	729	152	244	674	699	500		490	87	59	85	57	77	0.048	9.54	0.15
105	16.635	17.313	0.16	0.17	2.09	81	-0.91	1.61	78	-0.4	103	0.100	100	100	4.0	-0.3	697	150	241	650	666	481		457	86	59	85	58	76	0.045	7.68	0.58
110	17.432	18.143	0.16	0.17	2.07	81	-0.88	1.62	78	-0.6	103	0.100	100	100	3.8	-0.2	666	149	237	626	632	462		438	86	59	85	58	77	0.043	7.07	0.54
115	18.230	18.975	0.16	0.17	2.10	81	-0.91	1.62	78	-0.6	103	0.100	100	100	3.6	-0.2	638	148	233	600	609	446		425	86	59	85	58	78	0.041	6.88	0.47
120	19.028	19.807	0.16	0.17	2.09	81	-0.88	1.61	79	-0.5	102	0.100	100	100	3.4	-0.2	619	147	228	580	596	434		415	87	59	85	58	77	0.040	6.99	0.49
125	19.826	20.639	0.16	0.17	2.08	82	-0.88	1.62	79	-0.5	100	0.100	99	99	3.2	-0.2	603	147	224	566	588	426		411	87	60	85	58	77	0.039	7.12	0.46
130	20.626	21.470	0.16	0.17	2.10	82	-0.87	1.62	79	-0.6	100	0.100	100	99	3.0	-0.2	589	146	221	556	579	418		406	86	60	85	58	78	0.039	7.06	0.42
135	21.424	22.301	0.16	0.17	2.08	82	-0.91	1.62	79	-0.5	99	0.100	99	99	2.8	-0.2	581	146	218	548	575	414		403	86	60	85	59	76	0.038	7.08	0.42
140	22.223	23.133	0.16	0.17	2.09	82	-0.9	1.61	79	-0.4	98	0.100	99	99	2.6	-0.2	573	146	215	542	571	409		401	86	60	85	59	76	0.038	7.08	0.4
145	23.023	23.964	0.16	0.17	2.09	82	-0.89	1.61	79	-0.6	98	0.100	99	99	2.5	-0.1	574	146	213	537	568	408		404	85	60	85	59	77	0.038	6.87	0.28
150	23.822	24.796	0.16	0.17	2.07	82	-0.91	1.61	79	-0.6	98	0.100	99	99	2.3	-0.2	563	146	211	529	563	402		393	85	61	85	60	76	0.037	6.43	0.34
155	24.621	25.627	0.16	0.17	2.09	82	-0.91	1.62	79	-0.7	97	0.100	99	99	2.2	-0.1	533	146	209	516	543	389		360	86	61	85	60	77	0.033	5.51	0.52
160	25.422	26.460	0.16	0.17	2.09	82	-0.91	1.62	79	-0.7	95	0.100	99	99	2.1	-0.1	510	146	207	506	526	379		346	86	61	84	61	77	0.031	5.3	0.57
165	26.222	27.293	0.16	0.17	2.07	82	-0.9	1.61	79	-0.4	95	0.100	99	99	2.0	-0.1	497	146	205	498	514	372		336	86	62	85	61	77	0.030	5.34	0.57
170	27.021	28.126	0.16	0.17	2.09	82	-0.91	1.61	79	-0.4	93	0.100	99	99	1.9	-0.1	482	146	203	490	505	365		330	85	62	84	62	76	0.029	5.36	0.6
175	27.821	28.959	0.16	0.17	2.10	82	-0.87	1.62	79	-0.4	93	0.100	99	99	1.9	0	473	146	200	484	498	360		326	84	63	84	62	75	0.028	5.41	0.67
180	28.621	29.792	0.16	0.17	2.07	82	-0.89	1.62	79	-0.5	91	0.100	99	99	1.8	-0.1	468	146	198	480	495	357		328	85	63	84	62	75	0.028	5.55	0.58

Wood Heater Test Data

Run: 4

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 17-Jul-19
Beginning Clock Time: 11:19

Total Sampling Time: 365 min
Recording Interval: 5 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	29.96		29.93	29.95 0

OMNI Equipment Numbers: _____

PM Control Modules: 371, 372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 20.02 ft/sec.
Initial Tunnel Flow: 221.6 scfm
Average Tunnel Flow: 218.7 scfm
Post-Test Leak Check (1): 0.000 cfm @ 6 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 6 in. Hg
Average Test Piece Fuel Moisture: 20.88 Dry Basis %

Technician Signature: 

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.056	0.104	0.102	0.088	0.060	0.102	0.098	0.088	0.100	"H2O
Temp:	83	83	83	83	83	83	83	83	83	83

V_{strav} 19.90 ft/sec V_{scent} 21.25 ft/sec F_p 0.937

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface		Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
185	29.421	30.623	0.16	0.17	2.08	82	-0.89	1.62	79	-0.5	92	0.100	99	99	1.7	-0.1	464	146	196	475	496	355		330	86	64	84	63	76	0.029	5.67	0.54
190	30.220	31.455	0.16	0.17	2.09	81	-0.9	1.62	79	-0.4	91	0.100	99	99	1.6	-0.1	456	145	195	473	490	352		317	85	64	84	63	76	0.027	5.09	0.53
195	31.020	32.287	0.16	0.17	2.08	81	-0.87	1.61	79	-0.6	90	0.100	99	99	1.5	-0.1	449	145	194	467	483	348		313	84	64	84	64	75	0.027	5.15	0.54
200	31.818	33.118	0.16	0.17	2.08	81	-0.89	1.62	79	-0.5	90	0.100	99	98	1.5	0	441	144	193	462	475	343		308	84	64	84	64	76	0.026	4.94	0.57
205	32.618	33.951	0.16	0.17	2.10	81	-0.87	1.62	78	-0.4	90	0.100	99	99	1.4	-0.1	435	144	191	457	467	339		303	85	65	84	64	75	0.025	4.9	0.57
210	33.418	34.782	0.16	0.17	2.10	81	-0.9	1.62	78	-0.5	89	0.100	99	98	1.4	0	427	143	190	451	460	334		299	85	65	84	65	75	0.025	4.78	0.59
215	34.217	35.615	0.16	0.17	2.08	81	-0.9	1.62	78	-0.4	90	0.100	99	99	1.2	-0.18	420	143	188	445	454	330		297	84	65	84	65	76	0.024	4.81	0.63
220	35.016	36.446	0.16	0.17	2.10	81	-0.88	1.61	78	-0.6	88	0.100	99	98	1.2	-0.02	416	142	187	442	448	327		296	84	66	84	65	74	0.024	4.81	0.62
225	35.816	37.278	0.16	0.17	2.08	81	-0.87	1.62	78	-0.7	90	0.100	99	99	1.1	-0.1	407	142	186	438	443	323		292	85	66	84	66	74	0.023	4.56	0.6
230	36.614	38.109	0.16	0.17	2.08	81	-0.91	1.62	78	-0.4	89	0.100	98	98	1.1	0	401	141	184	433	436	319		289	85	66	84	66	75	0.023	4.37	0.59
235	37.413	38.940	0.16	0.17	2.09	81	-0.88	1.62	78	-0.7	88	0.100	99	98	1.0	-0.1	395	140	184	428	429	315		286	85	67	84	66	74	0.023	4.31	0.59
240	38.211	39.771	0.16	0.17	2.06	81	-0.9	1.60	78	-0.6	90	0.100	99	99	0.9	-0.08	393	140	182	427	424	313		287	84	67	84	66	78	0.022	4.27	0.56
245	39.009	40.602	0.16	0.17	2.08	81	-0.87	1.61	78	-0.7	89	0.100	98	98	0.9	-0.02	390	140	181	428	419	312		287	84	67	84	67	78	0.022	4.27	0.47
250	39.807	41.434	0.16	0.17	2.09	81	-0.91	1.61	78	-0.7	90	0.100	99	99	0.8	-0.1	387	140	180	425	413	309		285	86	67	84	67	78	0.022	4.12	0.44
255	40.604	42.266	0.16	0.17	2.07	81	-0.88	1.62	79	-0.7	90	0.100	98	99	0.7	-0.1	382	139	179	419	407	305		283	86	67	84	67	77	0.021	3.87	0.4
260	41.402	43.100	0.16	0.17	2.09	81	-0.9	1.62	79	-0.6	90	0.100	99	99	0.7	0	377	139	178	412	399	301		278	85	68	84	67	79	0.021	3.76	0.38
265	42.200	43.933	0.16	0.17	2.06	81	-0.86	1.63	79	-0.7	90	0.100	99	99	0.7	0	375	139	177	406	393	298		275	84	68	84	68	79	0.021	3.67	0.37
270	42.998	44.768	0.16	0.17	2.08	82	-0.87	1.62	80	-0.7	90	0.100	98	99	0.6	-0.06	368	138	176	400	386	294		273	85	68	84	68	80	0.020	3.58	0.36
275	43.797	45.603	0.16	0.17	2.07	82	-0.9	1.62	80	-0.5	89	0.100	98	99	0.6	-0.04	364	138	174	394	380	290		269	86	68	84	68	78	0.020	3.47	0.35
280	44.595	46.438	0.16	0.17	2.06	82	-0.91	1.62	80	-0.7	89	0.100	98	99	0.5	-0.1	357	137	173	388	374	286		266	85	68	84	68	80	0.019	3.42	0.35
285	45.394	47.274	0.16	0.17	2.08	82	-0.9	1.62	80	-0.5	89	0.100	98	99	0.5	0	351	137	172	386	370	283		261	85	69	84	68	78	0.018	3.64	0.38
290	46.193	48.109	0.16	0.17	2.07	82	-0.87	1.62	80	-0.4	89	0.100	98	99	0.4	-0.1	347	136	171	380	366	280		254	84	69	84	69	80	0.018	3.14	0.29
295	46.992	48.946	0.16	0.17	2.08	83	-0.88	1.62	81	-0.5	87	0.100	98	98	0.4	0	342	135	169	372	360	276		250	84	69	84	69	80	0.017	2.88	0.24
300	47.792	49.782	0.16	0.17	2.09	83	-0.87	1.62	81	-0.5	87	0.100	98	98	0.3	-0.1	334	135	168	362	353	270		244	85	69	84	69	80	0.016	2.63	0.22
305	48.592	50.619	0.16	0.17	2.09	83	-0.91	1.62	81	-0.5	88	0.100	98	99	0.3	0	326	135	166	353	345	265		239	85	69	84	69	79	0.015	2.49	0.21
310	49.391	51.456	0.16	0.17	2.07	83	-0.9	1.62	81	-0.8	87	0.100	98	98	0.3	0	319	134	164	343	337	259		234	84	70	84	69	80	0.014	2.36	0.2
315	50.191	52.294	0.16	0.17	2.08	83	-0.87	1.63	81	-1.6	86	0.100	98	98	0.3	0	312	133	162	334	329	254		230	84	70	84	70	78	0.014	2.34	0.21
320	50.993	53.132	0.16	0.17	2.09	83	-0.89	1.63	81	-1.7	86	0.100	98	98	0.2	-0.1	305	132	160	326	322	249		226	84	70	84	70	79	0.013	2.3	0.21
325	51.793	53.970	0.16	0.17	2.08	83	-0.87	1.62	81	-1.7	86	0.100	98	98	0.2	0	300	131	158	318	315	244		221	85	70	84	70	80	0.012	2.18	0.2
330	52.593	54.808	0.16	0.17	2.08	83	-0.9	1.63	81	-1.5	85	0.100	98	98	0.2	0	293	130	156	311	308	240		218	84	70	84	70	79	0.012	2.12	0.19
335	53.394	55.646	0.16	0.17	2.09	83	-0.87	1.63	81	-1.5	85	0.110	94	94	0.2	0	287	130	154	304	302	235		213	84	70	84	70	79	0.011	2.04	0.18
340	54.195	56.484	0.16	0.17	2.09	83	-0.88	1.64	81	-1.8	85	0.100	98	98	0.1	-0.1	282	128	152	298	296	231		211	83	70	84	70	81	0.010	2.11	0.2
345	54.996	57.322	0.16	0.17	2.07	83	-0.86	1.64	82	-1.6	85	0.100	98	98	0.1	0	278	127	150	295	293	229		210	85	71	84	71	79	0.010	2.16	0.2
350	55.796	58.161	0.16	0.17	2.08	83	-0.87	1.64	82	-1.4	84	0.100	98	98	0.1	0	273	126	148	290	288	225		206	85	71	84	71	80	0.010	1.98	0.18
355	56.597	59.000	0.16	0.17	2.09	83	-0.88	1.63	82	-1.7	84	0.100	98	98	0.1	0	269	125	146	285	283	222		203	84	71	84	71	79	0.009	1.94	0.18
360	57.399	59.840	0.16	0.17	2.09	83	-0.87	1.63	81	-1.7	84	0.100	98	99	0.1	0	264	124	145	280	277	218		200	83	71	84	71	79	0.009	1.84	0.17
365	58.200	60.678	0.16	0.17	2.08	83	-0.89	1.63	81	-1.7	83	0.100	98	98	0.0	-0.1	260	123	143	274	271	214		197	84	71	83	71	78	0.008	1.76	0.16

Wood Heater Test Data

Run: 4

Manufacturer: Glen Dimplex
Model: Nectre 65
Tracking No.: 2380
Project No.: 0568WS001E
Test Date: 17-Jul-19
Beginning Clock Time: 11:19

Total Sampling Time: 365 min
Recording Interval: 5 min
Background Sample Volume: _____ cubic feet

Meter Box Y Factor: 0.992 (1) 0.989 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	29.96		29.93	29.95

0

OMNI Equipment Numbers: _____

PM Control Modules: 371, 372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.270 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 20.02 ft/sec.
Initial Tunnel Flow: 221.6 scfm
Average Tunnel Flow: 218.7 scfm
Post-Test Leak Check (1): 0.000 cfm @ 6 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 6 in. Hg
Average Test Piece Fuel Moisture: 20.88 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.056	0.104	0.102	0.088	0.060	0.102	0.098	0.088	0.100	"H2O
Temp:	83	83	83	83	83	83	83	83	83	83

V_{strav} 19.90 ft/sec V_{scent} 21.25 ft/sec F_p 0.937

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface		Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
Avg/Tot	58.200	60.678	0.16	0.17	2.08	81		1.62	78		98	0.099	100	100								254.4				63	84	62	77	0.033		

Wood Heater Lab Data

Manufacturer:	Glen Dimplex	Equipment Numbers:	
Model:	Nectre 65		
Tracking No.:	2380		
Project No.:	0568WS001E		
Run #:	4		
Date:	7/17/19		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	T165S	84.4	78.2	6.2
C. Rear filter catch	Filter				0.0
D. Probe catch*	Probe				0.0
E. Filter seals catch*	Seals				0.0

Sub-Total | Total Particulate, mg: | 6.2

TRAIN 1 (Post First Hour Change-out)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	T170AP	166.8	166.1	0.7
C. Rear filter catch	Filter				0.0
D. Probe catch*	Probe	30	114329.1	114327.8	1.3
E. Filter seals catch*	Seals	R828	3551.8	3552.3	0.0

Sub-Total | Total Particulate, mg: | 2.0

Train 1 Aggregate | Total Particulate, mg: | **8.2**

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T170BP	171.0	165.4	5.6
B. Rear filter catch	Filter				0.0
C. Probe catch*	Probe	32	114742.4	114741.3	1.1
D. Filter seals catch*	Seals	R829	3322.8	3321.8	1.0

Total Particulate, mg: | **7.7**

AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter				0.0

Total Particulate, mg: | **0.0**

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Technician Signature: 

Wood Heater Test Results

Manufacturer: Glen Dimplex
Model: Nectre 65
Project No.: 0568WS001E
Tracking No.: 2380
Run: 4
Test Date: 07/17/19

Burn Rate	**1.09 kg/hr dry**
Average Tunnel Temperature	98 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	20.02 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	13124.6 dscf/hour
Average Delta p	0.099 inches H20
Total Time of Test	365 minutes

	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	0.000 cubic feet	58.200 cubic feet	60.678 cubic feet	9.470 cubic feet
Average Gas Meter Temperature	77 degrees Fahrenheit	81 degrees Fahrenheit	78 degrees Fahrenheit	80 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	0.000 dscf	56.668 dscf	59.109 dscf	9.228 dscf
Total Particulates - m_n	0 mg	8.2 mg	7.7 mg	6.2 mg
Particulate Concentration (dry-standard) - C_r/C_s	0.000000 grams/dscf	0.00014 grams/dscf	0.00013 grams/dscf	0.00067 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	11.55 grams	10.40 grams	8.82 grams
Particulate Emission Rate	0.00 grams/hour	1.90 grams/hour	1.71 grams/hour	8.82 grams/hour
Emissions Factor		1.74 g/kg	1.57 g/kg	2.35 g/kg
Difference from Average Total Particulate Emissions		0.58 grams	0.58 grams	
	Dual Train Comparison Results Are Acceptable			

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	10.98 grams
Particulate Emission Rate	**1.80 grams/hour**
Emissions Factor	1.66 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	8.82 grams
Particulate Emission Rate	8.82 grams/hour
Emissions Factor	2.35 grams/kg
7.5% of Average Total Particulate Emissions	0.82 grams

QUALITY CHECKS

Filter Temps < 90 °F	OK
Filter Face Velocity (47 mm)	OK
Dryer Exit Temp < 80F	OK
Leakage Rate	OK
Ambient Temp (55-90°F)	OK
Negative Probe Weight Eval.	OK
Pro-Rate Variation	OK

Technician Signature: 

Wood Heater Efficiency Results - CSA B415.1

Manufacturer: Glen Dimplex
Model: Nectre 65
Date: 07/17/19
Run: 4
Control #: 0568WS001E
Test Duration: 365
Output Category: II

Technician Signature: 

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	68.2%	73.0%
Combustion Efficiency	97.0%	97.0%
Heat Transfer Efficiency	70%	75.2%

Output Rate (kJ/h)	14,872	14,108	**(Btu/h)**
Burn Rate (kg/h)	1.09	2.41	**(lb/h)**
Input (kJ/h)	21,799	20,679	**(Btu/h)**

Test Load Weight (dry kg)	6.64	14.64	**dry lb**
MC wet (%)	17.27180807		
MC dry (%)	20.88		
Particulate (g)	10.98		
CO (g)	315		
Test Duration (h)	6.08		

Emissions	Particulate	CO
g/MJ Output	0.12	3.49
g/kg Dry Fuel	1.65	47.46
g/h	1.80	51.84
lb/MM Btu Output	0.28	8.10

Air/Fuel Ratio (A/F)	15.20

VERSION: **2.2** **12/14/2009**

Adjunct to ASTM E XXXX Wood Heater Cordwood Test Method - May 10, 2017 Version

Cordwood Fuel Load Calculators - 12 lb/ft^3 Nominal Load Density

Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight

Values to be input manually

For Usable Firebox Volumes up to 3.0 ft^3 - Low and Medium Fire

Nominal Required Load Density (wet basis)	12	lb/ft^3				
Usable Firebox Volume	1.47					
Total Nom. Load Wt. Target	17.64	lb				
Total Load Wt. Allowable Range	16.76	to	18.52	lb		
Core Target Wt. Allowable Range	7.938	to	11.47	lb		
Remainder Load Wt. Allowable Range	6.17	to	9.70	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	2.65	to	4.41	lb		3.53
Remainder Load Pc. Wt. Allowable Range	1.76	to	5.29	lb		3.53
	Pc. #					
Core Load Piece Wt. Actual	1	2.80	lb	In Range		
	2	3.70	lb	In Range		
	3	2.80	lb	In Range		
Core Load Total. Wt. Actual		9.30	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	4.20	lb	In Range		
(2 or 3 Pcs.)	2	2.30	lb	In Range		
	3	1.90	lb	In Range		
Remainder Load Piece Weight Ratio - Small/Large		45%		In Range		≤ 67%
Remainder Load Tot. Wt. Act		8.40	lb	In Range		
Total Load Wt. Actual		17.70	lb	In Range		
Core % of Total Wt.		53%		In Range		45-65%
Remainder % of Total Wt.		47%		In Range		35-55%
Actual Load % of Nominal Target		100%		In Range		95-105%
Actual Fuel Load Density		12.0	lb/ft^3			
Allowable Charcoal Bed Wt. Range (lb)	1.8	to	3.5			Mid-Point
Actual Charcoal Bed Wt.		1.9	lb	In Range		2.7
Actual Fuel Load Ending Wt.		0.0	lb	Valid Test		≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		17.7	lb			

Fuel Piece Moisture Reading (%-dry basis)

1	2	3	Ave.		Pc. Wt. Dry Basis			
19.5	21.6	20.8	20.6	In Range	2.32	lb	1.05	kg
18.8	18	24.3	20.4	In Range	3.07	lb	1.39	kg
18	18.8	19	18.6	In Range	2.36	lb	1.07	kg
28	24.8	20.4	24.4	In Range	3.38	lb	1.53	kg
24.6	18.5	22.5	21.9	In Range	1.89	lb	0.86	kg
18.9	18.6	20.7	19.4	In Range	1.59	lb	0.72	kg
Total Load Ave. MC % (dry basis)			21.1	In Range				
Total Load Ave. MC % (wet basis)			17.5					
Total Test Load Weight (dry basis) →					14.61	lb	6.63	kg
Total Fuel Weight Burned During Test Run (dry basis)					14.6	lb	6.63	kg

OMNI-Test Laboratories, Inc.

Wood Heater Run Sheets

Client: Glen Dimplex Project Number: 0568WS001E Run Number: 4
Model: Nectre 65 Tracking Number: 2380 Date: 7/17/19
Test Crew: B Davis
OMNI Equipment ID numbers:

Wood Heater Run Notes

Air Control Settings

Primary:

fully closed

Secondary: fixed

Tertiary/Pilot: N/A

Fan: N/A

Preburn Notes

Time	Notes
	See Run 3

Test Notes

Sketch test fuel configuration:

See photo

Start up procedures & Timeline:

Bypass: NA
Fuel loaded by: 80 Seconds
Door closed at: 6:20 minutes
Primary air: fully open until 13 min

Notes:

Time	Notes
60 4 hr 42 min	Changed front filter in fuel A Will less than 10% of fuel load weight loss, or 10 min., loading door was opened and Fuel was adjusted. Operation took less than 15 Seconds

Technician Signature: B Davis Date: 8/12/19

Section 4

Quality Assurance/Quality Control

QUALITY ASSURANCE/QUALITY CONTROL

OMNI follows the guidelines of ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories," and the quality assurance/quality control (QA/QC) procedures found in *OMNI*'s Quality Assurance Manual.

OMNI's scope of accreditation includes, but is not limited to, the following:

- ANSI (American National Standards Institute) for certification of product to safety standards.
- To perform product safety testing by the International Accreditation Service, Inc. (formerly ICBO ES) under accreditation as a testing laboratory designated TL-130.
- To perform product safety testing as a "Certification Organization" by the Standards Council of Canada (SCC).
- Serving as a testing laboratory for the certification of wood heaters by the U.S. Environmental Protection Agency.

This report is issued within the scope of *OMNI*'s accreditation. Accreditation certificates are available upon request.

The manufacturing facilities and quality control system for the production of the Nectre N65 at Glen Dimplex Americas were evaluated to determine if sufficient to maintain conformance with OMNI's requirements for product certification. OMNI has concluded that the manufacturing facilities, processes, and quality control system are adequate to produce the appliance congruous with the standards and model codes to which it was evaluated.

Sample Analysis

Analysis Worksheets
Tared Filter, Probe, and O-Ring Data

OMNI-Test Laboratories, Inc.

Wood Heater Run Sheets

Client: Glen Dimplex Project Number: 0568WS001E Run Number: 1
Model: Nectre 65 Tracking Number: 2380 Date: 7/16/19
Test Crew: BDavis
OMNI Equipment ID numbers: 00637, 00592, 00283A

ASTM E2515 Lab Sheet

Assembled By:

BDavis

Date/Time in Dessicator:

7/18/19 0910

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
	Date/Time: 7/19/19 1240	Date/Time: 7/22/19 0720	Date/Time: 7/25/19 0816	Date/Time:	Date/Time:
	R/H %: 25.5	R/H %: 31.6	R/H %: 34.7	R/H %:	R/H %:
	Temp: 74.6	Temp: 76.5	Temp: 75.6	Temp:	Temp:
	200 mg Audit: 199.9	200 mg Audit: 200.0	200 mg Audit: 200.0	200 mg Audit:	200 mg Audit:
	2 g Audit: 2000.2	2 g Audit: 2000.0	2 g Audit: 2000.3	2 g Audit:	2 g Audit:
	100 g Audit: 99998.1	100 g Audit 99997.9	100 g Audit 99997.9	100 g Audit	100 g Audit
	Initials: BC	Initials: BC	Initials: BC	Initials:	Initials:

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A (First Hour)	Front Filter	T162S	81.9	83.3	83.0	82.9		
	Rear Filter							
	Probe							
	O-Ring Set							
A (Remainder)	Front Filter	T157AP	162.5	166.3	166.2			
	Rear Filter	T163S	79.2	79.4	79.2			
	Probe	2	115016.4	115017.1	115017.2			
	O-Ring Set	R823	337.2	337.7	337.3	337.3		
B	Front Filter	T157BP	164.0	168.4	168.2			
	Rear Filter							
	Probe	OES3	114769.3	114770.0	114769.8			
	O-Ring Set	R824	336.0	336.6	336.4			
BG	Filter							

Technician Signature: BDavis Date: 8/12/19

OMNI-Test Laboratories, Inc.

Wood Heater Run Sheets

Client: Glen Dimplex | Project Number: 0568WS001E | Run Number: 2
Model: Nectre 65 | Tracking Number: 2380 | Date: 7/16/19
Test Crew: B Davis
OMNI Equipment ID numbers: 00637, 00592, 00283A

ASTM E2515 Lab Sheet

Assembled By: B Davis

Date/Time in Dessicator: 7/18/19 0910

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
	Date/Time: 7/19/19 1210	Date/Time: 7/22/19 0900	Date/Time: 7/23/19 0816	Date/Time:	Date/Time:
	R/H %: 25.5	R/H %: 31.6	R/H %: 34.7	R/H %:	R/H %:
	Temp: 74.6	Temp: 76.5	Temp: 75.6	Temp:	Temp:
	200 mg Audit: 199.9	200 mg Audit: 200.0	200 mg Audit: 200.0	200 mg Audit:	200 mg Audit:
	2 g Audit: 2.0002	2 g Audit: 2.0010	2 g Audit: 2.0003	2 g Audit:	2 g Audit:
	100 g Audit: 99.998.1	100 g Audit 99.999.9	100 g Audit 99.999.9	100 g Audit	100 g Audit
	Initials: BL	Initials: BL	Initials: BL	Initials:	Initials:

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A (First Hour)	Front Filter	T164S	79.0	80.1	80.0 ✓			
	Rear Filter							
	Probe							
	O-Ring Set							
A (Remainder)	Front Filter	T158AP	163.0	162.7	162.7 ✓			
	Rear Filter							
	Probe	3	116011.8	116012.7	116012.7 ✓			
	O-Ring Set	R826	3348.7	3349.0	3348.8 ✓			
B	Front Filter	T159DB	164.6	165.4 162.7 pa	165.4 ✓			
	Rear Filter							
	Probe	28	1147499	114751.4	114751.0	114751.2 ✓		
	O-Ring Set	8827	3534.3	3534.8	3334.5	3334.4 ✓		
BG	Filter							

Technician Signature: B Davis Date: 8/12/19

OMNI-Test Laboratories, Inc.

Wood Heater Run Sheets

Client: Glen Dimplex | Project Number: 0568WS001E | Run Number: 4
Model: Nectre 65 | Tracking Number: 2380 | Date: 7/17/19
Test Crew: B Davis
OMNI Equipment ID numbers: 00637, 00592, 00283A

ASTM E2515 Lab Sheet

Assembled By:

B Davis

Date/Time in Dessicator:

7/16/19 0910

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
Date/Time:	7/19/19 1210	7/22/19 0920	7/29/19 0816		
R/H %:	25.5	31.6	34.7		
Temp:	74.6	76.5	75.6		
200 mg Audit:	199.9	200.0	200.0		
2 g Audit:	2000.2	2000.0	2000.3		
100 g Audit:	99998.1	99997.9	99997.9		
Initials:	BL	BL	BL		

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A (First Hour)	Front Filter	T165S	78.2	84.5	84.4 ✓			
	Rear Filter							
	Probe							
	O-Ring Set							
A (Remainder)	Front Filter	T170AP	166.1	166.9 ~~166.0~~	166.8 ✓			
	Rear Filter							
	Probe	30	114327.8	114329.5	114328.9	114329.1 ✓		
	O-Ring Set	R828	3552.3	3551.6	3551.8 ✓			
B	Front Filter	T170BP	165.4	171.2	171.0 ✓			
	Rear Filter							
	Probe	32	114741.3	114742.6	114742.4 ✓			
	O-Ring Set	R829	3321.8	3323.8	3322.9	3322.8 ✓		
BG	Filter							

Technician Signature: B Davis Date: 8/12/19

Tare Sheet: (check one) **Probes**_____ **47mm Filters** ✓ **100mm Filters**_____ **O-Ring Pair**_____

Prepared By: B Davis Balance ID #: OMNI-00637 Thermohygrometer ID #: OMNI-00592 Audit Weight ID #/Mass: OMNI-00283A 1200 mg

Placed in Dessicator: Date: 5/16/19 Time: 0835 ID #	Date: 5/17/19 Time: 0845 RH %: 14.1 T (°F): 71.0 Audit: 200.0	Date: 5/20/19 Time: 0916 RH %: 9.7 T (°F): 71.2 Audit: 200.0	Date: 5/21/19 Time: 0820 RH %: 13.8 T (°F): 70.8 Audit: 200.1	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
T155AP	~~243.8~~ BR 163.2	162.8	162.9	✓			
T155BP	~~244.2~~ BR 163.3	163.1	✓				
T156AP	162.6	162.6	✓				
T156BP	163.8	163.4	163.6	✓			
T157AP	162.7	162.5	✓		7/16/19	0568WS001E	1
T157BP	163.9	164.0	✓		↓		↓
T158AP	162.8	163.0	✓		↓		2
T158BP	164.4	164.6	✓		↓		↓
T159AP	162.4	162.2	✓				
T159BP	164.1	163.9	✓				
T160S	82.0	81.7	81.9	✓			
T161S	82.0	82.2	✓				
T162S	81.9	81.9	✓		7/16/19	0568WS001E	1
T163S	79.2	79.2	✓		7/16/19	0568WS001E	1
T164S	79.0	79.0	✓		↓		2
T165S	77.9	78.2	78.2	✓	7/17/19		4
T166S	86.8	86.8	✓				
T167S	86.6	86.8	✓				
T168S	86.7	87.0	86.8	✓			
T169S	86.5	86.8	86.8	✓			
	Initials: BR	Initials: BR	Initials: BR	Initials:			

Final Technician Signature: _____ Date: 5/21/19 Evaluator signature: _____

Control No. P-SFDP-0002.xls, Effective date: 2/1/2017

Tare Sheet: (check one) **Probes**_____ **47mm Filters**_✓_ **100mm Filters**_____ **O-Ring Pair**_____

Prepared By: BDAV Balance ID #: omni-00637 Thermohygrometer ID #: omni-00392 Audit Weight ID #/Mass: omni-00283A / 200 mg

Placed in Dessicator: Date: 6/27/19 Time: 1210 ID #	Date: 6-28-19 Time: 14:40 RH %: 24 T (°F): 73.6 Audit: 200.0	Date: 6/29/19 Time: 08:00 RH %: 32 T (°F): 72.8 Audit: 200.1	Date: Time: RH %: T (°F): Audit:	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
T170AP	lk ~~83.7~~ 166.0	166.1			7/17/19	0508WS001E	4
T170BP	165.5	165.4			↓		↓
T171AP	166.4	166.3					
T171BP	167.4	167.3					
T172AP	166.8	166.9					
T172BP	167.3	167.4					
T173AP	167.1	167.0					
T173BP	167.5	167.6					
T174AP	167.8	167.6					
T174BP	167.5	167.5					
T175S	84.2	84.3					
T176S	84.0	84.0					
T177S	84.5	84.4					
T178S	83.8	83.8					
T179S	86.0	86.1					
T180S	86.8	86.7					
T181S	86.8	86.9					
T182S	87.2	87.1					
T183S	87.1	87.1					
T184S	87.5	87.5					
	Initials: lk	Initials: lk	Initials:	Initials:			

Final Technician Signature: _____ Date: 6/29/19 Evaluator signature: _____

Tare Sheet: (check one) **Probes** ✓ **47mm Filters**_____ **100mm Filters**_____ **O-Ring Pair**_____

Prepared By: B Davis Balance ID #: OMNI-00637 Thermohygrometer ID #: OMNI-00592 Audit Weight ID #/Mass: OMNI-00283A / 100g

Placed in Dessicator: Date: 6/27/19 Time: 1050 ID #	Date: 6/28/19 Time: 14:50 RH %: 24 T (°F): 73.6 Audit: 200.0	Date: 6/29/19 Time: 08:00 RH %: 32 T (°F): 72.8 Audit: 200.1	Date: 7/2/19 Time: 0814 RH %: 20.6 T (°F): 74.8 Audit: 200.1	Date: 7/10/19 Time: 0930 RH %: 19.4 T (°F): 75.2 Audit: 99998.0	Date Used	Project Number	Run No.
2	115016.9	115016.2	115016.4	✓	7/16/19	0568WS001E	1
OEs 3	114769.5	114768.9	114769.3	114769.3 ✓	↓	↓	↓
3	~~114769.5~~ 116012.5	116012.0	116011.8	✓	7/16/19	↓	2
4	114858.0	114857.9 —					
6	115350.2	115349.8	115349.4	115350.0			
8	115593.9	115593.7 —					
9	115692.3	115692.3 —					
23	114077.3	114076.9	114076.7 ✓				
25	114299.9	114299.5	114299.1	114299.3			
28	114750.6	114750.1	114749.9 ✓		7/16/19	0568WS001E	2
30	114328.6	114328.0	114327.8 ✓		7/17/19	0568WS001E	4
32	114741.5	114741.3 —			↓		↓
33	113944.1	113943.8	113943.7 ✓				
31	114367.1	114366.8	114366.6 ✓	Not used			
56	118613.2	118612.9	118613.0 ✓				
59	117785.3	117785.1 —					
	Initials: JL	Initials: JL	Initials: BR	Initials: JL			

Final Technician Signature: BD Date: 7/10/19

Evaluator signature: JL. Mey

Tare Sheet: (check one) **Probes**_____ **47mm Filters**_____ **100mm Filters**_____ **O-Ring Pair** ✓

Prepared By: B Davis Balance ID #: Omni-00637 Thermohygrometer ID #: Omni-00592 Audit Weight ID #/Mass: Omni-00283A 1 5g

Placed in Dessicator: Date: 6/25/19 Time: 0815 ID #	Date: 6/26/19 Time: 0925 RH %: 18.7 T (°F): 74.4 Audit: 4999.9	Date: 6/26/19 Time: 22:50 RH %: 23.2 T (°F): 75.0 Audit: 4999.9	Date: 6/27/19 Time: 1835 RH %: 14.4 T (°F): 74.6 Audit: 4999.9	Date: 7/10/19 Time: 0930 RH %: 19.6 T (°F): 75.2 Audit: 5000.0	Date Used	Project Number	Run No.
R817	33522	3352.7	3352.5	✓			
R818	3287.1	3287.6	3287.5	✓			
R819	3340.7	3341.3	3341.1	✓			
R820	4113.9	4114.4	4114.4	✓			
R821	3288.6	3289.2	3289.2	✓			
R822	3346.7	3347.3	3347.2	✓			
R823	3370.7	3371.2	3371.2	✓	7/16/19	0568WS001E	1
R824	3365.2	3365.8	3366.0	✓	↓	↓	↓
R825	3295.1	3295.3	—				
R826	3348.5	3348.7	—		7/16/19	0568WS001E	2
R827	35336	3534.1	3534.3	✓	↓	↓	↓
R828	3551.6	3552.3	3552.3	✓	7/17/19		4
R829	3321.8	3321.8	—		↓	↓	↓
R830	3580.9	3581.1	—		Not used		
R831	3500.9	3501.0	—		Not used		
R832	3622.7	3623.0	✗ 3623.4	3621.7	Not used		
	Initials: BR	Initials: BR	Initials: BR	Initials: BR			

Final Technician Signature: _____ Date: 7/10/19 Evaluator signature: _____

Calibrations

Methods ASTM E2515, ASTM E3053

ID #	Lab Name/Purpose	Log Name	Attachment Type
132	10 lb Weight	Weight Standard, 10 lb.	Calibration Certificate
16-140TT029	Platform Scale	United 1000 lb.	Calibration Certificate
650	Digital Barometer	Traceable Barometer	Calibration Certificate
283A	Audit Weights	Troemner 21pc Msas Set	Calibration Certificate
371	Sample Box / Dry Gas Meter	Apex Automated Emissions Sampling Box	Calibration Log
372	Sample Box / Dry Gas Meter	Apex Automated Emissions Sampling Box	Calibration Log
410	Microtector	Dwyer Microtector	Calibration Certificate
559	Vaneometer	Dwyer Vaneometer	Equipment Record
592	Thermohygrometer	Omega Digital Thermohygrometer	Calibration Log
594	Combustion Gas Analyzer	CAI Gas Analyzer	See Run Sheet
637	Milligram Balance	Analytical Balance - Mettler - Toledo	Calibration Certificate

SCALE WEIGHT CALIBRATION DATA SHEET

Weight to be calibrated: 10 pounds

ID Number: OMNI-00132

Standard Calibration Weight: 10 pounds

ID Number: OMNI-00255

Scale Used: MTW-150K

ID Number: OMNI-00353

Date: 2/23/2018 By: B. Davis

Standard Weight (A) (Lb.)	Weight Verified (B) (Lb.)	Difference (A - B)	% Error
10.0	10.0	0.0	0

*Acceptable tolerance is 1%.

This calibration is traceable to NIST using calibrated standard weights.

Technician signature: _____ Date: 2/23/18

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Nelke Consulting LLC
30522 SE Leavenworth Ct.
Eagle Creek, OR 97022

Report Number: NELK0116-1400TT029180418

CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Scale	United	1000 lb	16-1400TT029	N/A	Lab
Units	**Readability**	**SOP**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
lbs	0.2	QC033	4/18/18	N/A	4/2019

FUNCTIONAL CHECKS

SHIFT TEST		LINEARITY		REPEATABILITY	
Test Wt:	Tol:	Test Wt:	Tol:	Test Wt:	Tol:
250	0.4	HB44	HB44	200	0.2
As-Found:		As-Found:		As-Found:	
Pass: ☑	Fail: ☐	Pass: ☑	Fail: ☐	Pass: ☑	Fail: ☐
As-Left:		As-Left:		As-Left:	
Pass: ☑	Fail: ☐	Pass: ☑	Fail: ☐	Pass: ☑	Fail: ☐

CALIBRATION DATA

Standard	As-Found	As-Left
500	500.0	500.0
400	400.1	400.1
300	300.0	300.0
200	200.2	200.2
100	100.1	100.1
50	50.1	50.1

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Avoirdupois Cast W	Rice Lake	25 and 50lb	PWO990-CA	11/24/17	11/2019	20172265

Permanent Information Concerning this Equipment:

Comments/Info Concerning this Calibration:

Technician: D.Oudeans

Signature: D. Oudeans

Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy.

PT ID: NELK01

Certificate of Calibration

Certificate Number: **698278**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

ACCREDITED
0723.01
Calibration

PO: **190231**
Order Date: 04/04/2019
Authorized By: **N/A**

Property #: OMNI-00650
User: N/A
Department: N/A
Make: Control Company
Model: 6530
Serial #: 181062211
Description: Thermohygrometer / Barometer
Procedure: 403406
Accuracy: ±3%RH, ±.4°C(0.8°F), ±4mbar(0.12inHg)

Calibrated on: 04/18/2019
*Recommended Due: 04/18/2020
Environment: 22 °C 53 % RH
* As Received: Within Tolerance
* As Returned: Within Tolerance
Action Taken: Calibrated
Technician: **146**

Remarks: * Many factors may cause the unit to drift out of calibration before the recommended due date. Any reported error is the absolute value between the reference and the unit. Uncertainties include the effects of the unit.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
847A	Fluke	RPM4	Reference Pressure Monitor	11/21/2019	688957
644A	Thunder Scientific	1200	Two Pressure Humidity Generator	07/30/2019	674006

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	kError	UUT	Uncertainty
Before/After							Accredited = ✓
Humidity							
	%	13.0	10	16	1	14 %	5.8E-01 ✓
	%	50.0	47	53	2	48 %	5.8E-01 ✓
	%	80.0	77	83	3	77 %	5.8E-01 ✓
Temperature							
	°C	20.00	19.6	20.4	0.4	19.6 °C	8.1E-02 ✓
	°C	35.00	34.6	35.4	0.4	34.6 °C	8.1E-02 ✓
	°C	50.00	49.6	50.4	0.2	49.8 °C	8.1E-02 ✓
Barometer							
	29 inHg	29.6210	29.501	29.741	0.009	29.630 inHg	8.1E-02 ✓

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMI's), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without prior written consent of JJ Calibrations, Inc.
JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 04/19/2019 Rev # 15

Inspector

Certificate of Calibration

Certificate Number: **685888**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

0723.01
Calibration

PO: **180188**
Order Date: 10/09/2018
Authorized By: **N/A**

Property #: OMNI-00283A
User: N/A
Department: N/A
Make: Troemner Inc
Model: 1mg-100g (Class F)
Serial #: 47883
Description: Mass Set, 21pc
Procedure: DCN 500901
Accuracy: Class F

Calibrated on: 10/26/2018
*Recommended Due: 10/26/2023
Environment: **20** °C **57** % RH
* As Received: Within Tolerance
* As Returned: Within Tolerance
Action Taken: Calibrated
Technician: **139**

Remarks: * Many factors may cause the unit to drift out of calibration before the recommended due date. Any reported error is the absolute value between the reference and the unit. Uncertainties include the effects of the unit.

This set meets Class F specifications.
Received and returned eight (8) masses in a black case secured by a rubber band.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
723A	Rice Lake	1mg-200g (Class 0)	Mass Set,	03/23/2019	668240
800A	Sartorius	MSA225W100DI	Analytical Balance	12/11/2018	663857

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	[k]Error	UUT	Uncertainty Accredited = ✓
Before/After							
Mass							
Dot	200 mg	200.00030	199.4603	200.5403	0.0500	200.0503 mg	6.2E-01 ✓
	1 g	1.00000880	0.9991088	1.0009088	0.0000000	1.0000088 g	1E-03 ✓
	2 g	2.00001470	1.9989147	2.0011147	0.0003250	2.0003397 g	1.3E-03 ✓
	5 g	5.00000840	4.9985084	5.0015084	0.0000400	4.9999684 g	1.7E-03 ✓
	10 g	10.0000100	9.998010	10.002010	0.000245	9.999765 g	2.3E-03 ✓
Dot	20 g	20.0000140	19.996014	20.004014	0.000990	20.001004 g	4.6E-03 ✓
	50 g	49.9999660	49.989966	50.009966	0.000595	49.999371 g	1.1E-02 ✓
	100 g	100.000000	99.98000	100.02000	0.00194	99.99806 g	2.3E-02 ✓

Reviewer

3 Issued 10/29/2018 Rev # 15

Inspector

Thermal Metering System Calibration
Y Factor

Manufacturer:	Apex
Model:	XC-60-EP
Serial Number:	0702003
OMNI Tracking No.:	OMNI-00371
Calibrated Orifice:	☐ Yes

Average Gas Meter y Factor	Orifice Meter dH@
1.009	N/A

Calibration Date:	01/17/19	
Calibrated by:	B. Davis	
Calibration Frequency:	6 months	
Next Calibration Due:	7/17/2019	
Instrument Range:	1.000	cfm
Standard Temp.:	68	oF
Standard Press.:	29.92	"Hg
Barometric Press., Pb:	29.75	"Hg
Signature/Date:		

Previous Calibration Comparision

		Acceptable Deviation (5%)	Deviation
Date	7/16/2018		
y Factor	0.983	0.04915	0.026
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.009
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	OMNI-00001	
	Calib. Date	18-Nov-18	
	Calib. Value	0.9981	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H2O), Pr	0.00	0.00	0.00
DGM Pressure ("H2O), Pd	3.24	1.70	1.00
Initial Reference Meter	906.2	914.7	921
Final Reference Meter	914.604	920.9	928.303
Initial DGM	0	0	0
Final DGM	8.126	6.112	7.228
Temp. Ref. Meter (°F), Tr	70.9	69.5	70.0
Temperature DGM (°F), Td	68.0	66.0	70.8
Time (min)	26.0		67.5
Net Volume Ref. Meter, Vr	8.404	6.200	7.303
Net Volume DGM, Vd	8.126	6.112	7.228
Gas Meter y Factor =	**1.018**	**1.002**	**1.008**
Gas Meter y Factor Deviation (from avg.)	0.009	0.008	0.002
Orifice dH@	**N/A**	**N/A**	**N/A**
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

1. Deviation = |Average value for all runs - current run value|

** 2. $y = [Vr \times (y \text{ factor (ref)}) \times (Pb + (Pr/ 13.6)) \times (Td + 460)] / [Vd \times (Pb + (Pd / 13.6)) \times (Tr + 460)]$

** 3. $dH@ = 0.0317 \times Pd / (Pb\ (Td + 460)) \times [\ (Tr + 460) \times time) / Vr\ ]^2$

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272, or NIST traceable laboratory

** Equations come from EPA Method 5

The uncertainty of measurement is ±0.14 ft^3/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Temperature Calibration
EPA Method 28R, ASTM 2515

Booth:	Temperature Monitor Type:	Equipment Number:
Mobile	National Instruments Logger	00371, 00372

Reference Meter Equipment Number: 00373	Calibration Due Date: 7/21/19

Performed By:	Date:	Ambient Temperature:	Barometric Pressure:
A. Kravitz	1/121/2019	68	30.27

Input (F)	Amb	Meter A	Meter B	Filter A	Filter B	Tunnel	FB Interior
0	-1	-1	-1	-1	-1	-1	-1
100	99	99	99	99	99	99	99
300	299	299	299	300	299	299	299
500	499	499	499	499	499	499	499
700	699	699	699	699	699	699	699
1000	999	999	999	999	999	999	999

Input (F)	FB Top	Bottom	Back	Left	Right	Imp A	Imp B	Cat	Stack
0	0	0	-1	-1	-1	-1	-1	-1	-1
100	99	99	99	99	99	99	100	99	99
300	299	299	299	299	299	299	299	299	299
500	499	499	499	499	499	499	499	499	499
700	699	699	699	699	699	699	699	699	699
1000	999	999	999	999	999	999	999	999	999
1200								1249	
1600								1599	
2000								1999	

Technician signature: _____ Date: 1/21/2019

Reviewed By: _____ Date: 2/25/19

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET

Instrument to be calibrated: 371B

Maximum Range: 1" H2O ID Number: 371B

Calibration Instrument: Digital Manometer ID Number: 633

Date: 1/21/2019 By: Aaron Kravitz

This form is to be used only in conjunction with Standard Procedure C-SPC.

Range of Calibration Point ("WC)	Digital Manometer Input ("WC)	Pressure Gauge Response ("WC)	Difference (Input - Response)	% Error of Full Span*
0-20% Max. Range	0.12	0.13	0.01	1%
20-40% Max. Range	0.38	0.36	0.02	2%
40-60% Max. Range	0.44	0.45	0.01	1%
60-80% Max. Range	0.61	0.60	0.01	1%
80-100% Max. Range	0.48	0.49	0.01	1%

*Acceptable tolerance is 4%.

The uncertainty of measurement is ±0.4" WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Technician signature: _____ Date: 1/21/19

Reviewed by: _____ Date: 2/25/19

Thermal Metering System Calibration
Y Factor

Manufacturer:	Apex
Model:	XC-60-EP
Serial Number:	0702004
OMNI Tracking No.:	OMNI-00372
Calibrated Orifice:	☐ Yes

Average Gas Meter y Factor	Orifice Meter dH@
0.996	N/A

Calibration Date:	01/17/19	
Calibrated by:	B. Davis	
Calibration Frequency:	6 months	
Next Calibration Due:	7/17/2019	
Instrument Range:	1.000	cfm
Standard Temp.:	68	oF
Standard Press.:	29.92	"Hg
Barometric Press., Pb:	30.24	"Hg
Signature/Date:		

Previous Calibration Comparision

		Acceptable Deviation (5%)	Deviation
Date	7/16/2018		
y Factor	0.993	0.04965	0.003
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.014
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	OMNI-00001	
	Calib. Date	14-Nov-18	
	Calib. Value	0.9981	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H2O), Pr	0.00	0.00	0.00
DGM Pressure ("H2O), Pd	2.00	1.30	0.80
Initial Reference Meter	963.421	968.575	973.96
Final Reference Meter	968.575	973.968	979.252
Initial DGM	0	0	0
Final DGM	5.164	5.336	5.384
Temp. Ref. Meter (°F), Tr	65.3	65.5	66.5
Temperature DGM (°F), Td	67.0	68.0	69.0
Time (min)	27.8	36.5	48.3
Net Volume Ref. Meter, Vr	5.154	5.393	5.292
Net Volume DGM, Vd	5.164	5.336	5.384
Gas Meter y Factor =	**0.995**	**1.010**	**0.984**
Gas Meter y Factor Deviation (from avg.)	0.002	0.014	0.012
Orifice dH@	**N/A**	**N/A**	**N/A**
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

1. Deviation = |Average value for all runs - current run value|

** 2. y = [Vr x (y factor (ref)) x (Pb + (Pr/ 13.6)) x (Td + 460)]/ [Vd x (Pb + (Pd / 13.6)) x (Tr + 460)]

** 3. dH@ = 0.0317 x Pd / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272, or NIST traceable laboratory

** Equations come from EPA Method 5

The uncertainty of measurement is ±0.14 ft^3/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Temperature Calibration
EPA Method 28R, ASTM 2515

Booth:	Temperature Monitor Type:	Equipment Number:
Mobile	National Instruments Logger	00371, 00372

Reference Meter Equipment Number: 00373	Calibration Due Date: 7/21/19

Performed By:	Date:	Ambient Temperature:	Barometric Pressure:
A. Kravitz	1/121/2019	68	30.27

Input (F)	Amb	Meter A	Meter B	Filter A	Filter B	Tunnel	FB Interior
0	-1	-1	-1	-1	-1	-1	-1
100	99	99	99	99	99	99	99
300	299	299	299	300	299	299	299
500	499	499	499	499	499	499	499
700	699	699	699	699	699	699	699
1000	999	999	999	999	999	999	999

Input (F)	FB Top	Bottom	Back	Left	Right	Imp A	Imp B	Cat	Stack
0	0	0	-1	-1	-1	-1	-1	-1	-1
100	99	99	99	99	99	99	100	99	99
300	299	299	299	299	299	299	299	299	299
500	499	499	499	499	499	499	499	499	499
700	699	699	699	699	699	699	699	699	699
1000	999	999	999	999	999	999	999	999	999

1200 ——— 1249
1600 ——— 1599
2000 ——— 1999

Technician signature: _____ Date: 1/21/2019

Reviewed By: _____ Date: 2/25/19

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET

Instrument to be calibrated: 372B

Maximum Range: 1" H_2O ID Number: 372B

Calibration Instrument: Digital Manometer ID Number: 633

Date: 1/21/2019 By: Aaron Kravitz

This form is to be used only in conjunction with Standard Procedure C-SPC.

Range of Calibration Point ("WC)	Digital Manometer Input ("WC)	Pressure Gauge Response ("WC)	Difference (Input - Response)	% Error of Full Span*
0-20% Max. Range	0.14	0.15	0.01	1%
20-40% Max. Range	0.37	0.38	0.01	1%
40-60% Max. Range	0.54	0.56	0.02	2%
60-80% Max. Range	0.62	0.63	0.01	1%
80-100% Max. Range	0.94	0.96	0.02	2%

*Acceptable tolerance is 4%.

The uncertainty of measurement is ±0.4" WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Technician signature: _____ Date: 1/21/19

Reviewed by: _____ Date: 2/25/19

Certificate of Calibration

Certificate Number: **686722**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

0723.01
Calibration

PO: **180192**
Order Date: 10/22/2018
Authorized By: **N/A**

Property #: OMNI-00410
User: N/A
Department: N/A
Make: Dwyer
Model: 1430
Serial #: OMNI-00410
Description: Microtector
Procedure: DCN 500908
Accuracy: ±0.00025" WC

Calibrated on: 10/30/2018
*Recommended Due: 10/30/2019
Environment: 22 °C 44 % RH
* As Received: Limited
* As Returned: Limited
Action Taken: Calibrated
Technician: **111**

Remarks: * Many factors may cause the unit to drift out of calibration before the recommended due date. Any reported error is the absolute value between the reference and the unit. Uncertainties include the effects of the unit.

Previous limitation of micrometer head calibrated only continued. .001" reading micrometer head ±.001" (LSD) tolerance applied.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
541A	Select	E8FED2	Gage Block Set, 8pc	12/18/2018	663864

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	ᵏError	UUT	Uncertainty Accredited = ✓
Before/After							
Length							
	Inch	0.1300	0.129	0.131	0.001	0.129 Inch	1.1E-03 ✓
	Inch	0.3850	0.384	0.386	0.001	0.384 Inch	1.1E-03 ✓
	Inch	0.6150	0.614	0.616	0.001	0.614 Inch	1.1E-03 ✓
	Inch	0.8700	0.869	0.871	0.001	0.869 Inch	1.1E-03 ✓
	Inch	1.0000	0.999	1.001	0.001	0.999 Inch	1.1E-03 ✓

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMI's), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without prior written consent of JJ Calibrations, Inc.
JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 10/31/2018 Rev # 15

Inspector

Calibration Record

Vaneometer Air Velocity Meter OMNI-00559

Calibration Service Record			
Date	**By**	**Results**	**Date of next Calibration**
11/17/17	BD	Installed New Vane From Manufacturer	5/17/18
7/12/18	BR	Installed New Vane from Manufacturer	1/12/19
6/13/19	BR	Installed New Vane From Manufacture	6/15/19
6/13/19	BD	Installed New Vane From Manufacture	12/13/19

VWR Temperature Hygrometer Calibration Procedure and Data Sheet

Frequency: Every Two Years

Step 1: Locate NIST traceable standard.

Step 2: Place unit to be calibrated, tracking No. OMNI-00592, inside OMNI desiccate box on the same shelf with the NIST traceable standard.

Step 3: After a period of not less than four hours record the temperature and humidity of both units in the spaces provide below.

Step 4: If the unit to be calibrated matches the NIST standard within ± 4%, it is acceptable. If not, the unit needs to be sent to a repair company or replaced.

Verification Data:

Date: 1/29/19 ~~1/29/19~~ BA Technician: BDAVIS

Time in desiccate: 0840 Recording time: 1415

NIST Standard Temperature: 70.2 °F NIST Standard Humidity: 14.6

Test Unit Temperature Reading: 69.9 °F Test Unit Humidity Reading: 12.1

Test unit OMNI- 00592 is X or was not ___ within acceptable limits.

Technician Signature: [signature]

Comments: A difference of 2.5% was found, with a full scale of 90% on the Instrument this gives a 2.77% deviation.

ZRE NDIR/O_2

USER'S MANUAL

1312 West Grove Avenue
Orange, CA 92865-4134
Phone: 714-974-5560 Fax: 714-921-2531
www.gasanalyzers.com

Certificate of Calibration

Certificate Number: **692254**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

OnSite

0723.01
Calibration

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

PO: **181203**
Order Date: **01/11/2019**
Authorized By: **N/A**

Property #: **OMNI-00637**
User: **N/A**
Department: **N/A**
Make: **Mettler Toledo**
Model: **MS104TS/00**
Serial #: **B729400181**
Description: **Analytical Scale, 120g**
Procedure: **DCN 500887**
Accuracy: **±0.0005g**

Calibrated on: **01/11/2019**
*Recommended Due: **07/11/2019**
Environment: **19** °C **43** % RH
* As Received: **Within Tolerance**
* As Returned: **Within Tolerance**
Action Taken: **Calibrated**
Technician: **123**

Remarks: * Many factors may cause the unit to drift out of calibration before the recommended due date. Any reported error is the absolute value between the reference and the unit. Uncertainties include the effects of the unit.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
256A	Rice Lake	W0133K	Mass Set,	05/30/2019	660578

Measurement Data

Parameter / Measurement Description	Range	Unit	Reference	Min	Max	*Error	UUT	Uncertainty
Before/After								Accredited = ü
Force								
		g	10.00000	9.9995	10.0005	0.0000	10.0000 g	5.7E-04 ü
		g	30.00000	29.9995	30.0005	0.0000	30.0000 g	5.7E-04 ü
		g	60.00000	59.9995	60.0005	0.0002	59.9998 g	5.7E-04 ü
		g	90.00000	89.9995	90.0005	0.0001	89.9999 g	5.7E-04 ü
		g	120.00000	119.9995	120.0005	0.0002	119.9998 g	5.7E-04 ü

Reviewer

3 Issued 01/14/2019 Rev # 15

Inspector

Example Calculations

Equations and Sample Calculations

Manufacturer:	Glen Dimplex
Model:	Nectre 65
Run:	2
Category:	

Equations used to calculate the parameters listed below are described in this appendix. Sample calculations are provided for each equation. The raw data and printout results from a sample run are also provided for comparison to the sample calculations.

M_{FTAdb} - Total weight of fuel

BR – Dry burn rate, kg/hr

V_s – Average gas velocity in the dilution tunnel, ft/sec

Q_{sd} – Average gas flow rate in dilution tunnel, dscf/hr

$V_{m(std)}$ – Volume of gas sampled, corrected to dry standard conditions, dscf

m_n – Total particulate matter collected, mg

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to standard conditions, g/dscf

E_T – Total particulate emissions, g

PR - Proportional rate variation

PM_R – Particulate emissions for test run, g/hr

PM_F – Particulate emission factor for test run, g/dry kg of fuel burned

M_{FTAdb} - Total weight of fuel
ASTM E2780 equation (4)

$$M_{FTAdb} = M_{Sdb} + M_{Cdb}$$

Sample calculation:

M_{FTAdb} = 6.53

= **6.53** kg

BR – dry burn rate, kg/hr
ASTM E2780 equation (5)

$$BR = \frac{60\ M_{FTAdb}}{\theta}$$

Where,

θ = Total length of test run, min

Sample Calculation:

M_{Bdb} = 6.53 kg

θ = 325 min

$$BR = \frac{60 \times 6.53}{325}$$

BR = **1.21** kg/hr

V_s – Average gas velocity in the dilution tunnel, ft/sec
ASTM E2515 equations (9)

$$v_s = F_P \times k_p \times C_p \times (\sqrt{\Delta P})_{avg} \times \sqrt{\frac{T_{s(avg)}}{P_s \times M_s}}$$

Where:

F_p = Adjustment factor for center of tunnel pitot tube placement, $Fp = \frac{V_{strav}}{V_{scent}}$, ASTM E2515 Equation (1)

v_{scent} = Dilution tunnel velocity calculated after the multi-point pitot traverse at the center, ft/sec

v_{strav} = Dilution tunnel velocity calculated after the multi-point pitot traverse, ft/sec

k_p = Pitot tube constant, 85.49

C_p = Pitot tube coefficient: 0.99, unitless

ΔP* = Velocity pressure in the dilution tunnel, in H_2O

T_s = Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)

P_s = Absolute average gas static pressure in dilution tunnel, = $P_{bar} + P_g$, in Hg

P_{bar} = Barometric pressure at test site, in. Hg

P_g = Static pressure of tunnel, in. H_20; (in Hg = in H_20/13.6)

M_s = **The dilution tunnel wet molecular weight; M_s = 28.78 assuming a dry weight of 29 lb/lb-mole

Sample calculation:

$$Fp = \frac{21.43}{22.50} = 0.952$$

$$V_s = 0.952 \times 85.49 \times 0.99 \times 0.329 \times \left(\frac{107.9 + 460}{\left(29.93 + \frac{-0.27}{13.6} \right) \times 28.78} \right)^{1/2}$$

V_s = **21.54** ft/s

*The ASTM test standard mistakenly has the square root of the average delta p instead of the average of the square root of delta p. The current EPA Method 2 is also incorrect. This was verified by Mike Toney at EPA.

**The ASTM test standard mistakenly identifies Ms as the dry molecular weight. It should be the wet molecular weight as indicated in EPA Method 2.

Q_{sd} – Average gas flow rate in dilution tunnel, dscf/hr
ASTM E2515 equation (3)

$$Q_{sd} = 3600 \times (1 - B_{ws}) \times v_s \times A \times \frac{T_{std}}{T_{s(avg)}} \times \frac{P_s}{P_{std}}$$

Where:

3600	=	Conversion from seconds to hours (ASTM method uses 60 to convert in minutes)
B_{ws}	=	Water vapor in gas stream, proportion by volume; assume 2%
A	=	Cross sectional area of dilution tunnel, ft^2
T_{std}	=	Standard absolute temperature, 528 °R
P_s	=	Absolute average gas static pressure in dilution tunnel, = P_{bar} + P_g , in Hg
$T_{s(avg)}$	=	Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)
P_{std}	=	Standard absolute pressure, 29.92 in Hg

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 21.54 \times 0.196 \times \frac{528}{107.9 + 460} \times \frac{29.9 + \frac{-0.27}{13.6}}{29.92}$$

Q_{sd} = **13870.3** dscf/hr

$V_{m(std)}$ – Volume of Gas Sampled Corrected to Dry Standard Conditions, dscf
ASTM E2515 equation (6)

$$V_{m(std)} = K_1 \, V_m \, Y \frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{T_m}$$

Where:

K_1	=	17.64 °R/in. Hg
V_m	=	Volume of gas sample measured at the dry gas meter, dcf
Y	=	Dry gas meter calibration factor, dimensionless
P_{bar}	=	Barometric pressure at the testing site, in. Hg
ΔH	=	Average pressure differential across the orifice meter, in. H_2O
T_m	=	Absolute average dry gas meter temperature, °R

Sample Calculation:

Using equation for Train 1:

$$V_{m(std)} = 17.64 \times 51.385 \times 0.992 \times \frac{\left(29.93 + \frac{2.02}{13.6}\right)}{(85.8 + 460)}$$

$V_{m(std)}$ = **49.553** dscf

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 54.255 \times 0.989 \times \frac{\left(29.93 + \frac{1.61}{13.6}\right)}{(83.5 + 460)}$$

$V_{m(std)}$ = **52.333** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 0.00 \times 0 \times \frac{\left(\underline{29.93} + \frac{0.00}{13.6}\right)}{(82.2 + 460)}$$

$V_{m(std)}$ = **0** dscf

m_n – Total Particulate Matter Collected, mg
ASTM E2515 Equation (12)

$$m_n = m_p + m_f + m_g$$

Where:

m_p = mass of particulate matter from probe, mg

m_f = mass of particulate matter from filters, mg

m_g = mass of particulate matter from filter seals, mg

Sample Calculation:

Using equation for Train 1 (first hour):

m_n = 0.0 + 1.0 + 0.0

m_n = 1.0 mg

Using equation for Train 1 (post-first hour):

m_n = 0.9 + -0.3 + 0.1

m_n = 0.7 mg

Train 1 aggregate:

m_n = 1.0 + 0.7

m_n = **1.7** mg

Using equation for Train 2:

m_n = 1.3 + 0.8 + 0.1

m_n = **2.2** mg

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to standard conditions, g/dsc
ASTM E2515 equation (13)

$$C_s = K_2 \times \frac{m_n}{V_{m(std)}}$$

Where:

K_2	=	Constant, 0.001 g/mg
m_n	=	Total mass of particulate matter collected in the sampling train, mg
$V_{m(std)}$	=	Volume of gas sampled corrected to dry standard conditions, dscf

Sample calculation:

For Train 1:

$$C_s = 0.001 \times \frac{1.7}{49.55}$$

C_s = **0.00003** g/dscf

For Train 2

$$C_s = 0.001 \times \frac{2.2}{52.33}$$

C_s = **0.00004** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.0}{0}$$

C_r = **0** g/dscf

E_T – Total Particulate Emissions, g
ASTM E2515 equation (15)

$$E_T = (C_s - C_r) \times Q_{std} \times \theta$$

Where:

C_s	=	Concentration of particulate matter in tunnel gas, g/dscf
C_r	=	Concentration particulate matter room air, g/dscf
Q_{std}	=	Average dilution tunnel gas flow rate, dscf/hr
θ	=	Total time of test run, minutes

Sample calculation:

For Train 1

E_T = (0.000034 - 0) x 13870.3 x 325 /60

E_T = 2.58 g

For Train 2

E_T = (0.000042 - 0) x 13870.3 x 325 /60

E_T = 3.16 g

Average

E = 2.87 g

Total emission values shall not differ by more than 7.5% from the total average emissions

7.5% of the average =	0.22
Train 1 difference =	0.29
Train 2 difference =	0.29

PR - Proportional Rate Variation
ASTM E2515 equation (16)

$$PR = \left[\frac{\theta \times V_{mi} \times V_s \times T_m \times T_{si}}{\theta_i \times V_m \times V_{si} \times T_{mi} \times T_s} \right] \times 100$$

Where:

θ = Total sampling time, min

θ_i = Length of recording interval, min

V_{mi} = Volume of gas sample measured by the dry gas meter during the “ith” time interval, dcf

V_m = Volume of gas sample as measured by dry gas meter, dcf

V_{si} = Average gas velocity in the dilution tunnel during the "ith" time interval, ft/sec

V_s = Average gas velocity in the dilution tunnel, ft/sec

T_{mi} = Absolute average dry gas meter temperature during the "ith" time interval, ^oR

T_m = Absolute average dry gas meter temperature, ^oR

T_{si} = Absolute average gas temperature in the dilution tunnel during the "ith" time interval, ^oR

T_s = Absolute average gas temperature in the dilution tunnel, ^oR

Sample calculation (for the first 1 minute interval of Train 1):

$$PR = \left(\frac{325 \times 0.677 \times 21.54 \times (256.0 + 460) \times (85.8 + 460)}{5 \times 51.39 \times 22.05 \times (107.9 + 460) \times (82.0 + 460)} \right) \times 100$$

PR = 106 %

PM_R – Particulate emissions for test run, g/hr
ASTM E2780 equation (6)

$$PM_R = 60 (E_T/\theta)$$

Where,

E_T = Total particulate emissions, grams

θ = Total length of full integrated test run, min

Sample Calculation:

E_T (Dual train average) = 2.87 g

θ = 325 min

$PM_R = 60$ x (2.87 / 325)

PM_R = **0.53** g/hr

PM_F – Particulate emission factor for test run, g/dry kg of fuel burned
ASTM E2780 equation (7)

$$PM_F = E_T/M_{FTAdb}$$

Sample Calculation:

E_T (Dual train average) = 2.87 g

M_{Bdb} = 6.53 kg

PM_F = 2.87 / 6.53

PM_F = **0.44** g/kg

Appendix A
Manufacturer's Installation/Operation Instructions - Labels

DO NOT REMOVE THIS LABEL/NE PAS ENLEVER CETTE ÉTIQUETTE
CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA.
CONTACTEZ LE BUREAU DE LA CONSTRUCTION OU LE BUREAU DES INCENDIES AU SUJET DES RESTRICTIONS ET DES INSPECTIONS D'INSTALLATION DANS VOTRE RÉGION

Glen Dimplex AMERICAS

Listed Stove, Solid Fuel Type / Poêle à combustible solide homologué
FOR USE WITH SOLID WOOD FUEL ONLY / POUR USAGE AVEC BOIS SEULEMENT

Manufactured by
Glen Dimplex New Zealand
38 Harris Road
East Tamaki, Aukland 2013 New Zealand

Serial No. / No. de série :

Model / Modèle : Nectre N65

Certified for US and Canada

Tested & Listed By — Portland Oregon USA

OMNI Test Laboratories, Inc.
Report No. / No. de rapport 0568WS001S
Report No. / No. de rapport 0568WS001E
Tested to / Testé selon : UL1482-2011 (R2015)
ULC S627-00

PREVENT HOUSE FIRES

Install and use only in accordance with manufacturer's Installation Instructions and your local building codes. Contact your local building or fire officials about restrictions and installation inspection in your area.

CAUTION: Refer to local building codes and manufacturer's instructions for precautions required for passing a chimney through a combustible wall or ceiling. Do not connect this stove to a chimney flue serving another appliance. Do not obstruct the space beneath the stove. Clearances may be reduced by methods specified in NFPA211, listed wall shields, or other means approved by the local building or fire officials.

PRÉVENEZ LES INCENDIES

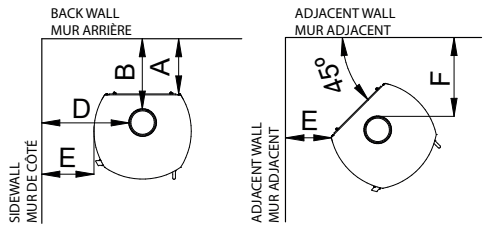
Installer et utiliser conformément au manuel d'installation du fabricant et aux codes du bâtiment locaux. Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.

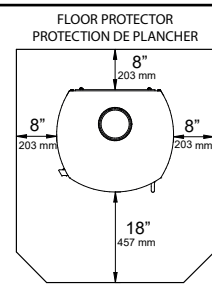
ATTENTION: Voir les codes locaux et le manuel d'installation du manufacturier pour le passage de la cheminée à travers un mur ou un plafond combustible.
Ne pas raccorder ce poêle à une cheminée déservant un autre appareil. Ne pas obstruer l'espace sous le poêle. Les dégagements peuvent être réduits à l'aide de méthodes spécifiées dans la norme NFPA211, de protections murales répertoriées ou de tout autre moyen approuvé par les agents locaux du bâtiment ou de prévention des incendies.

FREE STANDING INSTALLATION / INSTALLATION AUTOSTABLE

Clearance to combustlbles:

The material for the floor protector of this stove must be noncombustible. It must extend beneath the heater and to the front, sides and back as indicated. See Installation Manual for details of materials that can be used.
Required floor protection must be 18" (457 mm) in front and 8" (203 mm) on all other sides of the appliance.





Dégagement aux combustibles:

Le matériau utilisé pour le protecteur de plancher de ce poêle doit être incombustible. Il doit s'étendre sous l'appareil de chauffage et à l'avant, sur les côtés et à l'arrière, comme indiqué. Voir le manuel d'installation pour plus de détails sur les matériaux pouvant être utilisés.
La protection de sol requise doit être de 457 mm (18 po) à l'avant et 203 mm (8 po) sur tous les autres côtés de l'appareil.

	Installation	Clearance	Chimney & Connector	Dimensions A	B	C	D	E	F
US&Canada	Residential	Standard	Note 1	13	16.5	12	20.5	10.5	18.5
(in inches)	Residential	Reduced	Note 2	10	13	12	20	6	13.5

Note 1: 6 inch diameter, single wall, minimum 24 MSG black or 25 MSG blued steel connector pipe with factory-built chimney listed to either UL 103HT or ULCS629.
Note 2: 6 inch diameter listed double wall chimney connector or Type L vent pipe between stove and chimney.
Note 3: The minimum clearance from the top of the appliance to the ceiling is 42 inches (1067mm).

	Installation	Espaces libres	Cheminée et tuyau	Dimensions A	B	C	D	E	F
US&Canada	Résidentielle	Standards	Note 1	330	419	305	521	267	470
(en mm)	Résidentielle	Réduits	Note 2	254	330	305	508	152	343

Note 1 : Tuyau d'évacuation en acier noir de minimum 24 MSG ou en acier bleui de 25 MSG 6 po de diamètre, à paroi simple, avec cheminée préfabriquée, homologué ULC S629.
Note 2 : Tuyau d'évacuation 6 po de diamètre à paroi double ou tuyau d'évacuation de Type L homologué entre le poêle et la cheminée.
Note 3 : Le dégagement minimum entre le haut de l'appareil et le plafond est de 42 po (1067 mm).

CAUTION:

HOT WHILE IN OPERATION. DO NOT TOUCH. CONTACT MAY CAUSE SKIN BURNS. KEEP CHILDREN, CLOTHING, FURNISHINGS, AND COMBUSTIBLE MATERIAL A CONSIDERABLE DISTANCE AWAY. SEE NAMEPLATE AND INSTRUCTIONS. DO NOT OVERFIRE. IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING. INSPECT AND CLEAN CHIMNEY AND CONNECTOR FREQUENTLY. UNDER CERTAIN CONDITIONS OF USE, CREOSOTE BUILDUP MAY OCCUR RAPIDLY. DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON HEARTH. DO NOT BURN WITH FEED DOOR OPEN. REPLACE FEED DOOR GLASS ONLY WITH 5 MM CERAMIC GLASS.

THIS WOOD HEATER NEEDS PERIODIC INSPECTION AND REPAIR FOR PROPER OPERATION. CONSULT THE OWNER'S MANUAL FOR FURTHER INFORMATION. IT IS AGAINST U.S. FEDERAL REGULATIONS TO OPERATE THIS WOOD HETER IN A MANNER INCONSISTENT WITH THE OPERATING INSTRUCTIONS IN THE OWNER'S MANUAL.

ATTENTION :

CHAUD EN FONCTIONNEMENT. NE PAS TOUCHER. LE CONTACT PEUT CAUSER DES BRÛLURES À LA PEAU. GARDER LES ENFANTS, LES VÊTEMENTS, LES MEUBLES ET LES MATÉRIAUX COMBUSTIBLES ÉLOINGÉS DE L'ESPACE DESIGNÉ DE L'APPAREIL. VOIR L'ÉTIQUETTE ET LES INSTRUCTIONS. NE PAS SURCHAUFFER. SI LE POÊLE OU LE TUYAU DE CHEMINÉE ROUGIT, IL SURCHAUFFE. INSPECTER ET NETTOYER LA CHEMINÉE ET LE TUYAU CONNECTEUR FREQUEMMENT. SOUS CERTAINES CONDITIONS, IL SE PEUT QUE LA CREOSOTE S'ACCUMULE RAPIDEMENT. NE PAS SURÉLEVER LE FEU. PRÉPARER LE FEU DIRECTEMENT SUR L'ÂTRE. NE PAS BRÛLER LORSQUE LA PORTE DU POÊLE EST OUVERTE. REMPLACER LA VITRE DE LA PORTE D'ALIMENTATION SEULEMENT AVEC UN VERRE DE CÉRAMIQUE.

CET APPAREIL DE CHAUFFAGE REQUIERT DES INSPECTIONS ET RÉPARATIONS PÉRIODIQUES. CONSULTER LE MANUEL DE L'UTILISATEUR POUR PLUS D'INFORMATION. OPÉRER CET APPAREIL DE CHAUFFAGE DE FAÇON INCONSISTENTE PAR RAPPORT AU MANUEL DE L'UTILISATEUR CONSISTE UNE VIOLATION DE LA LOI FÉDÉRALE (É.U.)

U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U.
Conforme aux normes d'émission de particules de 2020 avec bûches de bois.
Weighted average emission rate/Moyenne pondérée des émissions – 1.98 g/h

Date of Manufacture / Date de fabrication

2019 ☐ 2020 ☐ 2021 ☐ 2022 ☐ 2023 ☐ Jan. ☐ Feb. ☐ Mar. ☐ Apr. ☐ May ☐ Jun. ☐ Jul. ☐ Aug. ☐ Sep. ☐ Oct. ☐ Nov. ☐ Dec. ☐

Nectre N65 Wood Stove

Installation & Operation Instruction Manual

THE N65 WOOD STOVE HAS BEEN TESTED FOR EMISSIONS AND EFFICIENCY AND CERTIFIED TO US ENVIRONMENTAL PROTECTION AGENCY'S PHASE II 2020 CORD WOOD STANDARD. ALSO, N65 HAS BEEN TESTED AND COMPLIES TO ULC-S627-00 & UL-1482-2011 (R2015) SAFETY STANDARDS BY AN ACCREDITED LABORATORY.

CAUTION!
Please read this entire manual before you install or use your new stove. Failure to follow instructions may result in property damage, bodily injury, or even death. Improper installation could void your warranty.

Report # 0568WS001E
Report # 0568WS001S

Table of Contents

This manual covers installation, operation, maintenance, and service. Read carefully before attempting to install, operate, or service the wood stove.

! NOTE: Procedures and techniques that are considered important enough to emphasize.

⚠ **CAUTION:** Procedures and techniques which, if not carefully followed, will result in damage to the equipment.

⚠ **WARNING:** Procedures and techniques which, if not carefully followed, will expose the user to the risk of fire, serious injury, or death.

Welcome & Congratulations

Congratulations on the purchase of your Nectre Wood Stove.

Wood is an important renewable energy resource. Please do your part to preserve our wood supply. Plant at least one tree each year. Future generations will thank you.

Please carefully read and save these instructions.

Please record your serial number below for future reference, which can be found on the Model and Serial Number Label on the back of your wood stove.

Serial Number _____

NO NEED TO RETURN TO THE STORE

Questions with operation or assembly? Require Parts Information?
Product Under Manufacturer's Warranty?

Contact us at: www.nectreusa.com/contact

For Troubleshooting and Technical Support

OR ☎ Toll-Free 1-888-668-6663

Please have your model number and product serial number ready.

CAUTIONS & WARNING

⚠ **CAUTION:** Read all instructions and warnings carefully before starting the installation. Failure to follow these instructions may result in a fire hazard or serious injury and will void the warranty.

① For use with solid wood fuel only – preferable dry, seasoned cordwood.

② Hot while in operation. Keep children, clothing, and furniture away. Contact may cause skin burns.

③ Do not install in a mobile home.

④ Do not burn garbage or flammable chemicals or fluids such as gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, naphtha, engine oil, or similar liquids to start or 'freshen up' a fire in this stove. Some of these fuels can generate deadly carbon monoxides. Keep all such liquids well away from the stove while it is in use.

⑤ Do not connect to any air distribution or duct system.

⑥ Do not elevate the fire by use of a log cradle or grates. Build fire directly on a 1-inch layer of ash spread evenly over the base of the firebox.

⑦ Do not store fuel within the specified installation clearance areas, or within the space required for refueling and ash removal.

⑧ Always close the door after ignition. Leaving the door open can cause smoke spillage and flames to come out of the stove and create dangerous and possibly life-threatening situations.

⑨ Ensure there are working carbon monoxide and smoke detectors in the home.

⑩ Normal operation of the stove will result in momentary emissions of smoke into the room when the refueling door is opened and closed. It is always recommended to install strategically placed smoke detectors away from the stove and to have a fire extinguisher in a convenient location. Make sure that they are not influenced by small and normal wisps of smoke that can come out of the stove at ignition or refueling but close enough to provide safety.

⑨ Never over fire your stove. If any part of the stove starts to glow red, over firing is happening. To correct over firing adjust the air intake control to a lower setting.

⑩ Never put wood above the firebrick lining of the firebox.

⑪ This wood heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual.

⑫ Cracked and broken components, e.g. glass panels or ceramic tiles, may render the installation unsafe.

⑬ This wood heater has a manufacturer-set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood heater in a manner inconsistent with operating instructions in this manual.

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED www.nficertified.org

We suggest that our woodburning hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Woodburning Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training www.wettinc.ca

CAUTIONS & WARNING

DO NOT REMOVE THIS LABEL/NE PAS ENLEVER CETTE ÉTIQUETTE
CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA.
CONTACTEZ LE BUREAU DE LA CONSTRUCTION OU LE BUREAU DES INCENDIES AU SUJET DES RESTRICTIONS ET DES INSPECTIONS D'INSTALLATION DANS VOTRE RÉGION

Glen Dimplex AMERICAS

Listed Stove, Solid Fuel Type / Poêle à combustible solide homologué
FOR USE WITH SOLID WOOD FUEL ONLY / POUR USAGE AVEC BOIS SEULEMENT

Manufactured by
Glen Dimplex New Zealand
38 Harris Road
East Tamaki, Aukland 2013 New Zealand

Serial No. / No. de série :
Model / Modèle : Nectre N65
Certified for US and Canada

Tested & Listed By — Portland Oregon USA

OMNI Test Laboratories, Inc.
Report No. / No. de rapport 0568WS001S
Report No. / No. de rapport 0568WS001E
Tested to / Testé selon : UL1482-2011 (R2015)
ULC S627-00

PREVENT HOUSE FIRES

Install and use only in accordance with manufacturer's Installation Instructions and your local building codes. Contact your local building or fire officials about restrictions and installation inspection in your area.

CAUTION: Refer to local building codes and manufacturer's instructions for precautions required for passing a chimney through a combustible wall or ceiling. Do not connect this stove to a chimney flue serving another appliance. Do not obstruct the space beneath the stove. Clearances may be reduced by methods specified in NFPA211, listed wall shields, or other means approved by the local building or fire officials.

PRÉVENEZ LES INCENDIES

Installer et utiliser conformément au manuel d'installation du fabricant et aux codes du bâtiment locaux. Contacter les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.

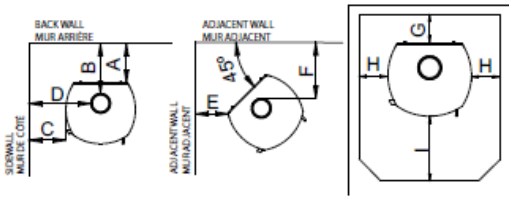
ATTENTION: Voir les codes locaux et le manuel d'installation du manufacturier pour le passage de la cheminée à travers un mur ou un plafond combustible.
Ne pas raccorder ce poêle à une cheminée déservant un autre appareil. Ne pas obstruer l'espace sous le poêle. Les dégagements peuvent être réduits à l'aide de méthodes spécifiées dans la norme NFPA211, de protections murales répertoriées ou de tout autre moyen approuvé par les agents locaux du bâtiment ou de prévention des incendies.

FREE STANDING INSTALLATION / INSTALLATION AUTOSTABLE

Clearance to combustibles:

The material for the floor protector of this stove must be noncombustible. It must extend beneath the heater and to the front, sides and back as indicated. See Installation Manual for details of materials that can be used.

Refer to table for front, side, and rear edge dimensions of floor protector from the stove.



Floor Protector / Protecteur de plancher		
	US	CANADA
G	N/A	8" (203 mm)
H	5" (127 mm)	8" (203 mm)
I	16" (406 mm)	18" (457 mm)

FOR REAR HORIZONTAL VENTS EXTEND PROTECTION UNDER AND 2" EITHER SIDE OF VENT.

POUR LES ÉVENTS À L'HORIZONTAL VERS L'ARRIÈRE, LA PROTECTION DOIT S'ÉTENDRE EN-DESSOUS ET À 2 PO DE CHAQUE CÔTÉ DE L'ÉVENT.

Dégagement aux combustibles :

Le matériau utilisé pour le protecteur de plancher de ce poêle doit être incombustible. Il doit s'étendre sous l'appareil de chauffage et à l'avant, sur les côtés et à l'arrière, comme indiqué. Voir le manuel d'installation pour plus de détails sur les matériaux pouvant être utilisés.

Se référer au tableau pour les dimensions entre les bords avant, arrière et latéraux du protecteur de plancher et le poêle.

	Installation	Clearance	Chimney & Connector	Dimensions A	B	C	D	E	F
US&Canada	Residential	Standard	Note 1	13	16.5	12	20.5	10.5	18.5
(in inches)	Residential	Reduced	Note 2	10	13	12	20	6	13.5

Note 1: 6 inch diameter, single wall, minimum 24 MSG black or 25 MSG blued steel connector pipe with factory-built chimney listed to either UL 103HT or ULCS629.
Note 2: 6 inch diameter listed double wall chimney connector or Type L vent pipe between stove and chimney.
Note 3: The minimum clearance from the top of the appliance to the ceiling is 42 inches (1067mm).

	Installation	Espaces libres	Cheminée et tuyau	Dimensions A	B	C	D	E	F
US&Canada	Résidentielle	Standards	Note 1	330	419	305	521	267	470
(en mm)	Résidentielle	Réduits	Note 2	254	330	305	508	152	343

Note 1 : Tuyau d'évacuation en acier noir de minimum 24 MSG ou en acier bleui de 25 MSG 6 po de diamètre, à paroi simple, avec cheminée préfabriquée, homologué ULC S629.
Note 2 : Tuyau d'évacuation 6 po de diamètre à paroi double ou tuyau d'évacuation de Type L homologué entre le poêle et la cheminée.
Note 3 : Le dégagement minimum entre le haut de l'appareil et le plafond est de 42 po (1067 mm).

CAUTION: HOT WHILE IN OPERATION. DO NOT TOUCH. CONTACT MAY CAUSE SKIN BURNS. KEEP CHILDREN, CLOTHING, FURNISHINGS, AND COMBUSTIBLE MATERIAL A CONSIDERABLE DISTANCE AWAY. SEE NAMEPLATE AND INSTRUCTIONS. DO NOT OVERFIRE. IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING. INSPECT AND CLEAN CHIMNEY AND CONNECTOR FREQUENTLY. UNDER CERTAIN CONDITIONS OF USE, CREOSOTE BUILDUP MAY OCCUR RAPIDLY. DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON HEARTH. DO NOT BURN WITH FEED DOOR OPEN. REPLACE FEED DOOR GLASS ONLY WITH 5 MM CERAMIC GLASS.

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U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission standards using cordwood.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U.
Conforme aux normes d'émission de particules de 2020 avec bûches de bois.
Weighted average emission rate/Moyenne pondérée des émissions – 1.98 g/h

Date of Manufacture / Date de fabrication

2019	2020	2021	2022	2023	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

7123040100R00

CAUTION

DO NOT OPEN

NO USER-SERVICEABLE PARTS INSIDE

SAVE THESE INSTRUCTIONS

Performance

Model	N65
Fuel Type	Dry Cordwood
Combustion Technology	Non-Catalytic
Recommended heating area [1]	Up to 200 m² (2,152 sq.ft.)
Maximum burn time [1]	Up to 8 /10 hours
Overall heat output rate [2] [3] (min to max)	14,108 - 68,531 BTU 4.13 kW - 20.08 kW
Average overall efficiency (HHV) [3] (dry cordwood)	69.6%
Average overall efficiency (LHV) [4] (dry cordwood)	74.5%
Weighted average overall efficiency [2] (dry cordwood)	67.3%
Average particulate emission rate [2]	1.98 g/hr
Average CO	1.258 g/min

[1] Recommended heating area and maximum burn time may vary depending on the home's location, stove location, floor plan, degree of insulation, chimney draft, climate, wood fuel type, quality, and moisture level.

[2] This stove is officially tested and certified by an independent agency for US EPA's cordwood test method As measured per CSA B415.1-10 stack loss method

[3] Higher Heating Value of the fuel

[4] Lower Heating Value of the fuel

EPA Compliance

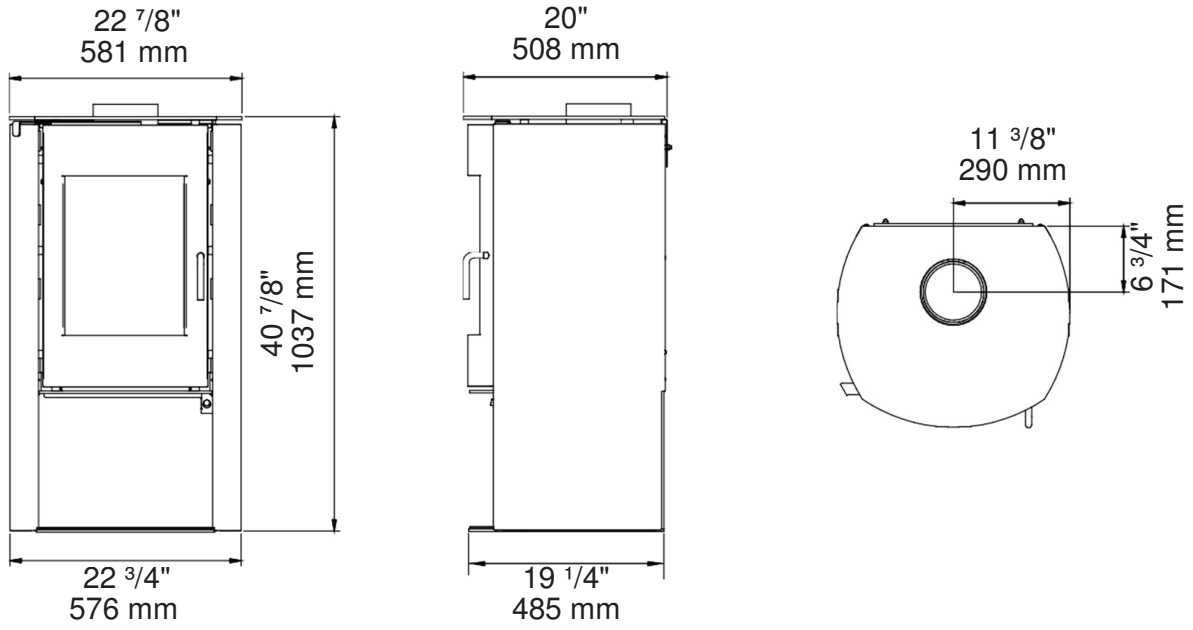
This manual describes the installation and operation of the Nectre N65 wood heater. This heater meets the 2020 U.S. Environmental Protection Agency's cordwood emission limits for wood heaters sold after May 15, 2020. Under specific test conditions, this heater has been shown to deliver heat at rates ranging from 14,108 to 68,531 BTU/hr.''

Specifications

Maximum log length		320 mm (12 19/32")
Firebox volume		0.047 m³ (1.67 ft³)
Weight		190 kg (419 lbs)
Flue outlet diameter		152 mm (6")
Recommended connector pipe diameter		152 mm (6")
Type of Chimney		ULC S629, UL103 HT(21000F)
Alcove installation		Not approved
Mobile home installation		Not approved
Baffle material		Steel
Door Glass	Material	Ceramic
	Size	431 mm x 325 mm x 5 mm (16 31/32" x 12 7/8" x 13/64")
Pedestal Glass	Material	Black Tempered Glass
	Size	430 mm x 485 mm x 6 mm (16 59/64 x 19 3/32 x 15/64)
Door Rope	Material	Braided Ceramic Rope, Round
	Diameter	13 mm (33/64)
	Length	1502 mm (59 9/64")

Technical Illustrations

Overall Dimensions:



Installation

SAFETY NOTICE:

If this stove is not properly installed, a house fire may result. For your safety, follow the installation instructions. Never use make-shift compromises during the installation of this stove. Contact local building or fire officials about permits, restrictions, and installation requirements in your area.

The information is given on the certification label affixed to the stove always overrides the information published, in any other media (owner's manual, catalogs, flyers, magazines, and websites.)

Any modification of the appliance that has not been approved in writing by the testing authority violates ANSI NFPA 211 (USA) and CSA B365 (Canada).

Components

After unpacking your N65 stove, ensure that the below parts are included inside the stove

- Refractory bricks:
  - 270 mm x 175 mm x 25 mm (10 5/8" x 6 7/8" x 1")
- Vermiculite bricks:
  - 263 mm x 165 mm x 25 mm (10 1/2" x 6 1/2" x 1")
  - 270 mm x 130 mm x 25 mm (10 5/8" x 5 1/8" x 1")
- 2 Firebrick Retainers (LH & RH)
- Ash pan
- Door handle extension
- 4 mm Hex keys

Assembling the Stove

POSITIONING THE TOP PLATE

Remove the 8 mm ($^{5}/_{16}$") thick top plate from the box and place it on top of the stove locating the hole in the plate over the flue collar. Adjust the position of the top plate so that there is an even space between the top plate and the flue collar.

POSITIONING THE ASH PAN

The ash pan slides into the gap created by the 48 mm (1 7/8") spacers between the firebox body and the base cabinet. The ash pan should slide all the way back, enough so that the door can then be closed.

DOOR HANDLE EXTENSION

The stainless steel handle of the door will become hot during operation of the stove. The door handle extension is packed along with the stove, which can be inserted at the bottom of the door handle to open and close the door during operation. The door handle can be stored in the extension holder bracket provided in the top right corner of the stand.

Positioning the Stove

First review the necessary clearances specified before considering where to position the stove. Check your local building codes or consult with your local fire department for more information.

The stove must be placed so that no combustibles are within or can swing within 36" (914 mm) of the front of the stove (doors, drapes, etc)

See the "Clearance to Combustible Material" section for minimum clearances to combustibles i.e. drywall, furniture etc.

Installation

Also check the practicability of installing the chimney system in relation to any obstructing roof beams before positioning the stove. Depending on the type of flue used, the clearances to combustible surfaces vary.

WARNING: Do not install this stove in a bedroom.

Outside Air Requirements

The stove requires sufficient fresh air supply to operate. The performance of the stove may affect if there is not sufficient fresh air required for combustion. The modern energy-efficient houses are quite airtight compared to conventional old houses. This airtightness makes the houses more sensitive to negative pressure when combustion air is exhausted through the chimney. The large extraction fans can cause extreme negative pressure and this air starvation can affect the performance of the stove.

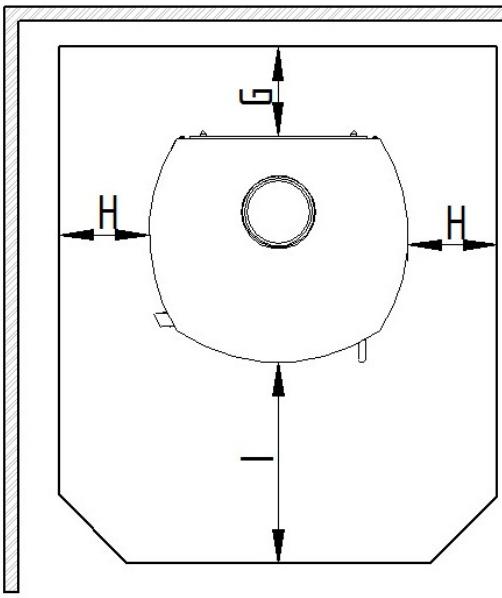
To prevent the air starvation, slightly open a nearby window to allow combustion air to enter the room. In extreme cold territories opening a window may not be feasible or icing may block the required ventilation. Installation of an outside air duct with rodent screen and rain hood will be required to overcome this air starvation issue. Check with local building officials for a specific requirement in certain localities

Floor Protector (Hearth)

Unless the stove will be standing on a heat resistant floor such as concrete slab with slate or tiles, it is necessary to provide a floor protector (hearth). The floor protector must be made of a continuous, noncombustible material such as steel, ceramic tiled floor, cement board, brick for any other approved or listed material for floor protection. Materials corresponding to ASTM E136 and UL 763 are considered to be combustible materials with the exception of gypsum.

The diagram below gives the minimum size of the floor protector. Refer table below to extend the floor protector from the curved front, side edges and the rear edge of the rear panel.

For installation with rear horizontal connector, extend protection under and 2” either side of the connector.



FLOOR PROTECTOR
PROTECTEUR DE PLANCHER

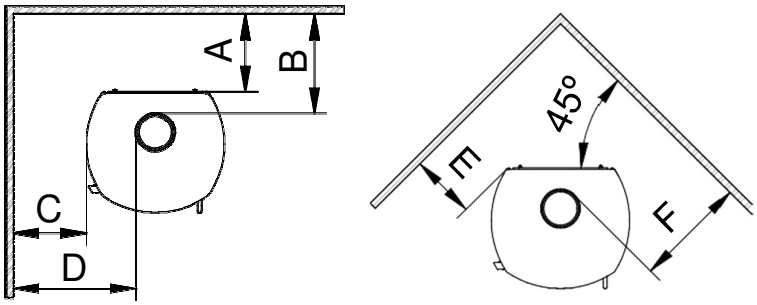
	US	CANADA
G *	N/A	8" (203 mm)
H	5" (127 mm)	8" (203 mm)
I	16" (406 mm)	18" (457 mm)

* FOR REAR HORIZONTAL VENTS EXTEND PROTECTION UNDER AND 2" EITHER SIDE OF VENT

Installation

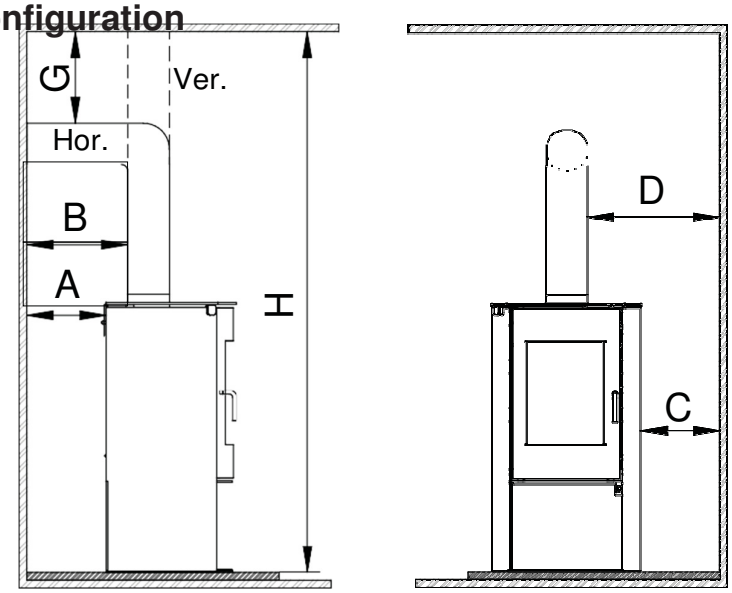
Clearances to Combustible Material

The minimum clearances shown in the table below have been determined by tests according to procedures set out in the safety standard ULC-S627-00 for Canada & UL-1482-2011 (R2015) for USA.



Minimum Clearance		Single Wall Connector	Double Wall Connector
A	Back wall to stove rear	13” (330 mm)	10” (254 mm)
B	Back Wall to connector pipe	16.5” (419 mm)	13” (330 mm)
C	Side wall to stove side	12” (305 mm)	12” (305 mm)
D	Side Wall to connector pipe	20.5” (521 mm)	20” (508 mm)
E	Corner wall to stove corner	10.5” (267 mm)	6” (153 mm)
F	Corner wall to connector	18.5” (470 mm)	13.5” (343 mm)

Back Wall Exit Configuration

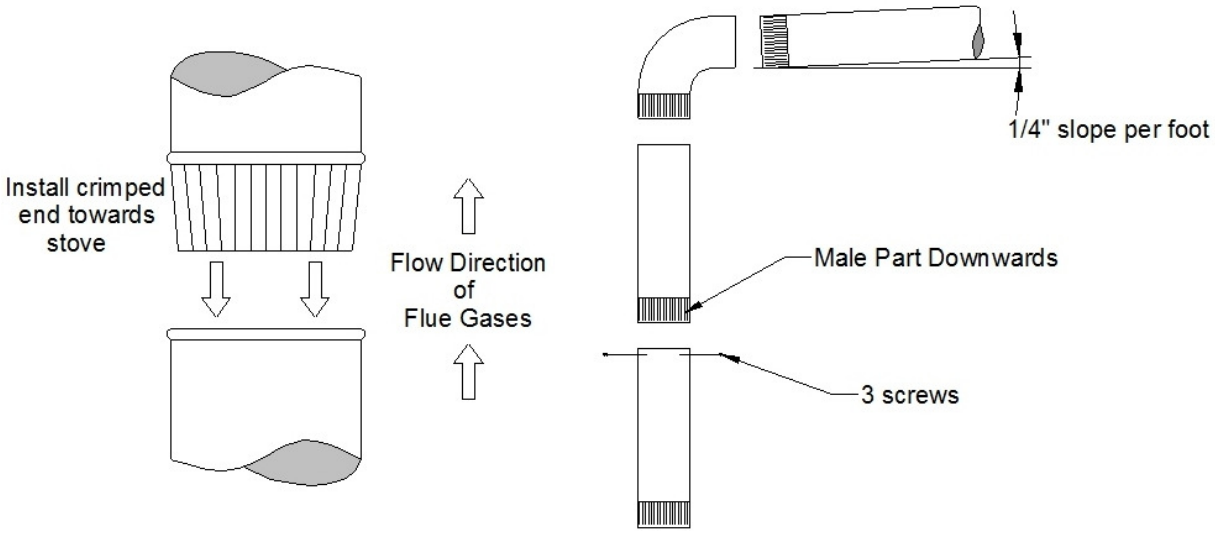


Minimum Clearance		Single Wall Connector	Double Wall Connector
A	Back wall to stove rear	17” (432 mm)	10” (254 mm)
B	Back Wall to connector pipe	20.5” (521 mm)	13” (330 mm)
C	Side wall to stove side	12” (305 mm)	12” (305 mm)
D	Side Wall to connector pipe	20.5” (521 mm)	20” (508 mm)
G	Ceiling to horizontal connector pipe	18” (457 mm)	16” (407 mm)
H	Ceiling to floor	82” (2083 mm)	82” (2083 mm)

Installation

Chimney Connector

- Chimney connector is required from the flue collar of the stove to factory-built chimney or masonry chimney.
- The chimney connector must be suitable for solid fuel, in good condition, and kept clean.
- For use with the N65 stove, the chimney connector MUST be 6” (150 mm) in diameter, with a minimum thickness of 24-gauge black steel or 26-gauge blued steel.
- Aluminum and galvanized steel pipe is not acceptable for use with the N65 stove. These materials can not withstand the extreme temperatures of a wood stove and can give off toxic fumes when fired.
- No part of the chimney connector may pass through an attic or roof space, closet or other concealed space, or through a floor ceiling. **DO NOT USE THE CONNECTOR PIPE AS A CHIMNEY**
- Each chimney connector or stove pipe section must be installed to the stove flue collar and to each other with the male (crimped) end toward the stove, Refer the figure below. Attach each of the sections to one another with three equidistant metal screws. This prevents any amount of condensed or liquid creosote from running down the outside of the pipe or the stovetop. All joints, including the flue collar connection, must be secured with three sheet metal screws to ensure that the sections do not separate.



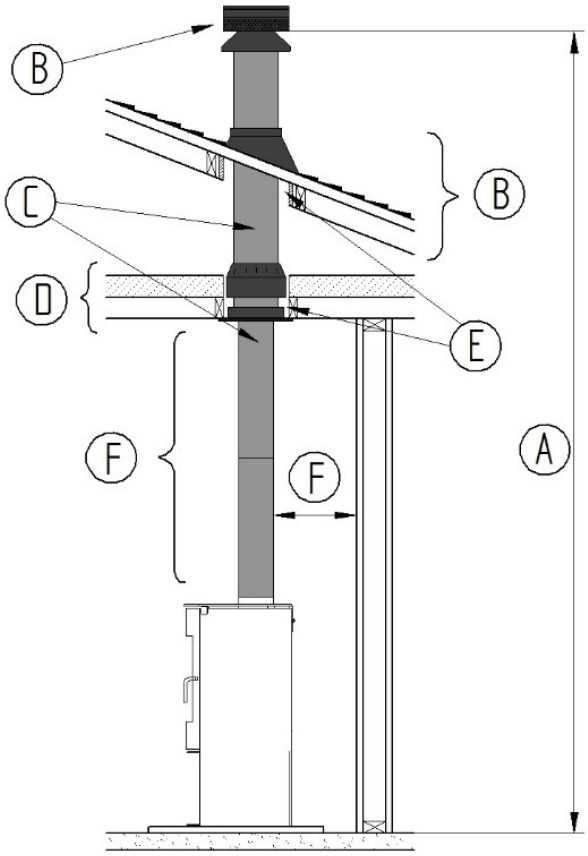
- For the best performance, the chimney connector should be as short and direct as possible, with no more than two 90° elbows. The maximum horizontal run is 36” (915 mm) and a recommended total length of stovepipe should not exceed 10 feet. Always slope horizontal runs upward ¼” per foot toward the chimney.
- All sections of the chimney connectors must be accessible for cleaning. Where passage through a wall or partition of combustible construction is desired, the installation must conform to NFPA 211 or CAN/CSA-B365.

Installation

Chimney Requirements

- DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.
- DO NOT CONNECT TO ANY AIR DISTRIBUTION DUCT OR SYSTEM UNLESS SPECIFICALLY APPROVED FOR SUCH INSTALLATIONS
- In Canada: The N65 stove must be connected to a factory-built chimney conforming to CAN/ULC-S629, standard for 650^{0}C Factory-Built Chimneys.
- UL 103 HT Chimney must be used from the first ceiling or floor or wall penetration to the chimney cap.
- Use 6" (152mm) diameter type UL 103 HT chimney from one manufacturer only. Do not mix components from different brands. You must purchase and install the ceiling support package or wall pass-through and "T" section package, firestops (where needed), insulation shield, roof flashing, chimney cap, etc from the same manufacturer.
- Follow the chimney manufacturer's installation instructions, clearances, and requirements.
- The chimney must be the required height above the roof or other obstructions for safety and proper draft operation. See section Chimney Termination and Height for details on Chimney Termination requirements.
- Elbows affect the draft adversely, hence not more than 180^0 of elbow (two 90^0 elbows, or two 45^0 & one 90^0 elbows) may be used for the entire system (connector and chimney). Additional elbows may be used if there is enough draft.
- An effective vapor barrier at the location where the chimney or component penetrates to the exterior of the structure must be maintained as per the installer's complying method.

(A) Min System Height 15' (4.5M)
Max System Height 33' (10.06M)
(B) Refer manufacturer's requirements for Roof penetration & Termination
(C) Chimney Sections
(D) Refer manufacturer's requirements for Ceiling penetration
(E) Refer manufacturer's requirements for Minimum air space to combustible (typically 2" / 51mm)
(F) Refer Chimney connections section on the previous page



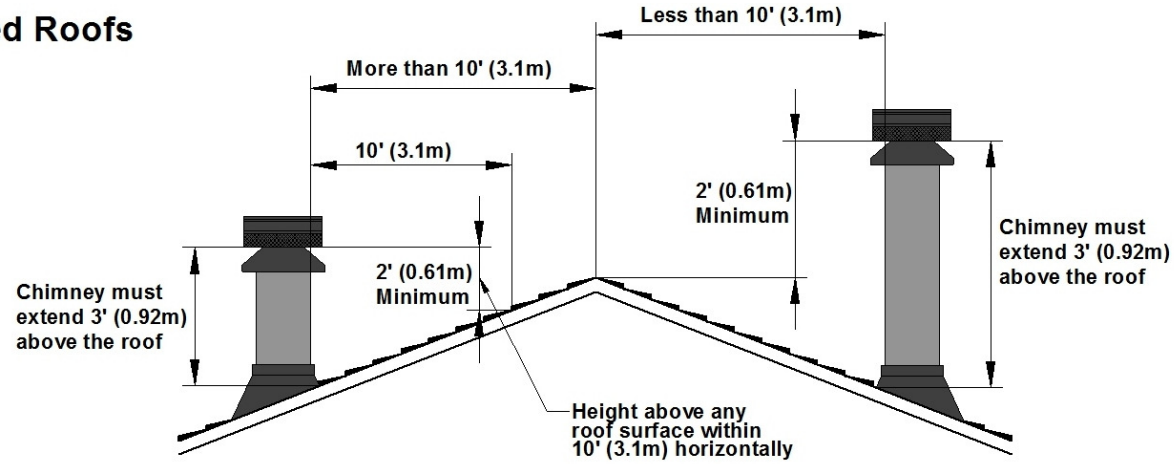
Installation

Chimney Termination & Height

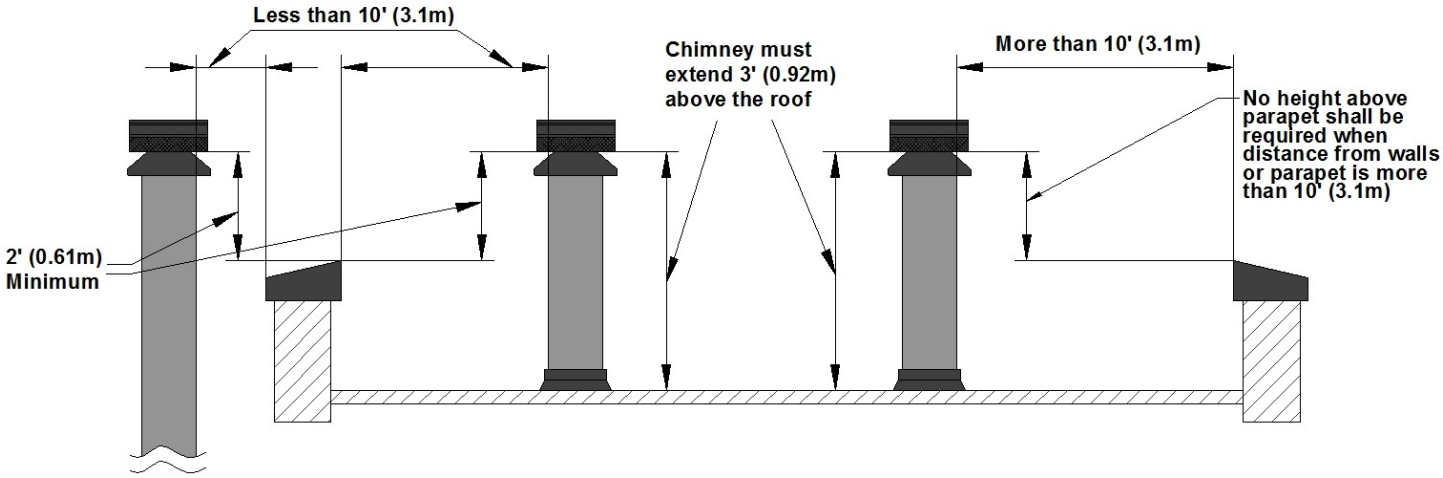
- A chimney termination must have an approved cap (to prevent water from entering)
- A masonry chimney or a listed factory-built chimney termination must be the required height above the roof and any other nearby obstructions. The chimney must be at least 3’ (914 mm) higher than the highest point where it passes through the roof and at least 2’ (600mm) higher than the highest part of the roof or structure that is within 10’ (300mm) of the chimney, measured horizontally.
- Termination must not be located where it will become plugged by snow or other material.

Refer to the schematic below:

Slanted Roofs

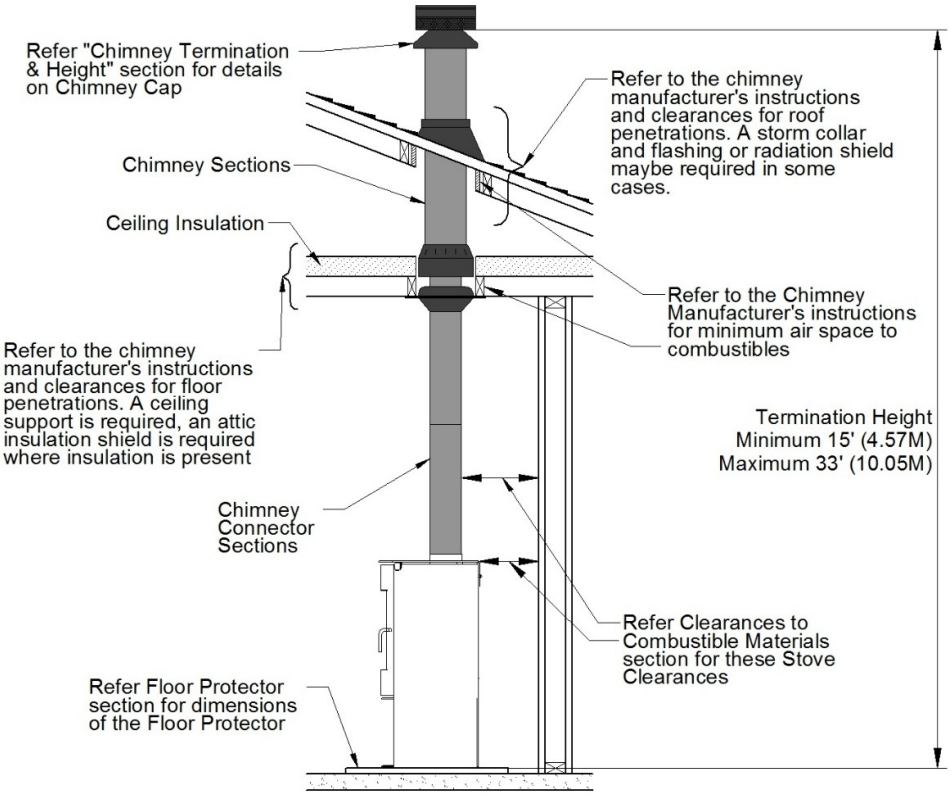


Flat Roofs

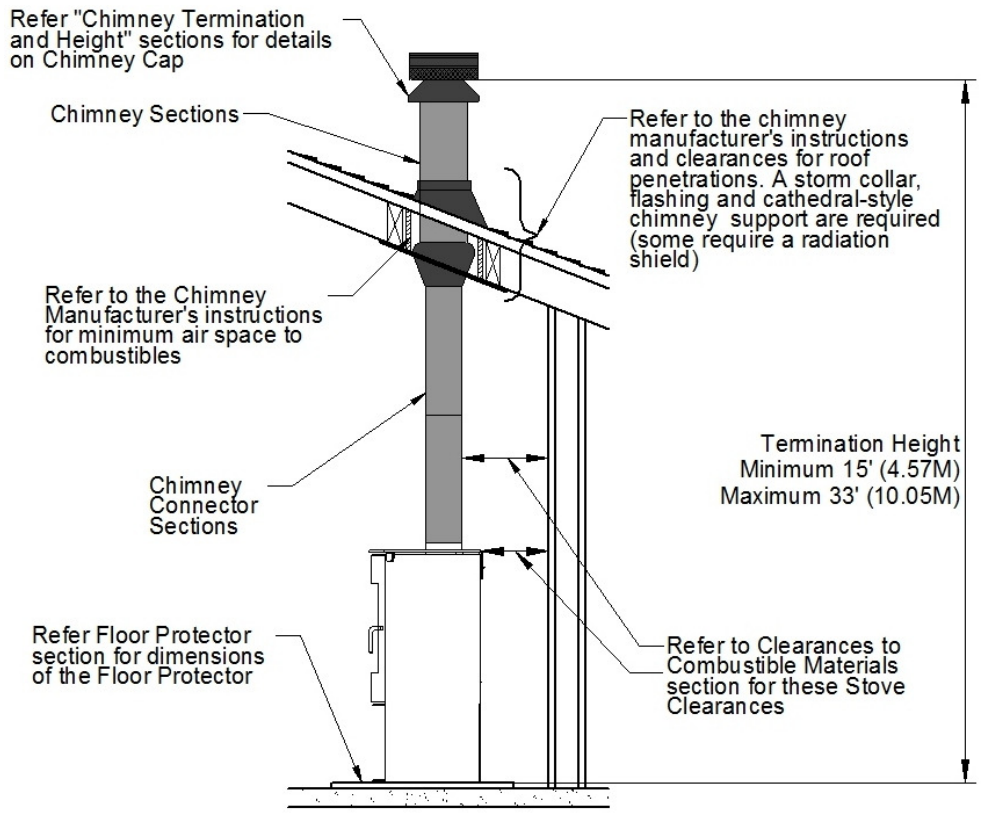


Installation

Standard Ceiling with a Factory-Built Chimney



Cathedral Ceiling with a Factory-Built Chimney



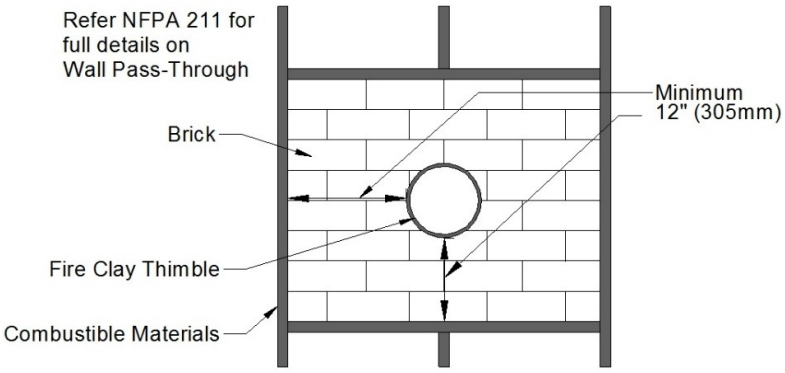
Installation

Exterior Factory-Built Chimney

A vertical rise of 74" of chimney connector is required, measured from the floor, before entering a Class 'A' wall penetration. If the chimney is to pass through the lower wall, a NFPA 211 wall pass-thought may be used, provided it meets the local building codes and approved by the local building authority.

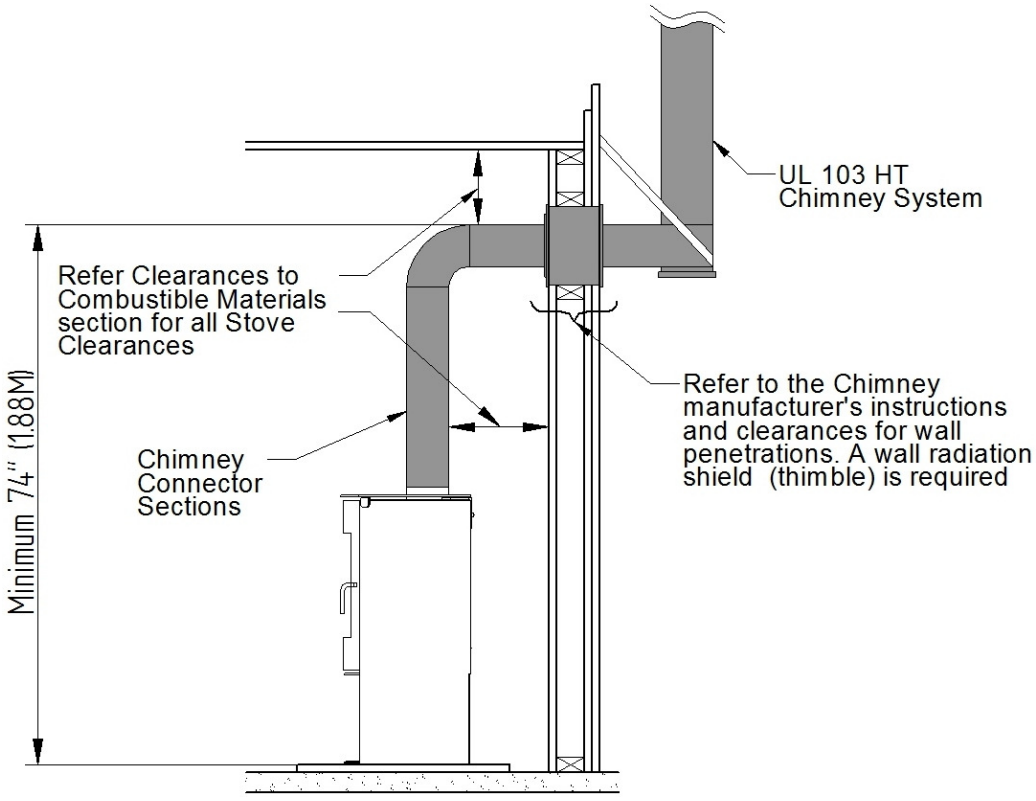
Wall Penetration under 74"

In cases where the chimney connector must be passed through a combustible wall or partition under 74", the following NFPA 211 method may be used if local building code permits. Check with local authorities before installation to ensure all necessary requirements have been met. The figure below details a wall passing through based on the NFPA 211 standards. After pass through, Class A chimney may be used in accordance with the chimney installation instructions.



Wall Penetration 74" or Greater

A vertical rise of 74" of chimney connector is required, measured from the floor, before entering a Class 'A' wall penetration. Note that the measurement is to the centerline of the flue when it makes a 90^0 turn.



Installation

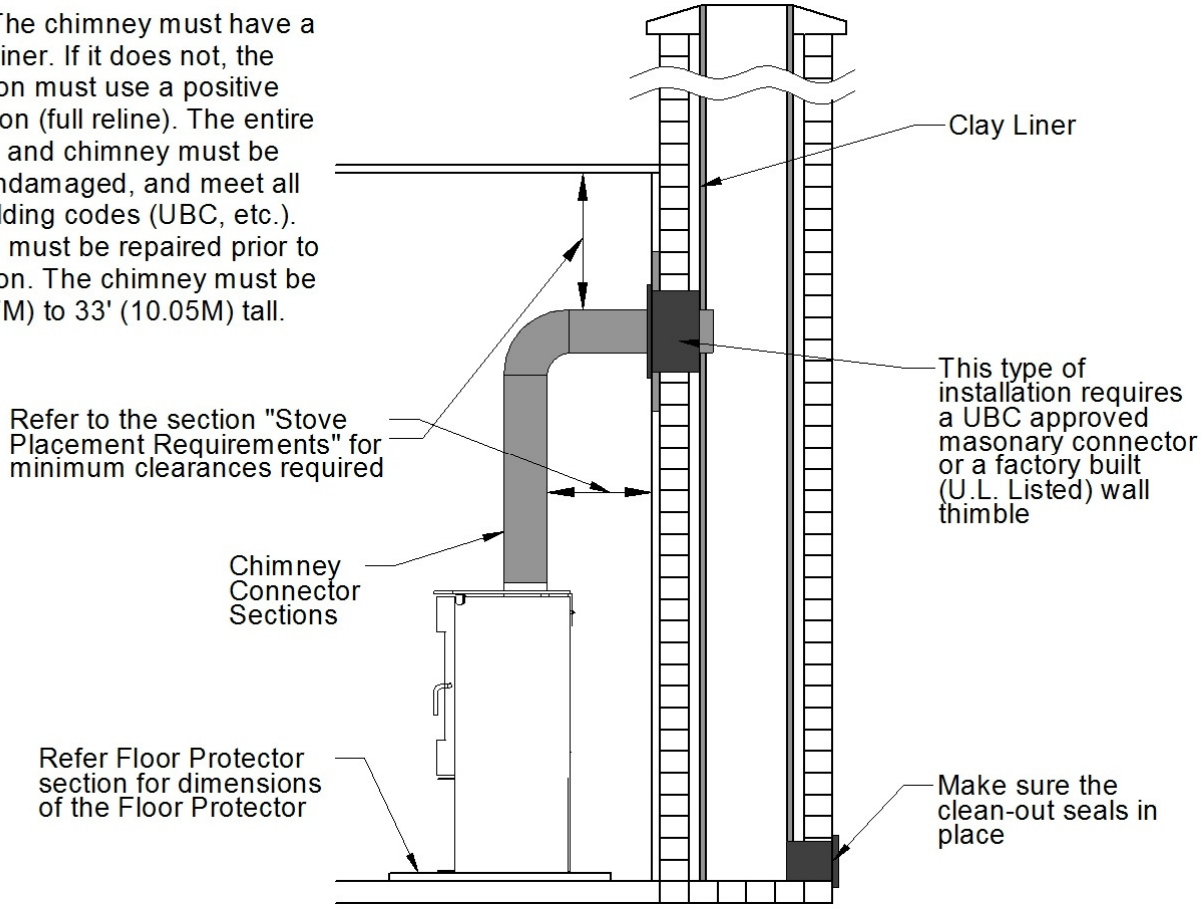
Interior or Exterior Masonry Chimney

NOT ALLOWED IN CANADA UNLESS FULL RELINE IS USED

For this type of installation use, a UBC approved masonry connector or other method approved by the NFPA 211 Standard. Refer Chimney Connector section of this manual.

It is highly recommended that a full reline (positive connection) when venting through a masonry chimney. Also it is recommended that a minimum 3' chimney be added to the minimum system heigh for every 1' of horizontal run.

NOTE: The chimney must have a clay tile liner. If it does not, the installation must use a positive connection (full reline). The entire fireplace and chimney must be clean, undamaged, and meet all local building codes (UBC, etc.). Damage must be repaired prior to installation. The chimney must be 15' (4.57M) to 33' (10.05M) tall.



Operating Instructions

Air Controls

The Nectre N65 has a single top air control for controlling the fire.
This control allows air to enter the firebox from above the door where it is then drawn down into the base of the fire while keeping the glass clean.

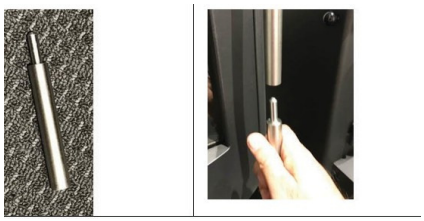
Door Handle

⚠ **WARNING:** The door handle may get hot if appliance has been left in high burn setting for an extended period of time.

The N65 is supplied with a stainless steel handle extension which can be inserted into the end of the door handle. This extension allows the door to be opened and closed without the risk of burn to the user's hand.

Open the top air control before opening the door to eliminate the chance of back draft and/or smoke entering the room.

The door handle extension should be stored in the compartment at the right hand top corner of the wood fuel storage compartment.



First Time Use

During the first few burns that the appliance is used, it may give off odorous non-toxic fumes. This is due to the paint curing.

Do not touch the paint while it is curing because it can leave a permanent mark on the appliance.

Once the paint has cured it will not re-occur.

Keep the room well ventilated until these fumes have cleared.

Operating Instructions

Fuel Selection

Hardwood with a moisture content of less than 25% (dry basis) must be used. For best results, wood should not exceed 270-300 mm (10 5/8" - 11 7/8") in length and 150 mm (5 7/8") diameter. The use of oversized wood will result in the stove not operating at its optimum efficiency.

It is better to burn several smaller pieces of wood than one large single piece.

Newly cut wood should be allowed to dry/season for 12 months before use. Wood should be stored in an environment protected from the weather to minimize any potential moisture content.

The use of poor-quality timber:

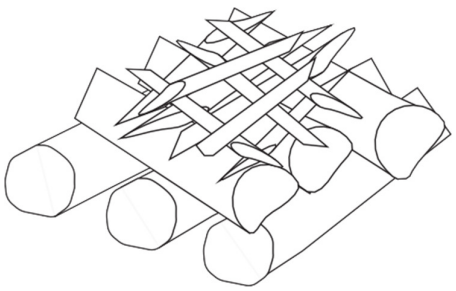
- Causes low combustion efficiency
- Produces poor emissions and excess smoke.
- Results in additional build-up of creosote (soot) in the flue which will then require regular cleaning and could eventually result in a flue fire if not properly maintained.

⚠ **CAUTION:** Do not burn unseasoned, painted, or treated wood. Do not burn colored paper, cardboard, solvents, or garbage.

Starting the Fire

We recommend using a top-down fire starting method, as this improves combustion, creating a cleaner burning fire.

1. Place 2-4 large logs (maximum 11 7/8" x 5 7/8") at the bottom of the firebox next to each other. For optimal burn conditions, place the logs in a front to back orientation (right angles to the door opening).
2. Place medium-sized logs on top, perpendicular to the ones at the bottom, creating a criss-cross formation.
3. Place a few layers of smaller pieces of kindling on top in a criss-cross formation
4. Place firelighters and/or paper and between the pieces of kindling.
5. Open the air control by pulling it all the way out.
6. Light the paper or firelighters.
7. Once the fire is established, adjust the air control to the desired position for the required heat output.



Operating Instructions

Maintaining the Fire

- After establishing the fire and loading it with larger pieces of wood, leave it running with the air control fully open. This setting is not the most energy efficient as some heat is lost up the flue instead of being transferred into the room. It is recommended to close the air control partially to achieve better efficiency and longer burn time. See 'Controlling the Heat Output' for more details.
- Running the appliance with the door open will not produce maximum heating in the room as it will draw a lot of already warmed air out of the room.

! NOTE: Do not overload firebox with fuel.

Controlling the Heat Output

- The heat output of the stove can be reduced by closing the air control (slide handle to the right.) This will restrict the oxygen supplied to the fire, thereby slowing down the rate at which the wood burns.
- This setting provides the best energy efficiency as the wood burns for longer. However, if not operated correctly may result in higher particulate emissions.
- Prior to closing the air control, ensure that the fire is burning briskly. This may require leaving the air control fully open for 10-15 minutes before shutting down.
- For the optimum balance between clean burning and efficiency, open the air control 3-5 mm (1/8-1/4").
- The air control can be adjusted to any position to provide heat output versus burn time.

Refueling

It is recommended to burn wood in cycles. Once the firewood is fully combusted, an additional load of wood can be placed on the hot coals to be reignited.

1. Open air control before opening door.
2. Rake / break up any existing coals.
3. Load the wood with the length orientated front to back.
4. Best results will be achieved by loading several smaller pieces of wood rather than one large piece.
5. Close door with air control fully open, and leave for minimum of 10 minutes to allow the fresh wood to catch.
6. After 10-15 minutes, the air control can be adjusted to the desired heat output setting.

Burning Tips

FUEL QUALITY

1. Use wood with a moisture content of less than 25% (dry basis). Logs should not feel moist or damp, or have moss and fungal growths.
2. Symptoms related to wet wood:
    - Difficulty starting and keeping a fire burning well
    - Smoke and small flames
    - Dirty glass and/or fire bricks

- Rapid creosote build-up in the flue/chimney
- Low heat output
- Short burn times, and blue/grey smoke from the flue/chimney outlet

3. Run the appliance at high heat output for a short period each day to avoid large build-up of tars and creosote within the appliance and flue.

FLUE DRAFT

The flue has two main functions:

1. To remove smoke, gases, and fumes from the appliance.
2. To provide a sufficient amount of draft (suction) in the appliance to ensure the fire keeps burning.

The draft is caused by the rising hot air in the flue when the fire has been lit.

The position, height, and size of the flue can affect the performance of the flue draft.

Factors affecting the flue draft include:

- Insufficient flue height
- Trees or other buildings nearby causing turbulence
- High and gusty winds
- Outside temperature and weather conditions
- Blocked flue

If the draft is insufficient or periodic down drafting occurs and the stove smokes or only burns slowly, extending the flue or fitting a specialized cowl will usually resolve the issue.

For advice on the correction of the persistent flue, problems consult your dealer/installer or local building code inspector for more information.

Flue/Chimney Fire

If a flue/chimney fire occurs:

- Shut air slide control fully to smother the fire.
- Contact your local, municipal or state/provincial fire authority for information on how to handle a chimney fire. Have a clearly understood plan to handle a chimney fire.
- Do not use the appliance after a flue fire until an accredited installer or fire official assesses the cause and any resultant damage.

Operating Instructions

Troubleshooting Tips

1. Glass indoor blackening — this can have several possible causes:
   - Burning unseasoned wood — if the wood is too wet, it will cause the glass to blacken.
   - Appliance operated at low temperature — after an overnight burn where the air slide control has been fully closed, the glass may have blackened. When the fire is re-stoked and burning on the high heat setting, the blackened glass should self-clean.
   - Problems with the flue — insufficient flue draft can cause the glass to blacken. If the flue is too short, not properly insulated, or in a position that results in a downdraft, then there will be insufficient flue draft. Contact the installer should this happen.

2. Trouble starting the fire — if all ash has been removed from the firebox, then it can upset the supply of air to the base of the fire. Retain some ash when cleaning out the firebox to help restart the fire.

3. Glass cracking — Do not over tighten the screws on the stainless steel strips that hold the door glass in place. Otherwise, expansion of the door may cause the glass to crack.

⚠ **WARNING:** Never operate a stove with cracked glass. The glass replacement is must before using the appliance again.

Maintenance

Inspection & Cleaning

1. It is important to establish a routine for the fuel, wood stove and firing technique. Check daily for creosote buildup. Be aware that the hotter the fire the less creosote is deposited, and weekly cleaning may be necessary for mild weather even though monthly cleaning may be enough in the coldest months.
2. Ensure that the door seals are in good condition. If they are worn, replace the door seals.
3. Inspect and clean the glass regularly in order to detect any cracks. If a crack is present, allow the fire to go out and the stove to cool before repairing. The glass can be cleaned with household window cleaner or general-purpose cleaner with a soft cloth. It is not advisable to use a cleaner that contains caustic or abrasive ingredients. Do not clean with alcohol-based cleaners. The glass should be washed only when the stove is cold to facilitate good operational practices.
4. Do not abuse the glass door by striking or slamming shut. Do not use the stove if the glass is broken. If the glass breaks, replace only with the same 5 mm (0.2") ceramic glass supplied from your dealer. Never substitute other materials for the glass. To replace the glass, follow the instructions on page 16.
5. The appliance, when cool, can be cleaned with a damp cloth. Do not use abrasive cleaners or scour pads.
6. Over the years, the black paint will fade and can be touched up with high heat resistant metallic black paint.
7. Depending on the quality of maintenance, there may be signs of rust (corrosion) on the body of the unit. To correct this, sand the affected area and paint using high heat resistant metallic black paint.

Ash Removal

Depending on the type of wood burnt and frequency, the ashes will need removing every 2 to 6 weeks.

Excess ashes should be removed when necessary. Make sure the stove is completely cold before you remove the ashes. Remove the log retainer grill in order to remove the ash with ease.

Scoop out the ashes and place them in a non-combustible or a metal container with a tight-fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground, well away from all combustible material, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all embers have thoroughly cooled.

Maintenance

Creosote – Formation & Need For Removal

1. When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited this makes an extremely hot fire.
2. To prevent creosote build-up:
   - Always burn dry wood. This allows clean burns and higher chimney temperatures, therefore less creosote deposit.
   - Leave the air control fully open for about 10-15 minutes every time you reload the stove to bring it back to proper operating temperatures. The secondary combustion can only take place if the firebox is hot enough.
   - Always check for creosote deposit once every two months and have your chimney cleaned at least once a year.
3. The chimney connector and chimney should be inspected at minimum every two months to determine if a creosote buildup of 3 mm (0.1") or more has occurred. If creosote has accumulated it should be removed to reduce the risk of a chimney fire.

Service

Always use a qualified technician or service agency to repair this unit.

Replacing the Firebricks

Over time the firebricks may become cracked and crumble away. If this happens they should be replaced soon after.

To replace the firebricks:

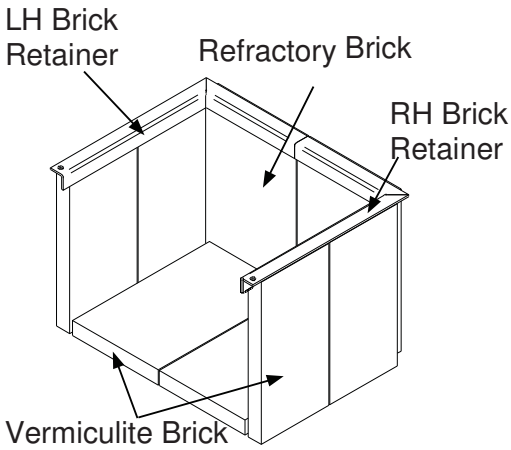
1. Remove all ash.
2. Raise the brick retainer so that the bricks can be removed.
3. Replace with new bricks, refractory bricks in the rear, and vermiculite bricks in the sides and base. Refit brick retainer.

Replacing the Brick Retainer

Over time the original brick retainer may burn out, in which case it can be replaced with a new one.

To replace the brick retainer:

1. Raise the old brick retainer and remove the firebricks. Remove the old retainer.
2. Refit the firebricks and then fit the retainer over the top locking them into position.



Replacing the Door Glass

This task may be easier with the door removed from the appliance and laid horizontally on a work-bench. When replacing the glass, the glass gasket should also be replaced to make sure it is properly sealed.

To remove the door:

1. With the Allen key supplied, remove the top air control handle from the air slide.
2. Open the door 90°.
3. With one hand on top of the door and the other supporting it underneath, raise it on the hinge pin until the top door hinge clears the top of the hinge pin.
4. Lower the door until the lower door hinge clears the bottom of the pin.

To replace the door glass:

1. The door glass is held in position by the rectangular glass retainer fixed by four M6 screws, two at the top and two at the bottom.
2. Using the 4 mm Allen key supplied with the stove, remove the four screws and the glass retainer.
3. Remove the glass and the old door seal rope.
4. The new glass will have been supplied with a length of grey door seal with adhesive strip on one side. Remove the wax paper backing from the adhesive and stick the door seal along the 5 mm thick edge of the glass. With the forefinger and thumb fold the door seal over each side of the glass. Do this around the external edge of the glass plate.
5. Refit the new glass with door seal into position in the door. Place the glass retainer over the top and fasten with the four M6 screws.

! NOTE: Take extra care not to over-tighten the screws, otherwise the glass will crack when the stove gets hot and the door expands.

Service

Replacing the Door Seal

This task may be easier with the door removed from the stove and laid horizontally on a work-bench (refer to page 16 on how to remove the door).

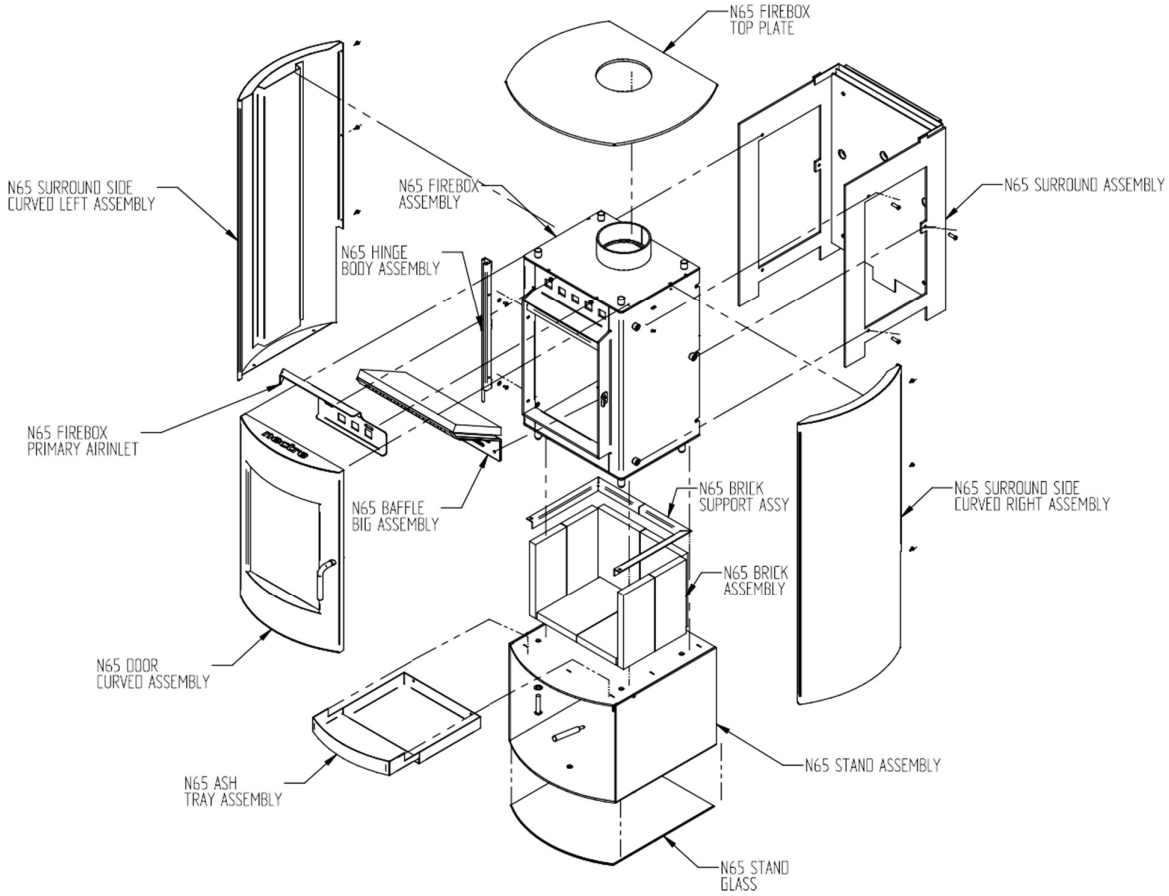
1. Remove any old seal from the door.
2. Clean out the groove in the door in which the seal was bedded using a flat-end screw driver or equivalent.
3. Run a thin line of clear roof and gutter silicone along the groove.
4. Starting with the end that has the silver tape around it, press the new door seal rope into the groove on the door.
5. Towards the end, there will be a small amount of excess rope. Trim this to the correct length, remove the backing from the adhesive silver tape supplied with the rope, and wrap the tape around the end that has been trimmed. Fit the end of the rope into the groove.
6. Refit the door if it has been removed and close.

Adjusting the Door Latch

If the door does not close firmly, the door latch will need to be adjusted.

1. Using the 4 mm Allen key supplied with the stove, slightly loosen the two screws fastening the latch to the side of the firebox body.
2. Gently tap the latch down only a millimeter to start with.
3. Retighten the screws and test for any improvement.
4. If no improvement, repeat process until door can be closed firmly.

Replacement Parts List



Part Description	Part number
Door	
Door Glass (with Tape)	770384
Door Rope	770414
Complete Door Assembly with Glass	770302
Door Handle Extension	770399
Firebricks	
Base Vermiculite Board (x 2)	770381
Rear Refractory Firebrick (x 2)	770382
Side Vermiculite Board (x 4)	770383
Brick Retainer	770312
Firebox	
Upper Baffle	770317
Main Baffle with Ceramic Blanket	770313
Air Slide Assembly	770369
Pedestal Glass	770398

Warranty

Glen Dimplex Americas Ltd. (Glen Dimplex Americas herein) warrants this wood stove to be able to operate under normal use and service and within 10 years from date of the original purchase on the terms herein shall repair or replace without cost to the original customer any part thereof which shall be returned to our factory which our inspection shows would prevent operation (transportation charges prepaid). This warranty does not apply to firebricks, brick retainer, baffle, door seal, glass nor discoloration of the surface or tarnishing of gold fittings all of which require normal service to maintain them.

Under the terms of this warranty, Glen Dimplex Americas assumes no responsibility for the labor costs involved in removing or replacing the stove. Nor shall Glen Dimplex Americas be liable for any injury, loss, or damage (direct, indirect, or consequential) arising out of the use or inability to use the product, or its removal and replacement. All other stove warranties, expressed or implied are excluded to the extent possible at law. Consumers also have rights under relevant State and Commonwealth Laws.

The Retailer does not have the authority to alter this warranty. For further information please contact Glen Dimplex Americas.

Defects must be brought to the attention of Glen Dimplex Americas by contacting Technical Support at www.nectrausa.com/contact or by calling
1-888-346-7539. Please have proof of purchase, catalogue/model and serial numbers available when calling. Limited warranty requires a proof of purchase of the product.

Technical Support

Technical and troubleshooting support, as well as a list of replacement parts can be found on
www.nectreusa.com/resources-downloads

Distributed in USA & Canada by:

Glen Dimplex AMERICAS
Enhancing the moments that matter in life

1-888-346-7539 | www.dimplex.com

In keeping with our policy of continuous product improvement, we reserve the right to make changes without notice.

Manufactured by:

38 Harris Road, East Tamaki
P.O.Box 58473, Botany, Manukau – 2163
Phone: 0800 666 2824
Fax: 0064 9 274 8472
Web: www.glendimplex.co.nz

Appendix B
Alt-125 E3053 Letter

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

FEB 2 8 2018

Mr. Justin White

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Dear Mr. White,

I am writing in response to your letter dated January 12, 2018, regarding wood heaters manufactured by Hearthstone QHPP, Inc. (Hearthstone). This response, dated February 28, 2018, supercedes our previous response (dated February 26, 2018) to correct an inaccuracy regarding required changes to ASTM E3053-17.

You are requesting to use an alternative test method, using cord wood, as referenced in section 60.532(c) of 40 CFR part 60, Subpart AAA, Standards of Performance for New Residential Wood Heaters (Subpart AAA) to meet the 2020 cord wood alternative compliance option. The 2020 cord wood alternative compliance option states that each affected wood heater manufactured or sold at retail for use in the United States on or after May 15, 2020, must not discharge into the atmosphere any gases that contain particulate matter in excess of 2.5 g/hr. Compliance must be determined by a cord wood test method approved by the Administrator along with the procedures in 40 CFR 60.534. You have requested approval to use the procedures and specifications found in ASTM Method E3053-17, a cord wood test method titled, "Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel," in conjunction with ASTM E2515-11 and Canadian Standards Administration (CSA) Method CSA-B415.1-10, which are specified in 40 CFR 60.534.

We understand that Hearthstone is also requesting that the alternative method proposed above be approved to apply broadly to all wood heaters manufactured by Hearthstone meeting the requirements of Subpart AAA, from the approval date of this request until such time that Subpart AAA is revised or replaced to require a different cord wood certification method, providing all requirements of section 60.533 of Subpart AAA are met.

With the caveats set forth below, we approve your alternative test method request for certifying wood heaters using ASTM E3053-17 in conjunction with section 60.534 of Subpart AAA to meet the 2020 cord wood compliance option until such time that Subpart AAA is revised or replaced to require a different cord wood certification method. We also approve application of this alternative method to all wood heaters manufactured by Hearthstone meeting the requirements of Subpart AAA.

As required in Subpart AAA, section 60.354(d), you or your approved test laboratory must also measure the first hour of particulate matter emissions for each test run using a separate filter in one of the two parallel sampling trains. These results must be reported separately and also included in the total particulate matter emissions per run. Also, as required by Subpart AAA, section 60.534(e), you must have your approved laboratory measure the efficiency, heat output, and carbon monoxide emissions of the tested wood heater using CSA-B415.1-10. For measurement of particulate matter emission concentrations, ASTM 2515-11 must be used.

The following change to ASTM E3053-17 must be followed:

1. Coal bed conditions prior to loading test fuel. The coal bed shall be a level plane without valleys or ridges for all test runs in the high, low, and medium burn rate categories.

The following changes to ASTM E2515-11 must be followed:

1. The filter temperature must be maintained between 80 and 90 degrees F during testing.

2. Filters must be weighed in pairs to reduce weighing error propagation; see ASTM 2515-11, Section 10.2.1 Analytical Procedure.

3. Sample filters must be Pall TX-40 or equivalent Teflon-coated glass fiber, and of 47 mm, 90 mm, 100 mm, or 110 mm in diameter.

4. Only one point is allowed outside the +/- 10 percent proportionality range per test run.

A copy of this letter must be included in each certification test report where this alternative test method is utilized.

It is reasonable that this alternative test method approval be broadly applicable to all wood heaters subject to the requirements of 40 CFR part 60, Subpart AAA. For this reason, we will post this letter as ALT-125 on our website at *http://www3.epa.gov/ttn/emc/approalt.html* for use by other interested parties. As noted earlier in this letter, this alternative method approval is valid until such time that Subpart AAA is revised or replaced to require a different cord wood certification method, and at such time, this alternative will be reconsidered and possibly withdrawn.

If you have additional questions regarding this approval, please contact Michael Toney of my staff at 919-541-5247 or toney.mike@epa.gov.

Sincerely,

Steffan M. Johnson, Group Leader
Measurement Technology Group

cc: Amanda Aldridge, EPA/OAQPS/OID
Adam Baumgart-Getz, EPA/OAQPS/OID
Rafael Sanchez, EPA/OECA
Michael Toney, EPA/OAQPS/AQAD