# TEST REPORT

**SCOPE:** EMISSIONS, EFFICIENCY AND OUTPUT

**FUEL:** EPA TEST FUEL (CRIBS)

**TEST STANDARD:** EPA

**MODEL:** BALTIC II WOOD STOVE

**Notice to reader**: Our Baltic II wood stove was tested as part of our 3.1 Series (NG1800) firebox. Therefore, the 3.1 Series (NG1800) is referenced throughout the attached test report.

TEST REPORT

**REPORT NUMBER: 101440749MTL-001**
**REPORT DATE: February 27, 2014**

## EVALUATION CENTER

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## RENDERED TO

Stove Builder International Inc
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St-Augustin-de-Desmaures, QC
G3A 2H3

## PRODUCT EVALUATED:

MODEL NG1800 SOLID FUEL ROOM HEATER

**Report of Testing Model NG1800 Wood Fuel Room Heater Insert for compliance as an "Affected Facility" with the applicable requirements of the following criteria: EPA Method 28 "Certification and Auditing of Wood Heaters" and EPA Method 5G "Determination of Particulate Matter Emissions from Wood Heaters".**

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# I. INTRODUCTION

Intertek Testing Services NA (Intertek) has conducted testing for (Stove Builder International Inc, on model NG1800 Solid Fuel Room Heater, to evaluate all applicable performance requirements included in EPA Method 28 “Certification and auditing of wood heaters” and Method 5G “Determination of particulate matter emissions from wood heaters.”

## I.A PURPOSE OF TEST

The test was conducted to determine if the unit is in accordance with U.S EPA requirements under 40 CGR 60 SUBPART AAA, NSPS for Residential Wood Heaters. This evaluation was conducted from December 2, 2013 to February 06, 2014.

## I.B LABORATORY

The test on the NG-1800 Solid Fuel Room Heater was conducted at the SBI Laboratory located at 250 Rue de Copenhague, St-Augustin-de-Desmaures QC. G3A 2H3. The laboratory elevation is 213 feet above sea level. The test was conducted by Claude Pelland, P.Eng.

## I.C DESCRIPTION OF UNIT

The model NG-1800 Solid Fuel Room Heater is constructed of carbon HR and CR steel . The outer dimensions are 29 3/4-inches deep, 31 1/2-inches high, and 23 3/4-inches wide. The unit has a front loading door with a viewing glass. (See product drawings.). See also components description in Appendix H.

Proprietary drawings and manufacturing methods are on file at Intertek in Lachine, Quebec

## I.D REPORT ORGANIZATION

This report includes summaries of all data necessary to determine compliance with the regulations. Raw data, calibration records, intermediate calculations, drawings, specifications and other supporting information are contained in appendices to this report.

# II. SUMMARY

## II.A PRETEST INFORMATION

A sample was submitted to Intertek directly from the client. The sample was not independently selected for testing. The test unit was handed to the Intertek representative at SBI laboratory located in St-Augustin-de-Desmaures, Quebec on December 2nd, 2013. The unit was inspected upon presentation on testing site and found to be in good condition. The unit was set up following the manufacturer's instructions without difficulty.

Following assembly, the unit was placed on the test stand and instrumented with thermocouples in the specified locations. Prior to beginning the emissions tests program, the unit was operated for a minimum of 10 hours at high-to-medium burn rates to break-in the stove. The unit was found to be operating satisfactory during this break-in. The 10 plus hours of pre-burning were conducted during several consecutive R & D runs performed by the manufacturer immediately preceding the dates of the testing reflected in this report. The fuel used for the break-in process was dimensional Douglas Fir lumber. Proofs of burning are reproduced in appendix C of this report.

Following the pre-burn break-in process the unit was allowed to cool. The unit's chimney system and laboratory dilution tunnels were cleaned using standard wire brush chimney cleaning equipment. On December 2nd, 2013 the unit was set-up for testing.

## II.B INFORMATION LOG

### TEST STANDARD

From December 2nd, 2013 through to February 6th, the unit was tested for EPA emissions.

### Deviation from Standard Method

No deviations from the standards were performed, however, only the applicable sections from each standard were used during all testing.

## II.C SUMMARY OF TEST RESULTS

**RUN #1(R&D) (November 25, 2013)** Air control was fully opened and was set at full closed position at 5 minutes. Burn time was 470 minutes for a burn-rate of 1,08 kg/h. The fuel was loaded by 120 seconds and the door was left partially opened and closed by 150 seconds. The blower was off for the first 30 minutes of the test and set at minimum speed for the remainder of the test. This reached a Category II. This burn rate was not retained for emissions calculation purposes. See modifications made to the unit between Nov 26 and Dec 02 as described in appendix G.

**RUN #2 (R&D) (November 26, 2013)** Air control was fully opened and closed with a rod of 5/32"ø at 5 minutes. Burn time was 570 minutes for a burn-rate of 0,90 kg/h. The fuel was loaded by 120 seconds and the door was left partially opened and closed by 150 seconds. The blower was off for the first 30 minutes of the test and at minimum speed for the remainder of the test. This reached a Category II. This burn rate was not retained for emissions calculation purposes. See modifications made to the unit between Nov 26 and Dec 02 as described in appendix G.

**RUN #1 (December 2, 2013)** Air control was set at full closed position (fixed 0.525 in² opening). Burn time was 470 minutes for a burn-rate of 1,07 kg/h. The fuel was loaded by 135 seconds and the door was left partially opened and closed by 145 seconds. The air control was opened for 5 minutes, and then fully closed. The blower was off for the first 30 minutes of the test and set at minimum speed for the remainder of the test. This reached a Category II.

**RUN #2 (December 3, 2013)** Air control was set at full closed position (fixed 0.525 in² opening). Burn time was 530 minutes for a burn-rate of 0,97 kg/h. The fuel was loaded by 120 seconds and the door was left partially opened and closed by 150 seconds. The air control was opened for 5 minutes, and then fully closed. The blower was off for the first 30 minutes of the test and set at minimum speed for the remainder of the test. This reached a Category II.

**RUN #3 (December 4, 2013)** Air control was set with a 1/16" drill bit from full closed position. Burn time was 420 minutes for a burn-rate of 1,19 kg/h. The fuel was loaded by 110 seconds and the door was left partially opened and closed by 150 seconds. The air control was opened for 5 minutes, and then set with a drill bit of 1/16" from full closed position. The blower was off for the first 30 minutes of the test and set at minimum speed for the remainder of the test. This reached a Category II. It is to be noted that only the last 30 minutes of the preborn were recorded on the logger. The first 30 minutes, though performed are not available.

**RUN #4 (December 5, 2013)** Air control was set with a 1/64" drill bit from full closed position. Burn time was 470 minutes for a burn-rate of 1,06 kg/h. The fuel was loaded by 115 seconds and the door was left partially opened and closed by 150 seconds. The air control was opened for 5 minutes, and then set with a drill bit of 1/64" from full closed position. The blower was off for the first 30 minutes of the test and set at minimum speed for the remainder of the test. This reached a Category II.

**RUN #5 (December 6, 2013)** Air control was set with a 3/16" drill bit from full closed position. Burn time was 350 minutes for a burn-rate of 1,45 kg/h. The fuel was loaded by 120 seconds and the door was left partially opened and closed by 180 seconds. The air control was opened for 5 minutes, and then set with a drill bit of 3/16" from full closed position. The blower was off for the first 30 minutes of the test and set at minimum speed for the remainder of the test. This reached a Category III.

**RUN #6 (December 9, 2013)** Air control was set to fully opened position. Burn time was 170 minutes for a burn-rate of 3,01 kg/h. The fuel was loaded by 95 seconds and the door was left partially opened and closed by 300 seconds. The air control was fully opened for the duration of the test. The blower was on for the full duration of the test and set to maximum speed. This reached a Category IV.

**RUN #7 (December 10, 2013)** Air control was set to fully opened position. Burn time was 180 minutes for a burn-rate of 2,85 kg/h. The fuel was loaded by 85 seconds and the door was left partially opened and closed by 280 seconds. The air control was fully opened for the duration of the test. The blower was off for the first 30 minutes of the test and set at maximum speed for the remainder of the test. This reached a Category IV.

**RUN #8 (December 11, 2013)** Air control was set to fully opened position. Burn time was 160 minutes for a burn-rate of 3,03 kg/h. The fuel was loaded by 95 seconds and the door was left partially opened and closed by 300 seconds. The air control was fully opened for the duration of the test. The blower was on for the full duration of the test and set to maximum speed. This reached a Category IV.

**RUN #9 (February 4, 2014)** Air control was set with a 1" flat bar from full closed position for the full duration of the test. Burn time was 220 minutes for a burn-rate of 2,19 kg/h. The fuel was loaded by 105 seconds and the door was left partially opened and closed by 120 seconds. The air control was fully opened for the duration of the test. The blower was off for the first 15 minutes of the test and set at maximum speed for the remainder of the test. This reached a Category IV.

**RUN #10 (February 5, 2014)** Air control was set with a 7/32" drill bit from full closed position. Burn time was 510 minutes for a burn-rate of 0,95 kg/h. The fuel was loaded by 90 seconds and the door was left partially opened and closed by 105 seconds. The air control was opened for 5 minutes, and then set with a drill bit of 7/32" from fully closed position. The blower was off for the full duration of the test because it was a fan confirmation test. This reached a Category II.

**RUN #11 (February 6, 2014)** Air control was set with a 1/2" drill bit from full closed position. Burn time was 250 minutes for a burn-rate of 2,01 kg/h. The fuel was loaded by 125 seconds and the door was left partially opened and closed by 140 seconds. The air control was opened for 5 minutes, and then set with a drill bit of 1/2" from full closed position. The blower was off for the first 30 minutes of the test and set at minimum speed for the remainder of the test. This reached a Category IV.

## II.D SUMMARY OF OTHER DATA

Operation of the unit to achieve the various burn rates was performed as per the following Testing protocol which was communicated by client prior to starting the test program. It was as follows:

**Category 1 (<0,80 kg/h)**
With primary air control completely closed, the stove cannot achieve this burn-rate category but can achieve category 2 with burn-rate <1,00 kg/h.

**Category 2 – Lowest achievable burn-rate :**
Put 3.5 lbs of kindling on top of 2-3 sheets of newspaper. Light that up and let that burn until only small flames remain in the stove. Level the coal bed and add a preburn fuel load (See picture below for general positions of pieces). Let that burn until yellow flaming has ceased. Remove all embers from the stove, zero the scale and put back 1,50 lbs of embers in the stove. Add a second preburn fuel. Wait for the scale to indicate approximately 9,00 lbs, close the primary air control completely and turn on the blower at minimum speed.
45 minutes after closing the air control, stir the coal bed and rake everything to the middle-front of the stove. Wait to be in the coal bed range allowed and for the average firebox temperature to reach approximately 415 °F. Just prior to loading, level the coal bed by following the general shape of the baffle which means having about 1" more coals at the front than at the back and leaving about ½" to 1" of coals at the back. This operation must not take more than 1 minute. When this is done, close the door, turn off the blower, start all required equipments and put the fuel load in. Position it by following the general shape of the firebox baffle. Once the fuel load is in, remove embers in front of the pilot and a little bit under the 2 x 4 in the middle. Turn on the blower 30 minutes after the beginning of the test.

**Category 2 – Alternative test (0,80 kg/h -1,25 kg/h):**
Put 3.5 lbs of kindling on top of 2-3 sheets of newspaper. Light that up and let that burn until only small flames remain in the stove. Level the coal bed and add a pre burn fuel load (See picture below for general positions of pieces). Let that burn until yellow flaming has ceased. Remove all embers from the stove, zero the scale and put back 1,50 lbs of embers in the stove. Add a second pre burn fuel. Wait for the scale to indicate approximately 9,00 lbs, close the primary air control with a drill bit of 1/16”Ø and turn on the blower at minimum speed.
45 minutes after closing the air control, stir the coal bed and rake everything to the middle-front of the stove. Wait to be in the coal bed range allowed and for the average firebox temperature to reach approximately 415$^{o}$F. Prior to loading, level the coal bed by following the general shape of the baffle which means having about 1" more coals at the front than at the back and leaving about ½ to 1" of coals at the back. This operation must not take more than 1 minute. When this is done, close the door, turn off the blower, start all required equipment and put the fuel load in. Once the fuel load is in, remove embers in front of the pilot and a little bit under the 2 x 4 in the middle. Turn on the blower 30 minutes after the beginning of the test.

**Category 3 (1,25 kg/h – 1,90 kg/h)**
Put 3.5 lbs of kindling on top of 2-3 sheets of newspaper. Light that up and let that burn until only small flames remain in the stove. Level the coal bed and add a pre burn fuel load (See picture below for general positions of pieces). Let that burn until yellow flaming has ceased. Remove all embers from the stove, zero the scale and put back 1,50 lbs of embers in the stove. Add a second pre burn fuel. Wait for the scale to indicate approximately 9,50 lbs, close the primary air control with a drill bit of 3/16"Ø and turn on the blower at minimum speed.
45 minutes after closing the air control, stir the coal bed and rake everything to the middle-front of the stove. Wait to be in the coal bed range allowed and for the average firebox temperature to reach approximately 450 °F. Prior to loading, level the coal bed by following the general shape of the baffle which means having about 1" more coals at the front than at the back and leaving about ½ to 1" of coals at the back. This operation must not take more than 1 minute. When this is done, close the door, turn off the blower, start all required equipment and put the fuel load in. Once the fuel load is in, remove embers in front of the pilot and a little bit under the 2 x 4 in the middle. Turn on the blower 30 minutes after the beginning of the test.

**Category 4 (Primary air control fully opened):**
Put 3.5 lbs of kindling on top of 2-3 sheets of newspaper. Light that up and let that burn until only small flames remain in the stove. Level the coal bed and add a pre burn fuel load (See picture below for general positions of pieces). Wait for approximately a pound to be burnt and then close the door and start the blower at maximum speed.
Wait for the average firebox temperature to start dropping and for the coal bed to be close to the minimum. When there is approximately ¼ pound left before reaching minimum coal bed weight, open the door, level the coal bed by following the general shape of the baffle which means having about 1" more coals at the front than at the back and leaving about ½ to 1" of coals at the back. This operation must not take more than 1 minute. When this is done, close the door, start all required equipment and put the fuel load in.

Thirteen runs were performed on this program. Program was planned to start on November, 18, 2013 and beginning of it was delayed to Nov 25, 2013.

On November 27, it was halted due to poor results obtained with a date of test resume being December 2nd.

Program ran from December 2nd to 11th where it halted again due to extreme conditions of low temperature and negative pressure in and around the laboratory.

On February 4th the program resumed and concluded.

The below mentioned runs were discarded based on the accompanying reasons:

| | |
|---|---|
| Runs #1a and #2a | were not considered based on their poor results. See appendix G for unit modification description. |
| Run #1 | too high emissions. Eliminated based on the 2/3 rule by runs2, 3, 4 |
| Runs #6, #7, #8 | based on the fact that the full opened air intake position was resettled at a lower position. The conditions of #6, #7 and #8 are therefore no longer possible. |

**EMISSIONS:**

| Run Number | Test Date (mm/dd/yyyy) | Burn Rate (kg/hr) | Emission Rate (g/hr) | Adjusted Emission Rate (g/hr) | Heating Efficiency (% HHV) | Heating Efficiency (% LHV) |
|---|---|---|---|---|---|---|
| **1*[1]** | **12/02/2013** | **1.07** | **6.39** | **8.48** | **64.6** | **69.8** |
| **1a*[1]** | **11/25/2013** | **1.08** | **4.66** | **6.53** | **Not reported** | **Not reported** |
| **2** | **12/03/2013** | **0.97** | **4.09** | **5.86** | **Not available** | **Not Available** |
| **2a*[1]** | **11/26/2013** | **0.90** | **5.86** | **7.89** | **Not reported** | **Not reported** |
| **3** | **12/03/2013** | **1.19** | **2.78** | **4.26** | **68.8** | **74.0** |
| **4** | **12/05/2013** | **1.06** | **3.25** | **4.84** | **67.1** | **72.5** |
| **5** | **12/06/2013** | **1.45** | **2.64** | **4.07** | **68.9** | **74.5** |
| **6*[1]** | **12/09/2013** | **3.01** | **4.35** | **6.17** | **Not available** | **Not Available** |
| **7*[1]** | **12/10/2013** | **2.85** | **6.26** | **8.34** | **55.4** | **59.9** |
| **8*[1]** | **12/11/2013** | **3.03** | **7.97** | **10.19** | **65.1** | **70.3** |
| **9** | **02/04/2014** | **2.19** | **1.80** | **2.96** | **65.3** | **70.5** |
| **10*[2]** | **02/05/2014** | **0.95** | **3.85** | **5.57** | **66.2** | **71.6** |
| **11** | **02/06/2014** | **2.01** | **1.85** | **3.01** | **66.8** | **72.2** |

*1: Runs 1a, 2a, 1, 6, 7, 8 not retained for Emission calculation purposes based on the reasons presented above.
*2: Run 10 was conducted as a fan confirmation test and is therefore not included in the weighted average.

**WEIGHTED AVERAGE CALCULATION**

| Test No. | Burn Rate | (E) Average Emission Rate g/hr | Heat Output (Btu/hr) | Probability | (K) Weighting Factor | (KxE) |
|---|---|---|---|---|---|---|
| 2 | 0.97 | 5.860 | 11696.45 | 0.3488 | 0.4176 | 2.4471 |
| 4 | 1.06 | 4.840 | 12781.69 | 0.4176 | 0.1892 | 0.9157 |
| 3 | 1.19 | 4.260 | 14349.26 | 0.5380 | 0.3044 | 1.2967 |
| 5 | 1.45 | 4.070 | 17484.39 | 0.7220 | 0.3756 | 1.5287 |
| 11 | 2.01 | 3.010 | 24236.98 | 0.9136 | 0.2132 | 0.6417 |
| 9 | 2.19 | 2.960 | 26407.46 | 0.9352 | 0.0864 | 0.2557 |
| | | | | **Totals:** | 1.5864 | 7.0858 |
| | | | | | **Weighted average emission rate:** | **4.4666** |

**TEST FACILITY CONDITIONS**

| Run | Room Temp. °F before | Room Temp °F after | Baro. Pres. In. Hg before | Baro. Pres. In. Hg after | R.H. % before | R.H. % after | Air Vel. Ft/min before | Air Vel. Ft/min after |
|---|---|---|---|---|---|---|---|---|
| **1** | **81.42** | **73.59** | **30.09** | **30.03** | **81** | **77** | **<50** | **<50** |
| **1a** | **71.35** | **72.02** | **30.27** | **30.18** | **50** | **75** | **<50** | **<50** |
| **2** | **85.31** | **83.00** | **29.97** | **30.00** | **85** | **80** | **<50** | **<50** |
| **2a** | **75.22** | **83.60** | **30.18** | **30.21** | **74** | **81** | **<50** | **<50** |
| **3** | **79.99** | **85.28** | **30.15** | **30.18** | **71** | **76** | **<50** | **<50** |
| **4** | **82.10** | **86.21** | **30.06** | **29.85** | **78** | **99** | **<50** | **<50** |
| **5** | **71.43** | **87.18** | **29.91** | **29.97** | **78** | **78** | **<50** | **<50** |
| **6** | **74.31** | **69.11** | **30.21** | **30.03** | **81** | **81** | **<50** | **<50** |
| **7** | **77.42** | **69.35** | **29.83** | **29.77** | **43** | **45** | **<50** | **<50** |
| **8** | **71.89** | **73.29** | **29.97** | **30.00** | **62** | **64** | **<50** | **<50** |
| **9** | **71.07** | **70.41** | **30.42** | **30.42** | **59** | **56** | **<50** | **<50** |
| **10** | **80.82** | **84.88** | **30.06** | **30.00** | **69** | **66** | **<50** | **<50** |
| **11** | **76.44** | **68.82** | **30.24** | **45.00** | **46** | **45** | **<50** | **<50** |

**DILUTION TUNNEL FLOW RATE MEASUREMENTS AND SAMPLING DATA (5G-3)**

| Run No. | Burn Time (min) | Velocity (ft/sec) | Volumetric Flow Rate (dscf/min) | Total Temp. ($^oR$) | Volume Sample ($ft^3$) | | Particulate Catch (mg) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 2 | 1 | 2 |
| **1** | **470** | **7.87** | **150.844** | **543.4** | **74.776** | **61.685** | **51.2** | **44.8** |
| **1a** | **470** | **7.63** | **147.591** | **557.2** | **74.824** | **60.160** | **38.5** | **32.4** |
| **2** | **530** | **7.67** | **147.746** | **568.3** | **84.370** | **75.788** | **36.3** | **37.3** |
| **2a** | **570** | **7.68** | **147.519** | **574.3** | **89.613** | **82.412** | **57.5** | **56.2** |
| **3** | **420** | **7.58** | **145.020** | **530.1** | **65.452** | **59.918** | **20.7** | **19.4** |
| **4** | **470** | **7.42** | **141.760** | **552.8** | **75.116** | **69.843** | **28.2** | **27.2** |
| **5** | **350** | **7.69** | **143.793** | **536.3** | **55.537** | **54.019** | **17.2** | **16.3** |
| **6** | **170** | **8.61** | **147.209** | **494.6** | **27.294** | **25.464** | **13.4** | **12.6** |
| **7** | **180** | **8.21** | **137.894** | **508.1** | **28.385** | **27.387** | **21.7** | **20.5** |
| **8** | **160** | **8.55** | **146.962** | **515.9** | **26.091** | **24.501** | **21.4** | **24.2** |
| **9** | **220** | **8.08** | **150.600** | **566.3** | **36.342** | **34.045** | **06.8** | **07.2** |
| **10** | **510** | **7.55** | **146.558** | **560.9** | **84.825** | **80.740** | **36.9** | **35.6** |
| **11** | **250** | **7.66** | **144.039** | **530.6** | **42.134** | **40.456** | **08.8** | **08.7** |

Filters and probe weight history can be found in appendix I

## DILUTION TUNNEL DUAL TRAIN PRECISION

| Run No. | Sample Ratios | | Total Emissions (g) | | % Deviation | % Deviation or 7.5% of 7.5 grams* |
|---|---|---|---|---|---|---|
| | Train 1 | Train 2 | Train 1 | Train 2 | | |
| **1** | **948.119** | **1149.332** | **48.544** | **51.490** | **2.44** | **5.60** |
| **1a** | **927.083** | **1153.045** | **35.693** | **37.359** | **1.89** | **3.33** |
| **2** | **928.116** | **1033.213** | **33.691** | **38.539** | **5.57** | **8.66** |
| **2a** | **938.216** | **1020.314** | **53.953** | **57.342** | **2.53** | **5.33** |
| **3** | **930.588** | **1016.524** | **19.263** | **19.721** | **0.97** | **1.06** |
| **4** | **886.993** | **953.954** | **25.013** | **25.948** | **1.52** | **2.00** |
| **5** | **906.205** | **931.659** | **15.587** | **15.186** | **1.08** | **1.06** |
| **6** | **916.898** | **982.782** | **12.286** | **12.383** | **0.33** | **0.53** |
| **7** | **874.445** | **906.288** | **18.985** | **18.579** | **0.88** | **1.87** |
| **8** | **901.222** | **959.724** | **19.286** | **23.225** | **7.70** | **20.93** |
| **9** | **911.669** | **973.188** | **6.199** | **7.007** | **5.08** | **4.13** |
| **10** | **881.164** | **925.744** | **32.515** | **32.956** | **0.56** | **0.80** |
| **11** | **854.651** | **890.091** | **7.521** | **7.744** | **1.21** | **0.93** |

*= As described in Method 5G-3 section 16.2.5

## GENERAL SUMMARY OF RESULTS

| Run No. | Burn Rate (kg/hr) | Change In Surface Temp ($^oF$) | Initial Draft (in/$H_2O$) | Run Time (min) | Average Draft (in/$H_2O$) |
|---|---|---|---|---|---|
| **1** | **1.07** | **83.7** | **0.058** | **470** | **0.091** |
| **1a** | **1.08** | **97.6** | **0.055** | **470** | **0.056** |
| **2** | **0.97** | **108.7** | **0.050** | **530** | **0.072** |
| **2a** | **0.90** | **114.6** | **0.060** | **570** | **0.053** |
| **3** | **1.19** | **70.4** | **0.055** | **420** | **0.063** |
| **4** | **1.06** | **93.1** | **0.055** | **470** | **0.067** |
| **5** | **1.45** | **76.7** | **0.058** | **350** | **0.070** |
| **6** | **3.07** | **34.9** | **0.100** | **170** | **0.185** |
| **7** | **2.85** | **48.4** | **0.073** | **180** | **0.088** |
| **8** | **3.03** | **56.2** | **0.080** | **160** | **0.059** |
| **9** | **2.19** | **106.7** | **0.073** | **220** | **0.107** |
| **10** | **0.95** | **101.2** | **0.055** | **510** | **0.052** |
| **11** | **2.01** | **70.9** | **0.065** | **250** | **0.074** |

# III. PROCESS DESCRIPTION

## III.A TEST SET-UP DESCRIPTON

A standard 6” diameter single wall pipe and insulated chimney system was installed to 15’ above floor level. The unit controls were set to the lowest setting during the test.

## III.B AIR SUPPLY SYSTEM

Combustion air enters at front of the firebox through an opening at the bottom of the firebox. This air is controlled by a sliding damper, which covers the inlet hole. The lever is located just below the door. All gases exit through the 6” dia. flue

# IV. SAMPLING SYSTEMS

## IV.A. SAMPLING LOCATIONS

Particulate samples are collected from the dilution tunnel at a point 23 feet from the tunnel entrance. The tunnel has two elbows and two mixing baffles in the system ahead of the sampling section. The first 10 feet of the sampling section is a 10 inches diameter pipe and the remaining is made of an 8 inches diameter pipe. Tunnel velocity pressure is determined by a standard Pitot tube located 48 inches from the beginning of the sampling section. The dry bulb thermocouple is located six inches downstream from the Pitot tube. Tunnel samplers are located 48 inches downstream of the Pitot tube and 36 inches upstream from the end of this section.

Stack gas samples are collected from the steel chimney section 8 feet ± 6 inches above the scale platform. (See Figure 1)

## IV.A.(1) DILUTION TUNNEL

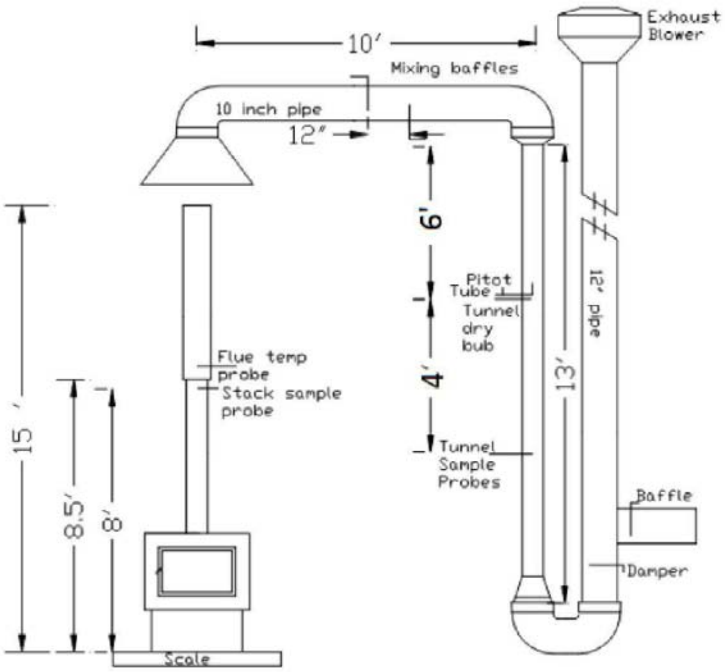


FIGURE 1

## IV.B.(2). DILUTION TUNNEL SAMPLE SYSTEMS

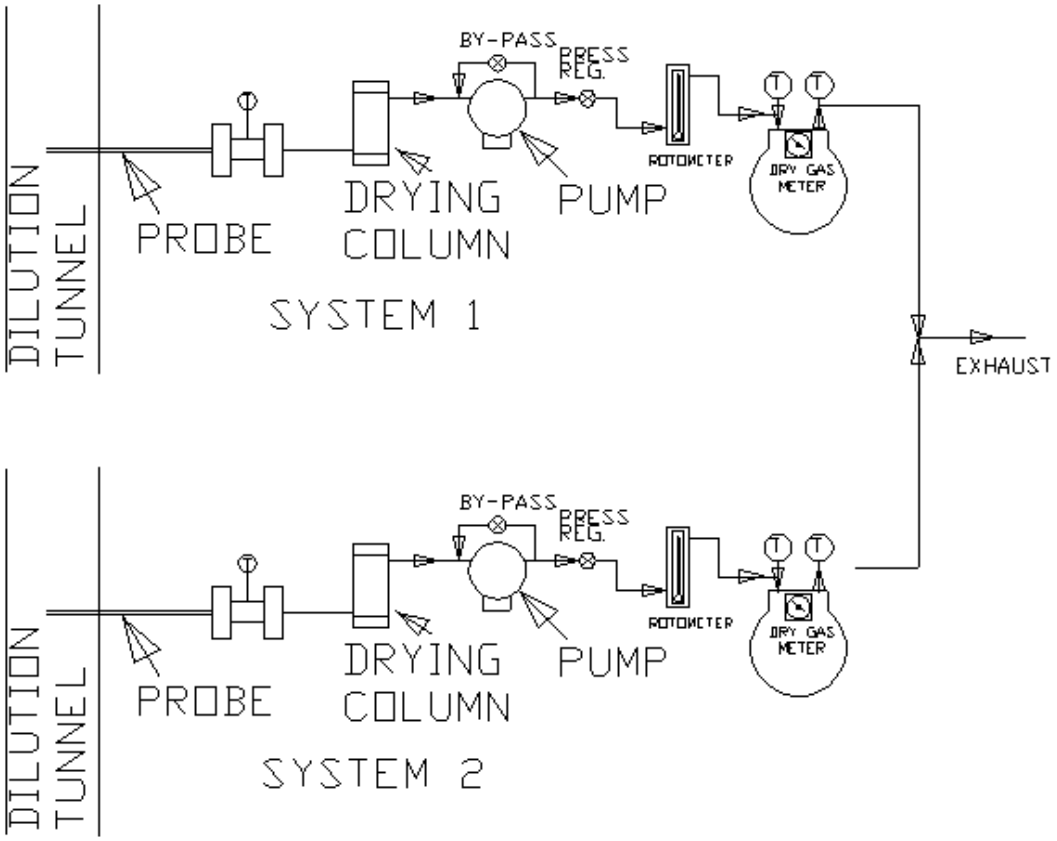


**Figure 2**

# V. SAMPLING METHODS

## V.A. PARTICULATE SAMPLING

Particulates were sampled in strict accordance with EPA Method 5G-3. This method uses two identical sampling systems with Gelman A/E 61631 binder free, 47-mm diameter filters. The dryers used in the sample systems are filled with “Drierite” before each test run.

# VI. QUALITY ASSURANCE

## VI.A. INSTRUMENT CALIBRATION

### VI.A. (1). DRY GAS METERS

At the beginning and conclusion of the test program, the dry gas meters were checked against a calibrated and traceable standard reference dry gas meter. Three runs were made on each dry gas meter used during the test program. The average calibration factors obtained are then compared with the six-month calibration factor and, if within 5%, the six-month factor is used to calculate standard volumes. Results of this calibration are contained in Appendix D.

An integral part of the post test calibration procedure is a leak check of the pressure side by plugging the system exhaust and pressurizing the system to 10” W.C. The system is judged to be leak free if it retains the pressure for at least 10 minutes.

The standard dry gas meter is calibrated annually by an external recognized calibration agency

### VI.A.(2). STACK SAMPLE ROTAMETER

The stack sample rotometer is checked by running three tests at each flow rate used during the test program. The flow rate is checked by running the rotometer in series with one of the dry gas meters for 10 minutes with the rotometer at a constant setting. The dry gas meter volume measured is then corrected to standard temperature and pressure conditions. The flow rate determined is then used to calculate actual sampled volumes.

## VI.A.(3). GAS ANALYZERS

The continuous analyzers are zeroed and spanned before each test with appropriate gases. A mid-scale multi-component calibration gas is then analyzed (values are recorded). At the conclusion of a test, the instruments are checked again with zero, span and calibration gases (values are recorded only). The drift in each meter is then calculated and must not exceed 5% of the scale used for the test.

At the conclusion of each unit test program, a five-point calibration check is made. This calibration check must meet accuracy requirements of the applicable standards. Consistent deviations between analyzer readings and calibration gas concentrations are used to correct data before computer processing. Data is also corrected for interferences as prescribed by the instrument manufacturer's instructions.

## VI.B. TEST METHOD PROCEDURES

## VI.B.(1). LEAK CHECK PROCEDURES

Before and after each test, each sample train is tested for leaks. Leakage rates are measured and must not exceed 0.02 CFM or 4% of the sampling rate. Leak checks are performed checking the entire sampling train, not just the dry gas meters. Pre-test and post-test leak checks are conducted with a vacuum of 5 inches of mercury. Vacuum is monitored during each test and the highest vacuum reached is then used for the post test vacuum value. If leakage limits are not met, the test run is rejected. During these tests, there was typically no vacuum

## VI.B.(2). TUNNEL VELOCITY/FLOW MEASUREMENT

The tunnel velocity is calculated from a center point Pitot tube signal multiplied by an adjustment factor. This factor is determined by a traverse of the tunnel as prescribed in EPA Method 1. Final tunnel velocities and flow rates are calculated from EPA Method 2, Equation 6.9 and 6.10. (Tunnel cross sectional area is the average from both lines of traverse.)

Pitot tubes are cleaned before each test and leak checks are conducted after each test.

### VI.B.(3). PM SAMPLING PROPORTIONALITY (5G-3)

Proportionality was calculated in accordance with EPA Method 5G-3. The data and results are included in Appendix C.

## VII. CONCLUSION

These tests demonstrate that this unit is an affected facility under the definition given in the regulation. The weighted average emission rate of 4.47 g/hr has been achieved.

## VII.A RESULTS AND OBSERVATIONS

The Model NG-1800 Solid Fuel space heater has been found to be in compliance with the applicable performance and construction requirements of the following criteria: EPA Method 28 “Certification and auditing of wood heaters” and Method 5G Determination of particulate matter emissions from wood heaters.”

**INTERTEK TESTING SERVICES NA**

Reported by: _____

Claude Pelland, P.Eng.
**Project Engineer**

Reviewed by:

Bruce Davis

_____

| Date: November 11th, 2013 |
|---|
| Primary air control setting: Fully closed |

| Time | FLUE : | BACK : | RIGHT SIDE : | AMBIANT : | TUNNEL : | TOP : | LEFT SIDE : | BOTTOM : | DRAFT : | Weight(Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| 15:30 | 285,6 | 465,6 | 415,6 | 72,39 | 98,89 | 320,4 | 408,7 | 440,9 | 0,041 | 54,05 |
| 15:40 | 253,9 | 418,2 | 393,1 | 80,34 | 95,22 | 324,7 | 391,5 | 433,8 | 0,046 | 21,45 |
| 15:50 | 261,4 | 375 | 361,1 | 83,27 | 89,94 | 312,5 | 359,1 | 421 | 0,049 | 20,71 |
| 16:00 | 300,6 | 350 | 339,7 | 84,66 | 93,05 | 352 | 336,3 | 404,6 | 0,054 | 19,66 |
| 16:10 | 303 | 336 | 326,3 | 87,21 | 94,69 | 379,3 | 329,7 | 387,4 | 0,054 | 18,68 |
| 16:20 | 288,4 | 329,1 | 321,9 | 88,59 | 94,23 | 393,1 | 327,1 | 371 | 0,052 | 17,81 |
| 16:30 | 270,5 | 323,5 | 317 | 89,2 | 93,28 | 378,1 | 325,9 | 355,8 | 0,05 | 17,09 |
| 16:40 | 277,7 | 318,8 | 319,8 | 89,31 | 93,22 | 365,8 | 323,8 | 341,8 | 0,046 | 16,28 |
| 16:50 | 295,3 | 322,1 | 332,4 | 89,84 | 94,53 | 383,1 | 323,5 | 327,9 | 0,053 | 15,41 |
| 17:00 | 297,7 | 335,1 | 344,1 | 91,01 | 95,29 | 408,7 | 333,8 | 314,4 | 0,054 | 14,58 |
| 17:10 | 290,2 | 346,6 | 352,7 | 91,93 | 95,32 | 412,1 | 344 | 303,1 | 0,053 | 13,83 |
| 17:20 | 287,2 | 352,6 | 358,1 | 92,44 | 95,02 | 407,9 | 350,4 | 293,6 | 0,052 | 13,1 |
| 17:30 | 289,2 | 354,4 | 360,6 | 89,27 | 94,83 | 407,2 | 354,2 | 288 | 0,052 | 12,45 |
| 17:40 | 282,7 | 354 | 358,3 | 75,7 | 87,95 | 402,8 | 353,7 | 277,4 | 0,05 | 11,7 |
| 17:50 | 273,8 | 351,6 | 357,5 | 74,26 | 86,38 | 393,6 | 354,5 | 268,6 | 0,05 | 10,99 |
| 18:00 | 270,1 | 350,7 | 359,8 | 76,77 | 87,68 | 386,5 | 356 | 262,6 | 0,048 | 10,34 |
| 18:10 | 266,8 | 351,1 | 361,1 | 76,31 | 85,97 | 380,3 | 353,7 | 256,8 | 0,048 | 9,7 |
| 18:20 | 263,7 | 353,2 | 364,9 | 74,97 | 85,66 | 376 | 353,9 | 252,5 | 0,048 | 9,1 |
| 18:30 | 254,1 | 355 | 367,8 | 78,8 | 85,97 | 368,5 | 353,5 | 248,5 | 0,046 | 8,47 |
| 18:40 | 243,9 | 356,5 | 367,3 | 74,29 | 83,55 | 355,6 | 352,2 | 245,6 | 0,045 | 7,94 |
| 18:50 | 234,9 | 359,4 | 367,7 | 77,64 | 84,66 | 342,3 | 351,2 | 243 | 0,043 | 7,45 |
| 19:00 | 227,6 | 362,9 | 365,6 | 76,84 | 82,67 | 330 | 347,4 | 240,5 | 0,041 | 7,03 |
| 19:10 | 227,8 | 365,7 | 366,2 | 74,31 | 82,1 | 323,1 | 344,8 | 238,6 | 0,042 | 6,58 |
| 19:20 | 213,6 | 373,2 | 363,8 | 79,06 | 83,01 | 314,8 | 343,3 | 237,3 | 0,039 | 6,27 |
| 19:30 | 204,8 | 371,1 | 356,8 | 76,87 | 80,91 | 298,8 | 338,6 | 235,5 | 0,039 | 6 |
| 19:40 | 200,3 | 363,1 | 351,5 | 73,75 | 79,65 | 286,1 | 334,1 | 234,5 | 0,036 | 5,72 |
| 19:50 | 196,7 | 359,6 | 349,8 | 77,48 | 81,19 | 276,5 | 332,1 | 234,9 | 0,037 | 5,48 |
| 20:00 | 192,6 | 357,2 | 346,6 | 77,22 | 79,85 | 269,9 | 330,4 | 235,1 | 0,035 | 5,22 |
| 20:10 | 191,1 | 356,1 | 344,4 | 72,63 | 78,57 | 264,5 | 330,8 | 236,5 | 0,035 | 4,99 |
| 20:20 | 191,6 | 357,4 | 345,9 | 79,08 | 80,97 | 263,7 | 334 | 238,8 | 0,035 | 4,75 |
| 20:30 | 189,8 | 358,7 | 345 | 76,7 | 79,11 | 263,2 | 337,5 | 241,3 | 0,035 | 4,53 |
| 20:40 | 190 | 359,8 | 344,2 | 73,67 | 78,17 | 262,5 | 341,7 | 245 | 0,034 | 4,32 |
| 20:50 | 189 | 361,8 | 345,4 | 76,91 | 79,98 | 262,7 | 344,5 | 249,7 | 0,035 | 4,18 |
| 21:00 | 188 | 362,3 | 345,7 | 78,02 | 79,72 | 263 | 343,2 | 252,9 | 0,033 | 3,98 |
| 21:10 | 188 | 362,2 | 345,2 | 75,75 | 78,4 | 261,5 | 344 | 255,9 | 0,033 | 3,77 |
| 21:20 | 187,3 | 362,1 | 346,1 | 74,53 | 78,81 | 260,5 | 345,5 | 258,7 | 0,033 | 3,62 |
| 21:30 | 185,5 | 363,3 | 346,2 | 78,44 | 79,91 | 259 | 345,7 | 261 | 0,033 | 3,45 |
| 21:40 | 184,6 | 362,3 | 345,7 | 76,38 | 78,54 | 257,2 | 343,2 | 262,6 | 0,033 | 3,27 |
| 21:50 | 184,8 | 361 | 345,8 | 74,14 | 78,47 | 255,6 | 340,1 | 264,2 | 0,033 | 3,11 |
| 22:00 | 184 | 360,8 | 346,5 | 78,4 | 79,59 | 255,4 | 337,3 | 265,9 | 0,033 | 2,96 |
| 22:10 | 183,6 | 361,5 | 344,9 | 75,61 | 78,14 | 254,7 | 333 | 267 | 0,033 | 2,78 |
| 22:20 | 182,7 | 363,2 | 344,5 | 73,75 | 77,99 | 252,9 | 328,4 | 268,9 | 0,033 | 2,61 |
| 22:30 | 181,1 | 365,8 | 345,1 | 78,89 | 79,73 | 251,9 | 325,5 | 271,3 | 0,031 | 2,47 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 22:40 | 179,8 | 366,2 | 343,3 | 76,75 | 78,36 | 249,5 | 322,7 | 272,7 | 0,032 | 2,31 |
| 22:50 | 178,7 | 367,9 | 340 | 73,5 | 77,54 | 247,5 | 319,4 | 273,7 | 0,032 | 2,15 |
| 23:00 | 176,7 | 370,8 | 338,2 | 78,17 | 79,29 | 245,7 | 317 | 274,4 | 0,031 | 2,04 |
| 23:10 | 175,7 | 371,5 | 334,4 | 75,34 | 77,41 | 242,6 | 313 | 273,9 | 0,031 | 1,92 |
| 23:20 | 174,1 | 369,8 | 331,6 | 77,15 | 79,08 | 241 | 310,7 | 274,5 | 0,031 | 1,74 |
| 23:30 | 170,9 | 362,7 | 327 | 77,27 | 78,3 | 237,4 | 305,4 | 273,6 | 0,03 | 1,65 |
| 23:40 | 170,2 | 361 | 321,1 | 73,77 | 77,02 | 234,2 | 300,1 | 272,5 | 0,031 | 1,53 |
| 23:50 | 169 | 364,1 | 318,2 | 78,47 | 78,78 | 232,4 | 297,2 | 272,1 | 0,029 | 1,37 |
| 0:00 | 168,6 | 370,5 | 315,1 | 75,89 | 77,28 | 231 | 293,7 | 270,1 | 0,029 | 1,21 |
| 0:10 | 169,3 | 375,9 | 314,7 | 77,49 | 78,8 | 229,9 | 293,1 | 269,3 | 0,031 | 1,03 |
| 0:20 | 168,7 | 381,4 | 313,7 | 77 | 77,85 | 229 | 291,3 | 266,6 | 0,03 | 0,89 |
| 0:30 | 169,8 | 384,6 | 313,4 | 75,88 | 78,08 | 228,2 | 291,1 | 266 | 0,03 | 0,73 |
| 0:44 | 167,5 | 383,7 | 312,7 | 76,8 | 77,83 | 227,1 | 289,7 | 263,8 | 0,029 | 0,6 |
| 0:50 | 167 | 379,2 | 312 | 75,98 | 78,24 | 225,6 | 287,9 | 263,3 | 0,029 | 0,43 |
| 1:00 | 164,9 | 375 | 310,7 | 77,52 | 78,01 | 222,8 | 284,5 | 261,8 | 0,028 | 0,32 |
| 1:10 | 164,4 | 370,2 | 307,8 | 73,93 | 76,39 | 219,9 | 281 | 260,6 | 0,029 | 0,17 |
| 1:20 | 163 | 366,4 | 306 | 77,51 | 78,02 | 218,4 | 279,1 | 259,5 | 0,029 | 0,04 |
| 1:30 | 163,3 | 363,3 | 301,8 | 71,81 | 76,08 | 216,5 | 278 | 257,4 | 0,029 | -0,08 |

| Date: November 12th, 2013 |
|---|
| Primary air control setting: Fully closed |

| Time | FLUE : | BACK : | RIGHT SIDE : | AMBIANT : | TUNNEL : | TOP : | LEFT SIDE : | BOTTOM : | DRAFT : | Weight(Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| 15:34 | 273,5 | 466,6 | 412,4 | 75,76 | 99,47 | 324,4 | 410,7 | 447,8 | - | 55,71 |
| 15:44 | 230,8 | 415,6 | 383,9 | 74,83 | 89,5 | 304,9 | 387,3 | 438,7 | - | 21,85 |
| 15:54 | 221,5 | 369,1 | 352,3 | 79,02 | 83,86 | 294 | 355,1 | 421 | - | 21,21 |
| 16:04 | 212,6 | 336,5 | 324,2 | 78,78 | 83,47 | 285 | 324,6 | 403,8 | - | 20,58 |
| 16:14 | 233,2 | 311,4 | 303,6 | 76,43 | 84,42 | 286,8 | 301,3 | 384,4 | - | 19,86 |
| 16:24 | 252,8 | 291,5 | 293,1 | 74,91 | 84,77 | 299,4 | 285,8 | 364,8 | - | 19,14 |
| 16:34 | 233,1 | 280,8 | 288,9 | 76,69 | 83,28 | 314,7 | 279,8 | 348,6 | - | 18,44 |
| 16:44 | 240,4 | 271,9 | 289,8 | 78,34 | 83,95 | 318,4 | 272,4 | 333,6 | - | 17,84 |
| 16:54 | 232,3 | 269,3 | 296,6 | 76,22 | 83,72 | 314,5 | 272,3 | 318 | - | 17,15 |
| 17:04 | 220,2 | 270,6 | 301,6 | 75,13 | 82,68 | 300,3 | 273,7 | 304,4 | - | 16,55 |
| 17:14 | 234,3 | 276,8 | 296,5 | 74,96 | 82,31 | 307,7 | 281,2 | 291,8 | - | 15,9 |
| 17:24 | 231,3 | 286,2 | 293,8 | 76,48 | 83,04 | 328,4 | 292,4 | 280,8 | - | 15,23 |
| 17:34 | 233,6 | 291,3 | 293,3 | 80,49 | 85,4 | 324,8 | 300,8 | 271,1 | - | 14,64 |
| 17:44 | 248,5 | 296,5 | 291,9 | 77,17 | 84,16 | 332,8 | 308,2 | 261,1 | - | 13,97 |
| 17:54 | 249 | 302,7 | 297,2 | 79,68 | 86,37 | 346,1 | 312,6 | 253,3 | - | 13,29 |
| 18:04 | 221,8 | 301,5 | 300,2 | 79,72 | 84,66 | 335,4 | 308,4 | 247,6 | - | 12,69 |
| 18:14 | 204,1 | 289,5 | 295,3 | 75,73 | 81,79 | 301 | 296,1 | 242,5 | - | 12,13 |
| 18:24 | 191,8 | 278,8 | 291 | 80,42 | 82,81 | 275,1 | 284,5 | 238,7 | - | 11,62 |
| 18:34 | 184,1 | 270,8 | 286,3 | 77,52 | 80,49 | 255,7 | 275,3 | 234,6 | - | 11,11 |
| 18:44 | 180,7 | 265,3 | 285,3 | 80,27 | 81,67 | 244,9 | 270,3 | 231,8 | - | 10,63 |
| 18:54 | 176,9 | 261,2 | 283,9 | 77,32 | 79,52 | 236,6 | 267,3 | 229,3 | - | 10,13 |
| 19:04 | 175 | 258,6 | 284,9 | 79,89 | 80,9 | 232,4 | 266,5 | 227,4 | - | 9,68 |
| 19:14 | 174,4 | 258 | 285,3 | 75,93 | 78,58 | 228,5 | 266,4 | 226,3 | - | 9,25 |
| 19:24 | 174,3 | 258,4 | 287,8 | 79,48 | 80,31 | 228 | 268,5 | 225,4 | - | 8,75 |
| 19:34 | 175,6 | 261 | 291 | 78,91 | 80,53 | 229,2 | 272,4 | 225,4 | - | 8,26 |
| 19:44 | 174,6 | 264 | 293,5 | 78,71 | 79,71 | 229,5 | 275 | 224,2 | - | 7,78 |
| 19:54 | 174,2 | 266,9 | 297,1 | 80,27 | 80,68 | 230,1 | 278,8 | 224,6 | - | 7,34 |
| 20:04 | 172,3 | 269,9 | 298,4 | 78,09 | 79,21 | 229,6 | 280,2 | 223,8 | - | 6,92 |
| 20:14 | 172,4 | 272,7 | 300,9 | 80,3 | 80,37 | 229,5 | 282,5 | 223,9 | - | 6,58 |
| 20:24 | 173,8 | 276,3 | 304,1 | 77,35 | 78,48 | 230,5 | 284 | 224,2 | - | 6,22 |
| 20:34 | 174,5 | 281,5 | 311,6 | 80,19 | 80,25 | 234,1 | 287,7 | 226,1 | - | 5,96 |
| 20:44 | 175,4 | 286,7 | 317,1 | 77,04 | 78,6 | 236,6 | 290,3 | 228,6 | - | 5,73 |
| 20:54 | 175,2 | 292 | 322,7 | 80,28 | 80,2 | 240 | 291,8 | 230,9 | - | 5,5 |
| 21:04 | 174,9 | 297,6 | 325,8 | 77,82 | 78,75 | 239,8 | 291 | 232,5 | - | 5,3 |
| 21:14 | 175 | 304,6 | 329,9 | 80,66 | 80,41 | 240,1 | 292 | 234,4 | - | 5,08 |
| 21:24 | 174,9 | 314,5 | 333,2 | 78,05 | 78,79 | 240,2 | 292,5 | 234,7 | - | 4,82 |
| 21:34 | 176,2 | 325,7 | 338,1 | 80,71 | 80,49 | 240,3 | 294,6 | 236 | - | 4,63 |
| 21:44 | 176,9 | 338,4 | 341,6 | 78,14 | 78,89 | 239,7 | 297,2 | 235,8 | - | 4,39 |
| 21:54 | 179 | 351,7 | 346,9 | 80,67 | 80,58 | 241,4 | 300,1 | 236,4 | - | 4,17 |
| 22:04 | 180,3 | 361,2 | 351,1 | 78,55 | 79,11 | 242,4 | 303 | 236,5 | - | 3,92 |
| 22:14 | 182,2 | 367,8 | 356 | 79,09 | 80,43 | 245,4 | 308,6 | 237,8 | - | 3,71 |
| 22:24 | 182,1 | 372,5 | 358 | 79,11 | 79,71 | 246,8 | 311,8 | 238,4 | - | 3,53 |
| 22:34 | 183,2 | 372,3 | 356,1 | 76,87 | 79,48 | 249,8 | 315 | 239,9 | - | 3,27 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 22:44 | 181,1 | 371,8 | 352,5 | 79,89 | 80,31 | 250,9 | 317 | 242,3 | - | 3,1 |
| 22:54 | 180,1 | 372,8 | 347,6 | 76,93 | 78,57 | 249,8 | 318,5 | 245,9 | - | 2,92 |
| 23:04 | 178,6 | 372,1 | 344,8 | 80,85 | 80,54 | 248,5 | 319,8 | 249,7 | - | 2,75 |
| 23:14 | 177,2 | 371 | 340,7 | 78,73 | 79,16 | 246,2 | 319 | 252,3 | - | 2,6 |
| 23:24 | 177,1 | 373,4 | 338,5 | 77,89 | 79,22 | 244,3 | 319,4 | 255,1 | - | 2,44 |
| 23:34 | 175,4 | 376,4 | 336,4 | 79,6 | 79,57 | 243,3 | 318,6 | 256,5 | - | 2,29 |
| 23:44 | 175 | 375,9 | 333,9 | 76,1 | 78,49 | 241 | 316,4 | 258,3 | - | 2,13 |
| 23:54 | 173,2 | 378,2 | 332,5 | 80,08 | 79,59 | 239,2 | 313,2 | 258,9 | - | 2 |
| 0:04 | 173,7 | 380,9 | 329,9 | 76,53 | 77,81 | 237,4 | 311,3 | 259,9 | - | 1,87 |
| 0:14 | 172,8 | 383,5 | 328,9 | 80,31 | 79,64 | 237 | 310,3 | 261 | - | 1,71 |
| 0:24 | 172,6 | 386,2 | 326,1 | 76,97 | 77,77 | 235,9 | 309 | 261,6 | - | 1,54 |
| 0:34 | 172,7 | 386,7 | 326,2 | 80,2 | 79,73 | 235,2 | 308,9 | 262,6 | - | 1,42 |
| 0:44 | 172 | 382,7 | 323,7 | 77,33 | 77,99 | 234,3 | 307,3 | 263,2 | - | 1,28 |
| 0:54 | 170,5 | 376,8 | 321 | 80,22 | 79,58 | 233,9 | 305 | 264,7 | - | 1,16 |
| 1:04 | 168,9 | 372,2 | 315,6 | 76,54 | 77,45 | 231,3 | 300,3 | 265,1 | - | 1,02 |
| 1:14 | 167,1 | 371,8 | 312,4 | 79,76 | 79,22 | 228,7 | 297,6 | 265,3 | - | 0,9 |
| 1:24 | 166,7 | 372 | 308,6 | 76,31 | 77,59 | 225,3 | 294,3 | 265,3 | - | 0,8 |
| 1:34 | 165,1 | 371,2 | 306,2 | 79,45 | 78,94 | 223,1 | 290,9 | 264,2 | - | 0,63 |
| 1:44 | 164,9 | 369,5 | 305 | 76,7 | 77,97 | 222,2 | 289,7 | 263,8 | - | 0,49 |
| 1:54 | 163,3 | 369 | 304,1 | 78,61 | 78,22 | 221,2 | 287,6 | 264,9 | - | 0,35 |
| 2:04 | 163,2 | 367,9 | 303,5 | 80,32 | 79,15 | 221,2 | 285,3 | 267,7 | - | 0,21 |
| 2:14 | 161,5 | 362 | 300,7 | 76,81 | 77,03 | 219,2 | 282 | 269 | - | 0,08 |
| 2:24 | 160,4 | 358,4 | 299,2 | 79,32 | 78,46 | 217,5 | 279,4 | 269,3 | - | -0,03 |
| 2:24 | 160,2 | 358,3 | 299,2 | 79,44 | 78,47 | 217,6 | 279,3 | 269,5 | - | -0,04 |

| Date: November 13th, 2013 |
|---|
| Primary air control setting: category 2 |

| Time | FLUE : | BACK : | RIGHT SIDE : | AMBIANT : | TUNNEL : | TOP : | LEFT SIDE : | BOTTOM : | DRAFT : | Weight(Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| 15:50 | 275,3 | 460,8 | 422,3 | 82,79 | 102,4 | 321,8 | 403,7 | 449,7 | 0,043 | 55,88 |
| 16:00 | 252 | 414,7 | 393,9 | 83,6 | 96,54 | 318,1 | 382 | 439 | 0,048 | 21,4 |
| 16:10 | 219,8 | 369,1 | 358,8 | 83,36 | 87,86 | 292,3 | 344,5 | 422,9 | 0,045 | 20,89 |
| 16:20 | 260,7 | 338,1 | 329,7 | 85,57 | 90,44 | 292,9 | 320,9 | 404,3 | 0,052 | 20,13 |
| 16:30 | 283,6 | 319,7 | 318,9 | 85,27 | 93,03 | 341,1 | 306,3 | 385,4 | 0,055 | 19,16 |
| 16:40 | 287,4 | 306,2 | 312,6 | 76,79 | 88,99 | 360,5 | 291,7 | 365,3 | 0,056 | 18,19 |
| 16:50 | 265 | 299,1 | 314 | 81,58 | 89,74 | 355,5 | 290,7 | 348,4 | 0,051 | 17,39 |
| 17:00 | 286,8 | 299,1 | 320,1 | 79,3 | 89,43 | 353,3 | 284 | 333,1 | 0,056 | 16,44 |
| 17:10 | 279,5 | 306,7 | 330,3 | 76,48 | 88,35 | 370,4 | 295,5 | 320,2 | 0,054 | 15,53 |
| 17:20 | 269 | 314,3 | 332,7 | 77,01 | 88,03 | 371,4 | 312,4 | 308,4 | 0,052 | 14,75 |
| 17:30 | 275,1 | 323 | 336,4 | 80,19 | 89,26 | 369,3 | 322,8 | 296,6 | 0,053 | 13,95 |
| 17:40 | 279,2 | 331,9 | 344,1 | 79,37 | 88,24 | 374,9 | 326,1 | 285,6 | 0,052 | 13,2 |
| 17:50 | 273,5 | 335,4 | 350,4 | 76,88 | 87,35 | 373,9 | 327,1 | 276,3 | 0,052 | 12,52 |
| 18:00 | 264,3 | 335,1 | 353,7 | 79,75 | 88,35 | 367,6 | 328,4 | 268,9 | 0,052 | 11,89 |
| 18:10 | 265 | 334,9 | 353,6 | 79,66 | 87,33 | 360,7 | 328,8 | 260,9 | 0,052 | 11,25 |
| 18:20 | 243 | 335,4 | 353,8 | 76,41 | 85,24 | 353,7 | 328,9 | 255,2 | 0,047 | 10,68 |
| 18:30 | 221,4 | 322,3 | 344,8 | 79,3 | 85,65 | 322,9 | 322 | 251,2 | 0,043 | 10,08 |
| 18:40 | 207,4 | 309,4 | 332,1 | 79,03 | 83,51 | 295,1 | 310,8 | 246,3 | 0,041 | 9,5 |
| 18:50 | 198,7 | 300,4 | 322,2 | 76,12 | 81,48 | 274,2 | 303,6 | 242,1 | 0,039 | 8,97 |
| 19:00 | 192,6 | 294,4 | 316,5 | 80,74 | 82,86 | 260,8 | 299,5 | 239 | 0,038 | 8,46 |
| 19:10 | 188,9 | 290,9 | 311 | 77,87 | 80,59 | 251,5 | 296,5 | 235,6 | 0,037 | 7,93 |
| 19:20 | 187,1 | 290 | 309,8 | 80,62 | 82,25 | 247,3 | 297,3 | 233,9 | 0,036 | 7,39 |
| 19:30 | 184,4 | 290,6 | 308,4 | 78,65 | 80,58 | 243,2 | 297,4 | 231,5 | 0,035 | 6,88 |
| 19:40 | 182,6 | 292,5 | 308,9 | 79,43 | 81,35 | 241,4 | 298,9 | 230,4 | 0,035 | 6,49 |
| 19:50 | 180,5 | 294,6 | 308,6 | 78,63 | 80 | 238,6 | 299,4 | 228,6 | 0,034 | 6,14 |
| 20:00 | 180,1 | 297,2 | 310,3 | 79,2 | 80,73 | 237,1 | 301,9 | 228,4 | 0,035 | 5,84 |
| 20:10 | 179,2 | 299,6 | 311,2 | 78,76 | 79,75 | 235,6 | 303,4 | 227,1 | 0,035 | 5,56 |
| 20:20 | 180,7 | 304,1 | 315 | 80,79 | 81,02 | 237,8 | 308,8 | 227,8 | 0,033 | 5,28 |
| 20:30 | 183,4 | 312,3 | 319,7 | 78,59 | 79,54 | 241,5 | 317,4 | 228,1 | 0,035 | 5,02 |
| 20:40 | 186,7 | 324,9 | 324,9 | 78,62 | 80,59 | 247,3 | 330 | 228,9 | 0,035 | 4,77 |
| 20:50 | 188,1 | 341,5 | 328,6 | 79,32 | 80,2 | 252,4 | 339,5 | 229,5 | 0,035 | 4,51 |
| 21:00 | 191,4 | 358 | 332,8 | 76,21 | 79,45 | 257 | 350 | 230,8 | 0,037 | 4,3 |
| 21:10 | 191,7 | 370,6 | 337,1 | 80,04 | 80,94 | 260,8 | 357,1 | 232 | 0,035 | 4,1 |
| 21:20 | 194,9 | 379,6 | 338,9 | 76,58 | 79,3 | 260,9 | 361,2 | 233,2 | 0,036 | 3,84 |
| 21:30 | 194,4 | 381,2 | 342,2 | 80,73 | 81,72 | 263,4 | 363,7 | 236 | 0,036 | 3,62 |
| 21:40 | 193,4 | 381,6 | 343,2 | 79,08 | 80,45 | 263,7 | 362,3 | 240,1 | 0,036 | 3,42 |
| 21:50 | 193,6 | 382,5 | 343,9 | 75,56 | 79,28 | 262,9 | 361,5 | 245,8 | 0,036 | 3,17 |
| 22:00 | 191,5 | 383,1 | 345,9 | 80,66 | 81,25 | 262,6 | 359,8 | 252 | 0,035 | 3,01 |
| 22:10 | 190,5 | 384,8 | 345,2 | 78,63 | 79,93 | 260 | 358,5 | 258,5 | 0,035 | 2,81 |
| 22:20 | 191,7 | 388,8 | 345,6 | 76,34 | 79,82 | 259,2 | 359 | 264,2 | 0,035 | 2,6 |
| 22:30 | 190,8 | 390,2 | 346,3 | 80,44 | 80,99 | 259,7 | 357,8 | 268,8 | 0,036 | 2,42 |
| 22:40 | 189,5 | 389 | 345,6 | 78,32 | 79,8 | 258,5 | 353,7 | 273,9 | 0,035 | 2,23 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 22:50 | 189 | 391,8 | 346 | 76,89 | 79,86 | 257,1 | 348,2 | 278,2 | 0,035 | 2,07 |
| 23:00 | 186,6 | 395 | 346,6 | 80,42 | 80,8 | 255,5 | 341,9 | 281 | 0,035 | 1,93 |
| 23:10 | 184,8 | 395,2 | 344,5 | 78,02 | 79,4 | 252,9 | 336,5 | 283,1 | 0,035 | 1,76 |
| 23:20 | 184 | 395,1 | 342,1 | 79,37 | 80,83 | 250,8 | 335 | 285,2 | 0,034 | 1,61 |
| 23:30 | 182,3 | 396,3 | 338,1 | 79,14 | 79,77 | 248,6 | 331,6 | 285,6 | 0,034 | 1,47 |
| 23:40 | 181,9 | 389,9 | 334,9 | 77,04 | 79,61 | 245,3 | 330 | 287,2 | 0,034 | 1,33 |
| 23:50 | 179,7 | 384,7 | 331,7 | 79,27 | 79,79 | 243,1 | 325,8 | 288,1 | 0,033 | 1,21 |
| 0:00 | 178,9 | 383,5 | 328,1 | 76,61 | 78,55 | 240,5 | 323 | 288,8 | 0,033 | 1,08 |
| 0:10 | 178,3 | 387,6 | 326,8 | 80,47 | 80,4 | 240 | 320,2 | 288,1 | 0,033 | 0,9 |
| 0:20 | 177,2 | 391 | 324,2 | 77,24 | 78,23 | 237,2 | 317 | 286,4 | 0,033 | 0,76 |
| 0:30 | 176,5 | 389,6 | 323,7 | 80,31 | 80,21 | 235,9 | 315 | 285,3 | 0,033 | 0,64 |
| 0:40 | 174,2 | 384,3 | 321 | 77,2 | 78,26 | 233,3 | 310,2 | 283,4 | 0,033 | 0,45 |
| 0:50 | 173,1 | 379,4 | 318,5 | 80,43 | 79,97 | 231,4 | 307,7 | 283,1 | 0,031 | 0,35 |
| 1:00 | 171,4 | 377,6 | 314,6 | 77,66 | 78,31 | 228,7 | 302,8 | 281,4 | 0,032 | 0,23 |
| 1:10 | 170,5 | 374,2 | 312,4 | 80,04 | 79,78 | 227 | 300,2 | 280,7 | 0,031 | 0,09 |
| 1:20 | 169,1 | 371,5 | 309,4 | 77,11 | 77,9 | 224,8 | 295,5 | 278,1 | 0,031 | -0,03 |

| Date: November 14th, 2013 |
|---|
| Primary air control setting: Category 2 |

| Time | FLUE : | BACK : | RIGHT SIDE : | AMBIANT : | TUNNEL : | TOP : | LEFT SIDE : | BOTTOM : | DRAFT : | Weight(Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| 16:08 | 235,8 | 481,9 | 417 | 79,78 | 93,86 | 314,6 | 399,6 | 456,3 | 0,043 | 49,81 |
| 16:18 | 245,1 | 431,4 | 396,1 | 84,49 | 95,74 | 305,1 | 390,4 | 440,7 | 0,047 | 21,72 |
| 16:28 | 243,8 | 384,9 | 363,8 | 88,2 | 91,82 | 295 | 358,3 | 428,3 | 0,05 | 20,93 |
| 16:38 | 265,4 | 355,6 | 341,2 | 89,24 | 93,22 | 310,6 | 330,4 | 404 | 0,052 | 19,99 |
| 16:48 | 267,3 | 336,6 | 327,9 | 78,6 | 90,28 | 331,9 | 308,6 | 389,3 | 0,054 | 19,06 |
| 16:58 | 268,5 | 324,3 | 322,2 | 81,97 | 90,63 | 353,6 | 300,7 | 372 | 0,052 | 18,09 |
| 17:08 | 276,9 | 315,4 | 315 | 79,98 | 90,29 | 357 | 295,4 | 353 | 0,054 | 17,35 |
| 17:18 | 303,6 | 317,7 | 317,1 | 80,36 | 92,39 | 372 | 298,5 | 336 | 0,058 | 16,41 |
| 17:28 | 324,6 | 331 | 325,2 | 76,13 | 93,59 | 405,9 | 314,4 | 320,9 | 0,061 | 15,35 |
| 17:38 | 331,3 | 345,2 | 336,5 | 75,1 | 94,97 | 424,3 | 330 | 304,4 | 0,061 | 14,3 |
| 17:48 | 333,3 | 356,8 | 347,7 | 74,24 | 95,69 | 437,8 | 342 | 289,9 | 0,061 | 13,28 |
| 17:58 | 326,7 | 361,8 | 356,8 | 74,79 | 95,15 | 436,8 | 349,8 | 279,7 | 0,06 | 12,32 |
| 18:08 | 326,7 | 366,5 | 363,9 | 74,51 | 95,11 | 438,3 | 354,1 | 269,9 | 0,058 | 11,4 |
| 18:18 | 321,2 | 372,7 | 372,6 | 74,33 | 94,68 | 435,9 | 359,6 | 262,7 | 0,058 | 10,54 |
| 18:28 | 316,5 | 380,9 | 384,5 | 82,61 | 95,75 | 435,8 | 369,4 | 260,8 | 0,058 | 9,72 |
| 18:38 | 316,7 | 390 | 391 | 77,93 | 93,51 | 434 | 373 | 257,6 | 0,059 | 8,91 |
| 18:48 | 316,4 | 399,1 | 398,1 | 79,72 | 93,82 | 434,6 | 378,7 | 256,5 | 0,058 | 8,07 |
| 18:58 | 311,8 | 410,3 | 404,5 | 77,02 | 92,45 | 434,9 | 384,3 | 253,4 | 0,057 | 7,34 |
| 19:08 | 301,2 | 420,8 | 411,8 | 79,42 | 92,45 | 425,8 | 392,4 | 252,6 | 0,054 | 6,69 |
| 19:18 | 277 | 429,4 | 416,8 | 76,25 | 89,71 | 404,4 | 395,3 | 251,8 | 0,052 | 6,01 |
| 19:28 | 258,7 | 433,5 | 416,2 | 78,72 | 88,7 | 380,7 | 401,3 | 252,5 | 0,048 | 5,58 |
| 19:38 | 243,7 | 432,2 | 409,1 | 81,74 | 87,52 | 356,6 | 404,4 | 253,8 | 0,046 | 5,27 |
| 19:48 | 234,6 | 426,9 | 403,4 | 77,33 | 85,26 | 336 | 398,8 | 254,4 | 0,044 | 5,01 |
| 19:58 | 227,7 | 423,6 | 400,2 | 79,36 | 85,43 | 322,6 | 394,6 | 258,1 | 0,043 | 4,77 |
| 20:08 | 221,6 | 421,1 | 396,4 | 79,91 | 84,15 | 312,2 | 388,1 | 260,7 | 0,042 | 4,53 |
| 20:18 | 218,7 | 420,3 | 393,9 | 77,36 | 83,42 | 304,2 | 384,4 | 265,2 | 0,041 | 4,3 |
| 20:28 | 215,8 | 420,6 | 392,7 | 79,04 | 83,84 | 298,2 | 382,6 | 269,9 | 0,041 | 4,09 |
| 20:38 | 213,6 | 420,8 | 392 | 81,09 | 83,51 | 294,6 | 379,9 | 273,2 | 0,04 | 3,88 |
| 20:48 | 212,7 | 420,4 | 389,8 | 77,86 | 82,48 | 290,9 | 377,6 | 275,9 | 0,04 | 3,68 |
| 20:58 | 211,6 | 420 | 388 | 77,62 | 82,73 | 288,9 | 376,3 | 278,9 | 0,039 | 3,48 |
| 21:08 | 209,9 | 419 | 386,8 | 81,48 | 83,26 | 288,3 | 375,1 | 280,8 | 0,04 | 3,25 |
| 21:18 | 209,6 | 415,9 | 381,5 | 78,35 | 82,03 | 285,4 | 373,1 | 282,7 | 0,04 | 3,06 |
| 21:28 | 208,4 | 411,2 | 378,5 | 77,24 | 82,38 | 282,8 | 371,9 | 285,7 | 0,039 | 2,87 |
| 21:38 | 204,2 | 406,6 | 374,6 | 81,16 | 82,95 | 280,1 | 370,4 | 287,5 | 0,039 | 2,71 |
| 21:48 | 199,3 | 401,5 | 366,2 | 78,06 | 81,28 | 273,9 | 363,6 | 289,5 | 0,037 | 2,56 |
| 21:58 | 197,7 | 398,8 | 359,7 | 77,66 | 81,71 | 268,7 | 356,3 | 289,5 | 0,038 | 2,42 |
| 22:08 | 194,1 | 395,4 | 355,4 | 81,23 | 82,07 | 264 | 349,7 | 290,2 | 0,037 | 2,25 |
| 22:18 | 191,6 | 393,6 | 349,8 | 78,06 | 80,63 | 258,9 | 342,9 | 289,6 | 0,036 | 2,11 |
| 22:28 | 190 | 391,6 | 346,2 | 77,04 | 80,85 | 255,3 | 338,4 | 289 | 0,036 | 1,96 |
| 22:38 | 187 | 388,6 | 342,3 | 80,85 | 81,2 | 251,6 | 334 | 288 | 0,036 | 1,81 |
| 22:48 | 185,2 | 385,1 | 337,2 | 77,61 | 79,86 | 247,6 | 328,2 | 286,1 | 0,034 | 1,66 |
| 22:58 | 183,7 | 381,7 | 333,5 | 78,1 | 80,64 | 244,3 | 325,2 | 285,1 | 0,035 | 1,51 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 23:08 | 181,3 | 378,2 | 328,6 | 80,72 | 80,85 | 241 | 321 | 283 | 0,035 | 1,39 |
| 23:18 | 178 | 372,7 | 322 | 78,23 | 79,47 | 237 | 314,6 | 280,5 | 0,033 | 1,22 |
| 23:28 | 177,4 | 368,4 | 320,5 | 77,4 | 80,16 | 234,9 | 309,5 | 278,5 | 0,033 | 1,08 |
| 23:38 | 175,8 | 370,4 | 319,1 | 79,96 | 80,06 | 233,2 | 303,7 | 277,3 | 0,032 | 0,95 |
| 23:48 | 176,8 | 382,5 | 319 | 77,96 | 79,2 | 232,6 | 300,1 | 271,9 | 0,033 | 0,81 |
| 23:58 | 177,4 | 394,2 | 321,5 | 79,82 | 80,4 | 233,2 | 300 | 270 | 0,034 | 0,66 |
| 0:08 | 177,5 | 403,5 | 321,8 | 79,24 | 79,62 | 233,6 | 298,6 | 272,3 | 0,033 | 0,48 |
| 0:18 | 178,4 | 400,7 | 324,1 | 76,85 | 79,44 | 233,4 | 298 | 269 | 0,033 | 0,3 |
| 0:28 | 177,6 | 399,8 | 327,1 | 80,41 | 80,09 | 233,6 | 297 | 266,9 | 0,033 | 0,15 |
| 0:38 | 177,1 | 397,8 | 326,7 | 77,02 | 78,89 | 232,8 | 295,2 | 262,7 | 0,033 | 0,01 |
| 0:48 | 176,6 | 392,9 | 327,4 | 80,88 | 80,23 | 232,5 | 294,5 | 262,1 | 0,033 | -0,11 |

| |
|---|
| Date: November 15th, 2013 |
| Primary air control setting: Fully opened |

| Time | FLUE : | BACK : | RIGHT SIDE : | AMBIANT : | TUNNEL : | TOP : | LEFT SIDE : | BOTTOM : | DRAFT : | Weight(Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| 11:11 | 584,9 | 639,9 | 490,4 | 76,71 | 174,4 | 564,5 | 511,5 | 337,5 | 0,074 | 39,51 |
| 11:21 | 598,8 | 553,4 | 498,4 | 76,32 | 161,9 | 537,9 | 513,1 | 393,3 | 0,084 | 20,21 |
| 11:31 | 671,2 | 504,3 | 478,7 | 77,5 | 168,3 | 591,7 | 496,3 | 397,4 | 0,091 | 17,47 |
| 11:41 | 790,8 | 509,3 | 481,3 | 77,6 | 195,6 | 720,6 | 508,7 | 382,2 | 0,098 | 14,01 |
| 11:51 | 753,4 | 558,9 | 513,4 | 81,02 | 192,9 | 763,7 | 541,7 | 368,4 | 0,096 | 10,87 |
| 12:01 | 676,5 | 641,1 | 548,8 | 82,25 | 176 | 720,9 | 568,5 | 354,2 | 0,091 | 8,51 |
| 12:11 | 636,8 | 701,7 | 576,5 | 81,61 | 164,9 | 666,4 | 586,8 | 347,6 | 0,088 | 6,62 |
| 12:21 | 593,8 | 716,1 | 586,9 | 81,1 | 154,2 | 622,1 | 596,3 | 342,2 | 0,085 | 5,16 |
| 12:31 | 561,1 | 719,3 | 584 | 79,89 | 146,1 | 581 | 586,4 | 341,7 | 0,081 | 4,18 |
| 12:41 | 517 | 708,2 | 574,9 | 79,29 | 137,1 | 532,8 | 567 | 347,9 | 0,075 | 3,47 |
| 12:51 | 472,8 | 679,3 | 558,1 | 77,61 | 129 | 485,4 | 547 | 353,2 | 0,073 | 2,93 |
| 13:01 | 447,2 | 663,7 | 536,4 | 76 | 123,4 | 445,5 | 525,3 | 358,1 | 0,069 | 2,39 |
| 13:11 | 429,8 | 659,4 | 518,1 | 74,69 | 120 | 420,9 | 506,6 | 362 | 0,068 | 1,89 |
| 13:21 | 413,9 | 664,5 | 502 | 73,96 | 116,7 | 400,3 | 491,3 | 366,1 | 0,067 | 1,4 |
| 13:31 | 406 | 669,8 | 487,2 | 76,03 | 115,6 | 389,5 | 481,2 | 366,3 | 0,064 | 1,1 |
| 13:41 | 396 | 651,5 | 475,5 | 76,44 | 113,9 | 380,1 | 469,9 | 367,2 | 0,064 | 0,72 |
| 13:51 | 387,1 | 634,1 | 465,7 | 75,46 | 112,3 | 368,4 | 459 | 367,6 | 0,063 | 0,4 |
| 14:01 | 377,8 | 618,8 | 455,7 | 75,22 | 110,8 | 358,9 | 449,2 | 366,9 | 0,062 | 0,08 |
| 14:11 | 368,6 | 601,2 | 445,5 | 74,89 | 109,2 | 348,5 | 439 | 366,8 | 0,061 | -0,23 |

| Date: November 18th, 2013 |
|---|
| Primary air control setting: 10% opened |

| Time | FLUE : | BACK : | RIGHT SIDE : | AMBIANT : | TUNNEL : | TOP : | LEFT SIDE : | BOTTOM : | DRAFT : | Weight(Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| 15:53 | 280,2 | 482,3 | 427,5 | 70,56 | 101,2 | 332,4 | 413,3 | 443,8 | 0,044 | 55,88 |
| 16:03 | 264,9 | 428,5 | 397,6 | 70,85 | 97,47 | 319,2 | 389 | 429 | 0,051 | 21,21 |
| 16:13 | 271 | 378 | 362,7 | 72,8 | 92,56 | 318,5 | 353,1 | 409,2 | 0,052 | 20,35 |
| 16:23 | 284,1 | 346,1 | 334,4 | 72,52 | 93,01 | 323,7 | 328,2 | 394,1 | 0,053 | 19,4 |
| 16:33 | 283,4 | 325,4 | 315,5 | 72,7 | 92,11 | 320,8 | 313,4 | 375,5 | 0,053 | 18,41 |
| 16:43 | 291 | 317,4 | 309,5 | 72,83 | 92,68 | 346,1 | 307,3 | 356,5 | 0,054 | 17,44 |
| 16:53 | 273,7 | 312,8 | 310,7 | 73,4 | 91,72 | 351,3 | 301,2 | 339,6 | 0,051 | 16,63 |
| 17:03 | 307,6 | 315,3 | 312,8 | 73,26 | 93,9 | 355,9 | 304,4 | 323,2 | 0,057 | 15,65 |
| 17:13 | 300,4 | 329,3 | 325,8 | 72,93 | 94,03 | 379,2 | 316,9 | 308,7 | 0,054 | 14,73 |
| 17:23 | 308,3 | 339,4 | 336,9 | 76,17 | 94,13 | 393,3 | 325,5 | 297 | 0,057 | 13,83 |
| 17:33 | 301,7 | 347,3 | 346,5 | 80,88 | 94,62 | 398,4 | 331,7 | 287,8 | 0,055 | 13,09 |
| 17:43 | 309,5 | 352 | 350 | 78,2 | 93,46 | 398,9 | 332,7 | 277,2 | 0,054 | 12,26 |
| 17:53 | 316,4 | 359,5 | 359,2 | 78,63 | 94,73 | 412,2 | 338,9 | 270,7 | 0,057 | 11,38 |
| 18:03 | 304,9 | 364,4 | 369,5 | 79,99 | 93,79 | 415 | 344,3 | 265 | 0,055 | 10,57 |
| 18:13 | 299,3 | 368 | 372,4 | 77,63 | 92,85 | 402,5 | 352,4 | 259,4 | 0,055 | 9,86 |
| 18:23 | 298,1 | 373,4 | 374,5 | 78,48 | 92,95 | 398,8 | 360,2 | 255 | 0,053 | 9,09 |
| 18:33 | 298,3 | 380,1 | 379,6 | 80,63 | 92,99 | 398,7 | 366,9 | 250,5 | 0,053 | 8,36 |
| 18:43 | 299,8 | 388,6 | 384,9 | 77,72 | 92,46 | 401,5 | 373 | 247,2 | 0,054 | 7,63 |
| 18:53 | 294,9 | 398,5 | 391,1 | 80,84 | 93,14 | 400,4 | 381,2 | 244,6 | 0,054 | 6,94 |
| 19:03 | 291,9 | 408,9 | 395,6 | 76,25 | 91,06 | 396,5 | 385,6 | 242,4 | 0,053 | 6,29 |
| 19:13 | 284,6 | 415,9 | 397,6 | 79,36 | 91,71 | 393,5 | 390,4 | 241,3 | 0,052 | 5,79 |
| 19:23 | 265,2 | 417,9 | 396,7 | 78,73 | 89,29 | 376,1 | 389,3 | 241,1 | 0,049 | 5,4 |
| 19:33 | 252,7 | 414,7 | 392,9 | 77,43 | 88,45 | 354,2 | 385,6 | 242,6 | 0,046 | 5,11 |
| 19:43 | 238,5 | 411,3 | 388,8 | 80,84 | 88,27 | 334,2 | 382 | 245 | 0,043 | 4,83 |
| 19:53 | 227,8 | 409,4 | 384,7 | 79,31 | 86,13 | 315,7 | 375,7 | 247,5 | 0,041 | 4,63 |
| 20:03 | 220,7 | 407,5 | 381,6 | 76,84 | 84,61 | 300,5 | 369,9 | 250,8 | 0,04 | 4,43 |
| 20:13 | 214,4 | 405,4 | 380,6 | 78,33 | 85,17 | 289,3 | 362,7 | 254,3 | 0,039 | 4,24 |
| 20:23 | 209,8 | 403,1 | 380,6 | 80,83 | 85,06 | 281,4 | 354,9 | 256,1 | 0,038 | 4,05 |
| 20:33 | 205,9 | 398,2 | 377,9 | 77,38 | 83,06 | 275,3 | 347,3 | 258,2 | 0,038 | 3,88 |
| 20:43 | 204,6 | 390 | 374,5 | 76,83 | 83,51 | 269,9 | 340,3 | 261,3 | 0,038 | 3,71 |
| 20:53 | 202,8 | 387,5 | 374,1 | 80,77 | 84,36 | 266,6 | 334,4 | 262,6 | 0,037 | 3,51 |
| 21:03 | 202 | 385,5 | 372,1 | 79,09 | 83,28 | 265 | 330 | 264 | 0,037 | 3,33 |
| 21:13 | 200 | 384,1 | 369,7 | 77,1 | 82,75 | 262,3 | 327,4 | 266,6 | 0,037 | 3,19 |
| 21:23 | 196,3 | 382 | 366 | 80,96 | 84,13 | 259,2 | 324,2 | 267,9 | 0,037 | 3,03 |
| 21:33 | 193,1 | 378,5 | 359,5 | 78,95 | 82,53 | 254,7 | 319,8 | 269,1 | 0,036 | 2,87 |
| 21:43 | 192 | 375,2 | 352,7 | 76,86 | 81,97 | 250,3 | 316,3 | 271,2 | 0,035 | 2,73 |
| 21:53 | 189,2 | 372,4 | 346,7 | 80,64 | 83,07 | 246,9 | 313,5 | 271,6 | 0,034 | 2,61 |
| 22:03 | 188,3 | 372,2 | 338,7 | 76,51 | 80,91 | 243,4 | 310,6 | 271,5 | 0,034 | 2,42 |
| 22:13 | 187,2 | 375,2 | 335 | 80,96 | 83,17 | 242,8 | 310,6 | 271,8 | 0,033 | 2,28 |
| 22:23 | 186,3 | 376,8 | 330,5 | 78,66 | 81,66 | 242 | 309,6 | 271 | 0,034 | 2,13 |
| 22:33 | 186 | 372,3 | 328,6 | 78,44 | 82,52 | 241,1 | 308 | 272,5 | 0,035 | 1,99 |
| 22:43 | 184 | 369,3 | 326,1 | 79,7 | 82,08 | 239,7 | 304,5 | 273,1 | 0,033 | 1,84 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 22:53 | 183,7 | 368,7 | 322,4 | 75,21 | 80,44 | 237,5 | 302,3 | 275,2 | 0,033 | 1,68 |
| 23:03 | 181,4 | 369,3 | 320,3 | 80,2 | 82,32 | 235,3 | 301,6 | 276,2 | 0,033 | 1,55 |
| 23:13 | 180,7 | 368,5 | 316,4 | 76,65 | 80,4 | 233,2 | 300,8 | 276,2 | 0,032 | 1,38 |
| 23:23 | 179,2 | 366,4 | 315,8 | 80,33 | 82,17 | 232 | 300 | 277,2 | 0,033 | 1,28 |
| 23:33 | 177,4 | 365,4 | 310,9 | 77,27 | 80,23 | 229,1 | 297,9 | 276,7 | 0,031 | 1,11 |
| 23:43 | 176,4 | 366,8 | 308,5 | 80,42 | 81,93 | 227 | 296,4 | 276,3 | 0,031 | 1 |
| 23:53 | 175,6 | 370,3 | 305,6 | 78,04 | 80,43 | 224,4 | 293,9 | 273,2 | 0,032 | 0,83 |
| 0:03 | 175,2 | 371,6 | 305,4 | 80,65 | 81,99 | 222,8 | 292,4 | 271,4 | 0,031 | 0,71 |
| 0:13 | 173,8 | 371,8 | 302,6 | 77,93 | 80,19 | 220,3 | 289,1 | 267,4 | 0,031 | 0,54 |
| 0:23 | 173,2 | 367,1 | 301,3 | 80,63 | 81,68 | 219,4 | 289,6 | 266 | 0,031 | 0,41 |
| 0:33 | 172,5 | 361,6 | 297,8 | 78,52 | 80,41 | 217,4 | 290,4 | 264,6 | 0,031 | 0,25 |
| 0:43 | 171,7 | 354,3 | 296,2 | 80,73 | 81,71 | 217,1 | 292,8 | 266,2 | 0,031 | 0,14 |
| 0:53 | 170,7 | 347,7 | 292 | 78,23 | 80,11 | 215,8 | 294,3 | 266,7 | 0,031 | -0,02 |

| Date: November 19th, 2013 |
|---|
| Primary air control setting: 25% opened |

| Time | FLUE : | BACK : | RIGHT SIDE : | AMBIANT : | TUNNEL : | TOP : | LEFT SIDE : | BOTTOM : | DRAFT : | Weight(Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| 15:42 | 328,5 | 528,9 | 449,1 | 69,79 | 113 | 373,4 | 454,4 | 471,6 | 0,053 | 55,88 |
| 15:52 | 400,9 | 474,6 | 433,4 | 76,37 | 115,4 | 408 | 434,6 | 464,3 | 0,068 | 20,6 |
| 16:02 | 402,8 | 432,6 | 408,7 | 79,71 | 110,8 | 426,3 | 404,5 | 450,1 | 0,069 | 19,1 |
| 16:12 | 443,9 | 422,2 | 396,7 | 86,44 | 115,9 | 451,2 | 388,6 | 433,6 | 0,076 | 17,52 |
| 16:22 | 481,6 | 437 | 400,1 | 76,67 | 118,9 | 518,4 | 390 | 406,8 | 0,077 | 15,75 |
| 16:32 | 470,6 | 458,5 | 419,6 | 74,4 | 116,9 | 537,6 | 404,3 | 387,5 | 0,075 | 13,95 |
| 16:42 | 462 | 478,1 | 439,8 | 74,06 | 115,8 | 541,3 | 419,7 | 368,8 | 0,075 | 12,29 |
| 16:52 | 446,1 | 493,4 | 455,4 | 73,38 | 113,3 | 531,1 | 432,5 | 354,3 | 0,072 | 10,89 |
| 17:02 | 430,7 | 504,2 | 464,6 | 73,33 | 110,7 | 515,7 | 440,7 | 341,8 | 0,071 | 9,56 |
| 17:12 | 418,2 | 513,8 | 471,6 | 72,02 | 108,5 | 502,5 | 446,4 | 330,7 | 0,071 | 8,39 |
| 17:22 | 400,4 | 519,5 | 475,5 | 79,96 | 107,6 | 487,7 | 450 | 324,5 | 0,066 | 7,36 |
| 17:32 | 389,6 | 522,1 | 478,3 | 80,91 | 107,9 | 472,3 | 449,7 | 320 | 0,066 | 6,55 |
| 17:42 | 363,5 | 525,6 | 483,1 | 78,33 | 103,6 | 449,9 | 444,2 | 314,7 | 0,062 | 5,79 |
| 17:52 | 339,9 | 528,9 | 484,7 | 76,77 | 99,58 | 417,2 | 439,1 | 310,3 | 0,059 | 5,2 |
| 18:02 | 323,8 | 516,4 | 480,3 | 79,98 | 98,53 | 394 | 436,2 | 311,4 | 0,057 | 4,79 |
| 18:12 | 305,9 | 498,9 | 463,6 | 76,48 | 95,26 | 369,8 | 429,9 | 311,9 | 0,054 | 4,46 |
| 18:22 | 291,8 | 476,8 | 449,6 | 78,15 | 94,38 | 348,9 | 419,3 | 314,4 | 0,052 | 4,17 |
| 18:32 | 279,1 | 460,8 | 438 | 80,86 | 93,26 | 330,7 | 404,8 | 315,4 | 0,05 | 3,93 |
| 18:42 | 271,3 | 449,8 | 426,9 | 77,52 | 91,15 | 316,8 | 392,7 | 317,4 | 0,049 | 3,73 |
| 18:52 | 265 | 439,9 | 418,8 | 79,95 | 91,73 | 307,2 | 382,6 | 318,4 | 0,048 | 3,52 |
| 19:02 | 257,8 | 434,2 | 408,2 | 79,05 | 89,45 | 298,4 | 374 | 317,3 | 0,047 | 3,3 |
| 19:12 | 254,6 | 429 | 400 | 76,69 | 88,91 | 291,3 | 367,5 | 318,4 | 0,047 | 3,1 |
| 19:22 | 251 | 429,7 | 395,1 | 79,68 | 89,54 | 286,6 | 362,7 | 317,7 | 0,047 | 2,89 |
| 19:32 | 248,7 | 433,9 | 389,9 | 80,14 | 88,72 | 281,8 | 358,8 | 314,7 | 0,046 | 2,64 |
| 19:42 | 252,8 | 449,6 | 384,9 | 75,66 | 87,53 | 279,7 | 358 | 313,2 | 0,047 | 2,4 |
| 19:52 | 256,6 | 476,6 | 386,4 | 79,31 | 89,55 | 282,6 | 362,7 | 315 | 0,047 | 2,1 |
| 20:02 | 259 | 502,8 | 389,8 | 80,87 | 89,6 | 286,1 | 366,8 | 313,4 | 0,046 | 1,84 |
| 20:12 | 260,4 | 522,9 | 391,8 | 77,08 | 88,09 | 288,3 | 371,3 | 312,4 | 0,047 | 1,56 |
| 20:22 | 259,4 | 523,8 | 395,5 | 77,36 | 88,99 | 289,9 | 376,7 | 315 | 0,047 | 1,3 |
| 20:32 | 256,1 | 513,2 | 396,7 | 81,54 | 90,02 | 289 | 378,2 | 314,9 | 0,047 | 1,08 |
| 20:42 | 256,3 | 507,9 | 394,2 | 79,04 | 88,62 | 286,9 | 376,7 | 315,4 | 0,047 | 0,84 |
| 20:52 | 255,9 | 504,5 | 392,5 | 76,1 | 88,15 | 285,6 | 376,2 | 316,8 | 0,047 | 0,61 |
| 21:02 | 253,2 | 499,6 | 390,9 | 78,76 | 89,06 | 284,3 | 374,3 | 317,8 | 0,047 | 0,42 |
| 21:12 | 250,3 | 493,4 | 388,3 | 80,8 | 88,99 | 281,7 | 370,6 | 317,1 | 0,046 | 0,24 |
| 21:22 | 249,2 | 490,2 | 382,5 | 77,34 | 87,33 | 279 | 366,7 | 316,4 | 0,045 | 0,03 |
| 21:32 | 247 | 485,4 | 379,3 | 78,01 | 88,43 | 276,7 | 364,9 | 317,3 | 0,045 | -0,18 |

| Date: November 21th, 2013 |
|---|
| Primary air control setting: 10% opened |

| Time | FLUE : | BACK : | RIGHT SIDE : | AMBIANT : | TUNNEL : | TOP : | LEFT SIDE : | BOTTOM : | DRAFT : | Weight(Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| 15:44 | 301,8 | 464,3 | 412,4 | 77,82 | 106,7 | 337,6 | 405,2 | 449,8 | 0,048 | 55,88 |
| 15:54 | 288,6 | 422 | 394,5 | 84,12 | 104 | 329,3 | 392,9 | 440,2 | 0,055 | 20,63 |
| 16:04 | 290,3 | 380,1 | 365,8 | 86,45 | 97,82 | 327,1 | 365,1 | 425,2 | 0,056 | 19,82 |
| 16:14 | 288,3 | 352,7 | 342,9 | 80,55 | 95,8 | 333,4 | 336,1 | 407,6 | 0,055 | 18,94 |
| 16:24 | 298,9 | 334,4 | 326,8 | 83,3 | 96,3 | 339,8 | 319,5 | 388,6 | 0,058 | 17,99 |
| 16:34 | 316,8 | 331,7 | 322,4 | 79,69 | 96,08 | 363,6 | 318 | 369,4 | 0,06 | 17 |
| 16:44 | 325,2 | 334,6 | 330,2 | 78,6 | 97,27 | 377,6 | 323 | 351,9 | 0,061 | 16,06 |
| 16:54 | 335,3 | 344,9 | 341,2 | 81,97 | 99,26 | 394,3 | 332,3 | 336,2 | 0,061 | 15,07 |
| 17:04 | 337,8 | 355,9 | 353,2 | 81,03 | 98,59 | 405,2 | 337,6 | 322 | 0,063 | 14,07 |
| 17:14 | 339,6 | 366,5 | 363,4 | 78,55 | 99,05 | 418,9 | 345 | 308,8 | 0,062 | 13,1 |
| 17:24 | 331,6 | 370 | 374 | 82,77 | 99,2 | 417,6 | 349,7 | 295,7 | 0,061 | 12,25 |
| 17:34 | 328 | 367 | 379,2 | 79,43 | 97,34 | 409,1 | 348 | 283,8 | 0,06 | 11,4 |
| 17:44 | 330,4 | 369,7 | 383,6 | 79,8 | 97,93 | 408,6 | 353,4 | 277,1 | 0,06 | 10,56 |
| 17:54 | 332,1 | 376,5 | 388 | 82,68 | 98,32 | 409,4 | 364 | 270,4 | 0,061 | 9,7 |
| 18:04 | 341,9 | 386,6 | 393,8 | 78,37 | 98,05 | 415,7 | 375,4 | 264,5 | 0,064 | 8,78 |
| 18:14 | 345,4 | 398,1 | 402,1 | 79,95 | 99,2 | 426,5 | 385,4 | 260,5 | 0,063 | 7,9 |
| 18:24 | 335,7 | 410,7 | 410,7 | 81,36 | 98 | 427,6 | 394,9 | 257,3 | 0,061 | 7,09 |
| 18:34 | 325,1 | 424 | 417,8 | 79,61 | 96,47 | 418,5 | 402,5 | 255,8 | 0,06 | 6,43 |
| 18:44 | 313,1 | 432,2 | 423,1 | 80,98 | 95,94 | 401,4 | 407,6 | 254,3 | 0,057 | 5,86 |
| 18:54 | 294,7 | 437,3 | 424,3 | 80,15 | 93,19 | 382,8 | 409,7 | 252 | 0,054 | 5,42 |
| 19:04 | 277,7 | 441 | 420,2 | 79,39 | 91,89 | 362,1 | 407,7 | 252,1 | 0,051 | 5,08 |
| 19:14 | 263,3 | 436,6 | 414,5 | 80,98 | 91,27 | 342,3 | 403,2 | 253,2 | 0,05 | 4,79 |
| 19:24 | 254,4 | 429,5 | 408,8 | 81,61 | 89,45 | 325,2 | 396,9 | 253,1 | 0,047 | 4,52 |
| 19:34 | 248,6 | 425,1 | 403,4 | 76,96 | 87,64 | 313,2 | 393,4 | 255,4 | 0,047 | 4,25 |
| 19:44 | 244,5 | 423,7 | 401,7 | 80,56 | 88,72 | 306,2 | 389,3 | 259,6 | 0,046 | 4,01 |
| 19:54 | 240 | 423,9 | 399,6 | 82,03 | 88 | 300,5 | 384,2 | 262,7 | 0,045 | 3,77 |
| 20:04 | 236,9 | 425,8 | 396,4 | 77,92 | 86,13 | 295,6 | 380,2 | 268 | 0,045 | 3,58 |
| 20:14 | 234,7 | 426,3 | 396,2 | 79,83 | 87,3 | 293 | 377,7 | 272,3 | 0,044 | 3,3 |
| 20:24 | 232,7 | 428,5 | 394,1 | 82,78 | 87,51 | 290,3 | 375,9 | 275,1 | 0,044 | 3,12 |
| 20:34 | 230,3 | 430,4 | 391,1 | 80,51 | 86,03 | 287,3 | 374,1 | 277,2 | 0,044 | 2,9 |
| 20:44 | 229,1 | 429,7 | 387,6 | 78,04 | 85,37 | 283,9 | 371,8 | 282,1 | 0,043 | 2,73 |
| 20:54 | 228,9 | 427,8 | 385,9 | 82,66 | 87,19 | 281 | 368,9 | 284,4 | 0,044 | 2,48 |
| 21:04 | 228,2 | 422,7 | 381,9 | 80,17 | 85,56 | 279,2 | 366,4 | 286,8 | 0,043 | 2,26 |
| 21:14 | 228,2 | 419,7 | 378,3 | 77,73 | 85,46 | 278,4 | 367 | 291,2 | 0,044 | 2,06 |
| 21:24 | 226,6 | 417,8 | 374,7 | 82,57 | 86,55 | 278,1 | 366,4 | 291,7 | 0,042 | 1,87 |
| 21:34 | 224 | 414,1 | 368,9 | 79,37 | 85,01 | 275,1 | 362,2 | 291,9 | 0,042 | 1,67 |
| 21:44 | 222,3 | 411,4 | 364 | 79,07 | 85,66 | 272,2 | 360,4 | 296,3 | 0,042 | 1,53 |
| 21:54 | 217,3 | 406,8 | 358,9 | 82,13 | 85,85 | 268,6 | 356,2 | 293,8 | 0,041 | 1,35 |
| 22:04 | 213,6 | 404,8 | 352 | 78,3 | 83,92 | 263,2 | 351,2 | 294,9 | 0,04 | 1,16 |
| 22:14 | 212,8 | 403,9 | 349,6 | 80,59 | 85,42 | 259,7 | 348,1 | 292,9 | 0,041 | 0,98 |
| 22:24 | 211,1 | 408,6 | 348,4 | 80,91 | 84,8 | 257,8 | 344,7 | 290,5 | 0,04 | 0,81 |
| 22:34 | 210,4 | 408 | 346,7 | 76,98 | 83,57 | 255,9 | 342,7 | 292,9 | 0,041 | 0,67 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 22:44 | 207,6 | 400,8 | 344,8 | 81,6 | 84,84 | 254,1 | 340 | 289,4 | 0,039 | 0,5 |
| 22:54 | 204,8 | 393,8 | 338,5 | 78,94 | 83,35 | 250,4 | 336,3 | 288,3 | 0,039 | 0,33 |
| 23:04 | 201,5 | 389,2 | 335,1 | 82,06 | 84,73 | 246,7 | 331,8 | 286,4 | 0,038 | 0,19 |
| 23:14 | 200,4 | 389,1 | 331,3 | 79,71 | 83,23 | 244,1 | 325,1 | 284,7 | 0,038 | -0,01 |
| 23:24 | 200,6 | 392,8 | 331,6 | 82,28 | 84,51 | 242,4 | 322,2 | 289,3 | 0,038 | -0,13 |

| Date: November 22th, 2013 |
|---|
| Primary air control setting: 10% opened |

| Time | FLUE : | BACK : | RIGHT SIDE : | AMBIANT : | TUNNEL : | TOP : | LEFT SIDE : | BOTTOM : | DRAFT : | Weight(Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| 15:37 | 293,3 | 471,7 | 418,8 | 76,57 | 110,1 | 335,7 | 405,9 | 428,2 | 0,042 | 33,94 |
| 15:47 | 288,8 | 425,8 | 399,4 | 83,28 | 107,1 | 343,2 | 391,7 | 417,1 | 0,056 | 21,19 |
| 15:57 | 289 | 384,7 | 373,3 | 86,73 | 103 | 346,2 | 361 | 406,2 | 0,055 | 20,28 |
| 16:07 | 308,4 | 357,9 | 351,4 | 88,7 | 104,5 | 352,1 | 336 | 391,4 | 0,058 | 19,32 |
| 16:17 | 316,9 | 342 | 336,2 | 80,2 | 102,3 | 364,9 | 319,6 | 372,6 | 0,06 | 18,4 |
| 16:27 | 327 | 339,4 | 331,2 | 78,62 | 101,7 | 395,7 | 316,2 | 355,3 | 0,061 | 17,33 |
| 16:37 | 344,4 | 348,2 | 339,2 | 78,6 | 104 | 419,1 | 323,7 | 340 | 0,063 | 16,22 |
| 16:47 | 350,2 | 358,6 | 346,9 | 81,78 | 105,3 | 438,5 | 337 | 327,9 | 0,064 | 15,1 |
| 16:57 | 347,5 | 369,8 | 353,8 | 78,73 | 104,2 | 446,5 | 348,4 | 314,4 | 0,063 | 14,08 |
| 17:07 | 348,7 | 377,2 | 357,8 | 82,09 | 105,1 | 448,6 | 359,6 | 302,3 | 0,062 | 13,08 |
| 17:17 | 340 | 379,7 | 361 | 78,37 | 103,3 | 445,1 | 367,5 | 291,6 | 0,063 | 12,19 |
| 17:27 | 342,4 | 383 | 366,1 | 82,09 | 104,6 | 441,5 | 372,4 | 283,3 | 0,06 | 11,24 |
| 17:37 | 340,8 | 390,6 | 372,4 | 78,54 | 103 | 440,8 | 380,8 | 276,7 | 0,061 | 10,3 |
| 17:47 | 339,5 | 398,4 | 379 | 80,85 | 103,5 | 441,2 | 388,8 | 271,1 | 0,061 | 9,37 |
| 17:57 | 330,8 | 406,1 | 387,2 | 79,03 | 101,8 | 439,5 | 394,7 | 266,3 | 0,06 | 8,59 |
| 18:07 | 312 | 411,1 | 391,2 | 79,77 | 99,54 | 424,6 | 395,4 | 262,3 | 0,057 | 7,89 |
| 18:17 | 303,1 | 414,1 | 391,8 | 77,9 | 98,61 | 409,5 | 396,5 | 258,8 | 0,054 | 7,34 |
| 18:27 | 290,2 | 417,7 | 391,1 | 80,89 | 97,49 | 396 | 396,8 | 256,3 | 0,053 | 6,77 |
| 18:37 | 278,5 | 419,9 | 388,3 | 78,15 | 95,44 | 376,5 | 398,3 | 254,1 | 0,052 | 6,3 |
| 18:47 | 262,7 | 424,4 | 388,1 | 81,81 | 95,1 | 360 | 400,4 | 252,6 | 0,049 | 5,88 |
| 18:57 | 250,1 | 419,1 | 385,4 | 76,7 | 91,87 | 337,8 | 394,2 | 251,2 | 0,047 | 5,55 |
| 19:07 | 239,4 | 412,8 | 382,4 | 78,6 | 91,78 | 322,1 | 389 | 251,6 | 0,045 | 5,32 |
| 19:17 | 231,1 | 409,3 | 379,4 | 81,08 | 91,28 | 308,6 | 383,4 | 251,3 | 0,043 | 5,07 |
| 19:27 | 226 | 408,5 | 376,1 | 76,97 | 88,91 | 297,9 | 379,8 | 252,3 | 0,042 | 4,86 |
| 19:37 | 222,6 | 410,1 | 375,5 | 77,16 | 88,81 | 291,9 | 378,3 | 254,1 | 0,042 | 4,66 |
| 19:47 | 221,1 | 415 | 376,3 | 79,28 | 89,57 | 288,5 | 378,3 | 256,5 | 0,042 | 4,37 |
| 19:57 | 220,6 | 418,6 | 377,6 | 81,07 | 89,81 | 287,1 | 378,9 | 257,7 | 0,042 | 4,16 |
| 20:07 | 219,4 | 420,3 | 376,9 | 78,21 | 88,17 | 283,3 | 379,7 | 259,6 | 0,041 | 3,93 |
| 20:17 | 220,4 | 423 | 376,9 | 77,49 | 88,19 | 281,6 | 381,7 | 263,3 | 0,041 | 3,72 |
| 20:27 | 219,9 | 423,8 | 377,1 | 81,47 | 89,5 | 282 | 382,7 | 265,1 | 0,041 | 3,5 |
| 20:37 | 221,2 | 422,6 | 374,8 | 77,86 | 87,9 | 282,9 | 384,4 | 268,2 | 0,042 | 3,26 |
| 20:47 | 221,5 | 421,8 | 374,7 | 77,05 | 88,03 | 282,4 | 384,7 | 272,2 | 0,042 | 3,04 |
| 20:57 | 219,5 | 420,5 | 373,8 | 79,8 | 89,05 | 282,2 | 381,4 | 276,8 | 0,041 | 2,88 |
| 21:07 | 215,3 | 417,2 | 371,4 | 79,66 | 88,32 | 280,6 | 375,4 | 280,1 | 0,04 | 2,69 |
| 21:17 | 211,5 | 410,7 | 369 | 76,31 | 86,58 | 275,3 | 367,3 | 283,2 | 0,039 | 2,54 |
| 21:27 | 208,3 | 405,6 | 368,4 | 79,07 | 88 | 270,3 | 357,8 | 286,6 | 0,039 | 2,34 |
| 21:37 | 205,3 | 401,9 | 365,7 | 79,86 | 87,41 | 266,1 | 349,2 | 286,7 | 0,039 | 2,19 |
| 21:47 | 203,5 | 398 | 362,6 | 77,14 | 86,2 | 262,1 | 343 | 286,9 | 0,038 | 2,03 |
| 21:57 | 201,3 | 392,7 | 359,1 | 78,7 | 86,86 | 259,3 | 339,3 | 292,9 | 0,037 | 1,89 |
| 22:07 | 198,7 | 388,2 | 353,2 | 80,25 | 87,1 | 256,8 | 335,4 | 292,5 | 0,037 | 1,74 |
| 22:17 | 197,8 | 385,5 | 346,9 | 76,95 | 85,55 | 253,5 | 333,3 | 293,1 | 0,037 | 1,62 |
| 22:27 | 196,7 | 383,1 | 344,3 | 80,16 | 87,29 | 251,9 | 332,3 | 296,6 | 0,037 | 1,46 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 22:37 | 193,5 | 381 | 340,2 | 79,23 | 86,11 | 248,1 | 328,1 | 295,6 | 0,037 | 1,3 |
| 22:47 | 193,8 | 377,7 | 337,1 | 75,64 | 85,04 | 246,1 | 324,3 | 295,1 | 0,036 | 1,12 |
| 22:57 | 191,9 | 375,2 | 336,7 | 80,7 | 86,92 | 244,6 | 320,9 | 295,8 | 0,036 | 0,97 |
| 23:07 | 191 | 372,7 | 333,6 | 78,23 | 85,22 | 242,2 | 317,3 | 294,1 | 0,036 | 0,79 |
| 23:17 | 190 | 370,9 | 332,2 | 79,31 | 86,11 | 240,9 | 318,3 | 294 | 0,036 | 0,66 |
| 23:27 | 187,2 | 369,5 | 328,2 | 79,63 | 85,63 | 238,6 | 314,7 | 292,5 | 0,035 | 0,5 |
| 23:37 | 186,7 | 372,5 | 324,9 | 76,47 | 84,34 | 235,8 | 312,3 | 292,2 | 0,036 | 0,37 |
| 23:47 | 184,9 | 376,6 | 324,1 | 80,01 | 85,69 | 234,5 | 310,2 | 290 | 0,035 | 0,21 |
| 23:57 | 183,1 | 375,6 | 322,1 | 77,01 | 83,98 | 231,5 | 307,7 | 283,6 | 0,035 | 0,06 |
| 0:07 | 180,9 | 366,7 | 321,4 | 80,56 | 85,69 | 228,4 | 304,2 | 282,1 | 0,033 | -0,06 |

Date: 2013-10-31

Equipment: SBI-153 Temperature: 70 F
Accuracy: 0,001 R.H.: 34%
Reference: SBI-188

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,09 | % | |
| **O.M.U** | **0,41** | **%** | |
| | Ave A.D. | 0,18 | % |
| Standard | Reading | A.D. | |
| MΩ | MΩ | | |
| 1,100 | 1,098 | 0,18 | |
| | | | |
| | | | |

Engineer: Vincent Pelletier

Date: 2013-10-31

Equipment: SBI-153 Temperature: 70 F
Accuracy: 0,1 R.H.: 34%
Reference: SBI-188

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,08 | % | |
| **O.M.U** | **0,17** | **%** | |
| | Ave A.D. | 0,00 | % |
| Standard | Reading | A.D. | |
| MΩ | MΩ | | |
| 120,0 | 120,0 | 0,00 | |
| | | | |
| | | | |

Kestrel®
Weather & Environmental Meters
by NK

# Certificate of Conformity

**This instrument was produced under rigorous factory production control and documented standard procedures. It was individually visually inspected, leak tested and function tested for display, backlight, button and software performance. The accuracy of each of its primary measurements was individually calibrated and/or tested against standards traceable to the National Institute of Standards and Technology ("NIST") or calibrated intermediary standards. This instrument is certified to have performed at the time of manufacture in compliance with the following specifications as they apply to this meter's specific model, measurements and features.**

## Methods Used in Calibration and Testing

### Wind Speed:

The Kestrel Pocket Weather Meter impeller installed in this unit was individually tested in a subsonic wind tunnel operating at approximately 300 fpm (1.5 m/s) and 1200 fpm (6.1 m/s) monitored by a Gill Instruments Model 1350 ultrasonic time-of-flight anemometer. The Standard's maximum combined uncertainty is +/–1.04% within the airspeed range 706.6 to 3923.9 fpm (3.59 to 19.93 m/s), and +/–1.66% within the airspeed range 166.6 to 706.6 fpm (0.85 to 3.59 m/s).

### Temperature:

Temperature response is verified in comparison with a Eutechnics 4600 Precision Thermometer or a standard Kestrel 4000 Weather and Environmental Meter calibrated weekly against the Eutechnics 4600. The Eutechnics 4600 is calibrated annually and is traceable to NIST with a system accuracy of +/– 0.05 °C.

### Direction / Heading

The sensitivity of the magnetic directional sensor is verfied at the component level by applying a magnetic field to the sensor and measuring the signal output at 4 points, as well as after assembly by orienting the unit to the cardinal directions and measuring the magnetic field output. In both cases the compass output must be accurate to within +/– 5 degrees.

### Relative Humidity:

Relative humidity receives a two-point calibration in humidity and temperature controlled chambers at 75.3% RH and 32.8% RH at 25° C. The calibration tanks are monitored with an Edgetech Model 2002 DewPrime II Standard Chilled Mirror Hygrometer. Following calibration, performance is further verified at an RH of approximately 43.2% against the Edgetech Hygrometer. The Edgetech Hygrometer is calibrated annually and is traceable to NIST with a maximum relative expanded uncertainty of +/– 0.2% RH.

### Barometric Pressure:

Pressure response is verified against a Mensor Series 6000 Digital Barometer or a standard Kestrel 4000 Weather and Environmental Meter calibrated weekly against the Mensor Barometer. The Mensor Barometer is calibrated annually and is traceable to NIST with a maximum relative expanded uncertainty of +/– 0.02% F.S.

**Approved By:**

Michael Naughton, Engineering Manager

**The enclosed Kestrel Weather and Environmental Meter was manufactured by Nielsen-Kellerman Co. at its facilities located at 21 Creek Circle, Boothwyn, PA 19061 USA.**

| Temps (s) | Heure | FLUE : | FIREBOX BACK : | FIREBOX RIGHT SIDE : | AMBIANT : | DILUTION TUNNEL : | FIREBOX TOP : | FIREBOX LEFT SIDE : | FIREBOX BOTTOM : | DMG INLET 1 : | DMG OUTLET 1 : | PROBE TEMPERATURE 1 : | DGM OUTLET 2 : | PROBE TEMPERATURE 2 : | DGM INLET 2 : |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 11,01 | 73,25 | 70,78 | 70,79 | 68,47 | 76,81 | 70,5 | 70,21 | 70,71 | 77,74 | 77,66 | 4175,1 | 77,58 | 4175,1 | 77,48 |
| 10 | 11,01 | 73,25 | 70,78 | 70,79 | 68,47 | 76,79 | 70,48 | 70,22 | 70,7 | 77,74 | 77,66 | 4175,1 | 77,57 | 4175,1 | 77,5 |
| 20 | 11,01 | 31,53 | 70,78 | 70,8 | 68,49 | 76,75 | 70,48 | 70,21 | 70,71 | 77,74 | 77,65 | 4175,1 | 77,59 | 4175,1 | 77,49 |
| 30 | 11,01 | 31,53 | 70,78 | 70,8 | 68,49 | 76,75 | 70,48 | 70,21 | 70,71 | 77,74 | 77,65 | 4175,1 | 77,59 | 4175,1 | 77,49 |
| 40 | 11,01 | 31,35 | 70,76 | 70,79 | 68,58 | 76,66 | 70,48 | 70,22 | 70,69 | 77,76 | 77,67 | 4175,1 | 77,58 | 4175,1 | 77,48 |
| 50 | 11,02 | 31,35 | 70,76 | 70,79 | 68,58 | 76,66 | 70,48 | 70,22 | 70,69 | 77,76 | 77,67 | 4175,1 | 77,58 | 4175,1 | 77,48 |
| 60 | 11,02 | 31,35 | 70,74 | 70,77 | 68,65 | 76,6 | 70,48 | 70,19 | 70,69 | 77,74 | 77,66 | 4175,1 | 77,56 | 4175,1 | 77,5 |
| 70 | 11,02 | 31,35 | 70,74 | 70,77 | 68,65 | 76,6 | 70,48 | 70,19 | 70,69 | 77,74 | 77,66 | 4175,1 | 77,56 | 4175,1 | 77,5 |
| 80 | 11,02 | 31,35 | 70,74 | 70,77 | 68,65 | 76,6 | 70,48 | 70,19 | 70,69 | 77,74 | 77,66 | 4175,1 | 77,56 | 4175,1 | 77,5 |
| 90 | 11,02 | 31,35 | 70,77 | 70,78 | 68,8 | 76,57 | 70,49 | 70,22 | 70,7 | 77,78 | 77,7 | 4175,2 | 77,6 | 4175,2 | 77,51 |
| 100 | 11,02 | 31,35 | 70,77 | 70,78 | 68,8 | 76,57 | 70,49 | 70,22 | 70,7 | 77,78 | 77,7 | 4175,2 | 77,6 | 4175,2 | 77,51 |
| 110 | 11,03 | 31,35 | 70,77 | 70,78 | 68,8 | 76,57 | 70,49 | 70,22 | 70,7 | 77,78 | 77,7 | 4175,2 | 77,6 | 4175,2 | 77,51 |
| 120 | 11,03 | 31,35 | 70,75 | 70,76 | 68,94 | 76,54 | 70,48 | 70,21 | 70,67 | 77,77 | 77,68 | 4175,2 | 77,59 | 4175,2 | 77,51 |
| 130 | 11,03 | 31,35 | 70,75 | 70,76 | 68,94 | 76,54 | 70,48 | 70,21 | 70,67 | 77,77 | 77,68 | 4175,2 | 77,59 | 4175,2 | 77,51 |
| 140 | 11,03 | 31,35 | 70,75 | 70,76 | 68,94 | 76,54 | 70,48 | 70,21 | 70,67 | 77,77 | 77,68 | 4175,2 | 77,59 | 4175,2 | 77,51 |
| 150 | 11,03 | 69,4 | 70,75 | 70,75 | 69 | 76,51 | 70,46 | 70,22 | 70,69 | 77,78 | 77,69 | 4175,2 | 77,61 | 4175,2 | 77,5 |
| 160 | 11,03 | 69,4 | 70,75 | 70,75 | 69 | 76,51 | 70,46 | 70,22 | 70,69 | 77,78 | 77,69 | 4175,2 | 77,61 | 4175,2 | 77,5 |
| 170 | 11,04 | 69,4 | 70,75 | 70,75 | 69 | 76,51 | 70,46 | 70,22 | 70,69 | 77,78 | 77,69 | 4175,2 | 77,61 | 4175,2 | 77,5 |
| 180 | 11,04 | 69,36 | 70,75 | 70,76 | 69,27 | 76,48 | 70,48 | 70,21 | 70,68 | 77,8 | 77,69 | 4175,3 | 77,62 | 4175,3 | 77,52 |
| 190 | 11,04 | 69,36 | 70,75 | 70,76 | 69,27 | 76,48 | 70,48 | 70,21 | 70,68 | 77,8 | 77,69 | 4175,3 | 77,62 | 4175,3 | 77,52 |
| 200 | 11,04 | 149,4 | 70,75 | 70,76 | 69,35 | 76,47 | 70,47 | 70,21 | 70,65 | 77,8 | 77,7 | 4175,3 | 77,62 | 4175,3 | 77,53 |
| 210 | 11,04 | 149,4 | 70,75 | 70,76 | 69,35 | 76,47 | 70,47 | 70,21 | 70,65 | 77,8 | 77,7 | 4175,3 | 77,62 | 4175,3 | 77,53 |
| 220 | 11,04 | 149,4 | 70,75 | 70,76 | 69,35 | 76,47 | 70,47 | 70,21 | 70,65 | 77,8 | 77,7 | 4175,3 | 77,62 | 4175,3 | 77,53 |
| 230 | 11,05 | 149,4 | 70,73 | 70,72 | 69,4 | 76,43 | 70,47 | 70,22 | 70,66 | 77,81 | 77,72 | 4175,3 | 77,62 | 4175,3 | 77,55 |
| 240 | 11,05 | 149,4 | 70,73 | 70,72 | 69,4 | 76,43 | 70,47 | 70,22 | 70,66 | 77,81 | 77,72 | 4175,3 | 77,62 | 4175,3 | 77,55 |
| 250 | 11,05 | 149,4 | 70,73 | 70,72 | 69,4 | 76,43 | 70,47 | 70,22 | 70,66 | 77,81 | 77,72 | 4175,3 | 77,62 | 4175,3 | 77,55 |
| 260 | 11,05 | 299,3 | 70,73 | 70,74 | 69,62 | 76,4 | 70,47 | 70,24 | 70,66 | 77,83 | 77,74 | 4175,4 | 77,64 | 4175,4 | 77,53 |
| 270 | 11,05 | 299,3 | 70,73 | 70,74 | 69,62 | 76,4 | 70,47 | 70,24 | 70,66 | 77,83 | 77,74 | 4175,4 | 77,64 | 4175,4 | 77,53 |
| 280 | 11,05 | 299,3 | 70,73 | 70,74 | 69,62 | 76,4 | 70,47 | 70,24 | 70,66 | 77,83 | 77,74 | 4175,4 | 77,64 | 4175,4 | 77,53 |
| 290 | 11,06 | 299,4 | 70,74 | 70,74 | 69,99 | 76,4 | 70,48 | 70,24 | 70,67 | 77,82 | 77,74 | 4175,4 | 77,66 | 4175,4 | 77,56 |
| 300 | 11,06 | 499,4 | 70,73 | 70,77 | 70,08 | 76,4 | 70,5 | 70,25 | 70,68 | 77,82 | 77,74 | 4175,5 | 77,67 | 4175,5 | 77,58 |
| 310 | 11,06 | 499,4 | 70,75 | 70,75 | 70,04 | 76,41 | 70,51 | 70,27 | 70,69 | 77,86 | 77,78 | 4175,5 | 77,68 | 4175,5 | 77,6 |
| 320 | 11,06 | 749,4 | 70,71 | 70,71 | 70,08 | 76,38 | 70,49 | 70,25 | 70,65 | 77,83 | 77,75 | 4175,5 | 77,66 | 4175,5 | 77,55 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 330 | 11,06 | 749,4 | 70,75 | 70,74 | 70,1 | 76,42 | 70,51 | 70,27 | 70,67 | 77,86 | 77,79 | 4175,6 | 77,68 | 4175,6 | 77,59 |
| 340 | 11,06 | 999,5 | 70,73 | 70,74 | 70,08 | 76,41 | 70,49 | 70,26 | 70,69 | 77,83 | 77,74 | 4175,6 | 77,68 | 4175,6 | 77,57 |
| 350 | 11,07 | 999,5 | 70,7 | 70,74 | 70,05 | 76,41 | 70,5 | 70,25 | 70,67 | 77,83 | 77,75 | 4175,6 | 77,66 | 4175,6 | 77,57 |
| 360 | 11,07 | 999,5 | 70,72 | 70,76 | 70,09 | 76,41 | 70,52 | 70,25 | 70,69 | 77,82 | 77,76 | 4175,6 | 77,69 | 4175,6 | 77,59 |
| 370 | 11,07 | 1249,4 | 70,72 | 70,73 | 70,08 | 76,38 | 70,52 | 70,26 | 70,65 | 77,85 | 77,76 | 4175,6 | 77,68 | 4175,6 | 77,6 |
| 380 | 11,07 | 1249,5 | 70,75 | 70,74 | 70,06 | 76,4 | 70,51 | 70,28 | 70,7 | 77,85 | 77,79 | 4175,7 | 77,7 | 4175,7 | 77,61 |
| 390 | 11,07 | 1499,4 | 70,73 | 70,75 | 70,03 | 76,37 | 70,53 | 70,29 | 70,7 | 77,87 | 77,8 | 4175,7 | 77,71 | 4175,7 | 77,61 |
| 400 | 11,07 | 1499,4 | 70,74 | 70,75 | 70 | 76,36 | 70,52 | 70,29 | 70,67 | 77,84 | 77,76 | 4175,7 | 77,7 | 4175,7 | 77,61 |
| 410 | 11,08 | 1749,5 | 70,75 | 70,74 | 70 | 76,37 | 70,52 | 70,28 | 70,69 | 77,85 | 77,78 | 4175,7 | 77,71 | 4175,7 | 77,62 |
| 420 | 11,08 | 1749,5 | 70,75 | 70,74 | 69,99 | 76,33 | 70,52 | 70,28 | 70,67 | 77,87 | 77,79 | 4175,7 | 77,71 | 4175,7 | 77,63 |
| 430 | 11,08 | 73,66 | 70,73 | 70,73 | 69,94 | 76,34 | 70,55 | 70,28 | 70,69 | 77,84 | 77,76 | 4175,7 | 77,7 | 4175,7 | 77,61 |
| 440 | 11,08 | 70,76 | 70,74 | 70,75 | 69,94 | 76,33 | 70,52 | 70,28 | 70,67 | 77,86 | 77,78 | 4175,8 | 77,71 | 4175,8 | 77,59 |
| 450 | 11,08 | 70,68 | 70,74 | 70,74 | 69,94 | 76,33 | 70,53 | 70,29 | 70,69 | 77,87 | 77,82 | 4175,8 | 77,72 | 4175,8 | 77,64 |
| 460 | 11,08 | 70,69 | 70,75 | 70,76 | 56,64 | 76,32 | 70,54 | 70,31 | 70,7 | 77,87 | 77,8 | 4175,8 | 77,74 | 4175,8 | 77,63 |
| 470 | 11,09 | 70,6 | 70,72 | 70,75 | 71,25 | 76,28 | 70,54 | 70,28 | 70,69 | 77,85 | 77,79 | 4175,8 | 77,72 | 4175,8 | 77,65 |
| 480 | 11,09 | 70,57 | 70,74 | 70,75 | 74,15 | 76,27 | 70,52 | 70,3 | 70,68 | 77,85 | 77,78 | 4175,8 | 77,72 | 4175,8 | 77,6 |
| 490 | 11,09 | 70,54 | 70,76 | 70,78 | 31,63 | 76,27 | 70,55 | 70,31 | 70,7 | 77,9 | 77,84 | 4175,9 | 77,75 | 4175,9 | 77,66 |
| 500 | 11,09 | 70,46 | 70,75 | 70,76 | 31,75 | 76,24 | 70,53 | 70,31 | 70,71 | 77,88 | 77,8 | 4175,9 | 77,74 | 4175,9 | 77,65 |
| 510 | 11,09 | 70,39 | 70,76 | 70,77 | 74,72 | 76,22 | 70,52 | 70,3 | 70,66 | 77,89 | 77,81 | 4175,9 | 77,76 | 4175,9 | 77,66 |
| 520 | 11,09 | 70,34 | 70,76 | 70,78 | 74,79 | 76,19 | 70,53 | 70,31 | 70,7 | 77,88 | 77,81 | 4176 | 77,76 | 4176 | 77,65 |
| 530 | 11,1 | 70,28 | 70,76 | 70,77 | 149,6 | 76,19 | 70,55 | 70,3 | 70,69 | 77,89 | 77,84 | 4176 | 77,75 | 4176 | 77,66 |
| 540 | 11,1 | 70,19 | 70,75 | 70,78 | 149,7 | 76,19 | 70,54 | 70,3 | 70,69 | 77,89 | 77,82 | 4176 | 77,75 | 4176 | 77,65 |
| 550 | 11,1 | 70,1 | 70,75 | 70,76 | 299,7 | 76,15 | 70,55 | 70,31 | 70,69 | 77,92 | 77,86 | 4176,1 | 77,77 | 4176,1 | 77,69 |
| 560 | 11,1 | 70,06 | 70,77 | 70,78 | 299,6 | 76,16 | 70,55 | 70,29 | 70,7 | 77,89 | 77,83 | 4176,1 | 77,78 | 4176,1 | 77,67 |
| 570 | 11,1 | 70 | 70,77 | 70,79 | 499,9 | 76,16 | 70,57 | 70,29 | 70,71 | 77,94 | 77,86 | 4176,1 | 77,78 | 4176,1 | 77,69 |
| 580 | 11,1 | 69,93 | 70,76 | 70,78 | 499,9 | 76,12 | 70,54 | 70,3 | 70,69 | 77,93 | 77,85 | 4176,2 | 77,78 | 4176,2 | 77,67 |
| 590 | 11,1 | 69,89 | 70,76 | 70,78 | 749,5 | 76,11 | 70,53 | 70,29 | 70,69 | 77,94 | 77,88 | 4176,2 | 77,79 | 4176,2 | 77,68 |
| 600 | 11,11 | 69,84 | 70,77 | 70,79 | 749,5 | 76,11 | 70,55 | 70,3 | 70,68 | 77,92 | 77,87 | 4176,2 | 77,8 | 4176,2 | 77,71 |
| 610 | 11,11 | 69,78 | 70,76 | 70,79 | 999,5 | 76,08 | 70,54 | 70,3 | 70,7 | 77,91 | 77,85 | 4176,3 | 77,79 | 4176,3 | 77,71 |
| 620 | 11,11 | 69,71 | 70,74 | 70,81 | 999,5 | 76,1 | 70,54 | 70,3 | 70,71 | 77,92 | 77,85 | 4176,3 | 77,8 | 4176,3 | 77,73 |
| 630 | 11,11 | 69,63 | 70,77 | 70,81 | 1249,4 | 76,1 | 70,55 | 70,29 | 70,7 | 77,92 | 77,87 | 4176,3 | 77,82 | 4176,3 | 77,7 |
| 640 | 11,11 | 69,58 | 70,77 | 70,79 | 1249,7 | 76,11 | 70,54 | 70,29 | 70,7 | 77,95 | 77,88 | 4176,4 | 77,81 | 4176,4 | 77,7 |
| 650 | 11,11 | 69,53 | 70,76 | 70,79 | 1499,4 | 76,07 | 70,54 | 70,28 | 70,68 | 77,92 | 77,85 | 4176,4 | 77,8 | 4176,4 | 77,69 |
| 660 | 11,12 | 69,47 | 70,74 | 70,8 | 1499,3 | 76,08 | 70,54 | 70,3 | 70,69 | 77,94 | 77,87 | 4176,4 | 77,83 | 4176,4 | 77,7 |
| 670 | 11,12 | 69,41 | 70,73 | 70,78 | 1749,4 | 76,06 | 70,51 | 70,27 | 70,68 | 77,95 | 77,91 | 4176,4 | 77,81 | 4176,4 | 77,74 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 680 | 11,12 | 69,39 | 70,76 | 70,79 | 1749,6 | 76,05 | 70,52 | 70,29 | 70,67 | 77,95 | 77,89 | 4176,5 | 77,82 | 4176,5 | 77,73 |
| 690 | 11,12 | 69,39 | 70,74 | 70,79 | 4176,5 | 76,04 | 70,53 | 70,26 | 70,7 | 77,95 | 77,89 | 4176,5 | 77,83 | 4176,5 | 77,74 |
| 700 | 11,12 | 69,41 | 70,73 | 70,8 | 4176,6 | 4176,6 | 70,52 | 70,28 | 70,68 | 77,95 | 77,9 | 4176,6 | 77,84 | 4176,6 | 77,75 |
| 710 | 11,12 | 69,4 | 70,75 | 70,79 | 4176,6 | 31,83 | 70,52 | 70,26 | 70,68 | 77,96 | 77,9 | 4176,6 | 77,81 | 4176,6 | 77,75 |
| 720 | 11,13 | 69,44 | 70,77 | 70,83 | 4176,7 | 31,64 | 70,56 | 70,28 | 70,69 | 77,99 | 77,92 | 4176,7 | 77,85 | 4176,7 | 77,78 |
| 730 | 11,13 | 69,42 | 70,74 | 70,79 | 4176,6 | 31,65 | 70,52 | 70,24 | 70,68 | 77,97 | 77,9 | 4176,6 | 77,86 | 4176,6 | 77,74 |
| 740 | 11,13 | 69,44 | 70,73 | 70,78 | 4176,7 | 74,74 | 70,53 | 70,25 | 70,69 | 77,96 | 77,91 | 4176,7 | 77,84 | 4176,7 | 77,76 |
| 750 | 11,13 | 69,44 | 70,75 | 70,82 | 4176,7 | 74,76 | 70,51 | 70,26 | 70,68 | 77,98 | 77,91 | 4176,7 | 77,87 | 4176,7 | 77,76 |
| 760 | 11,13 | 69,46 | 70,74 | 70,79 | 4176,7 | 149,6 | 70,51 | 70,26 | 70,67 | 77,99 | 77,94 | 4176,7 | 77,86 | 4176,7 | 77,78 |
| 770 | 11,13 | 69,49 | 70,74 | 70,78 | 4176,8 | 149,7 | 70,49 | 70,26 | 70,69 | 78 | 77,94 | 4176,8 | 77,88 | 4176,8 | 77,8 |
| 780 | 11,14 | 69,53 | 70,74 | 70,81 | 4176,8 | 299,7 | 70,51 | 70,26 | 70,66 | 78,01 | 77,93 | 4176,8 | 77,88 | 4176,8 | 77,79 |
| 790 | 11,14 | 69,57 | 70,74 | 70,77 | 4176,8 | 299,7 | 70,5 | 70,27 | 70,68 | 77,99 | 77,95 | 4176,8 | 77,87 | 4176,8 | 77,8 |
| 800 | 11,14 | 69,62 | 70,74 | 70,8 | 4176,9 | 499,8 | 70,51 | 70,28 | 70,7 | 78,01 | 77,95 | 4176,9 | 77,9 | 4176,9 | 77,79 |
| 810 | 11,14 | 69,62 | 70,71 | 70,78 | 4176,9 | 499,8 | 70,49 | 70,25 | 70,67 | 77,99 | 77,92 | 4176,9 | 77,87 | 4176,9 | 77,76 |
| 820 | 11,14 | 69,67 | 70,76 | 70,81 | 4177 | 749,7 | 70,49 | 70,26 | 70,67 | 78,02 | 77,97 | 4177 | 77,9 | 4177 | 77,8 |
| 830 | 11,14 | 69,7 | 70,74 | 70,82 | 4177 | 749,7 | 70,49 | 70,27 | 70,69 | 78,02 | 77,97 | 4177 | 77,91 | 4177 | 77,81 |
| 840 | 11,15 | 69,74 | 70,74 | 70,8 | 4177 | 999,9 | 70,51 | 70,28 | 70,68 | 78,03 | 77,98 | 4177 | 77,91 | 4177 | 77,84 |
| 850 | 11,15 | 69,76 | 70,72 | 70,79 | 4177,1 | 999,9 | 70,5 | 70,26 | 70,69 | 78,01 | 77,98 | 4177,1 | 77,9 | 4177,1 | 77,82 |
| 860 | 11,15 | 69,81 | 70,75 | 70,81 | 4177,1 | 1249,9 | 70,51 | 70,27 | 70,7 | 78,06 | 77,95 | 4177,1 | 77,94 | 4177,1 | 77,82 |
| 870 | 11,15 | 69,84 | 70,72 | 70,79 | 4177,1 | 1249,9 | 70,5 | 70,28 | 70,69 | 78,02 | 77,96 | 4177,1 | 77,94 | 4177,1 | 77,84 |
| 880 | 11,15 | 69,86 | 70,74 | 70,78 | 4177,2 | 1499,8 | 70,5 | 70,28 | 70,71 | 78,03 | 77,98 | 4177,2 | 77,92 | 4177,2 | 77,84 |
| 890 | 11,15 | 69,91 | 70,75 | 70,8 | 4177,2 | 1499,8 | 70,48 | 70,27 | 70,7 | 78,06 | 78 | 4177,2 | 77,93 | 4177,2 | 77,83 |
| 900 | 11,16 | 69,96 | 70,72 | 70,77 | 4177,2 | 1750 | 70,48 | 70,3 | 70,68 | 78,05 | 78,02 | 4177,2 | 77,94 | 4177,2 | 77,85 |
| 910 | 11,16 | 69,99 | 70,74 | 70,79 | 4177,3 | 1749,9 | 70,49 | 70,3 | 70,72 | 78,06 | 77,98 | 4177,3 | 77,95 | 4177,3 | 77,84 |
| 920 | 11,16 | 70,03 | 70,76 | 70,81 | 4177,4 | 4177,4 | 70,48 | 70,3 | 70,7 | 78,07 | 78,03 | 4177,4 | 77,96 | 4177,4 | 77,78 |
| 930 | 11,16 | 70,03 | 70,72 | 70,76 | 4177,3 | 75,94 | 70,46 | 70,28 | 70,68 | 78,05 | 78 | 4177,3 | 77,94 | 4177,3 | 77,84 |
| 940 | 11,16 | 70,09 | 70,74 | 70,8 | 4177,4 | 76,03 | 70,49 | 70,3 | 70,7 | 78,06 | 78,03 | 4177,4 | 77,96 | 4177,4 | 77,87 |
| 950 | 11,16 | 70,08 | 70,72 | 70,79 | 69,6 | 75,97 | 70,47 | 70,28 | 70,67 | 78,05 | 78,01 | 4177,4 | 77,94 | 4177,4 | 77,85 |
| 960 | 11,17 | 70,14 | 70,72 | 70,78 | 70,08 | 76 | 70,48 | 70,31 | 70,69 | 78,12 | 78,05 | 4177,5 | 77,98 | 4177,5 | 77,88 |
| 970 | 11,17 | 70 | 70,73 | 70,78 | 70,13 | 76,04 | 70,39 | 70,31 | 70,69 | 78,11 | 78,05 | 4177,5 | 77,97 | 4177,5 | 77,88 |
| 980 | 11,17 | 70,09 | 70,72 | 70,77 | 70,19 | 76,04 | 2246,3 | 70,28 | 70,68 | 78,08 | 78,03 | 4177,5 | 77,96 | 4177,5 | 77,86 |
| 990 | 11,17 | 70,24 | 70,72 | 70,78 | 70 | 76,06 | 31,53 | 70,3 | 70,69 | 78,08 | 78,02 | 4177,6 | 77,99 | 4177,6 | 77,87 |
| 1000 | 11,17 | 70,26 | 70,74 | 70,75 | 70,02 | 76,06 | 31,49 | 70,3 | 70,69 | 78,12 | 78,06 | 4177,6 | 77,98 | 4177,6 | 77,89 |
| 1010 | 11,17 | 70,27 | 70,71 | 70,78 | 70,04 | 76,04 | 74,5 | 70,3 | 70,66 | 78,07 | 78,02 | 4177,6 | 77,96 | 4177,6 | 77,85 |
| 1020 | 11,17 | 70,3 | 70,7 | 70,77 | 70,15 | 76,04 | 74,51 | 70,28 | 70,69 | 78,08 | 78,02 | 4177,7 | 77,97 | 4177,7 | 77,88 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1030 | 11,18 | 70,35 | 70,73 | 70,76 | 70,37 | 76,07 | 149,5 | 70,31 | 70,71 | 78,08 | 78,03 | 4177,7 | 78 | 4177,7 | 77,89 |
| 1040 | 11,18 | 70,37 | 70,73 | 70,79 | 70,4 | 76,06 | 149,5 | 70,31 | 70,69 | 78,1 | 78,05 | 4177,8 | 78,01 | 4177,8 | 77,9 |
| 1050 | 11,18 | 70,43 | 70,73 | 70,76 | 70,41 | 76,1 | 294,6 | 70,33 | 70,69 | 78,13 | 78,08 | 4177,8 | 78,01 | 4177,8 | 77,92 |
| 1060 | 11,18 | 70,44 | 70,75 | 70,78 | 70,5 | 76,11 | 299,5 | 70,33 | 70,69 | 78,13 | 78,07 | 4177,9 | 78,01 | 4177,9 | 77,91 |
| 1070 | 11,18 | 70,48 | 70,75 | 70,79 | 70,66 | 76,1 | 299,5 | 70,32 | 70,7 | 78,12 | 78,07 | 4177,9 | 78,02 | 4177,9 | 77,92 |
| 1080 | 11,18 | 70,53 | 70,77 | 70,79 | 70,8 | 76,15 | 499,6 | 70,35 | 70,72 | 78,13 | 78,1 | 4178 | 78,05 | 4178 | 77,95 |
| 1090 | 11,19 | 70,54 | 70,73 | 70,78 | 70,71 | 76,12 | 749,5 | 70,31 | 70,69 | 78,13 | 78,07 | 4178 | 78,02 | 4178 | 77,92 |
| 1100 | 11,19 | 70,6 | 70,76 | 70,79 | 70,58 | 76,15 | 749,5 | 70,37 | 70,7 | 78,14 | 78,09 | 4178 | 78,04 | 4178 | 77,93 |
| 1110 | 11,19 | 70,6 | 70,73 | 70,8 | 70,53 | 76,14 | 999,6 | 70,34 | 70,7 | 78,12 | 78,06 | 4178 | 78,03 | 4178 | 77,91 |
| 1120 | 11,19 | 70,6 | 70,77 | 70,8 | 70,53 | 76,17 | 999,6 | 70,35 | 70,72 | 78,15 | 78,12 | 4178,1 | 78,06 | 4178,1 | 77,96 |
| 1130 | 11,19 | 70,61 | 70,75 | 70,8 | 70,38 | 76,14 | 1249,5 | 70,35 | 70,73 | 78,14 | 78,08 | 4178,1 | 78,03 | 4178,1 | 77,93 |
| 1140 | 11,19 | 70,59 | 70,74 | 70,8 | 70,26 | 76,15 | 1249,6 | 70,37 | 70,72 | 78,14 | 78,09 | 4178,2 | 78,04 | 4178,2 | 77,93 |
| 1150 | 11,2 | 70,59 | 70,76 | 70,8 | 70,14 | 76,16 | 1499,5 | 70,36 | 70,7 | 78,16 | 78,1 | 4178,2 | 78,05 | 4178,2 | 77,95 |
| 1160 | 11,2 | 70,57 | 70,75 | 70,79 | 70,03 | 76,16 | 1499,6 | 70,36 | 70,72 | 78,14 | 78,09 | 4178,3 | 78,06 | 4178,3 | 77,95 |
| 1170 | 11,2 | 70,52 | 70,76 | 70,8 | 69,93 | 76,11 | 1499,5 | 70,36 | 70,7 | 78,15 | 78,12 | 4178,3 | 78,04 | 4178,3 | 77,96 |
| 1180 | 11,2 | 70,55 | 70,77 | 70,8 | 69,85 | 76,14 | 1749,6 | 70,39 | 70,73 | 78,17 | 78,13 | 4178,3 | 78,07 | 4178,3 | 77,99 |
| 1190 | 11,2 | 70,51 | 70,77 | 70,78 | 69,73 | 76,1 | 1749,6 | 70,37 | 70,73 | 78,16 | 78,12 | 4178,4 | 78,05 | 4178,4 | 77,98 |
| 1200 | 11,2 | 70,46 | 70,78 | 70,78 | 69,46 | 76,09 | 31,6 | 70,37 | 70,72 | 78,17 | 78,13 | 4178,4 | 78,07 | 4178,4 | 77,98 |
| 1210 | 11,21 | 70,25 | 4178,4 | 70,86 | 69,28 | 76,07 | 70,19 | 70,38 | 70,69 | 78,16 | 78,1 | 4178,4 | 78,08 | 4178,4 | 77,97 |
| 1220 | 11,21 | 70,28 | 50,01 | 70,8 | 69,25 | 76,07 | 70,49 | 70,37 | 70,71 | 78,18 | 78,14 | 4178,5 | 78,08 | 4178,5 | 77,99 |
| 1230 | 11,21 | 70,32 | 71,59 | 70,8 | 69,2 | 76,07 | 70,52 | 70,39 | 70,73 | 78,19 | 78,16 | 4178,5 | 78,08 | 4178,5 | 77,99 |
| 1240 | 11,21 | 70,24 | 31,42 | 70,79 | 69,14 | 76,03 | 70,52 | 70,35 | 70,71 | 78,16 | 78,11 | 4178,5 | 78,07 | 4178,5 | 77,98 |
| 1250 | 11,21 | 70,21 | 73,81 | 70,79 | 69,04 | 76,07 | 70,55 | 70,36 | 70,71 | 78,18 | 78,13 | 4178,6 | 78,1 | 4178,6 | 78 |
| 1260 | 11,21 | 70,19 | 73,74 | 70,83 | 68,94 | 76,05 | 70,55 | 70,41 | 70,75 | 78,19 | 78,15 | 4178,7 | 78,11 | 4178,7 | 77,99 |
| 1270 | 11,22 | 70,1 | 75,41 | 70,8 | 68,95 | 76,02 | 70,52 | 70,37 | 70,73 | 78,18 | 78,14 | 4178,7 | 78,08 | 4178,7 | 78 |
| 1280 | 11,22 | 70,07 | 81,89 | 70,81 | 68,87 | 76,02 | 70,54 | 70,38 | 70,73 | 78,19 | 78,15 | 4178,7 | 78,1 | 4178,7 | 77,99 |
| 1290 | 11,22 | 70,04 | 79,05 | 70,83 | 68,73 | 76,01 | 70,55 | 70,38 | 70,75 | 78,21 | 78,13 | 4178,8 | 78,11 | 4178,8 | 78,03 |
| 1300 | 11,22 | 70 | 74,61 | 70,82 | 68,62 | 76 | 70,53 | 70,39 | 70,72 | 78,21 | 78,16 | 4178,8 | 78,13 | 4178,8 | 78,02 |
| 1310 | 11,22 | 69,85 | 74,66 | 70,82 | 68,57 | 75,98 | 70,53 | 70,37 | 70,71 | 78,21 | 78,17 | 4178,8 | 78,1 | 4178,8 | 78,02 |
| 1320 | 11,22 | 69,86 | 74,18 | 70,8 | 67,91 | 76 | 70,52 | 70,37 | 70,73 | 78,22 | 78,16 | 4178,9 | 78,12 | 4178,9 | 78,04 |
| 1330 | 11,23 | 69,85 | 73,97 | 70,78 | 67,69 | 75,98 | 70,47 | 70,36 | 70,72 | 78,21 | 78,18 | 4178,9 | 78,11 | 4178,9 | 78,02 |
| 1340 | 11,23 | 69,66 | 73,77 | 70,81 | 67,78 | 75,99 | 70,52 | 70,36 | 70,72 | 78,24 | 78,2 | 4179 | 78,13 | 4179 | 78,04 |
| 1350 | 11,23 | 69,66 | 73,56 | 70,84 | 67,99 | 75,94 | 70,52 | 70,39 | 70,74 | 78,23 | 78,17 | 4179 | 78,13 | 4179 | 78,02 |
| 1360 | 11,23 | 69,63 | 73,43 | 70,82 | 67,73 | 75,91 | 70,51 | 70,36 | 70,71 | 78,2 | 78,17 | 4179 | 78,12 | 4179 | 78,02 |
| 1370 | 11,23 | 69,69 | 73,55 | 70,83 | 67,05 | 75,9 | 70,54 | 70,38 | 70,74 | 78,23 | 78,2 | 4179,1 | 78,14 | 4179,1 | 78,04 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1380 | 11,23 | 69,94 | 73,41 | 70,84 | 67,21 | 75,92 | 70,54 | 70,36 | 70,74 | 78,24 | 78,19 | 4179,1 | 78,16 | 4179,1 | 78,05 |
| 1390 | 11,24 | 69,87 | 73,31 | 70,84 | 67,48 | 75,99 | 70,54 | 70,36 | 70,73 | 78,24 | 78,19 | 4179,2 | 78,15 | 4179,2 | 78,05 |
| 1400 | 11,24 | 69,83 | 73,32 | 70,84 | 67,74 | 76,1 | 70,51 | 70,36 | 70,72 | 78,26 | 78,2 | 4179,2 | 78,16 | 4179,2 | 78,04 |
| 1410 | 11,24 | 69,76 | 73,28 | 70,81 | 68,02 | 76,08 | 70,5 | 70,33 | 70,71 | 78,22 | 78,19 | 4179,2 | 78,14 | 4179,2 | 78,05 |
| 1420 | 11,24 | 69,74 | 73,32 | 70,82 | 68,24 | 76,08 | 70,5 | 70,35 | 70,71 | 78,25 | 78,19 | 4179,3 | 78,16 | 4179,3 | 78,05 |
| 1430 | 11,24 | 69,72 | 73,33 | 70,85 | 68,45 | 76,06 | 70,53 | 70,35 | 70,73 | 78,25 | 78,22 | 4179,3 | 78,16 | 4179,3 | 78,05 |
| 1440 | 11,24 | 69,71 | 75,11 | 70,81 | 68,47 | 76,02 | 70,51 | 70,33 | 70,72 | 78,24 | 78,18 | 4179,4 | 78,16 | 4179,4 | 78,04 |
| 1450 | 11,24 | 69,73 | 73,71 | 70,87 | 68,59 | 76,01 | 70,49 | 70,37 | 70,73 | 78,25 | 78,21 | 4179,4 | 78,19 | 4179,4 | 78,06 |
| 1460 | 11,25 | 69,72 | 73,63 | 70,84 | 68,77 | 76 | 70,52 | 70,34 | 70,73 | 78,27 | 78,21 | 4179,5 | 78,19 | 4179,5 | 78,05 |
| 1470 | 11,25 | 69,77 | 4179,5 | 70,82 | 68,84 | 75,98 | 70,46 | 70,35 | 70,73 | 78,28 | 78,25 | 4179,5 | 78,17 | 4179,5 | 78,09 |
| 1480 | 11,25 | 70,05 | 70,75 | 70,8 | 68,96 | 75,99 | 70,56 | 70,34 | 70,72 | 78,27 | 78,22 | 4179,5 | 78,16 | 4179,5 | 78,08 |
| 1490 | 11,25 | 70,15 | 70,79 | 70,82 | 69,03 | 75,95 | 70,5 | 70,33 | 70,7 | 78,26 | 78,22 | 4179,6 | 78,17 | 4179,6 | 78,06 |
| 1500 | 11,25 | 69,97 | 4179,7 | 70,85 | 69,15 | 75,98 | 70,51 | 70,36 | 70,78 | 78,27 | 78,23 | 4179,7 | 78,21 | 4179,7 | 78,08 |
| 1510 | 11,25 | 69,9 | 73,59 | 70,81 | 69,18 | 75,97 | 70,48 | 70,35 | 70,71 | 78,27 | 78,23 | 4179,7 | 78,17 | 4179,7 | 78,08 |
| 1520 | 11,26 | 69,81 | 4179,7 | 70,8 | 69,25 | 75,97 | 70,58 | 70,35 | 70,74 | 78,31 | 78,26 | 4179,7 | 78,19 | 4179,7 | 78,11 |
| 1530 | 11,26 | 69,87 | 4179,8 | 70,82 | 69,32 | 75,95 | 70,47 | 70,33 | 70,71 | 78,28 | 78,24 | 4179,8 | 78,21 | 4179,8 | 78,1 |
| 1540 | 11,26 | 69,94 | 4179,8 | 70,83 | 69,35 | 75,96 | 70,47 | 70,35 | 70,72 | 78,29 | 78,25 | 4179,8 | 78,21 | 4179,8 | 78,1 |
| 1550 | 11,26 | 69,93 | 4179,8 | 70,81 | 69,48 | 75,96 | 70,46 | 70,34 | 70,71 | 78,26 | 78,23 | 4179,8 | 78,2 | 4179,8 | 78,08 |
| 1560 | 11,26 | 69,99 | 4179,9 | 70,83 | 69,68 | 76 | 70,47 | 70,34 | 70,72 | 78,29 | 78,23 | 4179,9 | 78,22 | 4179,9 | 78,1 |
| 1570 | 11,26 | 69,82 | 4179,9 | 70,81 | 69,82 | 76,03 | 70,47 | 70,35 | 70,72 | 78,29 | 78,25 | 4179,9 | 78,22 | 4179,9 | 78,11 |
| 1580 | 11,27 | 70,01 | 4180 | 70,81 | 69,85 | 76,06 | 70,45 | 70,36 | 70,71 | 78,32 | 78,27 | 4180 | 78,21 | 4180 | 78,14 |
| 1590 | 11,27 | 70,09 | 4180 | 70,83 | 70,03 | 76,05 | 70,47 | 70,36 | 70,71 | 78,31 | 78,28 | 4180 | 78,23 | 4180 | 78,13 |
| 1600 | 11,27 | 70,1 | 4180 | 70,8 | 70,14 | 76,06 | 70,46 | 70,35 | 70,7 | 78,31 | 78,27 | 4180 | 78,2 | 4180 | 78,12 |
| 1610 | 11,27 | 70,16 | 4180,1 | 70,81 | 70,09 | 76,07 | 70,46 | 70,35 | 70,7 | 78,3 | 78,27 | 4180,1 | 78,23 | 4180,1 | 78,1 |
| 1620 | 11,27 | 70,21 | 4180,1 | 70,8 | 70,09 | 76,1 | 70,46 | 70,36 | 70,71 | 78,31 | 78,29 | 4180,1 | 78,24 | 4180,1 | 78,14 |
| 1630 | 11,27 | 70,24 | 4180,2 | 70,82 | 70,32 | 76,09 | 70,46 | 70,36 | 70,73 | 78,3 | 78,28 | 4180,2 | 78,23 | 4180,2 | 78,15 |
| 1640 | 11,28 | 70,28 | 4180,2 | 70,81 | 70,3 | 76,09 | 70,46 | 70,38 | 70,72 | 78,29 | 78,27 | 4180,2 | 78,24 | 4180,2 | 78,11 |
| 1650 | 11,28 | 70,27 | 4180,2 | 70,79 | 70,45 | 76,11 | 70,45 | 70,37 | 70,71 | 78,31 | 78,26 | 4180,2 | 78,24 | 4180,2 | 78,12 |
| 1660 | 11,28 | 70,31 | 4180,3 | 70,81 | 70,44 | 76,13 | 70,48 | 70,38 | 70,71 | 78,31 | 78,26 | 4180,3 | 78,25 | 4180,3 | 78,13 |
| 1670 | 11,28 | 70,35 | 4180,3 | 70,79 | 70,39 | 76,13 | 70,46 | 70,37 | 70,72 | 78,31 | 78,28 | 4180,3 | 78,24 | 4180,3 | 78,14 |
| 1680 | 11,28 | 70,37 | 4180,4 | 70,82 | 70,55 | 76,17 | 70,48 | 70,4 | 70,72 | 78,34 | 78,3 | 4180,4 | 78,25 | 4180,4 | 78,14 |
| 1690 | 11,28 | 70,42 | 4180,4 | 70,81 | 70,62 | 76,19 | 70,47 | 70,38 | 70,73 | 78,32 | 78,28 | 4180,4 | 78,26 | 4180,4 | 78,16 |
| 1700 | 11,29 | 70,41 | 4180,4 | 70,78 | 70,63 | 76,16 | 70,46 | 70,37 | 70,69 | 78,31 | 78,28 | 4180,4 | 78,24 | 4180,4 | 78,15 |
| 1710 | 11,29 | 70,49 | 4180,5 | 70,81 | 70,85 | 76,21 | 70,46 | 70,4 | 70,73 | 78,31 | 78,29 | 4180,5 | 78,27 | 4180,5 | 78,17 |
| 1720 | 11,29 | 70,53 | 4180,5 | 70,8 | 70,67 | 76,2 | 70,48 | 70,4 | 70,71 | 78,35 | 78,29 | 4180,5 | 78,25 | 4180,5 | 78,18 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1730 | 11,29 | 70,52 | 4180,5 | 70,79 | 70,55 | 76,2 | 70,45 | 70,39 | 70,7 | 78,33 | 78,3 | 4180,5 | 78,25 | 4180,5 | 78,16 |
| 1740 | 11,29 | 70,57 | 4180,6 | 70,83 | 70,66 | 76,25 | 70,48 | 70,41 | 70,75 | 78,33 | 78,3 | 4180,6 | 78,3 | 4180,6 | 78,2 |
| 1750 | 11,29 | 70,56 | 4180,6 | 70,81 | 70,48 | 76,23 | 70,47 | 70,41 | 70,72 | 78,33 | 78,3 | 4180,6 | 78,27 | 4180,6 | 78,16 |
| 1760 | 11,3 | 70,57 | 4180,6 | 70,81 | 70,5 | 76,22 | 70,47 | 70,42 | 70,73 | 78,36 | 78,33 | 4180,6 | 78,28 | 4180,6 | 78,19 |
| 1770 | 11,3 | 70,57 | 4180,7 | 70,8 | 70,44 | 76,22 | 70,48 | 70,41 | 70,72 | 78,36 | 78,32 | 4180,7 | 78,26 | 4180,7 | 78,2 |
| 1780 | 11,3 | 70,55 | 4180,7 | 70,81 | 70,37 | 76,25 | 70,48 | 70,41 | 70,72 | 78,34 | 78,32 | 4180,7 | 78,28 | 4180,7 | 78,19 |
| 1790 | 11,3 | 70,55 | 4180,8 | 70,81 | 70,24 | 76,25 | 70,49 | 70,41 | 70,73 | 78,37 | 78,35 | 4180,8 | 78,27 | 4180,8 | 78,2 |
| 1800 | 11,3 | 70,53 | 32,08 | 70,74 | 70,07 | 76,24 | 70,6 | 70,38 | 70,68 | 78,34 | 78,31 | 4180,8 | 78,31 | 4180,8 | 78,18 |
| 1810 | 11,3 | 70,51 | 32,02 | 70,82 | 69,93 | 76,24 | 70,52 | 70,4 | 70,71 | 78,37 | 78,36 | 4180,8 | 78,29 | 4180,8 | 78,2 |
| 1820 | 11,31 | 70,47 | 74,97 | 70,82 | 69,82 | 76,26 | 70,5 | 70,4 | 70,71 | 78,35 | 78,33 | 4180,9 | 78,32 | 4180,9 | 78,19 |
| 1830 | 11,31 | 70,44 | 74,97 | 70,81 | 69,77 | 76,25 | 70,5 | 70,4 | 70,71 | 78,36 | 78,34 | 4180,9 | 78,28 | 4180,9 | 78,21 |
| 1840 | 11,31 | 70,42 | 149,8 | 70,81 | 69,47 | 76,25 | 70,5 | 70,42 | 70,73 | 78,36 | 78,29 | 4180,9 | 78,29 | 4180,9 | 78,18 |
| 1850 | 11,31 | 70,39 | 149,8 | 70,81 | 69,43 | 76,24 | 70,51 | 70,41 | 70,72 | 78,37 | 78,33 | 4181 | 78,31 | 4181 | 78,2 |
| 1860 | 11,31 | 70,37 | 299,8 | 70,83 | 69,44 | 76,23 | 70,54 | 70,44 | 70,75 | 78,36 | 78,36 | 4181,1 | 78,34 | 4181,1 | 78,21 |
| 1870 | 11,31 | 70,3 | 299,8 | 70,83 | 69,25 | 76,21 | 70,51 | 70,41 | 70,71 | 78,39 | 78,35 | 4181 | 78,29 | 4181 | 78,21 |
| 1880 | 11,31 | 70,24 | 499,8 | 70,8 | 69,06 | 76,2 | 70,5 | 70,41 | 70,73 | 78,37 | 78,36 | 4181,1 | 78,3 | 4181,1 | 78,21 |
| 1890 | 11,32 | 70,23 | 499,8 | 70,8 | 69,14 | 76,2 | 70,52 | 70,41 | 70,74 | 78,39 | 78,37 | 4181,1 | 78,31 | 4181,1 | 78,22 |
| 1900 | 11,32 | 70,17 | 749,6 | 70,82 | 69,01 | 76,23 | 70,52 | 70,42 | 70,75 | 78,36 | 78,34 | 4181,2 | 78,31 | 4181,2 | 78,22 |
| 1910 | 11,32 | 70,12 | 749,7 | 70,85 | 68,98 | 76,25 | 70,54 | 70,44 | 70,73 | 78,4 | 78,39 | 4181,2 | 78,34 | 4181,2 | 78,24 |
| 1920 | 11,32 | 70,08 | 999,7 | 70,85 | 68,92 | 76,23 | 70,51 | 70,41 | 70,7 | 78,35 | 78,33 | 4181,2 | 78,31 | 4181,2 | 78,21 |
| 1930 | 11,32 | 70,06 | 999,8 | 70,84 | 68,65 | 76,25 | 70,54 | 70,42 | 70,74 | 78,4 | 78,38 | 4181,3 | 78,34 | 4181,3 | 78,25 |
| 1940 | 11,32 | 69,98 | 999,8 | 70,83 | 68,33 | 76,24 | 70,51 | 70,4 | 70,71 | 78,36 | 78,33 | 4181,3 | 78,32 | 4181,3 | 78,23 |
| 1950 | 11,33 | 69,93 | 1249,7 | 70,84 | 68,46 | 76,23 | 70,53 | 70,41 | 70,74 | 78,4 | 78,39 | 4181,4 | 78,33 | 4181,4 | 78,24 |
| 1960 | 11,33 | 69,87 | 1249,6 | 70,84 | 68,56 | 76,25 | 70,51 | 70,4 | 70,71 | 78,38 | 78,33 | 4181,4 | 78,34 | 4181,4 | 78,22 |
| 1970 | 11,33 | 69,84 | 1499,6 | 70,86 | 68,24 | 76,26 | 70,54 | 70,42 | 70,75 | 78,43 | 78,4 | 4181,5 | 78,35 | 4181,5 | 78,27 |
| 1980 | 11,33 | 69,77 | 1499,7 | 70,85 | 67,61 | 76,26 | 70,54 | 70,42 | 70,74 | 78,42 | 78,38 | 4181,5 | 78,35 | 4181,5 | 78,26 |
| 1990 | 11,33 | 69,7 | 1749,7 | 70,85 | 67,77 | 76,23 | 70,53 | 70,39 | 70,72 | 78,43 | 78,37 | 4181,5 | 78,32 | 4181,5 | 78,24 |
| 2000 | 11,33 | 69,67 | 1749,7 | 70,87 | 68,06 | 76,24 | 70,52 | 70,39 | 70,71 | 78,42 | 78,41 | 4181,6 | 78,36 | 4181,6 | 78,26 |
| 2010 | 11,34 | 69,64 | 4181,6 | 71,06 | 67,4 | 76,27 | 70,72 | 70,51 | 70,86 | 78,42 | 78,38 | 4181,6 | 78,34 | 4181,6 | 78,28 |
| 2020 | 11,34 | 69,33 | 70,74 | 4181,6 | 67,44 | 76,24 | 70,59 | 70,39 | 70,91 | 78,42 | 78,39 | 4181,6 | 78,34 | 4181,6 | 78,25 |
| 2030 | 11,34 | 69,69 | 70,79 | 1749,5 | 66,96 | 76,22 | 70,54 | 70,38 | 70,72 | 78,43 | 78,42 | 4181,7 | 78,37 | 4181,7 | 78,26 |
| 2040 | 11,34 | 69,43 | 70,78 | 31,38 | 66,49 | 76,22 | 70,52 | 70,36 | 70,71 | 78,43 | 78,41 | 4181,7 | 78,37 | 4181,7 | 78,28 |
| 2050 | 11,34 | 69,42 | 70,78 | 31,37 | 66,39 | 76,22 | 70,53 | 70,36 | 70,71 | 78,43 | 78,42 | 4181,7 | 78,36 | 4181,7 | 78,27 |
| 2060 | 11,34 | 69,29 | 70,76 | 74,44 | 66,68 | 76,24 | 70,52 | 70,35 | 70,72 | 78,39 | 78,36 | 4181,7 | 78,36 | 4181,7 | 78,24 |
| 2070 | 11,35 | 69,31 | 70,78 | 74,43 | 67,21 | 76,22 | 70,53 | 70,36 | 70,7 | 78,43 | 78,42 | 4181,8 | 78,37 | 4181,8 | 78,28 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2080 | 11,35 | 69,34 | 70,76 | 149,4 | 67,75 | 76,23 | 70,54 | 70,37 | 70,71 | 78,43 | 78,4 | 4181,8 | 78,37 | 4181,8 | 78,28 |
| 2090 | 11,35 | 69,31 | 70,77 | 149,4 | 68,03 | 76,23 | 70,53 | 70,36 | 70,7 | 78,41 | 78,39 | 4181,9 | 78,39 | 4181,9 | 78,26 |
| 2100 | 11,35 | 69,4 | 70,79 | 299,4 | 68,14 | 76,25 | 70,55 | 70,39 | 70,73 | 78,43 | 78,41 | 4182 | 78,41 | 4182 | 78,29 |
| 2110 | 11,35 | 69,39 | 70,73 | 299,4 | 68,2 | 76,19 | 70,52 | 70,34 | 70,69 | 78,43 | 78,42 | 4181,9 | 78,35 | 4181,9 | 78,27 |
| 2120 | 11,35 | 69,43 | 70,76 | 499,5 | 68,38 | 76,21 | 70,51 | 70,35 | 70,71 | 78,46 | 78,42 | 4182 | 78,39 | 4182 | 78,28 |
| 2130 | 11,36 | 69,48 | 70,77 | 499,5 | 68,53 | 76,21 | 70,54 | 70,35 | 70,73 | 78,47 | 78,44 | 4182 | 78,41 | 4182 | 78,31 |
| 2140 | 11,36 | 69,47 | 70,76 | 749,4 | 68,65 | 76,19 | 70,51 | 70,36 | 70,72 | 78,46 | 78,44 | 4182 | 78,38 | 4182 | 78,3 |
| 2150 | 11,36 | 69,53 | 70,75 | 749,4 | 68,72 | 76,2 | 70,51 | 70,35 | 70,71 | 78,43 | 78,43 | 4182,1 | 78,39 | 4182,1 | 78,28 |
| 2160 | 11,36 | 69,61 | 70,78 | 999,5 | 68,8 | 76,2 | 70,52 | 70,37 | 70,73 | 78,46 | 78,42 | 4182,2 | 78,41 | 4182,2 | 78,31 |
| 2170 | 11,36 | 69,59 | 70,74 | 999,5 | 68,89 | 76,18 | 70,5 | 70,35 | 70,72 | 78,45 | 78,42 | 4182,2 | 78,41 | 4182,2 | 78,31 |
| 2180 | 11,36 | 69,67 | 70,77 | 1249,5 | 69,03 | 76,18 | 70,49 | 70,36 | 70,7 | 78,45 | 78,44 | 4182,2 | 78,41 | 4182,2 | 78,28 |
| 2190 | 11,37 | 69,69 | 70,76 | 1249,5 | 69,15 | 76,22 | 70,5 | 70,37 | 70,7 | 78,44 | 78,42 | 4182,2 | 78,43 | 4182,2 | 78,3 |
| 2200 | 11,37 | 69,74 | 70,74 | 1499,4 | 69,16 | 76,17 | 70,49 | 70,35 | 70,7 | 78,47 | 78,45 | 4182,2 | 78,38 | 4182,2 | 78,31 |
| 2210 | 11,37 | 69,73 | 70,75 | 1499,4 | 69,4 | 76,18 | 70,5 | 70,36 | 70,71 | 78,47 | 78,44 | 4182,3 | 78,42 | 4182,3 | 78,32 |
| 2220 | 11,37 | 69,81 | 70,75 | 1749,5 | 69,38 | 76,2 | 70,47 | 70,38 | 70,71 | 78,49 | 78,44 | 4182,4 | 78,44 | 4182,4 | 78,32 |
| 2230 | 11,37 | 69,83 | 70,76 | 1749,6 | 69,47 | 76,19 | 70,48 | 70,37 | 70,71 | 78,49 | 78,47 | 4182,4 | 78,44 | 4182,4 | 78,32 |
| 2240 | 11,37 | 69,8 | 70,75 | 4182,4 | 69,61 | 76,2 | 70,46 | 70,39 | 70,69 | 78,45 | 78,42 | 4182,4 | 78,42 | 4182,4 | 78,3 |
| 2250 | 11,38 | 69,88 | 70,72 | 4182,4 | 69,64 | 76,21 | 70,43 | 70,7 | 70,68 | 78,48 | 78,46 | 4182,4 | 78,42 | 4182,4 | 78,34 |
| 2260 | 11,38 | 69,91 | 70,58 | 70,83 | 69,71 | 76,2 | 70,66 | 4182,5 | 70,91 | 78,5 | 78,47 | 4182,5 | 78,43 | 4182,5 | 78,34 |
| 2270 | 11,38 | 69,92 | 70,76 | 70,83 | 69,83 | 76,24 | 70,46 | 31,41 | 70,69 | 78,48 | 78,47 | 4182,5 | 78,41 | 4182,5 | 78,32 |
| 2280 | 11,38 | 70,04 | 70,74 | 70,84 | 69,79 | 76,25 | 70,47 | 31,42 | 70,72 | 78,48 | 78,44 | 4182,5 | 78,43 | 4182,5 | 78,34 |
| 2290 | 11,38 | 70,05 | 70,74 | 70,85 | 69,92 | 76,25 | 70,47 | 74,46 | 70,71 | 78,49 | 78,44 | 4182,6 | 78,45 | 4182,6 | 78,32 |
| 2300 | 11,38 | 70,08 | 70,73 | 70,84 | 69,91 | 76,25 | 70,46 | 74,46 | 70,71 | 78,49 | 78,47 | 4182,6 | 78,46 | 4182,6 | 78,34 |
| 2310 | 11,38 | 70,13 | 70,73 | 70,86 | 70,09 | 76,28 | 70,46 | 149,4 | 70,72 | 78,5 | 78,46 | 4182,6 | 78,47 | 4182,6 | 78,35 |
| 2320 | 11,39 | 70,13 | 70,71 | 70,82 | 69,88 | 76,26 | 70,42 | 149,4 | 70,68 | 78,46 | 78,44 | 4182,6 | 78,46 | 4182,6 | 78,32 |
| 2330 | 11,39 | 70,17 | 70,75 | 70,84 | 69,94 | 76,31 | 70,46 | 299,5 | 70,7 | 78,48 | 78,47 | 4182,7 | 78,46 | 4182,7 | 78,35 |
| 2340 | 11,39 | 70,2 | 70,74 | 70,82 | 70,04 | 76,29 | 70,43 | 299,4 | 70,7 | 78,49 | 78,49 | 4182,7 | 78,45 | 4182,7 | 78,36 |
| 2350 | 11,39 | 70,26 | 70,74 | 70,84 | 70,33 | 76,3 | 70,46 | 499,5 | 70,72 | 78,52 | 78,5 | 4182,8 | 78,45 | 4182,8 | 78,36 |
| 2360 | 11,39 | 70,25 | 70,73 | 70,82 | 70,61 | 76,3 | 70,44 | 499,5 | 70,7 | 78,5 | 78,49 | 4182,8 | 78,43 | 4182,8 | 78,37 |
| 2370 | 11,39 | 70,3 | 70,75 | 70,84 | 70,59 | 76,33 | 70,46 | 749,4 | 70,7 | 78,51 | 78,5 | 4182,8 | 78,45 | 4182,8 | 78,34 |
| 2380 | 11,4 | 70,35 | 70,74 | 70,81 | 70,74 | 76,32 | 70,44 | 749,4 | 70,7 | 78,49 | 78,46 | 4182,8 | 78,48 | 4182,8 | 78,37 |
| 2390 | 11,4 | 70,35 | 70,73 | 70,81 | 70,67 | 76,33 | 70,42 | 999,5 | 70,69 | 78,47 | 78,44 | 4182,8 | 78,43 | 4182,8 | 78,33 |
| 2400 | 11,4 | 70,39 | 70,74 | 70,81 | 70,67 | 76,33 | 70,44 | 999,5 | 70,69 | 78,49 | 78,49 | 4182,9 | 78,45 | 4182,9 | 78,35 |
| 2410 | 11,4 | 70,42 | 70,72 | 70,84 | 70,67 | 76,36 | 70,44 | 1249,5 | 70,69 | 78,49 | 78,45 | 4182,9 | 78,47 | 4182,9 | 78,36 |
| 2420 | 11,4 | 70,46 | 70,75 | 70,82 | 70,67 | 76,36 | 70,45 | 1249,5 | 70,71 | 78,51 | 78,5 | 4183 | 78,48 | 4183 | 78,38 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2430 | 11,4 | 70,46 | 70,75 | 70,82 | 70,51 | 76,35 | 70,45 | 1499,4 | 70,71 | 78,51 | 78,51 | 4183 | 78,46 | 4183 | 78,39 |
| 2440 | 11,41 | 70,46 | 70,76 | 70,83 | 70,44 | 76,34 | 70,46 | 1499,5 | 70,73 | 78,53 | 78,51 | 4183 | 78,48 | 4183 | 78,38 |
| 2450 | 11,41 | 70,44 | 70,74 | 70,85 | 70,34 | 76,37 | 70,46 | 1734,3 | 70,71 | 78,53 | 78,52 | 4183,1 | 78,48 | 4183,1 | 78,42 |
| 2460 | 11,41 | 70,45 | 70,73 | 70,82 | 70,18 | 76,39 | 70,45 | 1749,6 | 70,73 | 78,51 | 78,49 | 4183,1 | 78,47 | 4183,1 | 78,39 |
| 2470 | 11,41 | 70,28 | 70,74 | 70,68 | 70,03 | 76,37 | 70,43 | 4183,1 | 70,6 | 78,51 | 78,46 | 4183,1 | 78,48 | 4183,1 | 78,35 |
| 2480 | 11,41 | 70,42 | 70,74 | 70,81 | 69,87 | 76,38 | 70,45 | 4183,1 | 70,58 | 78,52 | 78,54 | 4183,1 | 78,48 | 4183,1 | 78,39 |
| 2490 | 11,41 | 70,54 | 70,75 | 71,1 | 69,74 | 76,39 | 70,47 | 69,93 | 4183,2 | 78,51 | 78,48 | 4183,2 | 78,5 | 4183,2 | 78,38 |
| 2500 | 11,42 | 70,32 | 70,76 | 70,85 | 69,67 | 76,39 | 70,5 | 70,4 | 31,43 | 78,53 | 78,52 | 4183,2 | 78,53 | 4183,2 | 78,39 |
| 2510 | 11,42 | 70,34 | 70,75 | 70,85 | 69,42 | 76,36 | 70,48 | 70,38 | 31,43 | 78,54 | 78,53 | 4183,2 | 78,5 | 4183,2 | 78,42 |
| 2520 | 11,42 | 70,28 | 70,77 | 70,87 | 69,34 | 76,37 | 70,47 | 70,38 | 31,49 | 78,52 | 78,48 | 4183,3 | 78,52 | 4183,3 | 78,37 |
| 2530 | 11,42 | 70,25 | 70,74 | 70,85 | 69,36 | 76,36 | 70,48 | 70,39 | 74,45 | 78,53 | 78,53 | 4183,3 | 78,5 | 4183,3 | 78,4 |
| 2540 | 11,42 | 70,24 | 70,76 | 70,85 | 69,25 | 76,32 | 70,49 | 70,4 | 74,44 | 78,53 | 78,53 | 4183,3 | 78,53 | 4183,3 | 78,39 |
| 2550 | 11,42 | 70,19 | 70,76 | 70,83 | 69,19 | 76,28 | 70,48 | 70,39 | 149,4 | 78,54 | 78,52 | 4183,3 | 78,5 | 4183,3 | 78,39 |
| 2560 | 11,43 | 70,15 | 70,78 | 70,86 | 68,89 | 76,26 | 70,48 | 70,4 | 149,4 | 78,57 | 78,55 | 4183,4 | 78,5 | 4183,4 | 78,42 |
| 2570 | 11,43 | 70,1 | 70,75 | 70,84 | 68,92 | 76,24 | 70,49 | 70,4 | 299,4 | 78,54 | 78,55 | 4183,4 | 78,5 | 4183,4 | 78,42 |
| 2580 | 11,43 | 70,02 | 70,74 | 70,87 | 68,64 | 76,23 | 70,49 | 70,4 | 299,5 | 78,55 | 78,54 | 4183,4 | 78,52 | 4183,4 | 78,41 |
| 2590 | 11,43 | 69,97 | 70,77 | 70,84 | 68,4 | 76,24 | 70,49 | 70,4 | 499,5 | 78,54 | 78,52 | 4183,5 | 78,49 | 4183,5 | 78,41 |
| 2600 | 11,43 | 69,95 | 70,75 | 70,84 | 68,4 | 76,26 | 70,49 | 70,4 | 499,5 | 78,55 | 78,53 | 4183,5 | 78,5 | 4183,5 | 78,43 |
| 2610 | 11,43 | 69,92 | 70,77 | 70,88 | 68,55 | 76,28 | 70,51 | 70,44 | 749,4 | 78,54 | 78,51 | 4183,5 | 78,51 | 4183,5 | 78,41 |
| 2620 | 11,44 | 69,82 | 70,77 | 70,85 | 68,45 | 76,28 | 70,51 | 70,41 | 749,4 | 78,53 | 78,51 | 4183,6 | 78,49 | 4183,6 | 78,42 |
| 2630 | 11,44 | 69,78 | 70,76 | 70,86 | 68,34 | 76,27 | 70,49 | 70,4 | 999,5 | 78,52 | 78,49 | 4183,6 | 78,51 | 4183,6 | 78,39 |
| 2640 | 11,44 | 69,75 | 70,77 | 70,86 | 67,61 | 76,29 | 70,53 | 70,44 | 999,6 | 78,58 | 78,56 | 4183,6 | 78,51 | 4183,6 | 78,42 |
| 2650 | 11,44 | 69,7 | 70,78 | 70,88 | 67,54 | 76,3 | 70,53 | 70,41 | 1249,5 | 78,56 | 78,55 | 4183,7 | 78,53 | 4183,7 | 78,43 |
| 2660 | 11,44 | 69,66 | 70,78 | 70,87 | 67,65 | 76,33 | 70,53 | 70,41 | 1249,6 | 78,57 | 78,54 | 4183,7 | 78,51 | 4183,7 | 78,45 |
| 2670 | 11,44 | 69,59 | 70,76 | 70,88 | 67,76 | 76,3 | 70,5 | 70,39 | 1499,5 | 78,55 | 78,52 | 4183,7 | 78,51 | 4183,7 | 78,38 |
| 2680 | 11,45 | 69,52 | 70,77 | 70,87 | 67,89 | 76,3 | 70,52 | 70,38 | 1499,5 | 78,53 | 78,51 | 4183,8 | 78,5 | 4183,8 | 78,39 |
| 2690 | 11,45 | 69,46 | 70,76 | 70,86 | 67,71 | 76,31 | 70,53 | 70,38 | 1749,6 | 78,56 | 78,54 | 4183,8 | 78,49 | 4183,8 | 78,42 |
| 2700 | 11,45 | 69,43 | 70,74 | 70,84 | 67,79 | 76,18 | 70,52 | 70,4 | 1749,5 | 78,54 | 78,5 | 4183,8 | 78,49 | 4183,8 | 78,39 |
| 2710 | 11,45 | 69,47 | 70,75 | 70,87 | 67,51 | 76,2 | 70,53 | 70,27 | 4183,9 | 78,54 | 78,53 | 4183,9 | 78,51 | 4183,9 | 78,38 |
| 2720 | 11,45 | 69,38 | 70,76 | 71,14 | 67,38 | 76,04 | 70,54 | 70,4 | 70,63 | 78,54 | 78,51 | 4183,9 | 78,52 | 4183,9 | 78,39 |
| 2730 | 11,45 | 69,31 | 70,75 | 70,87 | 67,53 | 75,75 | 70,49 | 70,36 | 70,71 | 78,55 | 78,52 | 4183,9 | 78,49 | 4183,9 | 78,39 |
| 2740 | 11,46 | 69,3 | 70,75 | 70,85 | 67,83 | 75,57 | 70,51 | 70,39 | 70,7 | 78,55 | 78,52 | 4184 | 78,5 | 4184 | 78,41 |
| 2750 | 11,46 | 87,78 | 70,73 | 70,85 | 67,99 | 76,53 | 70,51 | 70,36 | 70,68 | 78,55 | 78,5 | 4184 | 78,51 | 4184 | 78,39 |
| 2760 | 11,46 | 104,2 | 70,73 | 70,86 | 68,15 | 80,39 | 70,48 | 70,35 | 70,69 | 78,53 | 78,52 | 4184 | 78,49 | 4184 | 78,41 |
| 2770 | 11,46 | 119,5 | 70,74 | 70,88 | 68,29 | 82,67 | 70,48 | 70,35 | 70,68 | 78,55 | 78,51 | 4184 | 78,47 | 4184 | 78,37 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2780 | 11,46 | 125,4 | 70,73 | 70,83 | 68,33 | 83,69 | 70,49 | 70,36 | 70,68 | 78,57 | 78,54 | 4184,1 | 78,48 | 4184,1 | 78,4 |
| 2790 | 11,46 | 133,9 | 70,78 | 70,87 | 68,45 | 84,48 | 70,51 | 70,39 | 70,69 | 78,59 | 78,56 | 4184,2 | 78,49 | 4184,2 | 78,43 |
| 2800 | 11,46 | 145,7 | 70,78 | 70,9 | 68,49 | 86,51 | 70,54 | 70,42 | 70,7 | 78,56 | 78,53 | 4184,2 | 78,52 | 4184,2 | 78,41 |
| 2810 | 11,47 | 160,3 | 70,84 | 70,92 | 68,64 | 89,1 | 70,59 | 70,48 | 70,69 | 78,58 | 78,53 | 4184,2 | 78,49 | 4184,2 | 78,42 |
| 2820 | 11,47 | 176 | 70,87 | 70,94 | 68,69 | 92,2 | 70,61 | 70,5 | 70,69 | 78,56 | 78,54 | 4184,3 | 78,49 | 4184,3 | 78,4 |
| 2830 | 11,47 | 193,3 | 70,96 | 70,97 | 69,06 | 95,88 | 70,68 | 70,58 | 70,68 | 78,56 | 78,53 | 4184,3 | 78,49 | 4184,3 | 78,4 |
| 2840 | 11,47 | 217,6 | 71,09 | 71,02 | 69,18 | 101 | 70,78 | 70,66 | 70,67 | 78,56 | 78,51 | 4184,3 | 78,49 | 4184,3 | 78,41 |
| 2850 | 11,47 | 232,6 | 71,25 | 71,1 | 69,35 | 105 | 70,91 | 70,77 | 70,69 | 78,59 | 78,55 | 4184,4 | 78,48 | 4184,4 | 78,42 |
| 2860 | 11,47 | 251,3 | 71,4 | 71,25 | 69,63 | 109,3 | 71,11 | 70,92 | 70,7 | 78,6 | 78,56 | 4184,4 | 78,5 | 4184,4 | 78,43 |
| 2870 | 11,48 | 264,8 | 71,62 | 71,39 | 69,84 | 113,4 | 71,3 | 71,12 | 70,68 | 78,57 | 78,52 | 4184,4 | 78,51 | 4184,4 | 78,41 |
| 2880 | 11,48 | 282,8 | 71,87 | 71,56 | 70,22 | 117,6 | 71,61 | 71,41 | 70,67 | 78,55 | 78,51 | 4184,5 | 78,49 | 4184,5 | 78,4 |
| 2890 | 11,48 | 306,3 | 72,16 | 71,76 | 70,56 | 123,1 | 71,9 | 71,72 | 70,67 | 78,57 | 78,48 | 4184,5 | 78,51 | 4184,5 | 78,36 |
| 2900 | 11,48 | 333,3 | 72,5 | 72,02 | 70,79 | 129,5 | 72,32 | 72,1 | 70,67 | 78,57 | 78,53 | 4184,5 | 78,47 | 4184,5 | 78,41 |
| 2910 | 11,48 | 367,1 | 72,88 | 72,37 | 71,02 | 137,8 | 72,82 | 72,55 | 70,69 | 78,45 | 78,58 | 4184,6 | 78,5 | 4184,6 | 78,44 |
| 2920 | 11,48 | 398,7 | 73,29 | 72,75 | 71,36 | 146,6 | 73,43 | 73,02 | 70,7 | 78,58 | 78,52 | 4184,6 | 78,5 | 4184,6 | 78,22 |
| 2930 | 11,49 | 424,1 | 73,68 | 73,15 | 71,67 | 153,8 | 74,13 | 73,52 | 70,71 | 78,57 | 78,49 | 4184,6 | 78,51 | 4184,6 | 78,4 |
| 2940 | 11,49 | 450,5 | 74,15 | 73,6 | 71,92 | 161,3 | 74,94 | 74,08 | 70,74 | 78,65 | 78,52 | 4184,7 | 78,47 | 4184,7 | 78,41 |
| 2950 | 11,49 | 471,5 | 74,62 | 74,07 | 72,14 | 169 | 75,8 | 74,65 | 70,76 | 78,62 | 78,52 | 4184,7 | 78,49 | 4184,7 | 78,42 |
| 2960 | 11,49 | 491,8 | 75,14 | 74,56 | 72,22 | 176,4 | 76,7 | 75,23 | 70,78 | 78,53 | 78,52 | 4184,7 | 78,5 | 4184,7 | 78,4 |
| 2970 | 11,49 | 517,1 | 75,69 | 75,07 | 72,14 | 183,9 | 77,64 | 75,84 | 70,82 | 78,61 | 78,6 | 4184,8 | 78,53 | 4184,8 | 4184,8 |
| 2980 | 11,49 | 531,2 | 76,23 | 75,64 | 72,74 | 192,9 | 78,65 | 76,45 | 70,84 | 78,58 | 78,55 | 4184,8 | 78,47 | 4184,8 | 31,68 |
| 2990 | 11,5 | 538,9 | 76,88 | 76,3 | 73,25 | 197,3 | 79,85 | 77,15 | 70,92 | 78,62 | 78,55 | 4184,8 | 78,5 | 4184,8 | 31,67 |
| 3000 | 11,5 | 546,3 | 77,53 | 76,94 | 73,22 | 203,1 | 81,17 | 77,85 | 70,97 | 78,56 | 78,51 | 4184,9 | 78,45 | 4184,9 | 31,65 |
| 3010 | 11,5 | 554 | 78,2 | 77,55 | 74,04 | 209,3 | 82,55 | 78,6 | 71,05 | 78,61 | 78,58 | 4184,9 | 78,51 | 4184,9 | 74,74 |
| 3020 | 11,5 | 566,5 | 78,94 | 78,22 | 74,37 | 214,9 | 84,06 | 79,42 | 71,14 | 78,64 | 78,54 | 4185 | 78,51 | 4185 | 74,74 |
| 3030 | 11,5 | 574,2 | 79,66 | 78,81 | 75,09 | 220,4 | 85,55 | 80,23 | 71,2 | 78,64 | 78,55 | 4185 | 78,5 | 4185 | 149,7 |
| 3040 | 11,5 | 577,6 | 80,44 | 79,49 | 75,39 | 225,6 | 87,1 | 81,12 | 71,32 | 78,65 | 78,59 | 4185 | 78,5 | 4185 | 149,7 |
| 3050 | 11,51 | 586,5 | 81,23 | 80,2 | 76,02 | 230,1 | 88,7 | 82,04 | 71,42 | 78,63 | 78,57 | 4185 | 78,48 | 4185 | 299,7 |
| 3060 | 11,51 | 594,8 | 82,06 | 80,92 | 75,99 | 235,7 | 90,4 | 83,01 | 71,55 | 78,62 | 78,55 | 4185,1 | 78,51 | 4185,1 | 299,7 |
| 3070 | 11,51 | 597,1 | 82,89 | 81,71 | 76,57 | 240,5 | 92,26 | 84,01 | 71,7 | 78,64 | 78,6 | 4185,1 | 78,51 | 4185,1 | 499,8 |
| 3080 | 11,51 | 602 | 83,76 | 82,56 | 76,55 | 244,5 | 94,1 | 85,07 | 71,87 | 78,65 | 78,58 | 4185,1 | 78,5 | 4185,1 | 499,8 |
| 3090 | 11,51 | 596,7 | 84,64 | 83,45 | 76,71 | 248,9 | 95,95 | 86,17 | 72,03 | 78,64 | 78,56 | 4185,2 | 78,5 | 4185,2 | 749,7 |
| 3100 | 11,51 | 594,1 | 85,53 | 84,39 | 77,13 | 250,8 | 97,74 | 87,32 | 72,24 | 78,64 | 78,57 | 4185,2 | 78,51 | 4185,2 | 749,7 |
| 3110 | 11,52 | 590,6 | 86,44 | 85,35 | 77 | 252,9 | 99,59 | 88,5 | 72,44 | 78,68 | 78,57 | 4185,2 | 78,51 | 4185,2 | 999,8 |
| 3120 | 11,52 | 593,7 | 87,37 | 86,3 | 77,13 | 256,5 | 101,5 | 89,68 | 72,66 | 78,65 | 78,57 | 4185,2 | 78,49 | 4185,2 | 999,8 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3130 | 11,52 | 602,3 | 88,34 | 87,33 | 77,17 | 259,7 | 103,6 | 90,97 | 72,92 | 78,65 | 78,56 | 4185,3 | 78,52 | 4185,3 | 1249,8 |
| 3140 | 11,52 | 609 | 89,34 | 88,34 | 77,63 | 262,6 | 105,6 | 92,27 | 73,19 | 78,66 | 78,61 | 4185,3 | 78,51 | 4185,3 | 1249,8 |
| 3150 | 11,52 | 612,6 | 90,38 | 89,4 | 77,77 | 266,9 | 107,8 | 93,63 | 73,48 | 78,66 | 78,6 | 4185,4 | 78,51 | 4185,4 | 1499,7 |
| 3160 | 11,52 | 614,6 | 91,42 | 90,48 | 77,91 | 269,3 | 110 | 95,01 | 73,78 | 78,64 | 78,6 | 4185,4 | 78,5 | 4185,4 | 1499,7 |
| 3170 | 11,53 | 615,7 | 92,52 | 91,61 | 78,08 | 271,9 | 112,5 | 96,43 | 74,11 | 78,65 | 78,61 | 4185,5 | 78,51 | 4185,5 | 1749,9 |
| 3180 | 11,53 | 619,7 | 93,68 | 92,75 | 77,95 | 274,7 | 115 | 97,89 | 74,47 | 78,66 | 78,58 | 4185,5 | 78,51 | 4185,5 | 1749,8 |
| 3190 | 11,53 | 613 | 94,84 | 93,9 | 78,19 | 276,9 | 117,7 | 99,38 | 74,83 | 78,65 | 78,73 | 4185,5 | 78,24 | 4185,5 | 4185,5 |
| 3200 | 11,53 | 604,8 | 96,06 | 95,06 | 78,38 | 276,9 | 120,3 | 100,9 | 75,22 | 78,7 | 78,58 | 4185,5 | 78,42 | 4185,5 | 78,21 |
| 3210 | 11,53 | 598,6 | 97,3 | 96,25 | 78,46 | 278,8 | 123,1 | 102,4 | 75,64 | 78,69 | 78,64 | 4185,6 | 78,53 | 4185,6 | 78,52 |
| 3220 | 11,53 | 588,7 | 98,59 | 97,5 | 77,86 | 279,8 | 125,9 | 104 | 76,08 | 78,63 | 78,59 | 4185,6 | 78,5 | 4185,6 | 78,44 |
| 3230 | 11,53 | 584,9 | 99,99 | 98,77 | 77,51 | 280,8 | 128,8 | 105,7 | 76,6 | 4185,6 | 79,92 | 4185,6 | 78,22 | 4185,6 | 78,37 |
| 3240 | 11,54 | 552,6 | 101,4 | 100,1 | 76,85 | 278,8 | 131,8 | 107,3 | 77,1 | 31,85 | 78,61 | 4185,7 | 78,53 | 4185,7 | 78,45 |
| 3250 | 11,54 | 495,4 | 103,3 | 101,8 | 76,39 | 269,9 | 135,8 | 109,4 | 77,85 | 31,78 | 78,59 | 4185,7 | 78,53 | 4185,7 | 78,46 |
| 3260 | 11,54 | 460,9 | 104,7 | 103,1 | 75,89 | 263,3 | 138,7 | 111 | 78,41 | 74,76 | 78,59 | 4185,7 | 78,51 | 4185,7 | 78,44 |
| 3270 | 11,54 | 434,2 | 106,2 | 104,5 | 75,83 | 258,4 | 141,7 | 112,5 | 79,05 | 74,79 | 78,61 | 4185,8 | 78,54 | 4185,8 | 78,47 |
| 3280 | 11,54 | 417,4 | 107,7 | 105,9 | 75,89 | 254 | 144,6 | 114,1 | 79,69 | 149,7 | 78,62 | 4185,8 | 78,54 | 4185,8 | 78,49 |
| 3290 | 11,54 | 415,3 | 109,2 | 107,2 | 75,76 | 252,2 | 147,7 | 115,7 | 80,37 | 149,7 | 78,6 | 4185,8 | 78,53 | 4185,8 | 78,48 |
| 3300 | 11,55 | 437,8 | 110,7 | 108,6 | 75,11 | 245,7 | 150,6 | 117,4 | 81,07 | 299,8 | 78,62 | 4185,9 | 78,54 | 4185,9 | 78,48 |
| 3310 | 11,55 | 454,7 | 112,3 | 109,9 | 74,57 | 232,1 | 153,5 | 119,2 | 81,78 | 299,8 | 78,63 | 4185,9 | 78,55 | 4185,9 | 78,47 |
| 3320 | 11,55 | 465,6 | 113,8 | 111,2 | 74,45 | 223 | 156,4 | 121,1 | 82,57 | 499,8 | 78,65 | 4185,9 | 78,54 | 4185,9 | 78,47 |
| 3330 | 11,55 | 476,4 | 115,4 | 112,5 | 74,38 | 216,5 | 159,2 | 122,9 | 83,35 | 499,8 | 78,63 | 4185,9 | 78,53 | 4185,9 | 78,46 |
| 3340 | 11,55 | 487,5 | 117 | 113,8 | 73,04 | 212 | 162 | 124,8 | 84,21 | 749,2 | 78,63 | 4186 | 78,55 | 4186 | 78,49 |
| 3350 | 11,55 | 499,1 | 118,5 | 115,2 | 73,55 | 207,8 | 164,7 | 126,6 | 85,06 | 749,7 | 78,65 | 4186 | 78,57 | 4186 | 78,48 |
| 3360 | 11,56 | 511,8 | 120,1 | 116,4 | 73,79 | 204,6 | 167,4 | 128,4 | 85,94 | 749,7 | 78,66 | 4186 | 78,55 | 4186 | 78,5 |
| 3370 | 11,56 | 522,5 | 121,7 | 117,7 | 74,03 | 202,1 | 170 | 130,1 | 86,86 | 999,8 | 78,66 | 4186,1 | 78,57 | 4186,1 | 78,5 |
| 3380 | 11,56 | 533,2 | 123,3 | 118,9 | 73,89 | 199,7 | 172,6 | 131,8 | 87,81 | 999,8 | 78,67 | 4186,1 | 78,55 | 4186,1 | 78,5 |
| 3390 | 11,56 | 543,7 | 124,9 | 120,1 | 73,87 | 197,4 | 175,2 | 133,4 | 88,81 | 1249,8 | 78,69 | 4186,2 | 78,58 | 4186,2 | 78,51 |
| 3400 | 11,56 | 553,8 | 126,5 | 121,3 | 73,55 | 195,7 | 177,8 | 135 | 89,8 | 1249,8 | 78,64 | 4186,2 | 78,54 | 4186,2 | 78,49 |
| 3410 | 11,56 | 564,5 | 128 | 122,4 | 73,58 | 194,2 | 180,5 | 136,5 | 90,86 | 1499,7 | 78,68 | 4186,2 | 78,59 | 4186,2 | 78,51 |
| 3420 | 11,57 | 574,6 | 129,6 | 123,6 | 73,42 | 192,9 | 183,1 | 137,9 | 91,87 | 1499,7 | 78,69 | 4186,2 | 78,58 | 4186,2 | 78,49 |
| 3430 | 11,57 | 586,8 | 131,2 | 124,7 | 73,12 | 191,3 | 185,8 | 139,3 | 92,96 | 1749,8 | 78,68 | 4186,3 | 78,57 | 4186,3 | 78,52 |
| 3440 | 11,57 | 594,2 | 132,8 | 125,8 | 72,92 | 190,3 | 188,6 | 140,7 | 94,05 | 1749,8 | 78,67 | 4186,3 | 78,58 | 4186,3 | 78,52 |
| 3450 | 11,57 | 599,3 | 134,4 | 126,9 | 70,87 | 189,8 | 191,4 | 142 | 95,19 | 1749,8 | 78,7 | 4186,3 | 78,56 | 4186,3 | 78,52 |
| 3460 | 11,57 | 605,3 | 136 | 128 | 72,1 | 188,5 | 194,2 | 143,2 | 96,32 | 4186,4 | 78,7 | 4186,4 | 78,61 | 4186,4 | 78,49 |
| 3470 | 11,57 | 609,7 | 137,7 | 129 | 72,65 | 187,7 | 197,1 | 144,4 | 97,5 | 4186,4 | 78,73 | 4186,4 | 78,63 | 4186,4 | 78,55 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3480 | 11,58 | 615,6 | 139,4 | 130 | 72,71 | 186,8 | 200,1 | 145,5 | 98,67 | 4186,4 | 78,71 | 4186,4 | 78,59 | 4186,4 | 78,51 |
| 3490 | 11,58 | 619,5 | 141,1 | 131,1 | 72,79 | 185,8 | 203,2 | 146,6 | 99,86 | 4186,4 | 78,72 | 4186,4 | 78,61 | 4186,4 | 78,53 |
| 3500 | 11,58 | 625 | 142,7 | 132,1 | 72,66 | 185,2 | 206,3 | 147,6 | 101,1 | 4186,5 | 78,74 | 4186,5 | 78,62 | 4186,5 | 78,54 |
| 3510 | 11,58 | 628,7 | 144,3 | 133,1 | 72,5 | 184,6 | 209,5 | 148,6 | 102,3 | 4186,5 | 78,72 | 4186,5 | 78,6 | 4186,5 | 78,53 |
| 3520 | 11,58 | 633,1 | 145,7 | 134,1 | 72,26 | 183,7 | 212,7 | 149,6 | 103,5 | 4186,5 | 78,71 | 4186,5 | 78,59 | 4186,5 | 78,53 |
| 3530 | 11,58 | 635,3 | 147,2 | 135,1 | 72,29 | 183,1 | 216,1 | 150,5 | 104,7 | 4186,5 | 78,71 | 4186,5 | 78,6 | 4186,5 | 78,54 |
| 3540 | 11,59 | 636,4 | 148,6 | 136,1 | 72,05 | 182,4 | 219,5 | 151,4 | 106 | 4186,6 | 78,73 | 4186,6 | 78,63 | 4186,6 | 78,54 |
| 3550 | 11,59 | 636 | 150,1 | 137,1 | 72,35 | 182 | 222,9 | 152,2 | 107,2 | 4186,6 | 78,75 | 4186,6 | 78,65 | 4186,6 | 78,56 |
| 3560 | 11,59 | 635,2 | 151,5 | 138,1 | 72,34 | 181,7 | 226,4 | 153 | 108,5 | 4186,6 | 78,74 | 4186,6 | 78,62 | 4186,6 | 78,56 |
| 3570 | 11,59 | 635,5 | 152,9 | 139,1 | 71,96 | 180,8 | 229,9 | 153,8 | 109,7 | 4186,7 | 78,76 | 4186,7 | 78,64 | 4186,7 | 78,57 |
| 3580 | 11,59 | 634,4 | 154,4 | 140,1 | 71,91 | 179,3 | 233,5 | 154,6 | 111 | 4186,7 | 78,71 | 31,97 | 78,63 | 4186,7 | 78,56 |
| 3590 | 11,59 | 635,6 | 155,8 | 141,1 | 71,97 | 179 | 237 | 155,4 | 112,2 | 4186,7 | 78,73 | 31,69 | 78,63 | 4186,7 | 78,55 |
| 3600 | 12 | 638,4 | 157,2 | 142,1 | 72 | 178,7 | 240,6 | 156,2 | 113,5 | 4186,8 | 78,74 | 74,89 | 78,65 | 4186,8 | 78,56 |
| 3610 | 12 | 640,7 | 158,7 | 143,2 | 72,07 | 179 | 244,2 | 157 | 114,8 | 4186,8 | 78,76 | 74,77 | 78,64 | 4186,8 | 78,54 |
| 3620 | 12 | 643,2 | 160,1 | 144,2 | 71,8 | 179,2 | 247,8 | 157,9 | 116 | 4186,8 | 78,76 | 149,9 | 78,66 | 4186,8 | 78,57 |
| 3630 | 12 | 645,4 | 161,6 | 145,2 | 71,79 | 179 | 251,4 | 158,7 | 117,3 | 4186,8 | 78,73 | 149,8 | 78,62 | 4186,8 | 78,54 |
| 3640 | 12 | 647,6 | 163 | 146,3 | 71,61 | 178,7 | 254,9 | 159,5 | 118,6 | 4186,9 | 78,77 | 299,9 | 78,65 | 4186,9 | 78,57 |
| 3650 | 12 | 652,5 | 164,4 | 147,4 | 71,86 | 178,8 | 258,5 | 160,3 | 119,9 | 4186,9 | 78,73 | 299,8 | 78,64 | 4186,9 | 78,54 |
| 3660 | 12 | 661,1 | 165,9 | 148,5 | 71,84 | 179,5 | 262 | 161,2 | 121,2 | 4186,9 | 78,77 | 499,9 | 78,64 | 4186,9 | 78,56 |
| 3670 | 12,01 | 667,5 | 167,4 | 149,6 | 71,88 | 180,2 | 265,6 | 162 | 122,4 | 4186,9 | 78,74 | 499,9 | 78,65 | 4186,9 | 78,56 |
| 3680 | 12,01 | 671,5 | 168,8 | 150,7 | 71,89 | 180,7 | 269,1 | 162,9 | 123,7 | 4187 | 78,75 | 749,8 | 78,65 | 4187 | 78,55 |
| 3690 | 12,01 | 677,6 | 170,3 | 151,8 | 72,08 | 181,2 | 272,7 | 163,8 | 125 | 4187 | 78,74 | 749,7 | 78,64 | 4187 | 78,56 |
| 3700 | 12,01 | 679,2 | 171,9 | 152,9 | 72,18 | 181,3 | 276,3 | 164,7 | 126,3 | 4187 | 78,76 | 999,8 | 78,67 | 4187 | 78,58 |
| 3710 | 12,01 | 680,2 | 173,4 | 154,1 | 71,9 | 181 | 279,7 | 165,5 | 127,6 | 4187 | 78,74 | 999,8 | 78,64 | 4187 | 78,56 |
| 3720 | 12,01 | 681,4 | 174,9 | 155,2 | 71,86 | 181 | 283,2 | 166,4 | 128,9 | 4187,1 | 78,76 | 1250 | 78,65 | 4187,1 | 78,57 |
| 3730 | 12,02 | 682,5 | 176,4 | 156,4 | 71,8 | 181,4 | 286,6 | 167,3 | 130,2 | 4187,1 | 78,78 | 1249,8 | 78,66 | 4187,1 | 78,57 |
| 3740 | 12,02 | 684,9 | 177,9 | 157,5 | 72 | 181,4 | 290 | 168,2 | 131,5 | 4187,1 | 78,79 | 1499,8 | 78,67 | 4187,1 | 78,59 |
| 3750 | 12,02 | 687,7 | 179,4 | 158,7 | 72,11 | 181,8 | 293,5 | 169 | 132,7 | 4187,1 | 78,76 | 1499,7 | 78,64 | 4187,1 | 78,57 |
| 3760 | 12,02 | 690,2 | 180,9 | 159,9 | 71,9 | 181,5 | 296,8 | 170 | 134 | 4187,2 | 78,79 | 1749,8 | 78,66 | 4187,2 | 78,59 |
| 3770 | 12,02 | 691,5 | 182,4 | 161,1 | 71,57 | 181,8 | 300,2 | 170,9 | 135,3 | 4187,2 | 78,79 | 1749,9 | 78,66 | 4187,2 | 78,58 |
| 3780 | 12,02 | 691,1 | 183,9 | 162,3 | 71,16 | 181,4 | 303,6 | 171,8 | 136,6 | 4187,2 | 78,8 | 4187,2 | 78,66 | 4187,2 | 78,59 |
| 3790 | 12,03 | 688,2 | 185,3 | 163,6 | 71,79 | 180,8 | 307 | 172,7 | 137,9 | 4187,2 | 78,77 | 4187,2 | 78,66 | 4187,2 | 78,59 |
| 3800 | 12,03 | 686,1 | 186,7 | 164,8 | 71,38 | 180,5 | 310,4 | 173,7 | 139,3 | 4187,3 | 78,79 | 4187,3 | 78,67 | 31,75 | 78,6 |
| 3810 | 12,03 | 684,5 | 188,1 | 166,1 | 71,72 | 180,4 | 313,7 | 174,7 | 140,6 | 4187,3 | 78,79 | 4187,3 | 78,67 | 31,84 | 78,59 |
| 3820 | 12,03 | 683,4 | 189,5 | 167,3 | 71,84 | 180,5 | 317 | 175,7 | 141,8 | 4187,3 | 78,77 | 4187,3 | 78,65 | 74,75 | 78,58 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3830 | 12,03 | 685 | 191 | 168,7 | 71,91 | 180,4 | 320,3 | 176,8 | 143,1 | 4187,3 | 78,77 | 4187,3 | 78,67 | 74,75 | 78,59 |
| 3840 | 12,03 | 683,4 | 192,4 | 170 | 71,93 | 180,4 | 323,5 | 177,8 | 144,4 | 4187,3 | 78,78 | 4187,3 | 78,67 | 74,74 | 78,6 |
| 3850 | 12,04 | 682,7 | 193,7 | 171,3 | 71,76 | 180,6 | 326,8 | 178,9 | 145,7 | 4187,4 | 78,78 | 4187,4 | 78,66 | 149,8 | 78,61 |
| 3860 | 12,04 | 683,8 | 195,1 | 172,7 | 71,73 | 180,6 | 330 | 179,9 | 147 | 4187,4 | 78,77 | 4187,4 | 78,68 | 149,7 | 78,6 |
| 3870 | 12,04 | 686,4 | 196,4 | 174,1 | 71,66 | 180,6 | 333,1 | 181 | 148,4 | 4187,4 | 78,79 | 4187,4 | 78,69 | 299,8 | 78,6 |
| 3880 | 12,04 | 686,7 | 197,7 | 175,5 | 71,45 | 180,4 | 336,3 | 182,1 | 149,7 | 4187,5 | 78,79 | 4187,5 | 78,68 | 299,8 | 78,61 |
| 3890 | 12,04 | 688,8 | 199 | 176,9 | 71,55 | 181,2 | 339,4 | 183,2 | 151 | 4187,5 | 78,81 | 4187,5 | 78,69 | 499,8 | 78,62 |
| 3900 | 12,04 | 690 | 200,4 | 178,4 | 71,41 | 181,1 | 342,6 | 184,3 | 152,3 | 4187,5 | 78,8 | 4187,5 | 78,68 | 499,8 | 78,63 |
| 3910 | 12,05 | 691,2 | 201,7 | 179,9 | 71,56 | 181,1 | 345,6 | 185,3 | 153,6 | 4187,5 | 78,79 | 4187,5 | 78,7 | 749,7 | 78,61 |
| 3920 | 12,05 | 691,7 | 203,1 | 181,4 | 71,26 | 181,6 | 348,6 | 186,5 | 154,8 | 4187,6 | 78,81 | 4187,6 | 78,69 | 749,7 | 78,62 |
| 3930 | 12,05 | 693,1 | 204,5 | 182,9 | 71,74 | 182,1 | 351,6 | 187,6 | 156 | 4187,6 | 78,79 | 4187,6 | 78,68 | 999,8 | 78,6 |
| 3940 | 12,05 | 697,5 | 206,2 | 184,5 | 71,89 | 182,3 | 354,5 | 188,7 | 157,3 | 4187,6 | 78,79 | 4187,6 | 78,69 | 999,8 | 78,61 |
| 3950 | 12,05 | 699,5 | 208 | 186 | 71,89 | 182,3 | 357,4 | 189,8 | 158,6 | 4187,6 | 78,77 | 4187,6 | 78,69 | 1249,7 | 78,6 |
| 3960 | 12,05 | 700,3 | 209,9 | 187,6 | 71,94 | 182,6 | 360,4 | 191 | 159,9 | 4187,6 | 78,79 | 4187,6 | 78,7 | 1249,7 | 78,62 |
| 3970 | 12,06 | 701,3 | 211,9 | 189,2 | 72,12 | 182,2 | 363,2 | 192,2 | 161,2 | 4187,7 | 78,78 | 4187,7 | 78,68 | 1499,6 | 78,61 |
| 3980 | 12,06 | 701,8 | 213,8 | 190,7 | 71,91 | 182,5 | 366,1 | 193,3 | 162,4 | 4187,6 | 78,77 | 4187,6 | 78,66 | 1499,7 | 78,59 |
| 3990 | 12,06 | 704,7 | 215,8 | 192,3 | 72,31 | 182,9 | 368,9 | 194,5 | 163,7 | 4187,7 | 78,83 | 4187,7 | 78,71 | 1749,7 | 78,62 |
| 4000 | 12,06 | 705,7 | 217,8 | 194 | 72,45 | 183,2 | 371,7 | 195,6 | 165 | 4187,7 | 78,79 | 4187,7 | 78,69 | 1749,7 | 78,63 |
| 4010 | 12,06 | 706,4 | 219,8 | 195,6 | 72,48 | 183,8 | 374,5 | 196,8 | 166,2 | 4187,8 | 78,8 | 4187,8 | 78,7 | 4187,8 | 78,63 |
| 4020 | 12,06 | 706,7 | 221,7 | 197,3 | 72,25 | 184 | 377,1 | 198 | 167,5 | 4187,8 | 78,81 | 4187,8 | 78,75 | 4187,8 | 78,63 |
| 4030 | 12,07 | 705,3 | 223,6 | 198,9 | 72,23 | 184,1 | 379,8 | 199,1 | 168,7 | 78,85 | 78,83 | 4187,8 | 78,58 | 4187,8 | 78,47 |
| 4040 | 12,07 | 703,2 | 225,6 | 200,6 | 72,28 | 183,9 | 382,4 | 200,3 | 170 | 78,93 | 78,77 | 4187,8 | 78,7 | 4187,8 | 78,61 |
| 4050 | 12,07 | 700 | 227,5 | 202,3 | 72,42 | 183,7 | 385 | 201,5 | 171,3 | 78,87 | 78,81 | 4187,8 | 78,71 | 4187,8 | 78,62 |
| 4060 | 12,07 | 700,1 | 229,4 | 204 | 72,5 | 182,8 | 387,6 | 202,7 | 172,5 | 78,91 | 78,77 | 4187,8 | 78,67 | 4187,8 | 78,62 |
| 4070 | 12,07 | 698,5 | 231,3 | 205,7 | 72,47 | 182,4 | 390,1 | 203,8 | 173,7 | 78,9 | 78,87 | 4187,9 | 78,72 | 4187,9 | 78,63 |
| 4080 | 12,07 | 697 | 233,2 | 207,5 | 72,29 | 182,6 | 392,7 | 205 | 175 | 78,87 | 78,8 | 4187,9 | 78,73 | 4187,9 | 78,65 |
| 4090 | 12,07 | 694,7 | 235,1 | 209,2 | 72,43 | 182,9 | 395,2 | 206,2 | 176,2 | 78,85 | 31,73 | 4187,9 | 78,71 | 4187,9 | 78,62 |
| 4100 | 12,08 | 693,2 | 237 | 210,9 | 72,62 | 182,8 | 397,6 | 207,4 | 177,5 | 78,86 | 31,7 | 4187,9 | 78,73 | 4187,9 | 78,64 |
| 4110 | 12,08 | 693,4 | 238,9 | 212,6 | 72,51 | 182,3 | 400,1 | 208,6 | 178,8 | 78,94 | 74,73 | 4187,9 | 78,72 | 4187,9 | 78,62 |
| 4120 | 12,08 | 692,3 | 240,8 | 214,3 | 72,71 | 182,1 | 402,5 | 209,8 | 180,1 | 78,89 | 74,73 | 4188 | 78,72 | 4188 | 78,62 |
| 4130 | 12,08 | 692,6 | 242,7 | 216,1 | 72,36 | 182,6 | 404,8 | 211 | 181,4 | 78,89 | 149,7 | 4188 | 78,73 | 4188 | 78,63 |
| 4140 | 12,08 | 692,1 | 244,6 | 217,8 | 72,59 | 182,5 | 407,2 | 212,2 | 182,7 | 78,93 | 149,7 | 4188 | 78,72 | 4188 | 78,62 |
| 4150 | 12,08 | 691,8 | 246,5 | 219,5 | 72,75 | 182,3 | 409,5 | 213,3 | 184 | 78,94 | 299,7 | 4188 | 78,72 | 4188 | 78,65 |
| 4160 | 12,09 | 692 | 248,4 | 221,3 | 72,88 | 182,4 | 411,8 | 214,6 | 185,3 | 78,95 | 299,6 | 4188 | 78,72 | 4188 | 78,65 |
| 4170 | 12,09 | 692 | 250,2 | 223 | 72,5 | 182,1 | 414,1 | 215,8 | 186,6 | 78,95 | 499,6 | 4188,1 | 78,72 | 4188,1 | 78,64 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4180 | 12,09 | 691,5 | 252,2 | 224,7 | 72,49 | 182 | 416,3 | 216,9 | 187,9 | 78,97 | 499,7 | 4188,1 | 78,73 | 4188,1 | 78,67 |
| 4190 | 12,09 | 690,9 | 254 | 226,4 | 72,73 | 181,7 | 418,4 | 218,1 | 189,2 | 78,89 | 749,5 | 4188,1 | 78,73 | 4188,1 | 78,65 |
| 4200 | 12,09 | 690,3 | 255,8 | 228,2 | 72,7 | 181,9 | 420,4 | 219,3 | 190,4 | 78,88 | 749,6 | 4188,1 | 78,73 | 4188,1 | 78,63 |
| 4210 | 12,09 | 690,9 | 257,7 | 229,9 | 72,96 | 181,4 | 422,4 | 220,5 | 191,8 | 78,87 | 756,4 | 4188,2 | 78,73 | 4188,2 | 78,65 |
| 4220 | 12,1 | 690,5 | 259,5 | 231,6 | 72,92 | 181,3 | 424,4 | 221,7 | 193,1 | 78,95 | 999,7 | 4188,1 | 78,74 | 4188,1 | 78,64 |
| 4230 | 12,1 | 691,4 | 261,4 | 233,3 | 72,62 | 181,5 | 426,5 | 222,9 | 194,4 | 78,91 | 999,7 | 4188,2 | 78,73 | 4188,2 | 78,66 |
| 4240 | 12,1 | 692,2 | 263,2 | 235,1 | 72,73 | 181,6 | 428,5 | 224,1 | 195,7 | 78,93 | 1249,6 | 4188,2 | 78,74 | 4188,2 | 78,66 |
| 4250 | 12,1 | 691,7 | 265 | 236,8 | 72,75 | 181,4 | 430,4 | 225,3 | 197,1 | 78,92 | 1249,6 | 4188,2 | 78,74 | 4188,2 | 78,65 |
| 4260 | 12,1 | 692,6 | 266,8 | 238,5 | 72,91 | 181 | 432,4 | 226,5 | 198,4 | 78,99 | 1499,6 | 4188,3 | 78,75 | 4188,3 | 78,69 |
| 4270 | 12,1 | 692,3 | 268,7 | 240,2 | 73,08 | 181,4 | 434,3 | 227,7 | 199,7 | 78,98 | 1499,4 | 4188,3 | 78,73 | 4188,3 | 78,68 |
| 4280 | 12,11 | 692,6 | 270,4 | 241,8 | 72,83 | 181,7 | 436,1 | 228,9 | 201 | 78,91 | 1749,6 | 4188,3 | 78,75 | 4188,3 | 78,67 |
| 4290 | 12,11 | 694,2 | 272,2 | 243,5 | 72,89 | 181,8 | 437,8 | 230,1 | 202,4 | 78,97 | 1749,7 | 4188,3 | 78,76 | 4188,3 | 78,68 |
| 4300 | 12,11 | 692,6 | 274 | 245,1 | 72,9 | 182,4 | 439,6 | 231,3 | 203,7 | 78,88 | 78,83 | 4188,3 | 77,55 | 4188,3 | 78,61 |
| 4310 | 12,11 | 692,1 | 275,8 | 246,8 | 72,65 | 181,8 | 441,2 | 232,5 | 205 | 78,98 | 78,87 | 4188,3 | 31,6 | 4188,3 | 78,68 |
| 4320 | 12,11 | 691,8 | 277,5 | 248,5 | 72,62 | 182,4 | 442,8 | 233,7 | 206,3 | 78,95 | 78,85 | 4188,3 | 31,59 | 4188,3 | 78,68 |
| 4330 | 12,11 | 692 | 279,3 | 250,2 | 72,93 | 182,3 | 444,3 | 234,9 | 207,7 | 78,93 | 78,85 | 4188,4 | 31,47 | 4188,4 | 78,69 |
| 4340 | 12,12 | 691,8 | 281,1 | 251,8 | 72,73 | 182 | 446 | 236,1 | 209 | 78,93 | 78,83 | 4188,4 | 74,6 | 4188,4 | 78,66 |
| 4350 | 12,12 | 692 | 282,8 | 253,4 | 73,01 | 182,2 | 447,6 | 237,3 | 210,4 | 78,97 | 78,87 | 4188,4 | 74,57 | 4188,4 | 78,69 |
| 4360 | 12,12 | 692,5 | 284,5 | 255,1 | 73,11 | 182,3 | 449,2 | 238,4 | 211,7 | 78,95 | 78,85 | 4188,4 | 149,5 | 4188,4 | 78,68 |
| 4370 | 12,12 | 692,8 | 286,2 | 256,7 | 73,08 | 182 | 450,7 | 239,6 | 213,1 | 78,94 | 78,83 | 4188,4 | 149,5 | 4188,4 | 78,7 |
| 4380 | 12,12 | 694,6 | 287,9 | 258,3 | 73 | 182,1 | 452,1 | 240,8 | 214,4 | 78,93 | 78,85 | 4188,4 | 299,5 | 4188,4 | 78,67 |
| 4390 | 12,12 | 694,5 | 289,6 | 259,9 | 73,18 | 182,5 | 453,7 | 241,9 | 215,8 | 78,97 | 78,85 | 4188,4 | 299,6 | 4188,4 | 78,68 |
| 4400 | 12,13 | 695,1 | 291,3 | 261,6 | 73,35 | 182,6 | 455,1 | 243,1 | 217,2 | 78,94 | 78,9 | 4188,5 | 499,6 | 4188,5 | 78,7 |
| 4410 | 12,13 | 694,7 | 293 | 263,2 | 73,15 | 182,2 | 456,6 | 244,2 | 218,5 | 78,98 | 78,89 | 4188,5 | 499,6 | 4188,5 | 78,72 |
| 4420 | 12,13 | 695,5 | 294,7 | 264,8 | 73,18 | 181,8 | 457,9 | 245,4 | 219,9 | 78,98 | 78,85 | 4188,5 | 749,4 | 4188,5 | 78,68 |
| 4430 | 12,13 | 696,9 | 296,3 | 266,4 | 73,56 | 182,4 | 459,2 | 246,5 | 221,2 | 78,94 | 78,87 | 4188,5 | 749,4 | 4188,5 | 78,69 |
| 4440 | 12,13 | 696,5 | 298 | 268 | 73,7 | 181,7 | 460,6 | 247,7 | 222,6 | 78,97 | 78,86 | 4188,5 | 999,6 | 4188,5 | 78,71 |
| 4450 | 12,13 | 696,2 | 299,7 | 269,7 | 73,55 | 182,1 | 462,1 | 248,8 | 224 | 78,93 | 78,83 | 4188,5 | 999,6 | 4188,5 | 78,69 |
| 4460 | 12,14 | 696,9 | 301,3 | 271,2 | 73,58 | 182,1 | 463,4 | 249,9 | 225,5 | 78,95 | 78,85 | 4188,5 | 1249,5 | 4188,5 | 78,69 |
| 4470 | 12,14 | 697,3 | 303 | 272,8 | 73,51 | 181,8 | 464,7 | 251,1 | 226,9 | 78,93 | 78,87 | 4188,6 | 1249,5 | 4188,6 | 78,71 |
| 4480 | 12,14 | 697,5 | 304,6 | 274,4 | 73,5 | 181,7 | 465,9 | 252,2 | 228,2 | 78,96 | 78,85 | 4188,6 | 1249,5 | 4188,6 | 78,69 |
| 4490 | 12,14 | 696,5 | 306,3 | 276 | 73,79 | 182,1 | 467,1 | 253,4 | 229,6 | 78,94 | 78,88 | 4188,6 | 1499,4 | 4188,6 | 78,7 |
| 4500 | 12,14 | 696,9 | 307,8 | 277,6 | 73,83 | 181,7 | 468,4 | 254,5 | 231 | 78,94 | 78,85 | 4188,6 | 1499,4 | 4188,6 | 78,69 |
| 4510 | 12,14 | 697,9 | 309,5 | 279,2 | 73,92 | 181,8 | 469,7 | 255,7 | 232,5 | 79,03 | 78,85 | 4188,7 | 1749,4 | 4188,7 | 78,72 |
| 4520 | 12,14 | 697,8 | 311,1 | 280,7 | 74,03 | 181,7 | 470,9 | 256,9 | 233,9 | 78,92 | 78,84 | 4188,7 | 1749,4 | 4188,7 | 78,69 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4530 | 12,15 | 699,5 | 312,7 | 282,3 | 73,48 | 181,7 | 472,2 | 258 | 235,2 | 78,95 | 78,86 | 4188,7 | 78,69 | 4188,7 | 78,67 |

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T1 (Flue) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,01 | % | |
| R.M.U. | 0,14 | % | |
| **O.M.U** | **1,74** | **%** | |
| | Ave A.D. | 0,86 | % |
| Standard | Reading | A.D. | |
| | | | |
| 70,0 | 69,40 | 0,86 | |
| 70,0 | 69,40 | 0,86 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,81** | **%** | |
| | Ave A.D. | 0,40 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,40 | 0,40 | |
| 150,0 | 149,40 | 0,40 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,47** | **%** | |
| | Ave A.D. | 0,23 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,30 | 0,23 | |
| 300,0 | 299,30 | 0,23 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,24** | **%** | |
| | Ave A.D. | 0,12 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,40 | 0,12 | |
| 500,0 | 499,40 | 0,12 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,16** | **%** | |
| | Ave A.D. | 0,08 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,40 | 0,08 | |
| 750,0 | 749,40 | 0,08 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,09** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,40 | 0,05 | |
| 1250,0 | 1249,50 | 0,04 | |
| | | | |

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T2 (ambiant) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **0,71** | **%** | |
| | Ave A.D. | 0,33 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,72 | 0,37 | |
| 75,0 | 74,79 | 0,28 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,49** | **%** | |
| | Ave A.D. | 0,23 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,60 | 0,27 | |
| 150,0 | 149,70 | 0,20 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,24** | **%** | |
| | Ave A.D. | 0,12 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,70 | 0,10 | |
| 300,0 | 299,60 | 0,13 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,06** | **%** | |
| | Ave A.D. | 0,02 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,90 | 0,02 | |
| 500,0 | 499,90 | 0,02 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,14** | **%** | |
| | Ave A.D. | 0,07 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,50 | 0,07 | |
| 750,0 | 749,50 | 0,07 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,07** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,40 | 0,05 | |
| 1250,0 | 1249,70 | 0,02 | |
| | | | |

Vincent Pelletier

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T3 (Dilution tunnel) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **0,72** | **%** | |
| | Ave A.D. | 0,33 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,74 | 0,35 | |
| 75,0 | 74,76 | 0,32 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,49** | **%** | |
| | Ave A.D. | 0,23 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,60 | 0,27 | |
| 150,0 | 149,70 | 0,20 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,21** | **%** | |
| | Ave A.D. | 0,10 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,70 | 0,10 | |
| 300,0 | 299,70 | 0,10 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,09** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,80 | 0,04 | |
| 500,0 | 499,80 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,08** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,70 | 0,04 | |
| 750,0 | 749,70 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,02** | **%** | |
| | Ave A.D. | 0,01 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,90 | 0,01 | |
| 1250,0 | 1249,90 | 0,01 | |
| | | | |

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T4 (Firebox top) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,01 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **1,35** | **%** | |
| | Ave A.D. | 0,66 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,50 | 0,67 | |
| 75,0 | 74,51 | 0,65 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,68** | **%** | |
| | Ave A.D. | 0,33 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,50 | 0,33 | |
| 150,0 | 149,50 | 0,33 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,34** | **%** | |
| | Ave A.D. | 0,17 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,50 | 0,17 | |
| 300,0 | 299,50 | 0,17 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,16** | **%** | |
| | Ave A.D. | 0,08 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,60 | 0,08 | |
| | | | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,14** | **%** | |
| | Ave A.D. | 0,07 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,50 | 0,07 | |
| 750,0 | 749,50 | 0,07 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,07** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,50 | 0,04 | |
| 1250,0 | 1249,60 | 0,03 | |
| | | | |

Vincent Pelletier

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T5 (Firebox back) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **0,28** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,97 | 0,04 | |
| 75,0 | 74,97 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,30** | **%** | |
| | Ave A.D. | 0,13 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,80 | 0,13 | |
| 150,0 | 149,80 | 0,13 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,15** | **%** | |
| | Ave A.D. | 0,07 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,80 | 0,07 | |
| 300,0 | 299,80 | 0,07 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,09** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,80 | 0,04 | |
| 500,0 | 499,80 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,10** | **%** | |
| | Ave A.D. | 0,05 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,60 | 0,05 | |
| 750,0 | 749,70 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,06** | **%** | |
| | Ave A.D. | 0,03 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,70 | 0,02 | |
| 1250,0 | 1249,60 | 0,03 | |
| | | | |

Vincent Pelletier

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T6 (Firebox right) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,01 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **1,53** | **%** | |
| | Ave A.D. | 0,75 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,44 | 0,75 | |
| 75,0 | 74,43 | 0,76 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,81** | **%** | |
| | Ave A.D. | 0,40 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,40 | 0,40 | |
| 150,0 | 149,40 | 0,40 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,41** | **%** | |
| | Ave A.D. | 0,20 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,40 | 0,20 | |
| 300,0 | 299,40 | 0,20 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,20** | **%** | |
| | Ave A.D. | 0,10 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,50 | 0,10 | |
| 500,0 | 499,50 | 0,10 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,16** | **%** | |
| | Ave A.D. | 0,08 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,40 | 0,08 | |
| 750,0 | 749,40 | 0,08 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,08** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,50 | 0,04 | |
| 1250,0 | 1249,50 | 0,04 | |
| | | | |

Vincent Pelletier

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T7 (Firebox left) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,01 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **1,46** | **%** | |
| | Ave A.D. | 0,72 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,46 | 0,72 | |
| 75,0 | 74,46 | 0,72 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,81** | **%** | |
| | Ave A.D. | 0,40 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,40 | 0,40 | |
| 150,0 | 149,40 | 0,40 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,37** | **%** | |
| | Ave A.D. | 0,18 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,50 | 0,17 | |
| 300,0 | 299,40 | 0,20 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,20** | **%** | |
| | Ave A.D. | 0,10 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,50 | 0,10 | |
| 500,0 | 499,50 | 0,10 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,16** | **%** | |
| | Ave A.D. | 0,08 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,40 | 0,08 | |
| 750,0 | 749,40 | 0,08 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,08** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,50 | 0,04 | |
| 1250,0 | 1249,50 | 0,04 | |
| | | | |

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T3 (Dilution tunnel) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,01 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **1,50** | **%** | |
| | Ave A.D. | 0,74 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,45 | 0,73 | |
| 75,0 | 74,44 | 0,75 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,81** | **%** | |
| | Ave A.D. | 0,40 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,40 | 0,40 | |
| 150,0 | 149,40 | 0,40 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,37** | **%** | |
| | Ave A.D. | 0,18 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,40 | 0,20 | |
| 300,0 | 299,50 | 0,17 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,20** | **%** | |
| | Ave A.D. | 0,10 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,50 | 0,10 | |
| 500,0 | 499,50 | 0,10 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,16** | **%** | |
| | Ave A.D. | 0,08 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,40 | 0,08 | |
| 750,0 | 749,40 | 0,08 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,07** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,50 | 0,04 | |
| 1250,0 | 1249,60 | 0,03 | |
| | | | |

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T9 (DGM inlet 1) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **0,66** | **%** | |
| | Ave A.D. | 0,30 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,76 | 0,32 | |
| 75,0 | 74,79 | 0,28 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,42** | **%** | |
| | Ave A.D. | 0,20 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,70 | 0,20 | |
| 150,0 | 149,70 | 0,20 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,15** | **%** | |
| | Ave A.D. | 0,07 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,80 | 0,07 | |
| 300,0 | 299,80 | 0,07 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,09** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,80 | 0,04 | |
| 500,0 | 499,80 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,08** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,70 | 0,04 | |
| 750,0 | 749,70 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,04** | **%** | |
| | Ave A.D. | 0,02 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,80 | 0,02 | |
| 1250,0 | 1249,80 | 0,02 | |
| | | | |

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T10 (DGM outlet 1) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **0,77** | **%** | |
| | Ave A.D. | 0,36 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,73 | 0,36 | |
| 75,0 | 74,73 | 0,36 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,42** | **%** | |
| | Ave A.D. | 0,20 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,70 | 0,20 | |
| 150,0 | 149,70 | 0,20 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,24** | **%** | |
| | Ave A.D. | 0,12 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,70 | 0,10 | |
| 300,0 | 299,60 | 0,13 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,15** | **%** | |
| | Ave A.D. | 0,07 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,60 | 0,08 | |
| 500,0 | 499,70 | 0,06 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,12** | **%** | |
| | Ave A.D. | 0,06 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,50 | 0,07 | |
| 750,0 | 749,60 | 0,05 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,07** | **%** | |
| | Ave A.D. | 0,03 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,60 | 0,03 | |
| 1250,0 | 1249,60 | 0,03 | |
| | | | |

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T11 (Probe temperature 1) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **0,53** | **%** | |
| | Ave A.D. | 0,23 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,89 | 0,15 | |
| 75,0 | 74,77 | 0,31 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,24** | **%** | |
| | Ave A.D. | 0,10 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,90 | 0,07 | |
| 150,0 | 149,80 | 0,13 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,12** | **%** | |
| | Ave A.D. | 0,05 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,90 | 0,03 | |
| 300,0 | 299,80 | 0,07 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,06** | **%** | |
| | Ave A.D. | 0,02 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,90 | 0,02 | |
| 500,0 | 499,90 | 0,02 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,07** | **%** | |
| | Ave A.D. | 0,03 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,80 | 0,03 | |
| 750,0 | 749,70 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,02** | **%** | |
| | Ave A.D. | 0,01 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1250,00 | 0,00 | |
| 1250,0 | 1249,80 | 0,02 | |
| | | | |

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T12 (DGM inlet 2) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **0,74** | **%** | |
| | Ave A.D. | 0,35 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,74 | 0,35 | |
| 75,0 | 74,74 | 0,35 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,42** | **%** | |
| | Ave A.D. | 0,20 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,70 | 0,20 | |
| 150,0 | 149,70 | 0,20 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,21** | **%** | |
| | Ave A.D. | 0,10 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,70 | 0,10 | |
| 300,0 | 299,70 | 0,10 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,09** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,80 | 0,04 | |
| 500,0 | 499,80 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,08** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,70 | 0,04 | |
| 750,0 | 749,70 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,04** | **%** | |
| | Ave A.D. | 0,02 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,80 | 0,02 | |
| 1250,0 | 1249,80 | 0,02 | |
| | | | |

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T13 (DGM outlet 2) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,01 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **1,14** | **%** | |
| | Ave A.D. | 0,55 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,60 | 0,53 | |
| 75,0 | 74,57 | 0,57 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,68** | **%** | |
| | Ave A.D. | 0,33 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,50 | 0,33 | |
| 150,0 | 149,50 | 0,33 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,31** | **%** | |
| | Ave A.D. | 0,15 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,50 | 0,17 | |
| 300,0 | 299,60 | 0,13 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,16** | **%** | |
| | Ave A.D. | 0,08 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,60 | 0,08 | |
| 500,0 | 499,60 | 0,08 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,16** | **%** | |
| | Ave A.D. | 0,08 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,40 | 0,08 | |
| 750,0 | 749,40 | 0,08 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,08** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,50 | 0,04 | |
| 1250,0 | 1249,50 | 0,04 | |
| | | | |

Vincent Pelletier

Vincent Pelletier

Date: 2013-06-20

Equipment: SBI-199 & SBI-200
T14 (Probe temperature 2) Temperature: 72 F
Accuracy: 0,1 R.H.: 54%
Reference: SBI-096

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,13 | % | |
| **O.M.U** | **0,72** | **%** | |
| | Ave A.D. | 0,33 | % |
| Standard | Reading | A.D. | |
| | | | |
| 75,0 | 74,75 | 0,33 | |
| 75,0 | 74,75 | 0,33 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,07 | % | |
| **O.M.U** | **0,36** | **%** | |
| | Ave A.D. | 0,17 | % |
| Standard | Reading | A.D. | |
| | | | |
| 150,0 | 149,80 | 0,13 | |
| 150,0 | 149,70 | 0,20 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,03 | % | |
| **O.M.U** | **0,15** | **%** | |
| | Ave A.D. | 0,07 | % |
| Standard | Reading | A.D. | |
| | | | |
| 300,0 | 299,80 | 0,07 | |
| 300,0 | 299,80 | 0,07 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,02 | % | |
| **O.M.U** | **0,09** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 500,0 | 499,80 | 0,04 | |
| 500,0 | 499,80 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,08** | **%** | |
| | Ave A.D. | 0,04 | % |
| Standard | Reading | A.D. | |
| | | | |
| 750,0 | 749,70 | 0,04 | |
| 750,0 | 749,70 | 0,04 | |
| | | | |

| | | | |
|---|---|---|---|
| S.D. | 0,00 | % | |
| R.M.U. | 0,01 | % | |
| **O.M.U** | **0,05** | **%** | |
| | Ave A.D. | 0,02 | % |
| Standard | Reading | A.D. | |
| | | | |
| 1250,0 | 1249,70 | 0,02 | |
| 1250,0 | 1249,70 | 0,02 | |
| | | | |

Vincent Pelletier

Date: 2013-06-20

## Nitrogen

| | Calibration gas | Results |
|---|---|---|
| **CO** | 0,00% | 0,00% |
| **CO2** | 0,00% | 0,00% |
| **O2** | 0,00% | 0,00% |

## Ambiant air

| | Results |
|---|---|
| **CO** | 0,00% |
| **CO2** | 0,00% |
| **O2** | 21,10% |

## Carbon Dioxide

| | Calibration gas | Results |
|---|---|---|
| **CO** | 0,00% | 0,28% |
| **CO2** | 19,80% | 19,98% |
| **O2** | 0,00% | 0,00% |

## Carbon monoxide

| | Calibration gas | Results |
|---|---|---|
| **CO** | 0,996% | 0,98% |
| **CO2** | 0,00% | 0,00% |
| **O2** | 0,00% | 0,00% |

Vincent Pelletier

AIR LIQUIDE

# CERTIFICAT D'ANALYSE

MONTREAL SPECIALTY GAS PLANT
11201 RAY LAWSON
MONTREAL QC
H1J 1M6

**Client:** QUEBEC
2230 BOUL. CHAREST O. STE-FOY
QUEBEC QUEBEC
G1N 2G3 CANADA

**Date d'analyse:** 25/11/2010
**Code de produit:** SPG-2MX0000729
**Qualité:** CERTIFIE
**Taille:** 7
**Raccord de sortie du robinet:** CGA 350

**No de série:** C0010195A
**No d'ordre de fabrication:** 10-SGM-3862
**Pression:** 10125 kPa (15°C)
1500 psi (21°C)
**Volume:** 0,739 m3
**Date d'expiration:** 25/11/2013

| COMPOSANTS | CONCENTRATION NOMINALE | RÉSULTAT D'ANALYSE |
|---|---|---|
| MONOXYDE DE CARBONE | 1 % molaire | 0,996 % molaire |
| AZOTE | BALANCE | BALANCE |

*Analyse réalisée par:* S. Amrani

SAMIA AMRANI B.Sc.

MÉTHODE D'ANALYSE:

La méthode d'analyse est basée sur le principe de la chromatographie en phase gazeuse comme décrit dans les Instructions d'Opérations de Air Liquide Canada. Selon les bescins,on choisi préferentiellement un détecteur FID ou TCD avec une colonne capillaire ou une colonne remplie.

PRÉCISION ANALYTIQUE:

Les spécifications pour les concentrations rapportées sont: +/- 2% pour les constituants en concentration supérieure à 0.5% et +/- 5% pour les constituants en concentration inférieure 0.5%. Sauf indication contraire, la précision d'analyse est indiquée en pourcentage du constituant. Dans certains cas, les valeurs peuvent changer en fonction de la nature, du nombre et de la concentration des constituants du mélange.



www.airliquide.ca

AIR LIQUIDE

# CERTIFICAT D'ANALYSE

MONTREAL SPECIALTY GAS PLANT
11201 RAY LAWSON
MONTREAL QC
H1J 1M6

**Client:** QUEBEC
2230 BOUL. CHAREST O. STE-FOY
QUEBEC QUEBEC
G1N 2G3 CANADA

**Date d'analyse:** 19/09/2013
**Code de produit:** SPG-2MX0008101
**Qualité:** CERTIFIE
**Taille:** 7AL
**Raccord de sortie du robinet:** CGA 580

**No de série:** FF-33551
**No d'ordre de fabrication:** 13-SGM-3199
**Pression:** 13500 kPa (15°C)
2000 psi (21°C)
**Volume:** 1,0 m3
**Date d'expiration:** 19/09/2016

| COMPOSANTS | CONCENTRATION NOMINALE | RÉSULTAT D'ANALYSE |
|---|---|---|
| DIOXYDE DE CARBONE | 20 % molaire | 19,9 % molaire |
| AZOTE | BALANCE | BALANCE |

*Analyse réalisée par:*

FREDERIC GAGNON B.Sc.

**MÉTHODE D'ANALYSE:**

La méthode d'analyse est basée sur le principe de la chromatographie en phase gazeuse comme décrit dans les Instructions d'Opérations de Air Liquide Canada. Selon les besoins,on choisi préférentiellement un détecteur FID ou TCD avec une colonne capillaire ou une colonne remplie.

**PRÉCISION ANALYTIQUE:**

Les spécifications pour les concentrations rapportées sont: +/- 2% pour les constituants en concentration supérieure à 0.5% et +/- 5% pour les constituants en concentration inférieure 0.5%. Sauf indication contraire, la précision d'analyse est indiquée en pourcentage du constituant. Dans certains cas, les valeurs peuvent changer en fonction de la nature, du nombre et de la concentration des constituants du mélange.


C13-SGM-3199-1
24/09/2013

## Claude Paré

**De:** Douglas, Rob [Robert.Douglas@nrc-cnrc.gc.ca]
**Envoyé:** 26 avril 2011 17:45
**À:** 'john.voorhees@intertek.com'
**Cc:** Claude Paré
**Objet:** NMI standards and ISO 17025 MRA recognition

Dear John Voorhees,

M. Claude Paré, a Lab Technician with Stove Builder International Inc. (250, rue de Copenhague Saint-Augustin-de-Desmaures Québec, Canada, G3A 2H3) has asked me to contact you with documentation for their use, by telephone, of our National Research Council (NRC) talking clock as a reference standard in the calibration of stopwatches for the measurement of (SI) time intervals.

Our NRC talking clock announces the official time for Canada, either as NRC Eastern Daylight Time ≡ UTC(NRC) - 4h, or as NRC Eastern Standard Time ≡ UTC(NRC) - 5h, depending on the season. These are defined identities, and this style of a verbal announcement from a National Institute of Metrology (NMI) has, in my long experience, never before required further documentation in the context of stopwatch calibration for time intervals. The start of the "beep" following each announcement is triggered by the UTC(NRC) signal. The UTC(NRC) signal is internationally compared in the highest level comparison amongst NMIs, primarily by continuous GPS measurements, sampled and verified every 5 days and published each month in the CIPM Key comparison CCTF-K001.UTC: http://kcdb.bipm.org/AppendixB/KCDB_ApB_result.asp?cmp_idy=617&cmp_cod=CCTF-K001.UTC&search=1&cmp_cod_search=&page=1&met_idy=8&bra_idy=0&epo_idy=0&cmt_idy=0&ett_idy_org=0&cou_cod=0 .

UTC(NRC), and time intervals derived from this time scale, are recognized http://kcdb.bipm.org/AppendixC/TF/CA/TF_CA.pdf internationally by the signatories of the CIPM MRA: http://www.bipm.org/en/cipm-mra/participation/signatories.html - in my opinion, this is the very highest and widest level of ISO 17025 recognition, and I must confess to being surprised by M. Paré's request.

I recommend this national standard widely for stopwatch calibration in Canada, for use within the uncertainties revealed by variations in repeated measurements that can quantify the overall variation from all the important sources of uncertainty (delay variations on the telephone network, reaction time variation, and the variation of the chronometer's rate). Thus I would be grateful if you would clarify for me what documentation about this standard you or your assessor believe is appropriate to meet the requirements of an ISO 17025 assessment.

**Dr. Rob Douglas**

Principal Research Officer : Agent de recherches principal
Frequency and Time : *Fréquence et temps*
Institute for National Measurement Standards : *Institut des etalons nationaux de mesure*
National Research Council Canada : *Conseil national de recherches Canada*
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Fax: (613) 952-1394 : *Télécopieur: (613) 952-1394*
rob.douglas@nrc-cnrc.gc.ca : *rob.douglas@nrc-cnrc.gc.ca*
Government of Canada : *Gouvernment du Canada*

# Report of Calibration

## As Found / As Left

ACCREDITED
CALIBRATION
CERT #2260.01

**Procedure (RUN): Low Pressure: CAL VER /Ruska 7250LP: Revision: 1.1.A**



***UUT***

| | |
|---|---|
| Made by: | Dwyer |
| Model: | 2000-00 |
| Serial No.: | W80111CF89 |
| ID No.: | SBI-024 |
| Description: | Pressure Gauge |

***Calibration***

| | |
|---|---|
| Report No.: | AC13011280-W80111CF89 |
| Adjusted: | No |
| Condition: | In Tolerance |
| Calibration Date: | 30-Jan-2013 |
| Calibration Due: | 30-Jan-2014 |

***Customer***

STOVE BUILDER INTERNATIONAL INC.
250 RUE DE COPENHAGUE
ST-AUSTIN-DE-DESMAURES, QC
G3A 2H3

***Environment***

| | |
|---|---|
| Temperature: | 23.3°C |
| Humidity: | 38%RH |

**STATEMENT OF UNCERTAINTY**: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2005 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

**STANDARDS**

| Instrument | Model | ID No./Serial No. | Traceability No. | Recall Date |
|---|---|---|---|---|
| Low Pressure Calibrator | Ruska 7250LP | PRE-CAL-06 | 1500138932/1500138934 | 20-Aug-2013 |

**REMARKS:**

Calibrated in vertical position.

Performed by: Anthony Morra
Anthony Morra

Reviewed by: Slava Peciurov

*This report shall not be reproduced except in full without written approval of Alpha Controls and Instrumentation.*

# Report of Calibration

## As Found / As Left

ACCREDITED
CALIBRATION
CERT #2260.01

**Procedure (RUN): Low Pressure: CAL VER /Ruska 7250LP: Revision: 1.1.A**



***UUT***

| | |
|---|---|
| Made by: | Dwyer |
| Model: | 2000-00 |
| Serial No.: | W80111CF89 |
| ID No.: | SBI-024 |
| Description: | Pressure Gauge |

***Calibration***

| | |
|---|---|
| Report No.: | AC13011280-W80111CF89 |
| Adjusted: | No |
| Condition: | In Tolerance |
| Calibration Date: | 30-Jan-2013 |
| Calibration Due: | 30-Jan-2014 |

| Test Description | STD | UUT | Error | Tolerance | Units | P/F | Uncertainty |
|---|---|---|---|---|---|---|---|
| ***LOW PRESSURE TEST*** | | | | | | | |
| 0.0000 inH2O | 0.0000 | 0.000 | 0.00000 | ±0.0100 | inH2O | Pass | 5.97e-004 |
| 0.0490 inH2O | 0.0490 | 0.050 | 0.00100 | ±0.0100 | inH2O | Pass | 5.97e-004 |
| 0.0990 inH2O | 0.0990 | 0.100 | 0.00100 | ±0.0100 | inH2O | Pass | 5.97e-004 |
| 0.1490 inH2O | 0.1490 | 0.150 | 0.00100 | ±0.0100 | inH2O | Pass | 5.97e-004 |
| 0.1990 inH2O | 0.1990 | 0.200 | 0.00100 | ±0.0100 | inH2O | Pass | 5.97e-004 |
| 0.2510 inH2O | 0.2510 | 0.250 | -0.00100 | ±0.0100 | inH2O | Pass | 5.97e-004 |
| 0.1990 inH2O | 0.1990 | 0.200 | 0.00100 | ±0.0100 | inH2O | Pass | 5.97e-004 |
| 0.1490 inH2O | 0.1490 | 0.150 | 0.00100 | ±0.0100 | inH2O | Pass | 5.97e-004 |
| 0.0970 inH2O | 0.0970 | 0.100 | 0.00300 | ±0.0100 | inH2O | Pass | 5.97e-004 |
| 0.0470 inH2O | 0.0470 | 0.050 | 0.00300 | ±0.0100 | inH2O | Pass | 5.97e-004 |
| 0.0000 inH2O | 0.0000 | 0.000 | 0.00000 | ±0.0100 | inH2O | Pass | 5.97e-004 |

END OF REPORT

*This report shall not be reproduced except in full without written approval of Alpha Controls and Instrumentation.*

# Thermal Metering System Calibration
# Y factor for Method 5G sampling

| | |
|---|---|
| Manufacturer: | American Meter Company |
| Model: | DTM-200A |
| Serial Number: | 90R054300 |

**Previous Calibration Comparision**

| | | | |
|---|---|---|---|
| Date | 2013-07-02 | Acceptable | |
| | | Deviation (5%) | Deviation |
| y Factor | 0.977 | 0.04885 | 0.025 |
| Acceptance | Acceptable | | |

**Average Gas Meter y Factor**

**1.002**

| | |
|---|---|
| Calibration Date: | 10-04-13 |
| Calibrated by: | Claude Paré |
| Calibration Frequency: | 6-month |
| Next Calibration Due: | 04-04-14 |
| Instrument Range: | 1.000 cfm |
| Standard Temp.: | 76 oF |
| Standard Press.: | 29.92 "Hg |
| Barometric Press.: | 30.15 "Hg |
| Signature/Date: | 2013-10-04 |

**Current Calibration**

| | |
|---|---|
| Acceptable y Deviation | 0.049 |
| Maximum y Deviation | 0.002 |
| | |
| | |
| Acceptance | Acceptable |

| Reference Standard * | | | |
|---|---|---|---|
| Standard Calibrator | Model | Standard Test Meter | |
| | S/N | 07J264834 | |
| | Calib. Date | 26-août-13 | |
| | Calib. Value | 0.9920 | y factor (ref) |

| Calibration Parameters | Run 1 | Run 2 | Run 3 |
|---|---|---|---|
| Vacuum ("Hg) | 0.00 | 0.00 | 0.00 |
| dH ("H2O) | 0.00 | 0.00 | 0.00 |
| Initial Reference Meter | 994.900 | 0.900 | 7.200 |
| Final Reference Meter | 1000.100 | 6.400 | 12.300 |
| Initial DGM | 862.720 | 868.728 | 874.906 |
| Final DGM | 867.884 | 874.190 | 879.954 |
| Temp. Ref. Meter (°F), Tr | 74.0 | 75.0 | 75.0 |
| Temperature DGM (°F), Td | 75.0 | 76.0 | 76.0 |
| Time (Minutes) | 31.5 | 22.3 | 58.8 |
| Net Volume Ref. Meter, Vr | 5.200 | 5.500 | 5.100 |
| Net Volume DGM, Vd | 5.164 | 5.462 | 5.048 |
| **Gas Meter y Factor =** | **1.001** | **1.001** | **1.004** |
| Gas Meter y Factor Deviation (from avg.) | 0.001 | 0.001 | 0.002 |
| **Orifice dH@** | **0.00** | **0.00** | **0.00** |
| Orifice dH@ Deviation (from avg.) | 0.000 | 0.000 | 0.000 |

where: 0.163936508

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [ (Tr + 460) x time) / Vr ]^2

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

# Thermal Metering System Calibration
# Y factor for Method 5G sampling

| | |
|---|---|
| Manufacturer: | American Meter Company |
| Model: | DTM-200A |
| Serial Number: | 98Z332226 |

**Previous Calibration Comparision**

| | | | |
|---|---|---|---|
| Date | 2013-07-02 | Acceptable | |
| | | Deviation (5%) | Deviation |
| y Factor | 0.986 | 0.0493 | 0.008 |
| Acceptance | Acceptable | | |

| | |
|---|---|
| Average Gas Meter y Factor | **0.994** |
| Calibration Date: | 10-04-13 |
| Calibrated by: | Claude Paré |
| Calibration Frequency: | 6-month |
| Next Calibration Due: | 04-04-14 |
| Instrument Range: | 1.000 cfm |
| Standard Temp.: | 77 oF |
| Standard Press.: | 29.92 "Hg |
| Barometric Press.: | 30.09 "Hg |
| Signature/Date: | 2013-10-04 |

**Current Calibration**

| | |
|---|---|
| Acceptable y Deviation | 0.049 |
| Maximum y Deviation | 0.005 |
| | |
| | |
| Acceptance | Acceptable |

| Reference Standard * | | | |
|---|---|---|---|
| Standard Calibrator | Model | Standard Test Meter | |
| | S/N | 07J264834 | |
| | Calib. Date | 26-août-13 | |
| | Calib. Value | 0.9920 | y factor (ref) |

| Calibration Parameters | Run 1 | Run 2 | Run 3 |
|---|---|---|---|
| Vacuum ("Hg) | 0.00 | 0.00 | 0.00 |
| dH ("H2O) | 0.00 | 0.00 | 0.00 |
| Initial Reference Meter | 13.300 | 19.800 | 30.400 |
| Final Reference Meter | 18.800 | 28.700 | 36.800 |
| Initial DGM | 689.801 | 696.342 | 706.856 |
| Final DGM | 695.283 | 705.268 | 713.244 |
| Temp. Ref. Meter (°F), Tr | 76.0 | 77.0 | 77.0 |
| Temperature DGM (°F), Td | 77.0 | 77.0 | 78.0 |
| Time (Minutes) | 44.8 | 28.3 | 60.5 |
| Net Volume Ref. Meter, Vr | 5.500 | 8.900 | 6.400 |
| Net Volume DGM, Vd | 5.482 | 8.926 | 6.388 |
| **Gas Meter y Factor =** | **0.997** | **0.989** | **0.996** |
| Gas Meter y Factor Deviation (from avg.) | 0.003 | 0.005 | 0.002 |
| **Orifice dH@** | **0.00** | **0.00** | **0.00** |
| Orifice dH@ Deviation (from avg.) | 0.000 | 0.000 | 0.000 |

where: 0.122502793

1. Deviation = |Average value for all runs - current run value|
2. y = [Vr x (y factor (ref)) x (Pb) x (Td + 460) / [Vd x (Pb + (dH / 13.6)) x (Tr + 460]
3. dH@ = 0.0317 x dH / (Pb (Td + 460)) x [ (Tr + 460) x time) / Vr ]^2

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

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ACCREDITATION ISO 17025 ™
SCC Scope Number 220

# CALIBRATION CERTIFICATE

| | | | |
|---|---|---|---|
| **Certificate no.:** | 349496 | **Calibration date:** | January 21, 2013 |
| **Identification:** | SBI-096 | **Certificate issued:** | January 31, 2013 |
| **Description:** | CALIBRATOR, OMEGA CL23A | **Interval:** | 12 months |
| **Size:** | TC K/J/T | **Due date:** | January 21, 2014 |
| **Manufacturer:** | OMEGA | **Procedure no.:** | MET/CAL |
| **Model no.:** | CL23A | **Environment:** | CLAS Type 2 Laboratory |
| **Serial no.:** | T-256137 | **Temperature:** | 23 ± 2°C |
| | | **Humidity:** | 35 - 55% RH |
| | | **Metrologist:** | BEN |

**Property of:** SBI
250 RUE DE COPENHAGUE
ST-AUGUSTIN-DE-DESMAURES, QC G3A 2H3

**Approved by:** David Llorens, Quality Manager

*This calibration certificate is issued in accordance with the applicable requirements of ISO/IEC 17025 and Ulrich Metrology's quality manual QM-08. Measurement results provided are traceable to either the National Research Council Canada (NRC), the National Institute of Standards and Technology (NIST), a national laboratory of another country signatory to the CIPM Mutual Recognition Arrangement (MRA), or a calibration laboratory accredited by an accrediting body with which Canada has an equivalence agreement.*

## CALIBRATION STANDARDS

See notes below.

## MEASUREMENT UNCERTAINTY

The above listed instrument meets or exceeds all specifications as stated in the reference procedure, unless noted otherwise. For measurement results associated with the conformance to a tolerance, the uncertainty in the measurement system did not exceed 25% (4:1 test uncertainty ratio) of the acceptable tolerance for each characteristic calibrated, unless otherwise noted in the report.

## CALIBRATION DATA

See next page for measurement results.

**Notes:**

*This certificate replaces certificate 347729. The DATA from 347729 is still valid and unchanged.*

*EQUIPMENT RECEIVED OUT OF SPECIFICATIONS.*

*Failed multiple calibrator outputs.*

*ADJUSTED.*

*The Calibration Laboratory Assessment Service (CLAS) of the National Research Council of Canada (NRC) has assessed and certified specific calibration capabilities of this laboratory and traceability to the International System of Units (SI) or to standards acceptable to the CLAS program. This certificate of calibration is issued in accordance with the conditions of certification granted by CLAS and the conditions of accreditation granted by the Standards Council of Canada (SCC). Neither CLAS nor SCC guarantee the accuracy of individual calibrations by accredited laboratories.*

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# CALIBRATION DATA

**Certificate no.:** 347729
**Identification:** SBI-096
**Description:** CALIBRATOR THERMOMETER
**Serial no.:** T-256137
**Procedure:** Omega CL23A: 5520A-M

**Result:** FAIL
**Condition:** AS-FOUND

## CALIBRATION STANDARDS

| Identification | Description | Manufacturer | Model no. | Cal. Date | Due Date |
|---|---|---|---|---|---|
| 7870009 | CALIBRATOR | FLUKE | 5520A | 2012/03/02 | 2013/03/02 |

## MEASUREMENT RESULTS (Per MET/CAL)

| PARAMETER | TRUE VALUE | TEST RESULT | ACCEPTANCE LIMITS LOW | HIGH | PASS/ FAIL | TUR |
|---|---|---|---|---|---|---|
| Temperature measurements are performed by electrical simulation. | | | | | | |
| DISPLAY CALIBRATION | | | | | | |
| Did all segments of the display illuminate? | | | | | | |
| Result of Operator Evaluation | | | | | PASS | |
| THERMOMETER CALIBRATION | | | | | | |
| K Type Thermocouple | | | | | | |
| -200.0degF | | -200.7 | -201.0 | -199.0 | PASS | 1.7 |
| -60.0degF | | -60.4 | -61.0 | -59.0 | PASS | 3.1 |
| -40.0degF | | -40.4 | -40.5 | -39.5 | PASS | 1.5 |
| 32.0degF | | 31.5 | 31.5 | 32.5 | PASS | 1.7 |
| 1240.0degF | | 1239.5 | 1239.5 | 1240.5 | PASS | 1.1 |
| 1260.0degF | | 1259.5 | 1259.5 | 1260.5 | PASS | 1.1 |
| 2500.0degF | | 2499.3 | 2499.0 | 2501.0 | PASS | 1.4 |
| J Type Thermocouple | | | | | | |
| -200.0degF | | -200.5 | -201.0 | -199.0 | PASS | 2.1 |
| -60.0degF | | -60.2 | -61.0 | -59.0 | PASS | 3.5 |
| -40.0degF | | -40.3 | -40.5 | -39.5 | PASS | 1.7 |
| 32.0degF | | 31.6 | 31.5 | 32.5 | PASS | 2.0 |
| 1240.0degF | | 1239.5 | 1239.5 | 1240.5 | PASS | 1.6 |
| 1260.0degF | | 1259.5 | 1259.5 | 1260.5 | PASS | 1.6 |
| 1400.0degF | | 1399.5 | 1399.4 | 1400.6 | PASS | 1.8 |
| T Type Thermocouple | | | | | | |
| -200.0degF | | -199.9 | -201.0 | -199.0 | PASS | 2.3 |
| -60.0degF | | -59.8 | -61.0 | -59.0 | PASS | 2.3 |
| -40.0degF | | -40.0 | -40.5 | -39.5 | PASS | 1.2 |
| 32.0degF | | 32.0 | 31.5 | 32.5 | PASS | 1.7 |
| 750.0degF | | 749.9 | 749.5 | 750.5 | PASS | 2.0 |
| CALIBRATOR CALIBRATION | | | | | | |
| K Type Thermocouple | | | | | | |
| -200.0degF | | -199.2 | -201.0 | -199.0 | PASS | 1.7 |

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**www.ulrich.ca**

| PARAMETER | TRUE VALUE | TEST RESULT | ACCEPTANCE LIMITS LOW | HIGH | PASS/ FAIL | TUR |
|---|---|---|---|---|---|---|
| -60.0degF | | -59.6 | -61.0 | -59.0 | PASS | 3.1 |
| -40.0degF | | -39.5 | -40.5 | -39.5 | PASS | 1.5 |
| 32.0degF | | 32.3 | 31.5 | 32.5 | PASS | 1.7 |
| 1240.0degF | | 1239.6 | 1239.5 | 1240.5 | PASS | 1.1 |
| 1260.0degF | | 1259.6 | 1259.5 | 1260.5 | PASS | 1.1 |
| 2500.0degF | | 2498.7 | 2499.0 | 2501.0 | FAIL | 1.4 |
| J Type Thermocouple | | | | | | |
| -200.0degF | | -199.6 | -201.0 | -199.0 | PASS | 2.1 |
| -60.0degF | | -59.9 | -61.0 | -59.0 | PASS | 3.5 |
| -40.0degF | | -39.8 | -40.5 | -39.5 | PASS | 1.7 |
| 32.0degF | | 32.0 | 31.5 | 32.5 | PASS | 2.0 |
| 1240.0degF | | 1239.6 | 1239.5 | 1240.5 | PASS | 1.6 |
| 1260.0degF | | 1259.6 | 1259.5 | 1260.5 | PASS | 1.6 |
| 1400.0degF | | 1399.3 | 1399.4 | 1400.6 | FAIL | 1.8 |
| T Type Thermocouple | | | | | | |
| -200.0degF | | -197.5 | -201.0 | -199.0 | FAIL | 2.3 |
| -60.0degF | | -59.9 | -61.0 | -59.0 | PASS | 2.3 |
| -40.0degF | | -39.8 | -40.5 | -39.5 | PASS | 1.2 |
| 32.0degF | | 31.9 | 31.5 | 32.5 | PASS | 1.7 |
| 750.0degF | | 749.6 | 749.5 | 750.5 | PASS | 2.0 |

***End of Test Data***

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# CALIBRATION DATA

**Certificate no.:** 347729
**Identification:** SBI-096
**Description:** CALIBRATOR THERMOMETER
**Serial no.:** T-256137
**Procedure:** Omega CL23A: 5520A-M

**Result:** PASS
**Condition:** AS-LEFT

## CALIBRATION STANDARDS

| Identification | Description | Manufacturer | Model no. | Cal. Date | Due Date |
|---|---|---|---|---|---|
| 7870009 | CALIBRATOR | FLUKE | 5520A | 2012/03/02 | 2013/03/02 |

## MEASUREMENT RESULTS (Per MET/CAL)

| PARAMETER | TRUE VALUE | TEST RESULT | ACCEPTANCE LIMITS LOW | HIGH | PASS/ FAIL | TUR |
|---|---|---|---|---|---|---|
| Temperature measurements are performed by electrical simulation. | | | | | | |
| DISPLAY CALIBRATION | | | | | | |
| Did all segments of the display illuminate? | | | | | | |
| Result of Operator Evaluation | | | | | PASS | |
| THERMOMETER CALIBRATION | | | | | | |
| K Type Thermocouple | | | | | | |
| -200.0degF | | -200.3 | -201.0 | -199.0 | PASS | 1.7 |
| -60.0degF | | -60.1 | -61.0 | -59.0 | PASS | 3.1 |
| -40.0degF | | -40.1 | -40.5 | -39.5 | PASS | 1.5 |
| 32.0degF | | 31.8 | 31.5 | 32.5 | PASS | 1.7 |
| 1240.0degF | | 1239.9 | 1239.5 | 1240.5 | PASS | 1.1 |
| 1260.0degF | | 1259.9 | 1259.5 | 1260.5 | PASS | 1.1 |
| 2500.0degF | | 2500.0 | 2499.0 | 2501.0 | PASS | 1.4 |
| J Type Thermocouple | | | | | | |
| -200.0degF | | -200.3 | -201.0 | -199.0 | PASS | 2.1 |
| -60.0degF | | -60.1 | -61.0 | -59.0 | PASS | 3.5 |
| -40.0degF | | -40.1 | -40.5 | -39.5 | PASS | 1.7 |
| 32.0degF | | 31.9 | 31.5 | 32.5 | PASS | 2.0 |
| 1240.0degF | | 1239.8 | 1239.5 | 1240.5 | PASS | 1.6 |
| 1260.0degF | | 1259.8 | 1259.5 | 1260.5 | PASS | 1.6 |
| 1400.0degF | | 1399.8 | 1399.4 | 1400.6 | PASS | 1.8 |
| T Type Thermocouple | | | | | | |
| -200.0degF | | -199.7 | -201.0 | -199.0 | PASS | 2.3 |
| -60.0degF | | -59.6 | -61.0 | -59.0 | PASS | 2.3 |
| -40.0degF | | -39.7 | -40.5 | -39.5 | PASS | 1.2 |
| 32.0degF | | 32.2 | 31.5 | 32.5 | PASS | 1.7 |
| 750.0degF | | 750.0 | 749.5 | 750.5 | PASS | 2.0 |
| CALIBRATOR CALIBRATION | | | | | | |
| K Type Thermocouple | | | | | | |
| -200.0degF | | -199.6 | -201.0 | -199.0 | PASS | 1.7 |

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| PARAMETER | TRUE VALUE | TEST RESULT | ACCEPTANCE LIMITS LOW | HIGH | PASS/ FAIL | TUR |
|---|---|---|---|---|---|---|
| -60.0degF | | -59.8 | -61.0 | -59.0 | PASS | 3.1 |
| -40.0degF | | -39.8 | -40.5 | -39.5 | PASS | 1.5 |
| 32.0degF | | 32.0 | 31.5 | 32.5 | PASS | 1.7 |
| 1240.0degF | | 1240.2 | 1239.5 | 1240.5 | PASS | 1.1 |
| 1260.0degF | | 1260.3 | 1259.5 | 1260.5 | PASS | 1.1 |
| 2500.0degF | | 2500.6 | 2499.0 | 2501.0 | PASS | 1.4 |
| J Type Thermocouple | | | | | | |
| -200.0degF | | -200.0 | -201.0 | -199.0 | PASS | 2.1 |
| -60.0degF | | -60.1 | -61.0 | -59.0 | PASS | 3.5 |
| -40.0degF | | -40.0 | -40.5 | -39.5 | PASS | 1.7 |
| 32.0degF | | 31.9 | 31.5 | 32.5 | PASS | 2.0 |
| 1240.0degF | | 1240.3 | 1239.5 | 1240.5 | PASS | 1.6 |
| 1260.0degF | | 1260.2 | 1259.5 | 1260.5 | PASS | 1.6 |
| 1400.0degF | | 1400.1 | 1399.4 | 1400.6 | PASS | 1.8 |
| T Type Thermocouple | | | | | | |
| -200.0degF | | -200.5 | -201.0 | -199.0 | PASS | 2.3 |
| -60.0degF | | -60.3 | -61.0 | -59.0 | PASS | 2.3 |
| -40.0degF | | -40.0 | -40.5 | -39.5 | PASS | 1.2 |
| 32.0degF | | 31.9 | 31.5 | 32.5 | PASS | 1.7 |
| 750.0degF | | 750.0 | 749.5 | 750.5 | PASS | 2.0 |

***End of Test Data***

# CERTIFICATE OF NIST TRACEABLE CALIBRATION

## Calibration Certificate No: 37492

LABORATORY ACCREDITATION BUREAU ACCREDITED
Certificate # L2115-1 Calibration

ISO 17025-2005 ACCREDITED

### Customer Information

Customer: SBI St-Augustin

Address : 250, De Copenhague
Doors 11-12
St-Augustin-de-Desmaures

Customer PO #: 36368

### Calibration Procedure Information

Procedure ID: GTP FLOW_INDI Revision #: 7 Revision Date: 1/6/2013

### Calibration Standards Information

| Graftel ID | Manufacturer | Model # | Description | CAL Due |
|---|---|---|---|---|
| 10074 | Meriam | 50MJ10-14 | Laminar Flowmeter | 3/1/2014 |
| 10075 | Meriam | 50MJ10-9 | Laminar Flowmeter | 6/25/2014 |
| 51202 | Paroscientific | 760-100A | Pressure, 100 Psia | 2/22/2014 |
| 10062 | Graftel | 9202 | 5-Channel Temperature Sensor | 8/24/2015 |
| 10128 | Furness | FCO352 | Diff Pressure | 8/5/2014 |
| 60030 | Paroscientific | 760-100A | Pressure, 100 psia | 2/22/2014 |
| 10159 | HOBO | U12-011 | Environment Monitor System | 12/3/2013 |

### Sensor Information

Manufacturer: American Meter
Description: Gas Meter
Method Used: Laminar
Model #: DTM-200A
Rated Accuracy: ± 1 % of Reading
Accuracy Specified By: AmericanMeter
Instrument ID#: SBI-103
Range: 0 to 250 cfh
Condition: Functional
Serial #: 07J264834
Comments: Calibration Date: 08-26-2013

*The instruments(s) listed on this certificate have been calibrated against standards traceable to the National Institue of Standards and Technology (NIST) or compared to nationally or internationally recognized consensus standards. The reported calibration uncertainty has a confidence level of 95% (K=2). A calibration uncertainty ratio of 4:1 was maintained unless required uncertainty is supported by analysis. Graftel, LLC. Quality Assurance System complies with applicable requirements of ISO/IEC-17025-2005 and ISO 9001: 2008. All results contained within this certification relate only to item(s) calibrated. This certificate shall not be reproduced except in full and with the written consent of Graftel, LLC. Acceptance Criteria per Simple Acceptance Rule: Measurement Uncertainty is not applied to the measured value when in/out of tolerance statement is made.*

Performed By: L. Chan Date: 08/26/2013

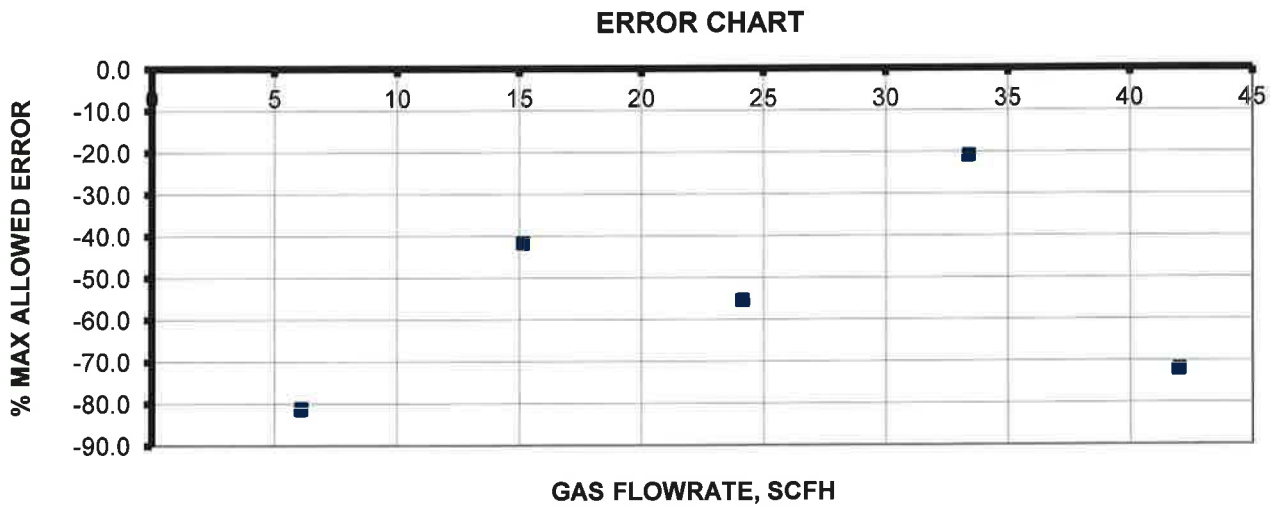
L. Chan
*Calibration Technician*



**GRAFTEL, LLC. 870 Cambridge Drive, Elk Grove Village, IL 60007 847.364.2600**
**www.graftel.com**

# ATTACHMENT TO CALIBRATION CERTIFICATE 37492
## AS FOUND DATA


| Air Flow Rate From Standard, scfh | Air Vol From Standard, scf | Air Vol From Meter, cf | Air vol From Meter, scf | Diff Air Vol STD - METER scf | % Proof | Measurement Uncertainty, scf | STATUS |
|---|---|---|---|---|---|---|---|
| 6.079 | 0.2866 | 0.30 | 0.289 | 0.00 | 99.195 | 0.002 | Pass |
| 15.146 | 0.9610 | 1.00 | 0.965 | 0.00 | 99.585 | 0.005 | Pass |
| 24.166 | 0.9620 | 1.00 | 0.967 | -0.01 | 99.450 | 0.005 | Pass |
| 33.409 | 1.9363 | 2.00 | 1.940 | 0.00 | 99.791 | 0.010 | Pass |
| 42.018 | 1.9333 | 2.00 | 1.947 | -0.01 | 99.285 | 0.010 | Pass |




| INSTRUMENT SPECIFICATIONS | | |
|---|---|---|
| Test Gas | Air | |
| Standard Pressure,Meter | 14.73 | psia |
| Standard Temperature,Meter | 60 | F |
| Rated Accuracy | 1 | % Rding |
| Full Scale Flow Rate | 250 | scfh Natural Gas @ 1/2 inch WC |
| **LABORATORY AMBIENT CONDITIONS** | | |
| Pressure | 14.42 | psia |
| Humidity | 49.63 | % RH |
| Temperature | 69.88 | F |

Flow - Humidity - Temperature - Pressure - Design - Consulting - Engineering
NIST Traceable Calibration Data Sheet
Graftel, LLC. 870 Cambridge Drive, Elk Grove Village, IL 60007
P. 847-364-2600 F. 847-364-2899
www.graftel.com

# Report of Calibration

**As Found / As Left**

ACCREDITED
CALIBRATION
CERT #2260.01

**Procedure (RUN): Low Pressure: CAL VER /Ruska 7250LP: Revision: 1.1.A**



***UUT***

| | |
|---|---|
| Made by: | Dwyer |
| Model: | 2000-0DC |
| Serial No.: | W46QJM |
| ID No.: | SBI-117 |
| Description: | Pressure Gauge |

***Calibration***

| | |
|---|---|
| Report No.: | AC13011280-W46QJM |
| Adjusted: | No |
| Condition: | In Tolerance |
| Calibration Date: | 30-Jan-2013 |
| Calibration Due: | 30-Jan-2014 |

***Customer***

STOVE BUILDER INTERNATIONAL INC.
250 RUE DE COPENHAGUE
ST-AUSTIN-DE-DESMAURES, QC
G3A 2H3

***Environment***

| | |
|---|---|
| Temperature: | 23.4°C |
| Humidity: | 38%RH |

**STATEMENT OF UNCERTAINTY**: The reported expanded uncertainty of measurement is stated as the standard measurement uncertainty multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. Alpha Controls certifies this instrument was calibrated on the date shown using standards traceable to NIST/NRC or accepted intrinsic standards and in compliance with ISO/IEC-17025:2005 and ANSI/NCSL Z540-1.

Any statement of compliance is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only. The customer must ensure equipment calibrated meets the intended use.

Tolerance is based on manufacturer specification if not stated otherwise. Calibration results relate to items calibrated only.

**STANDARDS**

| Instrument | Model | ID No./Serial No. | Traceability No. | Recall Date |
|---|---|---|---|---|
| Low Pressure Calibrator | Ruska 7250LP | PRE-CAL-06 | 1500138932/1500138934 | 20-Aug-2013 |

**REMARKS:**

Calibrated in vertical position.

Performed by: Anthony Morra
Anthony Morra

Reviewed by:
Slava Peciurov

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# Report of Calibration

## As Found / As Left

ACCREDITED
CALIBRATION
CERT #2260.01

**Procedure (RUN): Low Pressure: CAL VER /Ruska 7250LP: Revision: 1.1.A**



***UUT***

Made by: Dwyer
Model: 2000-0DC
Serial No.: W46QJM
ID No.: SBI-117
Description: Pressure Gauge

***Calibration***

Report No.: AC13011280-W46QJM
Adjusted: No
Condition: In Tolerance
Calibration Date: 30-Jan-2013
Calibration Due: 30-Jan-2014

| Test Description | STD | UUT | Error | Tolerance | Units | P/F | Uncertainty |
|---|---|---|---|---|---|---|---|
| ***LOW PRESSURE TEST*** | | | | | | | |
| 0.0000 inH2O | 0.0000 | 0.000 | 0.00000 | ±0.0150 | inH2O | Pass | 5.97e-004 |
| 0.1020 inH2O | 0.1020 | 0.100 | -0.00200 | ±0.0150 | inH2O | Pass | 5.97e-004 |
| 0.2040 inH2O | 0.2040 | 0.200 | -0.00400 | ±0.0150 | inH2O | Pass | 5.97e-004 |
| 0.3050 inH2O | 0.3050 | 0.300 | -0.00500 | ±0.0150 | inH2O | Pass | 5.97e-004 |
| 0.3980 inH2O | 0.3980 | 0.400 | 0.00200 | ±0.0150 | inH2O | Pass | 5.97e-004 |
| 0.5000 inH2O | 0.5000 | 0.500 | 0.00000 | ±0.0150 | inH2O | Pass | 5.97e-004 |
| 0.3960 inH2O | 0.3960 | 0.400 | 0.00400 | ±0.0150 | inH2O | Pass | 5.97e-004 |
| 0.2950 inH2O | 0.2950 | 0.300 | 0.00500 | ±0.0150 | inH2O | Pass | 5.97e-004 |
| 0.1950 inH2O | 0.1950 | 0.200 | 0.00500 | ±0.0150 | inH2O | Pass | 5.97e-004 |
| 0.0950 inH2O | 0.0950 | 0.100 | 0.00500 | ±0.0150 | inH2O | Pass | 5.97e-004 |
| 0.0000 inH2O | 0.0000 | 0.000 | 0.00000 | ±0.0150 | inH2O | Pass | 5.97e-004 |

END OF REPORT

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DIGITAL MEASUREMENT METROLOGY LABORATORY

A division of
**DIGITAL MEASUREMENT METROLOGY INC.**
26 Automatic Road, Unit 4
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TEL. (905) 790-9400 FAX. (905) 790-9266
Internet: *www.dmm.ca* E-mail: *service@dmm.ca*
**L-A-B Accredited Cert# L1048-1 Calibration, Testing & Dim Insp**

# CALIBRATION CERTIFICATE

| | | | | | |
|---|---|---|---|---|---|
| **Description:** | WEIGHT SET | **Calibration Date:** | 10/17/2013 | **Certificate:** | 62610 |
| **Asset Number:** | SBI-190/191 | **Property of:** | SBI ST-AUGUSTIN | | |
| **Serial/Model Number:** | N / A | **Address:** | 250, rue de Copenhague, Doors 10-12 | | |
| **Manufacturer:** | TROEMNER | **City/Prov/PC:** | St-Augustin-de-Desmaures QC G3A 2H3 | | |
| **Instrument Capacity:** | 5 kg to 10 kg | **Country:** | Canada | | |
| **Procedure:** | CP34G | **Method Used:** | COMPARISON | | |
| **Room Humidity:** | 43 % **Room Temp:** 20.2 °C | **Conformance Stds:** | ISO/IEC 17025: 2005 | | |

## CALIBRATION DATA

**Units:** kg

| Asset # | Std/Nominal | As Found | As Left | Min | Max | Tolerance In | Tolerance Out | Uncertainty |
|---|---|---|---|---|---|---|---|---|
| SBI-190 | 5 | 5.0004 | 5.0004 | 4.9995 | 5.0005 | ✔ | | ± 0.2 g |
| SBI-191 | 10 | 10.0006 | 10.0006 | 9.999 | 10.001 | ✔ | | ± 0.22 g |

**Remarks:**

*Inspected, cleaned and tested using the mfgr's specs and procedures, customer's, national or international standards, or new procedure design. Measurement uncertainty is not considered when deciding compliance to the tolerance or specs. It is up to the user to make a judgment of conformity to the limits shown.*

**Received Condition:**
In tolerance.

## CALIBRATION STANDARD(S) USED

| Traceable No. | Asset Number | Calibration Date | Date Due |
|---|---|---|---|
| 62370 | DMML-2356075 | 01-Oct-13 | 01-Oct-14 |
| W-023485-14924 | DMML-21669 | 06-Dec-11 | 06-Dec-13 |
| W-023485-14924 | DMML-21701 | 06-Dec-11 | 06-Dec-13 |

Weights are accurate to class F tolerance.

Estimated measurement uncertainty is, at minimum, an accuracy ratio of 4:1, unless otherwise stated.

Reported uncertainties represent a 95 % confidence level assuming a normal distribution, with a coverage factor of k=2.

This calibration was performed in the lab and is traceable to the International System of Units (SI Units) through NIST or NRC. This report is covered by our accreditation.

**Calibration of the instrument expires on October 17, 2014**

The results shown above relate to the above calibrated instrument/equipment only. Copyright of this Certificate is owned by the issuing laboratory and may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

TECHNICIAN Chris Riddle — Christopher Riddle

QUALITY APPROVAL Andrés Galeano — Andres Galeano

**END OF REPORT**

L-A-B ACCREDITED CERT# L1048-1 CALIBRATION
SEAL OF INSPECTION
INSTRUMENTS INSPECTED IN ACCORDANCE WITH ISO/IEC 17025: 2005

**Ulrich Métrologie inc.**
**Ulrich Metrology Inc.**
9912, Côte-de-Liesse
Montréal (Québec) H8T 1A1

Tél. (514) 631-6653
Fax (514) 631-6122
info@ulrich.ca
**www.ulrich.ca**

ACCREDITATION ISO 17025 ™

# CALIBRATION CERTIFICATE

| | | | |
|---|---|---|---|
| **Certificate no.:** | 377318 | **Calibration date:** | August 21, 2013 |
| **Identification:** | SBI-213 | **Certificate issued:** | August 21, 2013 |
| **Description:** | THERMO-HYGROMETER, AMPROBE TH-3 | **Interval:** | 12 months |
| **Manufacturer:** | AMPROBE | **Due date:** | August 21, 2014 |
| **Model no.:** | TH-3 | **Procedure no.:** | MET/CAL |
| **Serial no.:** | 101004044 | **Environment:** | CLAS Type 2 Laboratory |
| | | **Temperature:** | 23 ± 2°C |
| | | **Humidity:** | 35 - 55% RH |
| | | **Metrologist:** | NFS |

**Property of:** SBI
250 RUE DE COPENHAGUE
ST-AUGUSTIN-DE-DESMAURES, QC G3A 2H3

**Approved by:** David Llorens, Quality Manager

*This calibration certificate is issued in accordance with the applicable requirements of ISO/IEC 17025 and Ulrich Metrology's quality manual QM-09 Revision 9. Measurement results provided are traceable to either the National Research Council Canada (NRC), the National Institute of Standards and Technology (NIST), a national laboratory of another country signatory to the CIPM Mutual Recognition Arrangement (MRA), or a calibration laboratory accredited by an accrediting body with which Canada has an equivalence agreement.*

## CALIBRATION STANDARDS

See notes below.

## MEASUREMENT UNCERTAINTY

The above listed instrument meets or exceeds all specifications as stated in the reference procedure, unless noted otherwise. For measurement results associated with the conformance to a tolerance, the uncertainty in the measurement system did not exceed 25% (4:1 test uncertainty ratio) of the acceptable tolerance for each characteristic calibrated, unless otherwise noted in the report.

## CALIBRATION DATA

See next page for measurement results.

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226673 P

**Ulrich Métrologie inc.**
**Ulrich Metrology inc.**
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Montréal (Québec) H8T 1A1

Tél. (514) 631-6653
Fax (514) 631-6122
info@ulrich.ca
www.ulrich.ca

# CALIBRATION DATA

**Certificate no.:** 377318
**Identification:** SBI-213
**Description:** THERMO-HYGROMETER
**Serial no.:** 101004044
**Procedure:** Amprobe TH-3: 2500ST-LT-M

**Result:** PASS
**Condition:** FOUND-LEFT

## CALIBRATION STANDARDS

| Identification | Description | Manufacturer | Model no. | Cal. Date | Due Date |
|---|---|---|---|---|---|
| 1304953 | HUMIDITY GENERATOR | THUNDER SCIENTIFIC | 2500ST-LT | 2013/04/19 | 2014/04/30 |

## MEASUREMENT RESULTS (Per MET/CAL)

| PARAMETER | TRUE VALUE | TEST RESULT | ACCEPTANCE LIMITS LOW | HIGH | PASS/ FAIL | TUR |
|---|---|---|---|---|---|---|
| TEMPERATURE CALIBRATION | | | | | | |
| 23°C | | | | | | |
| 23.00degC | | 23.30 | 22.20 | 23.80 | PASS | |
| RELATIVE HUMIDITY CALIBRATION AT 23°C | | | | | | |
| 20% RH | | | | | | |
| 20.00% | | 19.50 | 17.00 | 23.00 | PASS | |
| 50% RH | | | | | | |
| 50.00% | | 48.50 | 47.00 | 53.00 | PASS | |
| 80% RH | | | | | | |
| 80.00% | | 77.50 | 77.00 | 83.00 | PASS | |

*End of Test Data*

Date: 2/8/2013

Equipment: SBI-232 Temperature: 72 F
Accuracy: 0.01 R.H.: 19%
Reference: Horloge parlante

| | | | |
|---|---|---|---|
| S.D. | 0.00 | % | |
| R.M.U. | 0.00 | % | |
| **O.M.U** | **0.00** | **%** | |
| | Ave A.D. | 0.00 | % |
| Standard | Reading | A.D. | |
| | | | |
| 84360.0 | 84360.0 | 0.00 | |
| | | | |
| | | | |

Technician: Claude Paré

Date: 2/8/2013

Equipment: SBI-234 Temperature: 72 F
Accuracy: 0.01 R.H.: 19%
Reference: Horloge parlante

| | | | |
|---|---|---|---|
| S.D. | 0.00 | % | |
| R.M.U. | 0.00 | % | |
| **O.M.U** | **0.00** | **%** | |
| | Ave A.D. | 0.00 | % |
| Standard | Reading | A.D. | |
| | | | |
| 84360.0 | 84360.0 | 0.00 | |
| | | | |
| | | | |

Technician: Claude Paré

**Certificate No: MT0031229**

**METTLER-TOLEDO, LLC**
1900 Polaris Pkwy
Columbus, OH 43240
1-800-METTLER

# METTLER TOLEDO

ACCREDITED
Cert # 1788.01

# Mass Calibration Certificate

## Customer Information

| | | | |
|---|---|---|---|
| *Customer Name:* | Sbi | *City:* | Saint-Augustin-De-Dema |
| *Address:* | 250 Rue Copenhague | *State / Province:* | QC |
| *Purchase Order:* | 34985 | *Zip / Postal Code:* | G3A 2H3 |

## Measurement and Test Equipment Identification

| | | | |
|---|---|---|---|
| *Serial Number:* | B316239338 | *Date Received:* | 4/17/2013 |
| *Manufacturer:* | Mettler-Toledo | *Condition:* | *Excellent* |
| *Asset number:* | | *Tolerance Class:* | OIML E2 |

## Environmental Conditions

| | | | |
|---|---|---|---|
| *Temperature:* | 20.430 °C | *Relative Humidity:* | 47.680 *%RH* |
| *Barometric Pressure:* | 988.9080 *hPa* | *Air Density:* | 1.1688 *kg/m³* |

The standards used to perform this calibration are traceable to NIST through METTLER TOLEDO traceability number: MT5061

This certificate is issued in accordance with the conditions granted by A2LA under Certificate number 1788.01, which is based on ISO/IEC17025. A2LA has assessed the measurement capability of the laboratory and its traceability to recognized national standards. All uncertainties in this certificate are reported at a 95% (k=2) confidence factor.

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| | | | |
|---|---|---|---|
| *Calibration Date:* | 04/17/2013 | *Next Calibration Due:* | 04/16/2014 |
| *Calibration Technician:* | Kathy Weatherbie | *Signature:* Ann J Anderson | 04/18/2013 |
| | | Metrology Specialist | Date |



16280500A

**Certificate No: MT0031229**

## As Found Data

| Nominal Value&Suffix | Serial Number | True Mass (g) | Conv. Mass (g) | Uncertainty (mg, k = 2) | Tolerance (mg) | Density (g/cm³) |
|---|---|---|---|---|---|---|
| 100 mg | (B316239338) | 0.1000032436 | 0.1000031492 | 0.0017 | 0.016 | 7.95 |



16280500A

**Certificate No: MT0031229**

## As Left Data

| Nominal Value&Suffix | Serial Number | True Mass (g) | Conv. Mass (g) | Uncertainty (mg, k = 2) | Tolerance (mg) | Density (g/cm³) |
|---|---|---|---|---|---|---|
| 100 mg | (B316239338) | 0.1000032436 | 0.1000031492 | 0.0017 | 0.016 | 7.95 |



16280500A

**Certificate No: MT0031229**

## Comparators Used

| # | Equipment Used | Serial Number | Equipment Type | Calibration Due |
|---|---|---|---|---|
| #6 : | a5XL | B010016731 | Automated Mass Comparator | 08/31/2013 |

## Comments

No Remarks



16280500A

## Definitions

**Nominal Value** - The value as labeled on the weight or defined by shape in accordance with OIML R111 for milligram weights. The number within the parentheses after the nominal value is the serial number of the set to which the weight belongs.

**True Mass** - The mass value of the weight if measured in a vacuum.

**Conventional Mass** - For a mass at 20 °C, "Conventional Mass" is the mass of a reference standard of density 8000 kg/m³ which it balances in air with a density of 1.2 kg/m³. This value should be referenced when testing the accuracy of a weighing device using any of the nominal values contained in this certificate. The As Found results will equal the As Left in cases where no adjustment or replacement was required.

**Uncertainty** - All Uncertainty values are reported at 95% confidence level (k=2) . The uncertainty value does not include a component for the affects due to magnetism.

**Tolerance** - The acceptable range of deviation (positive and negative) from the nominal value, including the uncertainty, as defined by ASTM and OIML for the respective classes.

**Density** - The assumed density of the material used by the manufacturer.

**Calibration Process** - The METTLER TOLEDO procedure used to obtain the measurement results. All procedures are based on SOPs as defined in NIST Handbook 145. The same process is used to obtain the As Found and As Left results.

**OOT** - The As Found measurement result combined with the uncertainty exceeded the tolerance for the specified weight class.

**A** - Weight was adjusted after As Found testing to within the appropriate tolerance class.

**R** - The received weight was replaced due to an out of tolerance condition and the weight was not adjustable or the weight for this nominal value was missing.



16280500A

Certificate No: MT0031137

**METTLER-TOLEDO, LLC**
1900 Polaris Pkwy
Columbus, OH 43240
1-800-METTLER

# METTLER TOLEDO

ACCREDITED
Cert # 1788.01

# Mass Calibration Certificate

## Customer Information

| | | | |
|---|---|---|---|
| *Customer Name:* | Sbi | *City:* | Saint-Augustin-De-Dema |
| *Address:* | 250 Rue Copenhague | *State / Province:* | QC |
| *Purchase Order:* | 34985 | *Zip / Postal Code:* | G3A 2H3 |

## Measurement and Test Equipment Identification

| | | | |
|---|---|---|---|
| *Serial Number:* | B316238717 | *Date Received:* | 4/16/2013 |
| *Manufacturer:* | Mettler-Toledo | *Condition:* | *Excellent* |
| *Asset number:* | | *Tolerance Class:* | OIML F1, F2 |

## Environmental Conditions

| | | | |
|---|---|---|---|
| *Temperature:* | 20.365 °C | *Relative Humidity:* | 47.865 *%RH* |
| *Barometric Pressure:* | 981.2060 *hPa* | *Air Density:* | 1.1599 *kg/m³* |

The standards used to perform this calibration are traceable to NIST through METTLER TOLEDO traceability number: MT5061

This certificate is issued in accordance with the conditions granted by A2LA under Certificate number 1788.01, which is based on ISO/IEC17025. A2LA has assessed the measurement capability of the laboratory and its traceability to recognized national standards. All uncertainties in this certificate are reported at a 95% (k=2) confidence factor.

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| | | | |
|---|---|---|---|
| *Calibration Date:* | 04/09/2013 | *Next Calibration Due:* | 04/15/2014 |
| *Calibration Technician:* | Kathy Weatherbie | *Signature:* Ann J Anderson | 04/16/2013 |
| | | Metrology Specialist | Date |



16280500A

**Certificate No: MT0031137**

## As Found Data

| Nominal Value&Suffix | Serial Number | True Mass (g) | Conv. Mass (g) | Uncertainty (mg, k = 2) | Tolerance (mg) | Density (g/cm³) |
|---|---|---|---|---|---|---|
| 200 g | (B316238717) | 200.001163 | 200.000974 | 0.035 | 3.0 | 7.95 |
| 10 g | (B316238717) | 10.0000725 | 10.0000630 | 0.0078 | 0.20 | 7.95 |



16280500A

## As Left Data

| Nominal Value&Suffix | Serial Number | True Mass (g) | Conv. Mass (g) | Uncertainty (mg, k = 2) | Tolerance (mg) | Density (g/cm³) |
|---|---|---|---|---|---|---|
| 200 g | (B316238717) | 200.001163 | 200.000974 | 0.035 | 3.0 | 7.95 |
| 10 g | (B316238717) | 10.0000725 | 10.0000630 | 0.0078 | 0.20 | 7.95 |

Certificate No: **MT0031137**

## Comparators Used

| # | Equipment Used | Serial Number | Equipment Type | Calibration Due |
|---|---|---|---|---|
| #11 : | a200XL | B010016733 | Automated Mass Comparator | 08/31/2013 |

## Comments

No Remarks



16280500A

## Definitions

**Nominal Value** - The value as labeled on the weight or defined by shape in accordance with OIML R111 for milligram weights. The number within the parentheses after the nominal value is the serial number of the set to which the weight belongs.

**True Mass** - The mass value of the weight if measured in a vacuum.

**Conventional Mass** - For a mass at 20 °C, "Conventional Mass" is the mass of a reference standard of density 8000 kg/m³ which it balances in air with a density of 1.2 kg/m³. This value should be referenced when testing the accuracy of a weighing device using any of the nominal values contained in this certificate. The As Found results will equal the As Left in cases where no adjustment or replacement was required.

**Uncertainty** - All Uncertainty values are reported at 95% confidence level (k=2) . The uncertainty value does not include a component for the affects due to magnetism.

**Tolerance** - The acceptable range of deviation (positive and negative) from the nominal value, including the uncertainty, as defined by ASTM and OIML for the respective classes.

**Density** - The assumed density of the material used by the manufacturer.

**Calibration Process** - The METTLER TOLEDO procedure used to obtain the measurement results. All procedures are based on SOPs as defined in NIST Handbook 145. The same process is used to obtain the As Found and As Left results.

**OOT** - The As Found measurement result combined with the uncertainty exceeded the tolerance for the specified weight class.

**A** - Weight was adjusted after As Found testing to within the appropriate tolerance class.

**R** - The received weight was replaced due to an out of tolerance condition and the weight was not adjustable or the weight for this nominal value was missing.



16280500A

**Certificate No: MT00346**

# METTLER TOLEDO

**METTLER TOLEDO**
1900 Polaris Pkwy
Columbus, OH 43240
1-800-METTLER

ACCREDITED
**Cert # 1788.01**

# Mass Calibration Certificate

## Customer Information

| | | | |
|---|---|---|---|
| *Customer Name*: | Mettler-Toledo QC | *City:* | Anjou |
| *Address*: | 9280 Du Parcours | *State / Province:* | QC |
| | | *Zip / Postal Code:* | H1J2Z1 |

## Measurement and Test Equipment Identification

| | | | |
|---|---|---|---|
| *Serial Number:* | MTP4 | *Date Received:* | 03/13/11 |
| *Manufacturer:* | Troemner | *Condition:* | Good |
| *Asset number:* | | *Tolerance Class*: | *ASTM , OIML* 6, F1 |

## Environmental Conditions

| | | | |
|---|---|---|---|
| *Temperature:* | 20.436 ℃ | *Relative Humidity:* | 49.887 *%RH* |
| *Barometric Pressure*: | 988.8998 *hPa* | *Air Density:* | 1.1685 *kg/m*$^3$ |

The standards used to perform this calibration are traceable to NIST through METTLER TOLEDO traceability number: MT5061

This certificate is issued in accordance with the conditions granted by A2LA under Certificate number 1788.01, which is based on ISO/IEC17025. A2LA has assessed the measurement capability of the laboratory and its traceability to recognized national standards. All uncertainties in this certificate are reported at a 95% (k=2) confidence factor.

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| | | | |
|---|---|---|---|
| *Calibration Date:* | 03/30/2011 | *Next Calibration Due:* | 03/30/2013 |
| *Calibration Technician:* | Kathy Weatherbie | *Signature:* Ann J Anderson | 04/07/2011 |
| | | Metrology Specialist | Date |

**Certificate No: MT00346**

## As Found Data

| Nominal Value&Suffix | | Serial Number | True Mass (g) | Conv. Mass (g) | Uncertainty (mg, k = 2) | Density (g/cm³) |
|---|---|---|---|---|---|---|
| 5 kg | * | (MTP4) | 5000.0060 | 4999.9916 | 2.0 | 7.85 |
| 5 kg | | (MTP4) | 5000.0232 | 5000.0089 | 2.0 | 7.85 |
| 2 kg | | (MTP4) | 2000.00054 | 1999.99481 | 0.34 | 7.85 |
| 1 kg | | (MTP4) | 999.998639 | 999.995772 | 0.065 | 7.85 |
| 500 g | | (MTP4) | 499.999773 | 499.998340 | 0.044 | 7.85 |
| 200 g | * | (MTP4) | 199.999566 | 199.998992 | 0.020 | 7.85 |
| 200 g | | (MTP4) | 200.000444 | 199.999871 | 0.020 | 7.85 |
| 100 g | * | (MTP4) | 100.000202 | 99.999915 | 0.018 | 7.85 |
| 100 g | | (MTP4) | 100.000381 | 100.000094 | 0.018 | 7.85 |
| 50 g | | (MTP4) | 49.9999113 | 49.9997680 | 0.0086 | 7.85 |
| 20 g | * | (MTP4) | 20.0000049 | 19.9999475 | 0.0054 | 7.85 |
| 20 g | | (MTP4) | 20.0000019 | 19.9999446 | 0.0054 | 7.85 |
| 10 g | | (MTP4) | 10.0000847 | 10.0000561 | 0.0045 | 7.85 |
| 5 g | | (MTP4) | 5.0000688 | 5.0000545 | 0.0020 | 7.85 |
| 2 g | * | (MTP4) | 2.0000782 | 2.0000725 | 0.0015 | 7.85 |
| 2 g | | (MTP4) | 2.0000555 | 2.0000498 | 0.0015 | 7.85 |
| 1 g | | (MTP4) | 1.0000425 | 1.0000397 | 0.0015 | 7.85 |
| 500 mg | | (MTP4) | 0.4999626 | 0.4999621 | 0.0011 | 7.95 |
| 200 mg | * | (MTP4) | 0.19997458 | 0.19997439 | 0.00085 | 7.95 |
| 200 mg | | (MTP4) | 0.19998519 | 0.19998500 | 0.00085 | 7.95 |
| 100 mg | | (MTP4) | 0.09999607 | 0.09999598 | 0.00084 | 7.95 |
| 50 mg | | (MTP4) | 0.04999361 | 0.04999357 | 0.00069 | 7.95 |
| 20 mg | | (MTP4) | 0.01998330 | 0.01997741 | 0.00061 | 2.70 |
| 10 mg | | (MTP4) | 0.00994911 | 0.00994618 | 0.00062 | 2.70 |

**Certificate No: MT00346**

## As Left Data

| Nominal Value&Suffix | | Serial Number | True Mass (g) | Conv. Mass (g) | Uncertainty (mg, k = 2) | Density (g/cm³) |
|---|---|---|---|---|---|---|
| 5 kg | * | (MTP4) | 5000.0060 | 4999.9916 | 2.0 | 7.85 |
| 5 kg | | (MTP4) | 5000.0232 | 5000.0089 | 2.0 | 7.85 |
| 2 kg | | (MTP4) | 2000.00054 | 1999.99481 | 0.34 | 7.85 |
| 1 kg | | (MTP4) | 999.998639 | 999.995772 | 0.065 | 7.85 |
| 500 g | | (MTP4) | 499.999773 | 499.998340 | 0.044 | 7.85 |
| 200 g | * | (MTP4) | 199.999566 | 199.998992 | 0.020 | 7.85 |
| 200 g | | (MTP4) | 200.000444 | 199.999871 | 0.020 | 7.85 |
| 100 g | * | (MTP4) | 100.000202 | 99.999915 | 0.018 | 7.85 |
| 100 g | | (MTP4) | 100.000381 | 100.000094 | 0.018 | 7.85 |
| 50 g | | (MTP4) | 49.9999113 | 49.9997680 | 0.0086 | 7.85 |
| 20 g | * | (MTP4) | 20.0000049 | 19.9999475 | 0.0054 | 7.85 |
| 20 g | | (MTP4) | 20.0000019 | 19.9999446 | 0.0054 | 7.85 |
| 10 g | | (MTP4) | 10.0000847 | 10.0000561 | 0.0045 | 7.85 |
| 5 g | | (MTP4) | 5.0000688 | 5.0000545 | 0.0020 | 7.85 |
| 2 g | * | (MTP4) | 2.0000782 | 2.0000725 | 0.0015 | 7.85 |
| 2 g | | (MTP4) | 2.0000555 | 2.0000498 | 0.0015 | 7.85 |
| 1 g | | (MTP4) | 1.0000425 | 1.0000397 | 0.0015 | 7.85 |
| 500 mg | | (MTP4) | 0.4999626 | 0.4999621 | 0.0011 | 7.95 |
| 200 mg | * | (MTP4) | 0.19997458 | 0.19997439 | 0.00085 | 7.95 |
| 200 mg | | (MTP4) | 0.19998519 | 0.19998500 | 0.00085 | 7.95 |
| 100 mg | | (MTP4) | 0.09999607 | 0.09999598 | 0.00084 | 7.95 |
| 50 mg | | (MTP4) | 0.04999361 | 0.04999357 | 0.00069 | 7.95 |
| 20 mg | | (MTP4) | 0.01998330 | 0.01997741 | 0.00061 | 2.70 |
| 10 mg | | (MTP4) | 0.00994911 | 0.00994618 | 0.00062 | 2.70 |

**Certificate No: MT00346**

## Comparators Used

| # | Equipment Used | Serial Number | Equipment Type | Calibration Due |
|---|---|---|---|---|
| #6 : | a5XL | B010016731 | Automated Mass Comparator | 06/30/2011 |
| 11# : | a200XL | B010016733 | Automated Mass Comparator | 06/30/2011 |
| 15# : | a1000 | B010016732 | Automated Mass Comparator | 06/01/2011 |
| 16# : | XP2004S | 1129043681 | Comparator | 08/02/2011 |
| 1# : | PR10003 | 1115413821 | Comparator | 08/16/2011 |

## Comments

No Remarks

**Certificate No: MT00346**

## Definitions

**Nominal Value** - The value as labeled on the weight or defined by shape in accordance with OIML R111 for milligram weights. The number within the parentheses after the nominal value is the serial number of the set to which the weight belongs.

**True Mass** - The mass value of the weight if measured in a vacuum.

**Conventional Mass** - For a mass at 20 °C, "Conventional Mass" is the mass of a reference standard of density 8000 kg/m³ which it balances in air with a density of 1.2 kg/m³. This value should be referenced when testing the accuracy of a weighing device using any of the nominal values contained in this certificate. The As Found results will equal the As Left in cases where no adjustment or replacement was required.

**Uncertainty** - All Uncertainty values are reported at 95% confidence level (k=2) . The uncertainty value does not include a component for the affects due to magnetism.

**Tolerance** - The acceptable range of deviation (positive and negative) from the nominal value, including the uncertainty, as defined by ASTM and OIML for the respective classes.

**Density** - The assumed density of the material used by the manufacturer.

**Calibration Process** - The METTLER TOLEDO procedure used to obtain the measurement results. All procedures are based on SOPs as defined in NIST Handbook 145. The same process is used to obtain the As Found and As Left results.

**OOT** - The As Found measurement result combined with the uncertainty exceeded the tolerance for the specified weight class.

**A** - Weight was adjusted after As Found testing to within the appropriate tolerance class.

**R** - The received weight was replaced due to an out of tolerance condition and the weight was not adjustable or the weight for this nominal value was missing.

Measurement Canada | Mesures Canada

An Agency of Industry Canada | Un organisme d'Industrie Canada

**District de Québec**
1550, avenue d'Estimauville
Québec, Québec, G1J 0C4

| № du jeu de poids | Émis le | Date d'expiration |
|---|---|---|
| | 2012-04-23 | 2013-04-23 |
| Propriétaire: Mettler-Toledo L.L.C. | | |
| Adresse: 2435 Watt, porte 15<br>Québec, Qc G1P 3X2 | | |
| Personne ressource: Sylvain Doyon | | No de téléphone: 418-654-0001 |

## CERTIFICAT DE DÉSIGNATION

### Étalons gravimétriques

Je soussigné(e), étant autorisé(e) par le ministre d'Industrie à exercer les pouvoirs du ministre d'Industrie conformément à l'article 13 (1) de la *Loi sur les poids et mesures*,

1) certifie par la présente que l'étalon ou jeu d'étalons a été étalonné conformément à la partie III du Règlement sur les poids et mesures et par rapport à un étalon de référence traçable aux étalons nationaux de mesure du Canada par une chaîne ininterrompue de comparaisons (les étalons nationaux de mesures du Canada sont maintenus par l'Institut des étalons nationaux de mesures (IÉNM) du Conseil national de recherches du Canada), et

2) désigne ledit étalon ou jeu d'étalons décris ci-dessous à titre d'étalon(s) local(aux):

| Numéro d'identification | Valeur Nominale | Numéro d'identification | Valeur Nominale | Numéro d'identification | Valeur Nominale | Numéro d'identification | Valeur Nominale |
|---|---|---|---|---|---|---|---|
| Q118 | 20 kg | Q128 | 20 kg | Q138 | 20 kg | Q148 | 20 kg |
| Q119 | 20 kg | Q129 | 20 kg | Q139 | 20 kg | Q149 | 20 kg |
| Q120 | 20 kg | Q130 | 20 kg | Q140 | 20 kg | Q150 | 20 kg |
| Q121 | 20 kg | Q131 | 20 kg | Q141 | 20 kg | Q151 | 20 kg |
| Q122 | 20 kg | Q132 | 20 kg | Q142 | 20 kg | | |
| Q123 | 20 kg | Q133 | 20 kg | Q143 | 20 kg | | |
| Q124 | 20 kg | Q134 | 20 kg | Q144 | 20 kg | | |
| Q125 | 20 kg | Q135 | 20 kg | Q145 | 20 kg | | |
| Q126 | 20 kg | Q136 | 20 kg | Q146 | 20 kg | | |
| Q127 | 20 kg | Q137 | 20 kg | Q147 | 20 kg | | |

| District | Certifié par | Désigné par : (Lettres moulées) | Titre du poste |
|---|---|---|---|
| 28 | Pascal Turgeon<br>№ du certificat d'étalonnage: 1367024 | Guy Tessier<br>(Signature) | Gestionnaire de district |

Le droit d'auteur de ce certificat appartient à Mesures Canada et ne doit pas être reproduit autrement qu'en totalité sans avoir préalablement obtenu l'autorisation écrite de Mesures Canada.



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**District de Québec**
1550, avenue d'Estimauville
Québec, Québec, G1J 0C4

| № du jeu de poids | Émis le | Date d'expiration |
|---|---|---|
| | 2012-04-23 | 2013-04-23 |
| Propriétaire: Mettler-Toledo L.L.C. | | |
| Adresse: 2435 Watt, porte 15<br>Québec, Qc G1P 3X2 | | |
| Personne ressource: Sylvain Doyon | | No de téléphone: 418-654-0001 |

## CERTIFICAT DE DÉSIGNATION

### Étalons gravimétriques

Je soussigné(e), étant autorisé(e) par le ministre d'Industrie à exercer les pouvoirs du ministre d'Industrie conformément à l'article 13 (1) de la *Loi sur les poids et mesures*,

1) certifie par la présente que l'étalon ou jeu d'étalons a été étalonné conformément à la partie III du Règlement sur les poids et mesures et par rapport à un étalon de référence traçable aux étalons nationaux de mesure du Canada par une chaîne ininterrompue de comparaisons (les étalons nationaux de mesures du Canada sont maintenus par l'Institut des étalons nationaux de mesures (IÉNM) du Conseil national de recherches du Canada), et

2) désigne ledit étalon ou jeu d'étalons décris ci-dessous à titre d'étalon(s) local(aux):

| Numéro d'identification | Valeur Nominale | Numéro d'identification | Valeur Nominale | Numéro d'identification | Valeur Nominale | Numéro d'identification | Valeur Nominale |
|---|---|---|---|---|---|---|---|
| Q101 | 20 kg | Q111 | 20 kg | | | | |
| Q102 | 20 kg | Q112 | 20 kg | | | | |
| Q103 | 20 kg | Q113 | 20 kg | | | | |
| Q104 | 20 kg | Q114 | 20 kg | | | | |
| Q105 | 20 kg | Q115 | 20 kg | | | | |
| Q106 | 20 kg | Q116 | 20 kg | | | | |
| Q107 | 20 kg | | | | | | |
| Q108 | 20 kg | | | | | | |
| Q109 | 20 kg | | | | | | |
| Q110 | 20 kg | | | | | | |

| District | Certifié par | Désigné par : (Lettres moulées) | Titre du poste |
|---|---|---|---|
| 28 | Pascal Turgeon<br>№ du certificat d'étalonnage: 1367024 | Guy Tessier<br>(Signature) | Gestionnaire de district |

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| Document | Calibrated (YMD) - Étalonné (AMJ) |
|---|---|
| **M11-0616** | 2012/03/27 |
| **Project/Applicant - Projet/Requérant** | **Recalibration - Date - de réétalonnage** |
| CP-ML-11-0194<br>Mettler-Toledo Inc. | 2013/03/27 |
| **Owner - Propriétaire** | |
| Mettler-Toledo Inc.<br>110-780 rue King Ouest, suite 220<br><br>Sherbrooke QC J1H 1R7 | |

**Approval and Calibration Services Laboratory**
**Standards Building**
**151 Tunney's Pasture Driveway**
**Ottawa, Ontario**
**K1A 0C9**

**Laboratoire des services d'approbation et d'étalonnage**
**Immeuble des normes**
**151, allée Tunney's Pasture**
**Ottawa, Ontario**
**K1A 0C9**

## Certificate of Calibration and Designation

I, the undersigned, being authorized by the Minister of Industry to exercise the power of the Minister of Industry pursuant to Section 13, sub-section 1 of the Weights and Measures Act,

1) hereby certify that the standard or set of standards has been calibrated in accordance with Part III of the Weights and Measures Regulations in relation to a reference standard traceable to the National Measurement Standards of Canada through an unbroken chain of comparisons (the National Measurement Standards are maintained by the Institute of National Measurement Standards (INMS) of the National Research Council of Canada), and

2) designate the said standard or set of standards described below as local standard(s):

## Certificat d'Étalonnage et de Désignation

Je, soussigné(e), étant autorisé(e) par le ministre d'Industrie à exercer les pouvoirs du ministre d'Industrie conformément à l'article 13, paragraphe 1 de la Loi sur les poids et mesures,

1) certifie par la présente que l'étalon ou jeu d'étalons a été étalonné conformément à la partie III du Règlement sur les poids et mesures et par rapport à un étalon de référence traçable aux étalons nationaux de mesure du Canada par une chaîne ininterrompue de comparaisons (les étalons nationaux de mesures du Canada sont maintenus par l'Institut des étalons nationaux de mesures (IÉNM) du Conseil national de recherches du Canada), et

2) désigne ledit étalon ou jeu d'étalons décris ci-dessous à titre d'étalon(s) local(aux):

| | |
|---|---|
| Project #: | CP-ML-11-0194 |
| Serial No.: | 55588 |
| Standard Group: | Accredited Weight Kits |
| Manufacturer: | Mettler-Toledo Inc. |
| Characteristics: | Mettler Toledo Inc. 5kg to 100mg ( 2 X 5g )<br>(Version:2008/12/10) |

| | |
|---|---|
| No. Projet: | CP-ML-11-0194 |
| No. de série: | 55588 |
| Groupe d'étalons: | Jeux de poids accrédités |
| Fabricant: | Mettler-Toledo Inc. |
| Caractéristiques: | Mettler Toledo Inc. 5kg a 100mg ( 2 X 5g )<br>(Version:2008/12/10) |

| PROCEDURE(S) USED | SOFTWARE USED |
|---|---|
| MC-MA-CP-001ver.7.0 | DTCS ver. 2.3.4 |

| PROCÉDURE(S) UTILISÉ(S) | LOGICIEL(S) UTILISÉ(S) |
|---|---|
| MC-MA-CP-001ver.7.0 | SECI ver. 2.3.4 |

### STANDARD(S) USED

| Device | Certificate | Standard Group |
|---|---|---|
| 874017 | M10-0001 | BM Metric Mass Standards |
| ML88025 | M11-0082 | BM Metric Mass Standards |
| MS58 | M11-0108 | BM Metric Mass Standards |

### ÉTALON(S) UTILISÉ(S)

| Instrument | Certificat | Groupe d'étalons |
|---|---|---|
| 874017 | M10-0001 | BM Étalons de masse - syst. mé |
| ML88025 | M11-0082 | BM Étalons de masse - syst. mé |
| MS58 | M11-0108 | BM Étalons de masse - syst. mé |

Calibrated by: **Denis D'Aoust**
Étalonné par:
Legal Metrologist
Métrologiste légal

Designated by: **Ronald Peasley**
Désigné par:
Senior Engineer - Gravimetry
Ingénieur principal intérimaire - Gravimétrie

Date MAR 28 2012

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The Calibration Laboratory Assessment Service (CLAS) of the National Research Council of Canada (NRC) has assessed and certified specific calibration capabilities of this laboratory and traceability to the International System of Units (SI) or to standards acceptable to the CLAS program. This certificate of calibration is issued in accordance with the conditions of certification granted by CLAS and the conditions of accreditation granted by the Standards Council. Neither CLAS nor SCC guarantee the accuracy of individual calibrations by accredited laboratories.

Le Service d'évaluation des laboratoires d'étalonnage (CLAS) du Conseil national de recherches du Canada (CNRC) a évalué et certifié la capacité d'étalonnage du laboratoire et la traçabilité au Système international d'unités (SI) ou à des étalons acceptables selon le CLAS. Le présent certificat d'étalonnage est délivré conformément aux conditions de certification du CLAS et aux conditions d'accréditation du Conseil canadien des normes (CCN). Le CLAS et le CCN ne garantissent pas l'exactitude des étalonnages individuels effectués par les laboratoires accrédités.

CLAS NRC·CNRC
CLAS 2009-03
SCC 659



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| Document | Calibrated (YMD) - Étalonné (AMJ) |
|---|---|
| M11-0616 | 2012/03/27 |
| Project/Applicant - Projet/Requérant | Recalibration - Date - de réétalonnage |
| CP-ML-11-0194 | 2013/03/27 |
| Mettler-Toledo Inc. | |

# VERIFICATION VALUES - VALEURS D'ESSAI

| Identification Number<br>Numéro d'identification | Nominal Value<br>Valeur nominale |
|---|---|
| TM1 | 5 kg |
| TM2 | 5 kg |
| TM1 | 2 kg |
| TM2 | 2 kg |
| TM | 1 kg |
| TM1 | 500 g |
| TM2 | 500 g |
| TM3 | 500 g |
| TM4 | 500 g |
| TM1 | 200 g |
| TM2 | 200 g |
| TM | 100 g |
| A6 | 50 g |
| A5 | 20 g |
| A4 | 10 g |
| A3• | 10 g |
| A1 | 5 g |
| A2• | 5 g |
| TM• | 2 g |
| TM•• | 2 g |
| 489A | 1 g |
| | 500 mg |
| • | 500 mg |
| | 200 mg |
| • | 200 mg |
| | 100 mg |

**NOTES:**

All weights listed above were verified.
All values are expressed in conventional mass, as defined by the Organisation internationale de métrologie légale (OIML): "The conventional value of the result of weighing a body in air is equal to the mass of a standard, of conventionally chosen density (8000 kg/m^3), at a conventionally chosen temperature (20°C), which balances this body at this reference in air of conventionally chosen density (1.2 kg/m^3)."

The applied standard tolerances are those established in Section 54 and set out in Schedule IV, Part III and IV of the Weights and Measures Regulations.

**NOTES:**

Tous les poids ci-haut mentionnés ont été étalonnés.
Toutes les valeurs sont exprimées en masse conventionnelle qui est définie par l'Organisation internationale de métrologie légale (OIML) comme suit: "La valeur conventionnelle du résultat de l'action de peser un corps dans l'air est égale à la masse d'un étalon, de densité conventionnellement choisie (8000 kg/m^3), à une température choisie conventionnellement (20°C), qui permet d'équilibrer ce corps à cette température de référence dans l'air de densité choisie conventionnellement (1.2 kg/m^3)."

Les marges de tolérance appliquées sont établies à l'article 54 et décrites à l'annex IV, partie III et IV du Règlement sur les poids et mesures.

Fabricant de poêles international inc.
Stove Builder International Inc.

# RAPPORT DE CALIBRATION
# REPORT OF CALIBRATION

## DONNÉES DE CALIBRATION / CALIBRATION DATA

Date de calibration Calibration date: 2013-11-26

Équipement /Equipment: SBI-014 Température / Temperature : 71 F

Précision / Accuracy : 0.05 lbs R.H. : 20 %

Référence / Reference : SBI-190

| Std/Nominal | True Mass (kg) | Scale reading (lbs) | Allowed (lbs) Min | Allowed (lbs) Max | Tolerance |
|---|---|---|---|---|---|
| 5 kg | 5.0004 | 11.00 | 10.82 | 11.23 | In |

**Fait par :**
**Performed by:** Vincent Pelletier

**Vincent Pelletier**

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**SBI, Fabricant de poêles international inc | Stove Builder International Inc.**
250 rue de Copenhague St-Augustin-de-Desmaures (Québec) G3A 2H3, Canada
Tel.: 1 418 878-3040 Fax.: 1 418 878-3001
www.sbi-international.com

Fabricant de poêles international inc.
Stove Builder International Inc.

# RAPPORT DE CALIBRATION
# REPORT OF CALIBRATION

## DONNÉES DE CALIBRATION / CALIBRATION DATA

Date de calibration Calibration date: 2013-12-02

Équipement /Equipment: SBI-014 Température / Temperature : 69 F

Précision / Accuracy : 0.05 lbs R.H. : 21 %

Référence / Reference : SBI-190

| Std/Nominal | True Mass (kg) | Scale reading (lbs) | Allowed (lbs) Min | Allowed (lbs) Max | Tolerance |
|---|---|---|---|---|---|
| 5 kg | 5.0004 | 11.00 | 10.82 | 11.23 | In |

**Fait par :**
**Performed by:** Vincent Pelletier

**Vincent Pelletier**

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250 rue de Copenhague St-Augustin-de-Desmaures (Québec) G3A 2H3, Canada
Tel.: 1 418 878-3040 Fax.: 1 418 878-3001
www.sbi-international.com

Fabricant de poêles international inc.
Stove Builder International Inc.

# RAPPORT DE CALIBRATION
# REPORT OF CALIBRATION

## DONNÉES DE CALIBRATION / CALIBRATION DATA

Date de calibration Calibration date: 2014-02-04

Équipement /Equipment: SBI-014 Température / Temperature : 68 F

Précision / Accuracy : 0.05 lbs R.H. : 13 %

Référence / Reference : SBI-190

| Std/Nominal | True Mass (kg) | Scale reading (lbs) | Allowed (lbs) Min | Allowed (lbs) Max | Tolerance |
|---|---|---|---|---|---|
| 5 kg | 5.0004 | 11.00 | 10.82 | 11.23 | In |

**Fait par :**
**Performed by:** Vincent Pelletier

**Vincent Pelletier**

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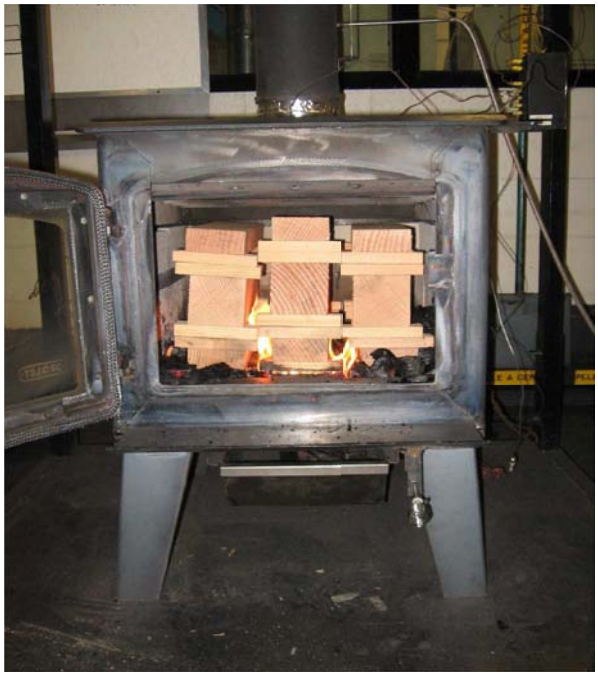
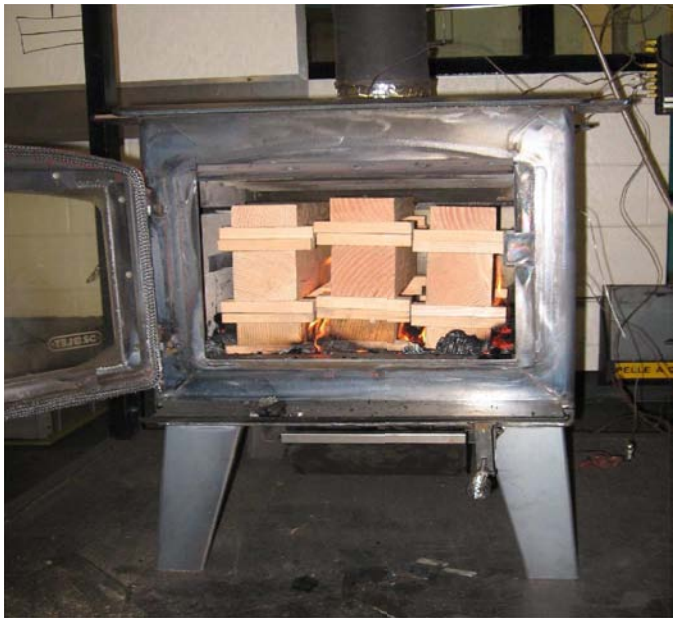
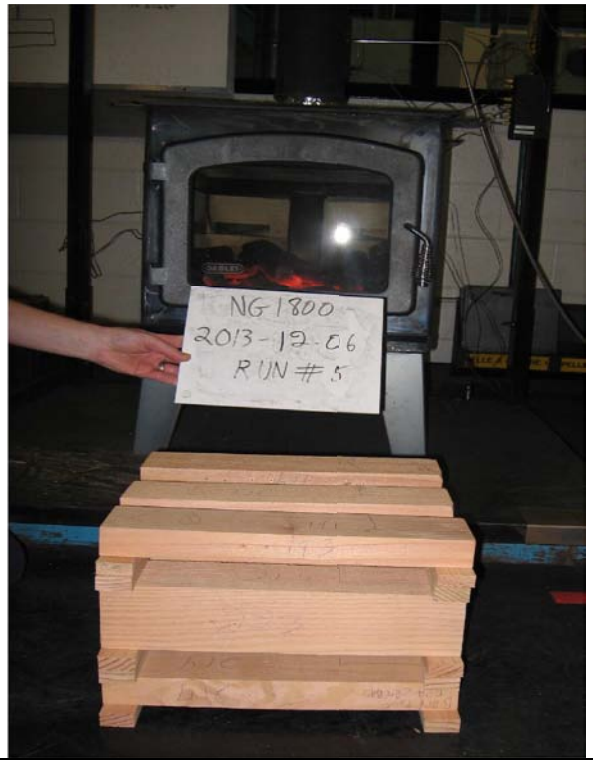
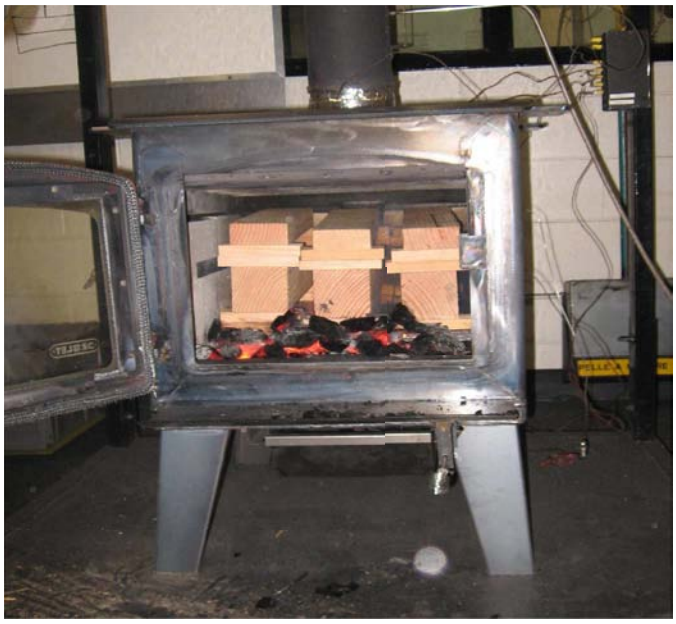
**SBI, Fabricant de poêles international inc | Stove Builder International Inc.**
250 rue de Copenhague St-Augustin-de-Desmaures (Québec) G3A 2H3, Canada
Tel.: 1 418 878-3040 Fax.: 1 418 878-3001
www.sbi-international.com

| | |
|---|---|
| Run 1a Fuel Load<br> <br> | Run 1 Fuel Loaded<br><br>N/A |
| Run 2a Fuel Load<br> <br> | Run 2a Fuel Loaded<br> |

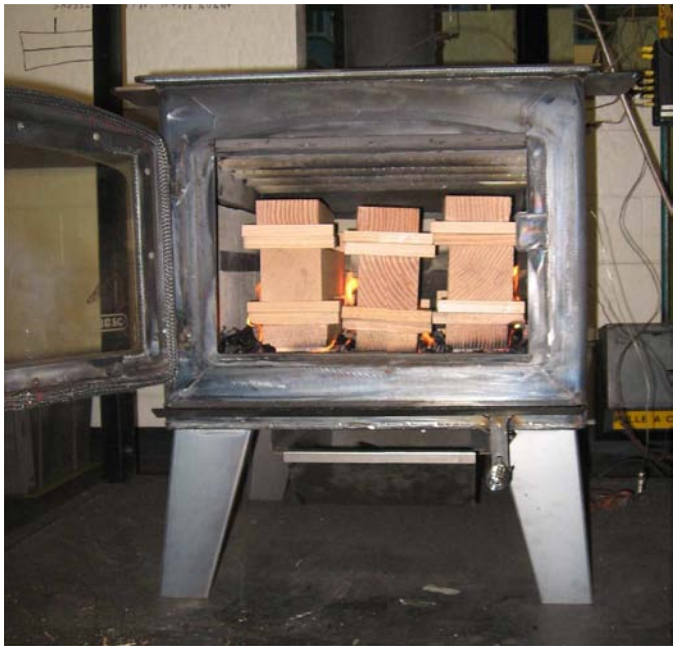
| | |
|---|---|
| Run 1 Fuel Load<br> <br> | Run 1 Fuel Loaded<br>  |
| Run 2 Fuel Load<br> <br> | Run 2 Fuel Loaded<br> |

| | |
|---|---|
| Run 3 Fuel Load<br> <br> | Run 3 Fuel Loaded<br> |
| Run 4 Fuel Load<br> <br> | Run 4 Fuel Loaded<br>  |

| | |
|---|---|
| Run 5 Fuel Load<br>  <br> | Run 5 Fuel Loaded<br> |
| Run 6 Fuel Load<br> <br> | Run 6 Fuel Loaded<br>  |

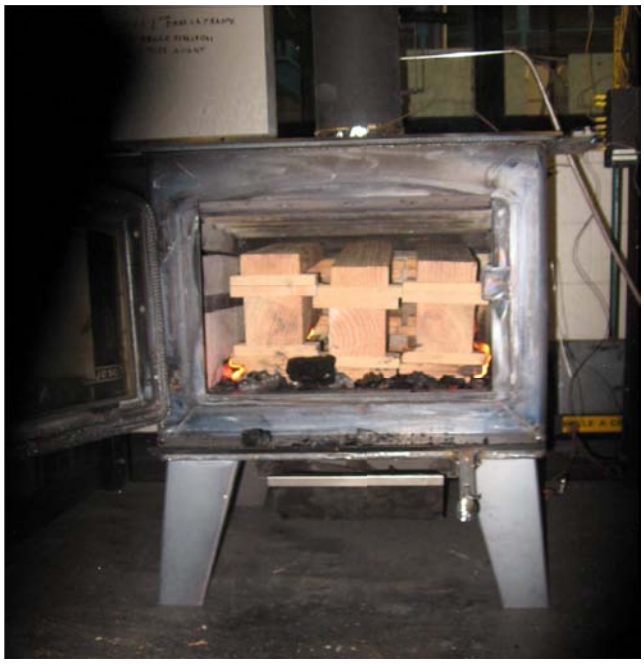
Run 7 Fuel Load

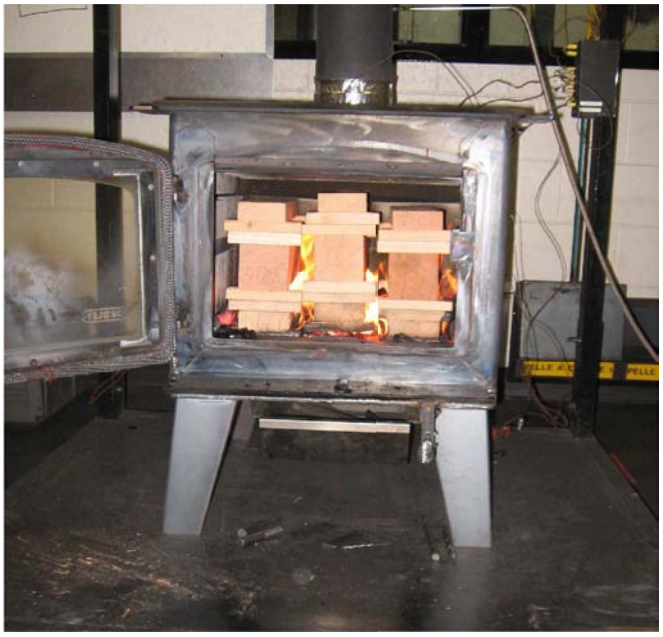
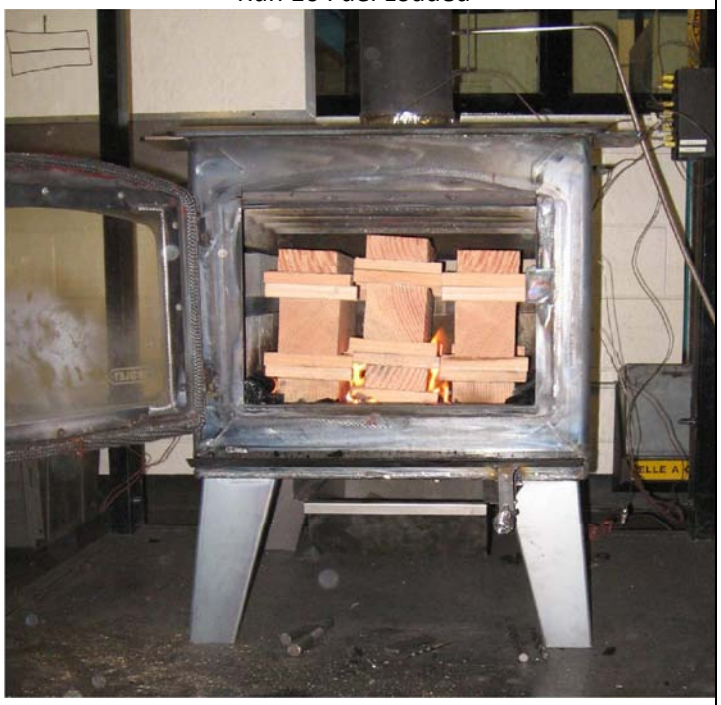
Run 7 Fuel Loaded

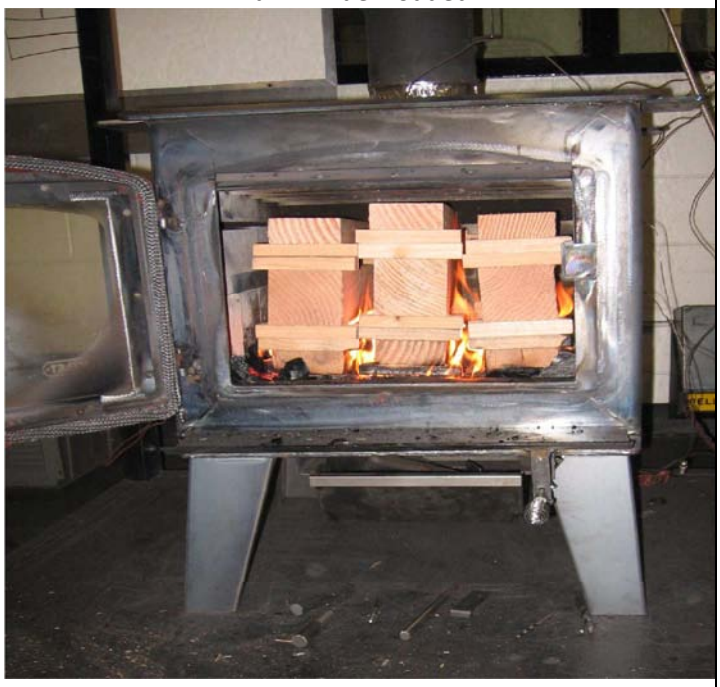


Run 8 Fuel Load

Run 8 Fuel Loaded



| Run 9 Fuel Load | Run 9 Fuel Loaded |
| --- | --- |
| |  |
| Run 10 Fuel Load | Run 10 Fuel Loaded |
| |  |

| Run 11 Fuel Load | Run 11 Fuel Loaded |
| --- | --- |
| |  |

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 2, 2013 |
| Test Run Number: | 1 |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **1.07** | |
| Emission-Rate, g/hr: | **6.39** | |
| Adjusted Emission-Rate, g/hr : | **8.48** | |
| Duration of Test, Minutes | 470 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 852.802 | 854.373 |
| Dry Gas Meter Ending Reading, $ft^3$ | 926.755 | 915.822 |
| Barometric Pressure Correction Factor | 1.005 | 1.005 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 1.004 | 1.005 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **74.776** | **61.685** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **150.844** | |
| Total Tunnel Volume, scf | **70896.791** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 948.119 | 1149.332 |
| Sample Particulate Mass, mg | 51.2 | 44.8 |
| Total Emissions, grams | 48.544 | 51.490 |
| Emission-Rate, g/hr | 6.20 | 6.57 |
| Adjusted Emission Rates, g/hr | **8.27** | **8.69** |
| Deviation, % | 2.44% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 74.79 | 70.89 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.004@5 | 0.0025@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 83.7 | |
| Maximum Ambient Temperture, ℉ | 88 | |
| Mimimum Ambient Temperature, ℉ | 69 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 22.21 | |
| Dry-Basis Fuel Load Moisture Content, % | 20.27 | |
| Wet-Basis Fuel Load Moisture Content, % | 16.85 | |
| Coal Bed Range, lb. | 4.50 | 5.50 |
| Actual Coal Bed, Lb. | 5.35 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | December 2, 2013 |
| Test Run No: | 1 |

## Temperature Data

| | |
|---|---|
| Firebox Temp Start | 410.98 |
| Firebox Temp End | 327.28 |
| Firebox Delta-T | **83.7** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **74.79** | **70.89** |

| Interval | 10 | Duration of Test, Min | **470** |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| 0 | 0 | 81.42 | 105.5 | 250.7 | 311.5 | 449 | 470.3 | 400.2 | 423.9 | | 66.11 | 64.6 | 65 | 64.745 |
| 1 | 10 | 84.57 | 106.2 | 250.7 | 298.4 | 451.5 | 422 | 384.1 | 400.5 | | 72.11 | 68.93 | 65.145 | 64.845 |
| 2 | 20 | 84.36 | 101.8 | 258.4 | 297.6 | 436 | 376.5 | 354.8 | 367.6 | | 73.15 | 69.44 | 65.25 | 64.895 |
| 3 | 30 | 84.97 | 103.5 | 277.3 | 309.4 | 418.2 | 346.7 | 332.1 | 338.9 | | 73.39 | 70.12 | 65.39 | 65.105 |
| 4 | 40 | 85.16 | 104.1 | 288.9 | 331.2 | 398 | 325.4 | 314.3 | 323.6 | | 73.36 | 70.31 | 65.415 | 65.125 |
| 5 | 50 | 85.75 | 102.9 | 274 | 334.8 | 380.1 | 307.4 | 299.6 | 313 | | 73.3 | 69.85 | 65.495 | 65.11 |
| 6 | 60 | 86.27 | 104.6 | 296.4 | 354.1 | 363.5 | 300.8 | 295.9 | 306 | | 73.39 | 69.72 | 65.515 | 65.125 |
| 7 | 70 | 86.05 | 103.5 | 286.3 | 349.2 | 348.5 | 298.7 | 296.4 | 307.6 | | 73.29 | 70.24 | 65.65 | 65.36 |
| 8 | 80 | 85.03 | 107.6 | 332.4 | 360.1 | 333.1 | 306 | 293.6 | 316.6 | | 73.61 | 70.18 | 65.685 | 65.295 |
| 9 | 90 | 85.95 | 107.7 | 327 | 391.8 | 320.7 | 324.3 | 311.5 | 331.9 | | 73.83 | 70.24 | 65.795 | 65.41 |
| 10 | 100 | 86.26 | 110.4 | 350.9 | 414.9 | 308.5 | 341.3 | 328 | 341.5 | | 74.08 | 70.59 | 65.705 | 65.305 |
| 11 | 110 | 87.61 | 110.6 | 344.3 | 436.4 | 297.9 | 361 | 342.6 | 351 | | 74.77 | 70.89 | 65.83 | 65.37 |
| 12 | 120 | 83.45 | 107.4 | 336.6 | 429.9 | 288.5 | 369.9 | 345.6 | 360.5 | | 74.79 | 70.68 | 65.78 | 65.325 |
| 13 | 130 | 85.41 | 107.4 | 340.6 | 427.9 | 280.8 | 370.7 | 346.8 | 366.5 | | 74.46 | 70.49 | 65.71 | 65.135 |
| 14 | 140 | 83.27 | 107.9 | 353 | 436.8 | 273.7 | 373.1 | 350.1 | 373.4 | | 74.33 | 70.26 | 65.66 | 65.21 |
| 15 | 150 | 81.98 | 107.7 | 349.6 | 446 | 269.1 | 380.5 | 359.7 | 382.7 | | 74.45 | 70.48 | 65.7 | 65.26 |
| 16 | 160 | 79.2 | 104.4 | 333.5 | 436.4 | 263.5 | 388.4 | 367.5 | 390.3 | | 74.06 | 70.23 | 65.69 | 65.225 |
| 17 | 170 | 79.78 | 103.8 | 318.4 | 419 | 260.5 | 397 | 372.9 | 395.6 | | 73.71 | 69.88 | 65.605 | 65.035 |
| 18 | 180 | 82.96 | 102.2 | 305.4 | 404.4 | 257.7 | 409.8 | 381.4 | 402.6 | | 73.31 | 69.68 | 65.68 | 65.27 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 190 | 78.26 | 99.51 | 293 | 391.7 | 256.1 | 422.1 | 387.1 | 408.3 | | 73.09 | 69.38 | 65.75 | 65.355 |
| 20 | 200 | 79.63 | 98.1 | 275.1 | 373.1 | 255.5 | 425.9 | 387.6 | 413.9 | | 72.58 | 69.41 | 65.665 | 65.31 |
| 21 | 210 | 82.79 | 97.22 | 260.8 | 350.8 | 255 | 424.1 | 383.7 | 416.6 | | 72.28 | 68.83 | 65.66 | 65.24 |
| 22 | 220 | 80.61 | 94.91 | 251.8 | 331.4 | 254.7 | 422.4 | 378.9 | 416.9 | | 71.94 | 68.52 | 65.64 | 65.21 |
| 23 | 230 | 77.63 | 93.83 | 246 | 318.9 | 257.1 | 421.9 | 378.9 | 416.6 | | 71.77 | 68.35 | 65.655 | 65.23 |
| 24 | 240 | 81.32 | 94.42 | 239.9 | 311.3 | 259.5 | 422.1 | 378.8 | 417.6 | | 71.56 | 68.23 | 65.69 | 65.2 |
| 25 | 250 | 81.12 | 93.4 | 234.1 | 303.7 | 261.4 | 422 | 376.1 | 416.5 | | 71.53 | 68.28 | 65.76 | 65.35 |
| 26 | 260 | 77.23 | 91.9 | 232 | 296.9 | 265 | 421.4 | 373.1 | 415 | | 71.49 | 68.44 | 65.835 | 65.455 |
| 27 | 270 | 80.88 | 92.88 | 229.2 | 293.4 | 266.9 | 419 | 372.5 | 414.4 | | 71.4 | 68.5 | 65.82 | 65.385 |
| 28 | 280 | 78.74 | 91.26 | 226.3 | 288.4 | 268.9 | 416.9 | 370.1 | 411.3 | | 71.18 | 68.31 | 65.765 | 65.295 |
| 29 | 290 | 76.77 | 90.95 | 224.9 | 283.4 | 272.4 | 414.3 | 369.3 | 408.1 | | 71.1 | 68.24 | 65.75 | 65.245 |
| 30 | 300 | 77.72 | 90.44 | 221.6 | 280.5 | 273.3 | 412.7 | 366.9 | 403.4 | | 70.79 | 68.1 | 65.745 | 65.345 |
| 31 | 310 | 73.69 | 88.83 | 219.4 | 275.4 | 276.2 | 411.9 | 362 | 400 | | 70.61 | 68 | 65.74 | 65.295 |
| 32 | 320 | 73.07 | 88.59 | 216.7 | 272.2 | 278.6 | 412.7 | 355 | 399.9 | | 70.52 | 67.84 | 65.76 | 65.25 |
| 33 | 330 | 76.3 | 89.19 | 214.4 | 270.4 | 280.4 | 414.6 | 348.5 | 399.9 | | 70.37 | 67.62 | 65.73 | 65.325 |
| 34 | 340 | 73.77 | 88.01 | 214.1 | 267.3 | 281.7 | 416.9 | 343.8 | 397.2 | | 70.25 | 67.75 | 65.79 | 65.4 |
| 35 | 350 | 72.39 | 87.72 | 213.6 | 266 | 284 | 418.3 | 341.5 | 394.5 | | 70.12 | 67.81 | 65.745 | 65.365 |
| 36 | 360 | 73.46 | 87.94 | 211.4 | 265.4 | 285.7 | 416.5 | 340.1 | 391.6 | | 70.13 | 67.8 | 65.75 | 65.33 |
| 37 | 370 | 75.8 | 88.59 | 210.2 | 262.7 | 286.6 | 415.3 | 339.9 | 386 | | 70.09 | 67.92 | 65.79 | 65.36 |
| 38 | 380 | 74.91 | 87.93 | 209.2 | 261.2 | 287.4 | 421.7 | 342.6 | 379.3 | | 70.13 | 67.77 | 65.795 | 65.42 |
| 39 | 390 | 71.44 | 86.63 | 210.1 | 260 | 289.5 | 427 | 346.2 | 374.3 | | 70.18 | 67.71 | 65.79 | 65.34 |
| 40 | 400 | 73.15 | 86.95 | 208.3 | 259.3 | 290.2 | 430 | 347.4 | 370.1 | | 69.94 | 67.54 | 65.735 | 65.325 |
| 41 | 410 | 70.21 | 86.04 | 207.9 | 258.3 | 291.7 | 431.8 | 348.3 | 365.9 | | 69.76 | 67.6 | 65.735 | 65.315 |
| 42 | 420 | 74.14 | 87.45 | 206.1 | 258.5 | 291.5 | 427.4 | 348.3 | 362.9 | | 69.6 | 67.65 | 65.72 | 65.31 |
| 43 | 430 | 69.26 | 85.26 | 205.1 | 254.7 | 292.1 | 423.4 | 346.4 | 356.4 | | 69.65 | 67.64 | 65.78 | 65.405 |
| 44 | 440 | 71.37 | 86.46 | 204.5 | 252.1 | 292.8 | 422.2 | 346.1 | 352.8 | | 69.74 | 67.66 | 65.815 | 65.44 |
| 45 | 450 | 72.4 | 86.14 | 202.4 | 250 | 292.6 | 421.3 | 344.7 | 348.8 | | 69.67 | 67.65 | 65.85 | 65.425 |
| 46 | 460 | 70.03 | 85.32 | 201.4 | 248 | 293.3 | 418.3 | 342.6 | 345.9 | | 69.63 | 67.63 | 65.83 | 65.385 |
| 47 | 470 | 73.59 | 86.58 | 199.1 | 246.2 | 293.3 | 414.3 | 338.6 | 344 | | 69.63 | 67.54 | 65.825 | 65.435 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 2, 2013 |
| Test Run Number: | 1 |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 30.09 | 81 | Meter Box (A) | 1.002 |
| End | 30.03 | 77 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 470 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.004@5 | 0.0025@5 |

| Maximum Vacuum | | Average Gases, % | | |
|---|---|---|---|---|
| Train A | Train B | O2 | CO2 | CO |
| **0.00** | **0.00** | **14.229** | **5.117** | **1.329** |

| | Particulate Sampling Data | | | | | | | | | | | | Combustion Gasses, % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg | O2 | CO2 | CO |
| **0** | 0.015 | 0.00 | 0.00 | 0.058 | 22.21 | **22.21** | 852.802 | 854.373 | **99.97** | **99.98** | 0.00 | 0.00 | 16.39 | 2.13 | 1.49 |
| **10** | 0.015 | 0.00 | 0.00 | 0.058 | 21.20 | **1.01** | 854.388 | 855.598 | **101.79** | **94.60** | 0.00 | 0.00 | 18.05 | 1.6 | 0.81 |
| **20** | 0.015 | 0.00 | 0.00 | 0.060 | 20.47 | **0.73** | 855.952 | 856.944 | **99.97** | **103.53** | 0.00 | 0.00 | 16.75 | 2.68 | 0.88 |
| **30** | 0.015 | 0.00 | 0.00 | 0.065 | 19.55 | **0.92** | 857.499 | 858.318 | **99.01** | **105.80** | 0.00 | 0.00 | 15.85 | 3.97 | 1.04 |
| **40** | 0.015 | 0.00 | 0.00 | 0.065 | 18.63 | **0.92** | 859.038 | 859.708 | **98.54** | **107.09** | 0.00 | 0.00 | 15.17 | 4.43 | 0.9 |
| **50** | 0.015 | 0.00 | 0.00 | 0.065 | 17.88 | **0.75** | 860.573 | 860.944 | **98.17** | **95.13** | 0.00 | 0.00 | 16.05 | 4.66 | 1.12 |
| **60** | 0.015 | 0.00 | 0.00 | 0.065 | 16.96 | **0.92** | 862.104 | 862.304 | **98.06** | **104.82** | 0.00 | 0.00 | 14.8 | 4.86 | 0.95 |
| **70** | 0.015 | 0.00 | 0.00 | 0.065 | 16.23 | **0.73** | 863.656 | 863.633 | **99.28** | **102.29** | 0.00 | 0.00 | 14.55 | 5.48 | 1.15 |
| **80** | 0.015 | 0.00 | 0.00 | 0.073 | 15.17 | **1.06** | 865.247 | 864.869 | **102.14** | **95.49** | 0.00 | 0.00 | 11.71 | 8.88 | 0.71 |
| **90** | 0.015 | 0.00 | 0.00 | 0.070 | 14.26 | **0.91** | 866.762 | 866.137 | **97.25** | **97.95** | 0.00 | 0.00 | 13.17 | 7.5 | 0.79 |
| **100** | 0.015 | 0.00 | 0.00 | 0.075 | 13.28 | **0.98** | 868.282 | 867.433 | **97.82** | **100.37** | 0.00 | 0.00 | 11.65 | 9.07 | 0.69 |
| **110** | 0.015 | 0.00 | 0.00 | 0.073 | 12.36 | **0.92** | 869.788 | 868.781 | **96.91** | **104.40** | 0.00 | 0.00 | 13.1 | 7.53 | 0.71 |
| **120** | 0.015 | 0.00 | 0.00 | 0.070 | 11.54 | **0.82** | 871.394 | 870.064 | **103.06** | **99.10** | 0.00 | 0.00 | 13.14 | 7.35 | 0.73 |
| **130** | 0.015 | 0.00 | 0.00 | 0.073 | 10.72 | **0.82** | 872.992 | 871.382 | **102.56** | **101.84** | 0.00 | 0.00 | 12.64 | 8.15 | 0.67 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 140 | 0.015 | 0.00 | 0.00 | 0.073 | 9.81 | 0.91 | 874.598 | 872.675 | 103.13 | 99.93 | 0.00 | 0.00 | 12.07 | 8.76 | 0.64 |
| 150 | 0.015 | 0.00 | 0.00 | 0.073 | 8.93 | 0.88 | 876.180 | 873.991 | 101.56 | 101.68 | 0.00 | 0.00 | 12.43 | 8.22 | 0.68 |
| 160 | 0.015 | 0.00 | 0.00 | 0.070 | 8.14 | 0.79 | 877.757 | 875.306 | 100.95 | 101.32 | 0.00 | 0.00 | 12.73 | 7.7 | 0.79 |
| 170 | 0.015 | 0.00 | 0.00 | 0.068 | 7.33 | 0.81 | 879.332 | 876.519 | 100.79 | 93.44 | 0.00 | 0.00 | 12.45 | 7.22 | 1.28 |
| 180 | 0.015 | 0.00 | 0.00 | 0.065 | 6.63 | 0.70 | 880.911 | 877.804 | 100.88 | 98.81 | 0.00 | 0.00 | 12.69 | 6.87 | 1.29 |
| 190 | 0.015 | 0.00 | 0.00 | 0.063 | 6.01 | 0.62 | 882.488 | 879.065 | 100.50 | 96.71 | 0.00 | 0.00 | 13.09 | 6.07 | 1.26 |
| 200 | 0.015 | 0.00 | 0.00 | 0.060 | 5.64 | 0.37 | 884.061 | 880.494 | 100.14 | 109.47 | 0.00 | 0.00 | 13.63 | 5.23 | 1.45 |
| 210 | 0.015 | 0.00 | 0.00 | 0.060 | 5.35 | 0.29 | 885.636 | 881.844 | 100.19 | 103.35 | 0.00 | 0.00 | 13.63 | 5.1 | 1.54 |
| 220 | 0.015 | 0.00 | 0.00 | 0.055 | 5.04 | 0.31 | 887.212 | 883.143 | 100.04 | 99.24 | 0.00 | 0.00 | 13.5 | 5.22 | 1.56 |
| 230 | 0.015 | 0.00 | 0.00 | 0.055 | 4.75 | 0.29 | 888.792 | 884.422 | 100.20 | 97.62 | 0.00 | 0.00 | 13.63 | 5.09 | 1.61 |
| 240 | 0.015 | 0.00 | 0.00 | 0.055 | 4.53 | 0.22 | 890.375 | 885.735 | 100.44 | 100.27 | 0.00 | 0.00 | 13.82 | 4.76 | 1.7 |
| 250 | 0.015 | 0.00 | 0.00 | 0.053 | 4.30 | 0.23 | 891.957 | 887.073 | 100.27 | 102.06 | 0.00 | 0.00 | 13.84 | 4.67 | 1.78 |
| 260 | 0.015 | 0.00 | 0.00 | 0.053 | 4.06 | 0.24 | 893.538 | 888.415 | 100.05 | 102.20 | 0.00 | 0.00 | 13.93 | 4.82 | 1.77 |
| 270 | 0.015 | 0.00 | 0.00 | 0.053 | 3.85 | 0.21 | 895.117 | 889.732 | 100.02 | 100.40 | 0.00 | 0.00 | 13.93 | 4.61 | 1.87 |
| 280 | 0.015 | 0.00 | 0.00 | 0.050 | 3.61 | 0.24 | 896.697 | 891.033 | 99.94 | 99.05 | 0.00 | 0.00 | 14.2 | 4.74 | 1.65 |
| 290 | 0.015 | 0.00 | 0.00 | 0.050 | 3.41 | 0.20 | 898.283 | 892.322 | 100.30 | 98.12 | 0.00 | 0.00 | 14.1 | 4.67 | 1.67 |
| 300 | 0.015 | 0.00 | 0.00 | 0.050 | 3.19 | 0.22 | 899.861 | 893.597 | 99.75 | 96.99 | 0.00 | 0.00 | 14.27 | 4.41 | 1.67 |
| 310 | 0.015 | 0.00 | 0.00 | 0.050 | 2.97 | 0.22 | 901.440 | 894.873 | 99.67 | 96.93 | 0.00 | 0.00 | 14.39 | 4.49 | 1.51 |
| 320 | 0.015 | 0.00 | 0.00 | 0.050 | 2.75 | 0.22 | 903.026 | 896.152 | 100.08 | 97.15 | 0.00 | 0.00 | 14.41 | 4.37 | 1.56 |
| 330 | 0.015 | 0.00 | 0.00 | 0.050 | 2.55 | 0.20 | 904.610 | 897.420 | 100.02 | 96.35 | 0.00 | 0.00 | 14.44 | 4.29 | 1.68 |
| 340 | 0.015 | 0.00 | 0.00 | 0.048 | 2.36 | 0.19 | 906.192 | 898.727 | 99.77 | 99.20 | 0.00 | 0.00 | 14.43 | 4.41 | 1.58 |
| 350 | 0.015 | 0.00 | 0.00 | 0.050 | 2.14 | 0.22 | 907.772 | 900.015 | 99.63 | 97.73 | 0.00 | 0.00 | 14.59 | 4.33 | 1.58 |
| 360 | 0.015 | 0.00 | 0.00 | 0.050 | 1.97 | 0.17 | 909.358 | 901.313 | 100.02 | 98.52 | 0.00 | 0.00 | 14.84 | 3.97 | 1.65 |
| 370 | 0.015 | 0.00 | 0.00 | 0.050 | 1.78 | 0.19 | 910.950 | 902.685 | 100.45 | 104.19 | 0.00 | 0.00 | 14.47 | 4.54 | 1.54 |
| 380 | 0.015 | 0.00 | 0.00 | 0.048 | 1.55 | 0.23 | 912.529 | 903.999 | 99.57 | 99.72 | 0.00 | 0.00 | 14.55 | 4.29 | 1.58 |
| 390 | 0.015 | 0.00 | 0.00 | 0.048 | 1.36 | 0.19 | 914.104 | 905.288 | 99.20 | 97.72 | 0.00 | 0.00 | 14.68 | 4.19 | 1.58 |
| 400 | 0.015 | 0.00 | 0.00 | 0.048 | 1.15 | 0.21 | 915.688 | 906.603 | 99.81 | 99.72 | 0.00 | 0.00 | 14.79 | 4.02 | 1.65 |
| 410 | 0.015 | 0.00 | 0.00 | 0.048 | 0.94 | 0.21 | 917.275 | 907.939 | 99.92 | 101.23 | 0.00 | 0.00 | 14.93 | 4.11 | 1.6 |
| 420 | 0.015 | 0.00 | 0.00 | 0.048 | 0.76 | 0.18 | 918.852 | 909.271 | 99.42 | 101.06 | 0.00 | 0.00 | 15.22 | 3.62 | 1.64 |
| 430 | 0.015 | 0.00 | 0.00 | 0.450 | 0.58 | 0.18 | 920.432 | 910.578 | 99.40 | 98.95 | 0.00 | 0.00 | 15.08 | 4.01 | 1.52 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **440** | **0.015** | **0.00** | **0.00** | **0.450** | **0.43** | **0.15** | **922.010** | **911.933** | **99.37** | **102.69** | **0.00** | **0.00** | 15.08 | 3.81 | 1.56 |
| **450** | **0.015** | **0.00** | **0.00** | **0.475** | **0.25** | **0.18** | **923.592** | **913.220** | **99.59** | **97.51** | **0.00** | **0.00** | 15.2 | 3.71 | 1.56 |
| **460** | **0.015** | **0.00** | **0.00** | **0.450** | **0.07** | **0.18** | **925.175** | **914.523** | **99.58** | **98.65** | **0.00** | **0.00** | 15.43 | 3.54 | 1.59 |
| **470** | **0.015** | **0.00** | **0.00** | **0.045** | **0.00** | **0.07** | **926.755** | **915.822** | **99.51** | **98.45** | **0.00** | **0.00** | 15.52 | 3.46 | 1.55 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 2, 2013 |
| Test Run Number: | 1 |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0100 | 106 | 0.1000 |
| A2 | 0.0150 | 106 | 0.1225 |
| A3 | 0.0150 | 106 | 0.1225 |
| A4 | 0.0150 | 106 | 0.1225 |
| A Center | 0.0150 | 106 | 0.1225 |
| B1 | 0.0100 | 103 | 0.1000 |
| B2 | 0.0150 | 103 | 0.1225 |
| B3 | 0.0150 | 102 | 0.1225 |
| B4 | 0.0125 | 102 | 0.1118 |
| B Center | 0.0150 | 104 | 0.1225 |
| Averages | 0.01375 | 104.43 | 0.1155 |

| | | |
|---|---|---|
| Tunnel Diameter | **8.000** | inches |
| Tunnel Static | **-0.058** | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9432 | factor |
| Baro. Pressure | 30.09 | |
| Pitot Factor | **0.99** | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 7.924 | Ft/ Sec |
| Initial Flow | **149.83** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.011357553 | | |
| VS (2) | 0.013767812 | STD Tunnel Flow: | 150.84 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 470 | | | | 556.284375 | 74.744 | 61.659 | 7.87 | 99.97 | 99.98 |
| Time | Average Firebox Temp | Ending Average Firebox Temp | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 411.0 | | 0.015 | 565.5 | | | 7.936 | | |
| 10 | 391.3 | | 0.015 | 566.2 | 1.605 | 1.230 | 7.941 | 101.79 | 94.60 |
| 20 | 366.5 | | 0.015 | 561.8 | 1.582 | 1.352 | 7.910 | 99.97 | 103.53 |
| 30 | 349.1 | | 0.015 | 563.5 | 1.564 | 1.379 | 7.922 | 99.01 | 105.80 |
| 40 | 338.5 | | 0.015 | 564.1 | 1.556 | 1.395 | 7.926 | 98.54 | 107.09 |
| 50 | 327.0 | | 0.015 | 562.9 | 1.552 | 1.241 | 7.917 | 98.17 | 95.13 |
| 60 | 324.1 | | 0.015 | 564.6 | 1.548 | 1.365 | 7.929 | 98.06 | 104.82 |
| 70 | 320.1 | | 0.015 | 563.5 | 1.569 | 1.333 | 7.922 | 99.28 | 102.29 |
| 80 | 321.9 | | 0.015 | 567.6 | 1.608 | 1.240 | 7.950 | 102.14 | 95.49 |
| 90 | 336.0 | | 0.015 | 567.7 | 1.531 | 1.272 | 7.951 | 97.25 | 97.95 |
| 100 | 346.8 | | 0.015 | 570.4 | 1.536 | 1.300 | 7.970 | 97.82 | 100.37 |
| 110 | 357.8 | | 0.015 | 570.6 | 1.522 | 1.352 | 7.971 | 96.91 | 104.40 |
| 120 | 358.9 | | 0.015 | 567.4 | 1.623 | 1.287 | 7.949 | 103.06 | 99.10 |
| 130 | 358.5 | | 0.015 | 567.4 | 1.615 | 1.323 | 7.949 | 102.56 | 101.84 |
| 140 | 361.4 | | 0.015 | 567.9 | 1.623 | 1.298 | 7.953 | 103.13 | 99.93 |
| 150 | 367.6 | | 0.015 | 567.7 | 1.599 | 1.321 | 7.951 | 101.56 | 101.68 |
| 160 | 369.2 | | 0.015 | 564.4 | 1.594 | 1.320 | 7.928 | 100.95 | 101.32 |
| 170 | 369.0 | | 0.015 | 563.8 | 1.592 | 1.218 | 7.924 | 100.79 | 93.44 |
| 180 | 371.2 | | 0.015 | 562.2 | 1.596 | 1.289 | 7.913 | 100.88 | 98.81 |
| 190 | 373.1 | | 0.015 | 559.51 | 1.594 | 1.265 | 7.894 | 100.50 | 96.71 |
| 200 | 371.2 | | 0.015 | 558.1 | 1.590 | 1.434 | 7.884 | 100.14 | 109.47 |
| 210 | 366.0 | | 0.015 | 557.22 | 1.592 | 1.355 | 7.877 | 100.19 | 103.35 |
| 220 | 360.9 | | 0.015 | 554.91 | 1.593 | 1.304 | 7.861 | 100.04 | 99.24 |
| 230 | 358.7 | | 0.015 | 553.83 | 1.597 | 1.283 | 7.853 | 100.20 | 97.62 |
| 240 | 357.9 | | 0.015 | 554.42 | 1.600 | 1.318 | 7.858 | 100.44 | 100.27 |
| 250 | 355.9 | | 0.015 | 553.4 | 1.599 | 1.342 | 7.850 | 100.27 | 102.06 |
| 260 | 354.3 | | 0.015 | 551.9 | 1.597 | 1.346 | 7.840 | 100.05 | 102.20 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 270 | 353.2 | | 0.015 | 552.88 | 1.596 | 1.321 | 7.847 | 100.02 | 100.40 |
| 280 | 351.1 | | 0.015 | 551.26 | 1.597 | 1.305 | 7.835 | 99.94 | 99.05 |
| 290 | 349.5 | | 0.015 | 550.95 | 1.603 | 1.293 | 7.833 | 100.30 | 98.12 |
| 300 | 347.4 | | 0.015 | 550.44 | 1.595 | 1.279 | 7.829 | 99.75 | 96.99 |
| 310 | 345.1 | | 0.015 | 548.83 | 1.596 | 1.280 | 7.818 | 99.67 | 96.93 |
| 320 | 343.7 | | 0.015 | 548.59 | 1.603 | 1.283 | 7.816 | 100.08 | 97.15 |
| 330 | 342.8 | | 0.015 | 549.19 | 1.601 | 1.272 | 7.820 | 100.02 | 96.35 |
| 340 | 341.4 | | 0.015 | 548.01 | 1.599 | 1.311 | 7.812 | 99.77 | 99.20 |
| 350 | 340.9 | | 0.015 | 547.72 | 1.597 | 1.292 | 7.810 | 99.63 | 97.73 |
| 360 | 339.9 | | 0.015 | 547.94 | 1.603 | 1.302 | 7.812 | 100.02 | 98.52 |
| 370 | 338.1 | | 0.015 | 548.59 | 1.609 | 1.376 | 7.816 | 100.45 | 104.19 |
| 380 | 338.4 | | 0.015 | 547.93 | 1.596 | 1.318 | 7.812 | 99.57 | 99.72 |
| 390 | 339.4 | | 0.015 | 546.63 | 1.592 | 1.293 | 7.802 | 99.20 | 97.72 |
| 400 | 339.4 | | 0.015 | 546.95 | 1.601 | 1.319 | 7.805 | 99.81 | 99.72 |
| 410 | 339.2 | | 0.015 | 546.04 | 1.604 | 1.340 | 7.798 | 99.92 | 101.23 |
| 420 | 337.7 | | 0.015 | 547.45 | 1.594 | 1.336 | 7.808 | 99.42 | 101.06 |
| 430 | 334.6 | | 0.015 | 545.26 | 1.597 | 1.311 | 7.792 | 99.40 | 98.95 |
| 440 | 333.2 | | 0.015 | 546.46 | 1.595 | 1.359 | 7.801 | 99.37 | 102.69 |
| 450 | 331.5 | | 0.015 | 546.14 | 1.598 | 1.291 | 7.799 | 99.59 | 97.51 |
| 460 | 329.6 | | 0.015 | 545.32 | 1.600 | 1.307 | 7.793 | 99.58 | 98.65 |
| 470 | 327.3 | 327.28 | 0.015 | 546.58 | 1.597 | 1.303 | 7.802 | 99.51 | 98.45 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| Sample ID Number: | **101440749MTL-003** |
| Test Date: | **December 2, 2013** |
| Test Run Number: | **1** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.5 | to | 5.5 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 419.58 |

| | |
|---|---|
| Final Coal Bed Wt, lb | 5.35 |

| | |
|---|---|
| Interval | 10 |

| Time | | Temperature Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Flue Draft | Fuel Weight | Weight Loss |
| 0 | 0 | 83.84 | 183.5 | 616.6 | 699.9 | 539.8 | 701.6 | 572.2 | 582.4 | | | 8.48 | **2.96** |
| 1 | 10 | 82.96 | 128.1 | 463.3 | 641.3 | 545.8 | 677.6 | 567.7 | 583.3 | | | 7.33 | 1.15 |
| 2 | 20 | 80.03 | 113.4 | 383.4 | 558.4 | 529.8 | 640.8 | 538 | 559.7 | | | 6.69 | 0.64 |
| 3 | 30 | 79.91 | 104.3 | 332.3 | 479 | 503.8 | 605.2 | 504.1 | 535 | | | 6.35 | 0.34 |
| 4 | 40 | 79.19 | 104.5 | 297 | 417.2 | 488 | 561.9 | 471.9 | 506.1 | | | 6.10 | 0.25 |
| 5 | 50 | 84.47 | 106.6 | 281.4 | 376.2 | 469.7 | 533.2 | 450.7 | 483.4 | | | 5.86 | 0.24 |
| 6 | 60 | 83.34 | 99.46 | 256 | 344.4 | 463.6 | 503.9 | 425.7 | 457.8 | | | 5.67 | 0.19 |
| 7 | 70 | 79.53 | 98.06 | 245.1 | 320.9 | 453 | 479.7 | 408.3 | 436 | | | 5.35 | 0.32 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: December 2, 2013
Test Run Number: 1

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 9 | | 120 | |
| B - Rear Filter Catch | Filter | 10 | | 119.3 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 288.8 | 239.3 | 49.5 |
| Probe & Filter Holder | Probe | 21 | 136039.4 | 136037.7 | 1.7 |
| | | | Total Particulate, mg | | **51.2** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 11 | | 118.6 | |
| B - Rear Filter Catch | Filter | 12 | | 118.9 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 279.5 | 237.5 | 42 |
| Probe & Filter Holder | Probe | 22 | 139572.8 | 139570.0 | 2.8 |
| | | | Total Particulate, mg | | **44.8** |

| | |
|---|---|
| **Manufacturer:** | SBI |
| **Model:** | NG1800 |
| **Date:** | 12/02/13 |
| **Run:** | 1 |
| **Control #:** | G101440749 |
| **Test Duration:** | **470 min** |

| | HHV | LHV |
|---|---|---|
| **Eff** | **64.58%** | **69.80%** |
| **Comb Eff** | **85.95%** | **85.95%** |
| **HT Eff** | **75.13%** | **81.21%** |
| **Output** | **13,684** | **kJ/h** |
| **Burn Rate** | **1.07** | **kg/h** |
| **Grams CO** | **1,663** | **g** |
| **Input** | **21,190** | **kJ/h** |
| **MC wet** | **16.85** | |

| | |
|---|---|
| Overall Heating Efficiency: | 64.58% |
| Combustion Efficiency: | 85.95% |
| Heat Transfer Efficiency: | 75.13% |

| | | | |
|---|---|---|---|
| Heat Output: | 12,981 | Btu/h | |
| Heat Input: | 20,101 | Btu/h | |
| Burn Duration: | 7.83 | h | |
| Burn Rate: | 2.36 | lb/h | |
| Stack Temp: | 257.7 | Deg. F | |

Ultimate $CO_2$

$CO_{2\text{-ult}}$ 19.64

$F_0$

1.060

| **Averages** | **1.33** | **5.12** | **2.26** | **20.51** | **14.73** | **125.31** | **26.10** | **82.4%** | **75.8%** | **62.5%** |
|---|---|---|---|---|---|---|---|---|---|---|
| **INPUT DATA** | | | **Oxygen Calculation** | | | **Input Data** | | **Combust** | **Heat** | **Net** |
| **Elapsed Time** | **Weight Remainin** | **% CO [e]** | **% $CO_2$ [d]** | **Excess Air EA** | **Total $O_2$** | **Calc. % $O_2$ [g]** | **Flue Gas (ºC)** | **Room Temp (ºC)** | **Eff %** | **Transfer %** | **Eff %** |
| 0 | 10.08 | 1.49 | 2.13 | 442.6% | 20.70 | 17.83 | 121.5 | 27.5 | 68.1% | 63.5% | 43.3% |
| 10 | 9.62 | 0.81 | 1.60 | 715.1% | 20.78 | 18.78 | 121.5 | 29.2 | 74.6% | 56.5% | 42.2% |
| 20 | 9.29 | 0.88 | 2.68 | 451.8% | 20.70 | 17.58 | 125.8 | 29.1 | 81.0% | 67.4% | 54.6% |
| 30 | 8.87 | 1.04 | 3.97 | 292.1% | 20.61 | 16.12 | 136.3 | 29.4 | 83.7% | 72.3% | 60.5% |
| 40 | 8.45 | 0.90 | 4.43 | 268.5% | 20.59 | 15.71 | 142.7 | 29.5 | 86.8% | 73.1% | 63.4% |
| 50 | 8.11 | 1.12 | 4.66 | 239.8% | 20.56 | 15.34 | 134.4 | 29.9 | 84.7% | 74.8% | 63.4% |
| 60 | 7.70 | 0.95 | 4.86 | 238.1% | 20.56 | 15.22 | 146.9 | 30.2 | 87.1% | 73.9% | 64.4% |
| 70 | 7.36 | 1.15 | 5.48 | 196.3% | 20.50 | 14.45 | 141.3 | 30.0 | 86.2% | 76.0% | 65.5% |
| 80 | 6.88 | 0.71 | 8.88 | 104.8% | 20.31 | 11.07 | 166.9 | 29.5 | 94.1% | 78.8% | 74.2% |
| 90 | 6.47 | 0.79 | 7.50 | 136.9% | 20.39 | 12.50 | 163.9 | 30.0 | 92.4% | 77.4% | 71.6% |
| 100 | 6.03 | 0.69 | 9.07 | 101.3% | 20.30 | 10.88 | 177.2 | 30.1 | 94.4% | 78.3% | 73.9% |
| 110 | 5.61 | 0.71 | 7.53 | 138.4% | 20.40 | 12.51 | 173.5 | 30.9 | 93.2% | 76.7% | 71.5% |
| 120 | 5.24 | 0.73 | 7.35 | 143.1% | 20.41 | 12.69 | 169.2 | 28.6 | 92.9% | 76.6% | 71.1% |
| 130 | 4.86 | 0.67 | 8.15 | 122.7% | 20.36 | 11.87 | 171.4 | 29.7 | 94.0% | 77.7% | 73.0% |
| 140 | 4.45 | 0.64 | 8.76 | 109.0% | 20.32 | 11.24 | 178.3 | 28.5 | 94.6% | 77.8% | 73.6% |
| 150 | 4.05 | 0.68 | 8.22 | 120.7% | 20.35 | 11.79 | 176.4 | 27.8 | 93.9% | 77.2% | 72.5% |
| 160 | 3.69 | 0.79 | 7.70 | 131.4% | 20.38 | 12.28 | 167.5 | 26.2 | 92.6% | 77.1% | 71.4% |
| 170 | 3.33 | 1.28 | 7.22 | 131.1% | 20.38 | 12.52 | 159.1 | 26.5 | 87.9% | 76.9% | 67.6% |
| 180 | 3.01 | 1.29 | 6.87 | 140.7% | 20.40 | 12.89 | 151.9 | 28.3 | 87.3% | 77.2% | 67.4% |
| 190 | 2.73 | 1.26 | 6.07 | 168.0% | 20.46 | 13.76 | 145.0 | 25.7 | 86.2% | 76.3% | 65.8% |
| 200 | 2.56 | 1.45 | 5.23 | 194.1% | 20.50 | 14.54 | 135.1 | 26.5 | 82.7% | 75.6% | 62.5% |
| 210 | 2.43 | 1.54 | 5.10 | 195.8% | 20.50 | 14.63 | 127.1 | 28.2 | 81.5% | 76.4% | 62.3% |
| 220 | 2.29 | 1.56 | 5.22 | 189.7% | 20.49 | 14.49 | 122.1 | 27.0 | 81.6% | 77.1% | 63.0% |
| 230 | 2.16 | 1.61 | 5.09 | 193.2% | 20.50 | 14.60 | 118.9 | 25.4 | 80.8% | 77.0% | 62.3% |
| 240 | 2.06 | 1.70 | 4.76 | 204.1% | 20.51 | 14.90 | 115.5 | 27.4 | 79.0% | 76.9% | 60.8% |
| 250 | 1.95 | 1.78 | 4.67 | 204.5% | 20.51 | 14.95 | 112.3 | 27.3 | 78.0% | 77.1% | 60.1% |
| 260 | 1.84 | 1.77 | 4.82 | 198.1% | 20.50 | 14.80 | 111.1 | 25.1 | 78.6% | 77.3% | 60.7% |
| 270 | 1.75 | 1.87 | 4.61 | 203.1% | 20.51 | 14.97 | 109.6 | 27.2 | 77.0% | 77.2% | 59.5% |
| 280 | 1.64 | 1.65 | 4.74 | 207.4% | 20.52 | 14.95 | 107.9 | 26.0 | 79.4% | 77.7% | 61.7% |
| 290 | 1.55 | 1.67 | 4.67 | 209.8% | 20.52 | 15.02 | 107.2 | 24.9 | 79.0% | 77.5% | 61.2% |
| 300 | 1.45 | 1.67 | 4.41 | 223.1% | 20.54 | 15.29 | 105.3 | 25.4 | 78.2% | 77.2% | 60.3% |
| 310 | 1.35 | 1.51 | 4.49 | 227.4% | 20.54 | 15.30 | 104.1 | 23.2 | 80.0% | 77.3% | 61.9% |
| 320 | 1.25 | 1.56 | 4.37 | 231.2% | 20.55 | 15.40 | 102.6 | 22.8 | 79.1% | 77.2% | 61.1% |
| 330 | 1.16 | 1.68 | 4.29 | 229.0% | 20.55 | 15.42 | 101.3 | 24.6 | 77.7% | 77.3% | 60.0% |
| 340 | 1.07 | 1.58 | 4.41 | 227.9% | 20.54 | 15.34 | 101.2 | 23.2 | 79.0% | 77.5% | 61.3% |
| 350 | 0.97 | 1.58 | 4.33 | 232.4% | 20.55 | 15.43 | 100.9 | 22.4 | 78.8% | 77.3% | 60.9% |
| 360 | 0.89 | 1.65 | 3.97 | 249.5% | 20.57 | 15.77 | 99.7 | 23.0 | 76.8% | 76.5% | 58.7% |
| 370 | 0.81 | 1.54 | 4.54 | 223.1% | 20.54 | 15.23 | 99.0 | 24.3 | 79.9% | 78.3% | 62.5% |
| 380 | 0.70 | 1.58 | 4.29 | 234.6% | 20.55 | 15.47 | 98.4 | 23.8 | 78.6% | 77.7% | 61.1% |
| 390 | 0.62 | 1.58 | 4.19 | 240.4% | 20.56 | 15.58 | 98.9 | 21.9 | 78.3% | 77.1% | 60.4% |
| 400 | 0.52 | 1.65 | 4.02 | 246.4% | 20.57 | 15.72 | 97.9 | 22.9 | 76.9% | 76.9% | 59.2% |
| 410 | 0.43 | 1.60 | 4.11 | 244.0% | 20.56 | 15.65 | 97.7 | 21.2 | 77.8% | 77.0% | 59.9% |
| 420 | 0.34 | 1.64 | 3.62 | 273.4% | 20.59 | 16.15 | 96.7 | 23.4 | 75.4% | 76.0% | 57.3% |
| 430 | 0.26 | 1.52 | 4.01 | 255.2% | 20.57 | 15.80 | 96.2 | 20.7 | 78.2% | 76.9% | 60.2% |
| 440 | 0.20 | 1.56 | 3.81 | 265.8% | 20.59 | 16.00 | 95.8 | 21.9 | 77.0% | 76.5% | 59.0% |
| 450 | 0.11 | 1.56 | 3.71 | 272.7% | 20.59 | 16.10 | 94.7 | 22.4 | 76.6% | 76.5% | 58.6% |
| 460 | 0.03 | 1.59 | 3.54 | 282.9% | 20.60 | 16.27 | 94.1 | 21.1 | 75.6% | 75.8% | 57.3% |
| 470 | 0.00 | 1.55 | 3.46 | 292.1% | 20.61 | 16.37 | 92.8 | 23.1 | 75.6% | 76.1% | 57.6% |

| Air Fuel Ratio (A/F) | | |
|---|---|---|
| Dry Molecular Weight ($M_d$) | 29.41 | |
| Dry Moles Exhaust Gas ($N_r$): | 547.28 | %HC |
| Air Fuel Ratio (A/F) | 15.58 | 1.32 |

| | | |
|---|---|---|
| Combustion Efficiency: | 85.95% | |
| Total Input (kJ): | 165,991 | 157,434 |
| Total Output (kJ): | 107,191 | 101,665 |
| Efficiency: | 64.58% | |
| Total CO (g): | 1662.81 | |

13,684 kJ/h

21,190 kJ/h

1.070 kg/h

125.4 Deg. C

| 18.89 | 3.30 | 67.30 | 2.74 | 67.29 | 166291 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.82 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Air Fuel Ratio | Wet Wt Now Wt | % Wet Consume x | Dry Wt. Now $Wt_{dn}$ | % Dry Comsume y | Total Input | Fuel Properties Carbon /12= [a] | Hydrogen /1= [b] | Oxygen /16= [c] | Calorific Value | Mw Moisture Fuel | [h] |
| 30.7 | 10.08 | 0.00 | 8.38 | 0.00 | 0 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.55 |
| 47.0 | 9.62 | 4.55 | 8.00 | 4.55 | 10276 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.81 |
| 32.1 | 9.29 | 7.83 | 7.72 | 7.83 | 6166 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.86 |
| 22.9 | 8.87 | 11.98 | 7.38 | 11.98 | 6876 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.87 |
| 21.6 | 8.45 | 16.12 | 7.03 | 16.12 | 6241 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.96 |
| 19.8 | 8.11 | 19.50 | 6.75 | 19.50 | 6241 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.88 |
| 19.9 | 7.70 | 23.64 | 6.40 | 23.64 | 6166 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.97 |
| 17.3 | 7.36 | 26.92 | 6.12 | 26.92 | 6689 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.92 |
| 12.2 | 6.88 | 31.70 | 5.72 | 31.70 | 7362 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 79.34 |
| 14.1 | 6.47 | 35.79 | 5.38 | 35.79 | 7063 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 79.21 |
| 12.0 | 6.03 | 40.21 | 5.01 | 40.21 | 7100 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 79.36 |
| 14.2 | 5.61 | 44.35 | 4.66 | 44.35 | 6502 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 79.25 |
| 14.4 | 5.24 | 48.04 | 4.35 | 48.04 | 6128 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 79.23 |
| 13.3 | 4.86 | 51.73 | 4.04 | 51.73 | 6465 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 79.31 |
| 12.5 | 4.45 | 55.83 | 3.70 | 55.83 | 6689 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 79.36 |
| 13.2 | 4.05 | 59.79 | 3.37 | 59.79 | 6241 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 79.31 |
| 13.7 | 3.69 | 63.35 | 3.07 | 63.35 | 5979 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 79.23 |
| 13.6 | 3.33 | 67.00 | 2.77 | 67.00 | 5643 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.98 |
| 14.1 | 3.01 | 70.15 | 2.50 | 70.15 | 4933 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.95 |
| 15.7 | 2.73 | 72.94 | 2.27 | 72.94 | 3699 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.91 |
| 17.1 | 2.56 | 74.61 | 2.13 | 74.61 | 2466 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.78 |
| 17.1 | 2.43 | 75.91 | 2.02 | 75.91 | 2242 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.73 |
| 16.8 | 2.29 | 77.31 | 1.90 | 77.31 | 2242 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.73 |
| 17.0 | 2.16 | 78.61 | 1.79 | 78.61 | 1906 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.70 |
| 17.5 | 2.06 | 79.60 | 1.71 | 79.60 | 1682 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.64 |
| 17.5 | 1.95 | 80.64 | 1.62 | 80.64 | 1756 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.60 |
| 17.2 | 1.84 | 81.72 | 1.53 | 81.72 | 1682 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.61 |
| 17.4 | 1.75 | 82.67 | 1.45 | 82.67 | 1682 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.55 |
| 17.7 | 1.64 | 83.75 | 1.36 | 83.75 | 1644 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.66 |
| 17.9 | 1.55 | 84.65 | 1.29 | 84.65 | 1569 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.64 |
| 18.6 | 1.45 | 85.64 | 1.20 | 85.64 | 1644 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.63 |
| 18.9 | 1.35 | 86.63 | 1.12 | 86.63 | 1644 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.70 |
| 19.1 | 1.25 | 87.62 | 1.04 | 87.62 | 1569 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.67 |
| 18.9 | 1.16 | 88.52 | 0.96 | 88.52 | 1457 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.61 |
| 18.9 | 1.07 | 89.37 | 0.89 | 89.37 | 1532 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.67 |
| 19.2 | 0.97 | 90.36 | 0.81 | 90.36 | 1457 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.66 |
| 20.1 | 0.89 | 91.13 | 0.74 | 91.13 | 1345 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.61 |
| 18.7 | 0.81 | 91.99 | 0.67 | 91.99 | 1569 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.69 |
| 19.3 | 0.70 | 93.02 | 0.58 | 93.02 | 1569 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.66 |
| 19.6 | 0.62 | 93.88 | 0.51 | 93.88 | 1495 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.65 |
| 19.9 | 0.52 | 94.82 | 0.43 | 94.82 | 1569 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.61 |
| 19.8 | 0.43 | 95.77 | 0.35 | 95.77 | 1457 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.64 |
| 21.4 | 0.34 | 96.58 | 0.29 | 96.58 | 1345 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.59 |
| 20.5 | 0.26 | 97.39 | 0.22 | 97.39 | 999 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.67 |
| 21.0 | 0.20 | 98.06 | 0.19 | 97.78 | 1097 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.63 |
| 21.4 | 0.11 | 98.87 | 0.11 | 98.71 | 1541 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.63 |
| 21.9 | 0.03 | 99.68 | 0.03 | 99.64 | 1371 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.60 |
| 22.5 | 0.00 | 100.00 | 0.00 | 100.00 | 300 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.62 |

Moisture Content $M_{Cwb}$: 16.85

| | | | | |
|---|---|---|---|---|
| | Moisture of Wood (wet basis): | 16.85 | Dry kg : | 8.38 |
| (Btu) | Initial Dry Weight $Wt_{do}$ (kg): | 8.38 | CA: | 48.73 |
| (Btu) | Moisture Content Dry | 20.26 | HY: | 6.87 |
| | | | OX: | 43.9 |

| | | | | | |
|---|---|---|---|---|---|
| Load Weight (kg): | **10.08** | | | | |
| Fuel Heating | **HHV** | **LHV** | | **HHV** | **LHV** |
| Value in kJ/kg - CV: | **19,810** | **18,329** | Btu/lb | **8522.5** | **7885.2** |

| **20.91** | **1.63** | **5.26** | **0.17** | **0.16** | **30.87** | **99.72** | **8.82** | **1.12** | **517.81** | **32.27** | **11.26** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mass Balance (moles/100 mole dry flue gas)** | | | | **kg Wood per 100 mole** | **Moles per kg of Dry Wood** | | | | | | **Moisture Present** |
| **[u]** | **[w]** | **[j]** | **[k]** | **Nk** | **$CO_2$** | **$O_2$** | **CO** | **HC** | **$N_2$** | **$H_2O$** | |
| 20.84 | 0.94 | 2.84 | 0.19 | 0.09 | 22.83 | 191.02 | 15.97 | 2.02 | 841.79 | 30.48 | 11.26 |
| 20.91 | 0.62 | 1.94 | 0.09 | 0.06 | 26.14 | 306.78 | 13.23 | 1.44 | 1287.74 | 31.65 | 11.26 |
| 20.92 | 0.90 | 2.90 | 0.10 | 0.09 | 29.88 | 196.09 | 9.81 | 1.11 | 879.31 | 32.29 | 11.26 |
| 20.92 | 1.26 | 4.09 | 0.13 | 0.13 | 31.55 | 128.10 | 8.26 | 1.00 | 626.77 | 32.53 | 11.26 |
| 20.94 | 1.34 | 4.39 | 0.11 | 0.13 | 33.26 | 117.93 | 6.76 | 0.80 | 592.84 | 32.93 | 11.26 |
| 20.92 | 1.46 | 4.73 | 0.14 | 0.15 | 32.13 | 105.77 | 7.72 | 0.96 | 543.94 | 32.61 | 11.26 |
| 20.95 | 1.46 | 4.78 | 0.11 | 0.15 | 33.48 | 104.87 | 6.54 | 0.79 | 544.04 | 32.95 | 11.26 |
| 20.93 | 1.67 | 5.44 | 0.14 | 0.17 | 33.01 | 87.04 | 6.93 | 0.87 | 475.47 | 32.78 | 11.26 |
| 21.04 | 2.38 | 8.01 | 0.09 | 0.24 | 37.46 | 46.70 | 2.99 | 0.36 | 334.65 | 33.80 | 11.26 |
| 21.01 | 2.06 | 6.90 | 0.10 | 0.21 | 36.50 | 60.83 | 3.85 | 0.46 | 385.55 | 33.60 | 11.26 |
| 21.05 | 2.42 | 8.16 | 0.08 | 0.24 | 37.61 | 45.11 | 2.86 | 0.34 | 329.05 | 33.83 | 11.26 |
| 21.02 | 2.05 | 6.87 | 0.08 | 0.20 | 36.92 | 61.35 | 3.48 | 0.41 | 388.59 | 33.71 | 11.26 |
| 21.02 | 2.01 | 6.74 | 0.09 | 0.20 | 36.73 | 63.43 | 3.65 | 0.43 | 395.97 | 33.66 | 11.26 |
| 21.04 | 2.19 | 7.37 | 0.08 | 0.22 | 37.38 | 54.45 | 3.07 | 0.36 | 363.74 | 33.80 | 11.26 |
| 21.05 | 2.33 | 7.86 | 0.08 | 0.23 | 37.73 | 48.41 | 2.76 | 0.32 | 341.83 | 33.87 | 11.26 |
| 21.04 | 2.21 | 7.44 | 0.08 | 0.22 | 37.36 | 53.59 | 3.09 | 0.36 | 360.43 | 33.79 | 11.26 |
| 21.01 | 2.11 | 7.07 | 0.10 | 0.21 | 36.60 | 58.40 | 3.76 | 0.45 | 376.61 | 33.62 | 11.26 |
| 20.95 | 2.13 | 7.00 | 0.17 | 0.21 | 34.00 | 58.95 | 6.03 | 0.78 | 371.94 | 32.95 | 11.26 |
| 20.94 | 2.05 | 6.71 | 0.17 | 0.20 | 33.67 | 63.16 | 6.32 | 0.82 | 386.95 | 32.88 | 11.26 |
| 20.93 | 1.84 | 6.01 | 0.16 | 0.18 | 33.07 | 74.94 | 6.86 | 0.88 | 429.91 | 32.76 | 11.26 |
| 20.90 | 1.69 | 5.43 | 0.19 | 0.17 | 31.08 | 86.43 | 8.62 | 1.12 | 468.12 | 32.29 | 11.26 |
| 20.88 | 1.68 | 5.38 | 0.20 | 0.17 | 30.43 | 87.29 | 9.19 | 1.20 | 469.69 | 32.12 | 11.26 |
| 20.88 | 1.72 | 5.50 | 0.20 | 0.17 | 30.50 | 84.69 | 9.12 | 1.19 | 460.06 | 32.14 | 11.26 |
| 20.87 | 1.70 | 5.42 | 0.21 | 0.17 | 30.06 | 86.23 | 9.51 | 1.25 | 464.73 | 32.03 | 11.26 |
| 20.86 | 1.65 | 5.21 | 0.22 | 0.16 | 29.07 | 91.00 | 10.38 | 1.37 | 480.17 | 31.79 | 11.26 |
| 20.85 | 1.65 | 5.18 | 0.24 | 0.16 | 28.51 | 91.29 | 10.87 | 1.44 | 479.80 | 31.65 | 11.26 |
| 20.85 | 1.68 | 5.30 | 0.23 | 0.17 | 28.83 | 88.51 | 10.59 | 1.40 | 470.13 | 31.72 | 11.26 |
| 20.84 | 1.66 | 5.19 | 0.25 | 0.16 | 27.96 | 90.78 | 11.34 | 1.51 | 476.47 | 31.51 | 11.26 |
| 20.86 | 1.63 | 5.16 | 0.22 | 0.16 | 29.28 | 92.37 | 10.19 | 1.34 | 485.91 | 31.85 | 11.26 |
| 20.86 | 1.62 | 5.11 | 0.22 | 0.16 | 29.06 | 93.43 | 10.39 | 1.36 | 489.33 | 31.79 | 11.26 |
| 20.86 | 1.55 | 4.89 | 0.22 | 0.15 | 28.57 | 99.09 | 10.82 | 1.42 | 509.45 | 31.69 | 11.26 |
| 20.88 | 1.53 | 4.85 | 0.20 | 0.15 | 29.58 | 100.78 | 9.95 | 1.29 | 518.44 | 31.95 | 11.26 |
| 20.87 | 1.51 | 4.78 | 0.20 | 0.15 | 29.08 | 102.48 | 10.38 | 1.35 | 523.56 | 31.83 | 11.26 |
| 20.85 | 1.52 | 4.80 | 0.22 | 0.15 | 28.28 | 101.64 | 11.08 | 1.45 | 518.32 | 31.62 | 11.26 |
| 20.87 | 1.53 | 4.83 | 0.21 | 0.15 | 29.05 | 101.08 | 10.41 | 1.35 | 518.19 | 31.81 | 11.26 |
| 20.86 | 1.51 | 4.76 | 0.21 | 0.15 | 28.90 | 102.97 | 10.54 | 1.37 | 524.95 | 31.78 | 11.26 |
| 20.85 | 1.44 | 4.51 | 0.22 | 0.14 | 27.77 | 110.33 | 11.54 | 1.50 | 549.79 | 31.51 | 11.26 |
| 20.87 | 1.55 | 4.91 | 0.20 | 0.15 | 29.50 | 98.97 | 10.01 | 1.30 | 511.40 | 31.92 | 11.26 |
| 20.86 | 1.50 | 4.73 | 0.21 | 0.15 | 28.82 | 103.94 | 10.61 | 1.38 | 528.39 | 31.76 | 11.26 |
| 20.86 | 1.47 | 4.64 | 0.21 | 0.15 | 28.62 | 106.41 | 10.79 | 1.40 | 537.21 | 31.72 | 11.26 |
| 20.85 | 1.45 | 4.55 | 0.22 | 0.14 | 27.88 | 109.02 | 11.44 | 1.49 | 545.13 | 31.54 | 11.26 |
| 20.86 | 1.46 | 4.59 | 0.21 | 0.15 | 28.34 | 107.95 | 11.03 | 1.43 | 542.30 | 31.65 | 11.26 |
| 20.85 | 1.35 | 4.20 | 0.21 | 0.13 | 26.99 | 120.45 | 12.23 | 1.59 | 586.02 | 31.34 | 11.26 |
| 20.87 | 1.41 | 4.45 | 0.20 | 0.14 | 28.58 | 112.65 | 10.83 | 1.40 | 560.68 | 31.73 | 11.26 |
| 20.86 | 1.37 | 4.31 | 0.20 | 0.14 | 27.91 | 117.17 | 11.43 | 1.48 | 576.00 | 31.57 | 11.26 |
| 20.86 | 1.35 | 4.23 | 0.20 | 0.13 | 27.67 | 120.11 | 11.64 | 1.50 | 586.49 | 31.52 | 11.26 |
| 20.85 | 1.31 | 4.10 | 0.21 | 0.13 | 27.08 | 124.42 | 12.16 | 1.57 | 601.25 | 31.38 | 11.26 |
| 20.85 | 1.28 | 4.01 | 0.20 | 0.13 | 27.11 | 128.28 | 12.14 | 1.56 | 615.88 | 31.40 | 11.26 |

| | | | | | | | | | | | SUMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **398.46** | **3945.58** | **2972.04** | **2890.76** | **2858.58** | **3792.29** | **3459.46** | **299.25** | **6020.28** | **13438.33** | **120871.17** | **68519.73** |
| **Stack Temp K** | **Heat Content Change - Ambient to Stack Temperature** | | | | | | **Room Temp K** | **Energy Losses (kJ/kg** | | | |
| | **Flue Gas Constituent** | | | | | | | **Flue Gas Constit** | | | |
| | **$CO_2$** | **$O_2$** | **CO** | **$N_2$** | **$CH_4$** | **$H_2O$** | | **$CO_2$** | **$O_2$** | **CO** | **$N_2$** |
| 394.65 | 3726.15 | 2812.93 | 2737.51 | 2706.72 | 3567.87 | 3276.55 | 300.61 | 85.05 | 537.34 | 4561.76 | 2278.50 |
| 394.65 | 3659.16 | 2761.31 | 2687.02 | 2656.85 | 3506.00 | 3216.04 | 302.36 | 95.66 | 847.11 | 3780.84 | 3421.33 |
| 398.93 | 3839.22 | 2894.60 | 2816.09 | 2784.60 | 3684.20 | 3370.32 | 302.24 | 114.73 | 567.60 | 2804.60 | 2448.53 |
| 409.43 | 4259.48 | 3204.01 | 3115.28 | 3080.83 | 4103.80 | 3727.81 | 302.58 | 134.38 | 410.42 | 2364.61 | 1930.99 |
| 415.87 | 4522.92 | 3397.42 | 3302.17 | 3265.90 | 4368.02 | 3951.07 | 302.68 | 150.43 | 400.67 | 1934.53 | 1936.15 |
| 407.59 | 4167.00 | 3135.38 | 3048.78 | 3015.02 | 4012.65 | 3648.31 | 303.01 | 133.90 | 331.62 | 2209.13 | 1639.99 |
| 420.04 | 4672.87 | 3506.49 | 3407.30 | 3370.06 | 4520.65 | 4076.58 | 303.30 | 156.46 | 367.71 | 1874.45 | 1833.45 |
| 414.43 | 4443.91 | 3338.75 | 3245.31 | 3209.63 | 4290.24 | 3883.09 | 303.18 | 146.71 | 290.60 | 1983.11 | 1526.08 |
| 440.04 | 5539.50 | 4139.86 | 4018.58 | 3975.54 | 5396.13 | 4806.61 | 302.61 | 207.49 | 193.34 | 859.54 | 1330.42 |
| 437.04 | 5393.14 | 4032.60 | 3914.98 | 3872.94 | 5248.93 | 4682.86 | 303.12 | 196.87 | 245.30 | 1103.20 | 1493.21 |
| 450.32 | 5949.60 | 4436.14 | 4303.65 | 4258.09 | 5817.98 | 5146.78 | 303.29 | 223.75 | 200.13 | 821.94 | 1401.12 |
| 446.65 | 5764.84 | 4301.00 | 4173.20 | 4128.88 | 5631.56 | 4990.98 | 304.04 | 212.85 | 263.85 | 999.73 | 1604.43 |
| 442.37 | 5671.90 | 4237.52 | 4113.05 | 4069.07 | 5527.95 | 4919.51 | 301.73 | 208.35 | 268.79 | 1047.49 | 1611.24 |
| 444.59 | 5724.41 | 4273.78 | 4147.51 | 4103.31 | 5585.64 | 4960.49 | 302.82 | 213.97 | 232.72 | 882.35 | 1492.52 |
| 451.48 | 6062.96 | 4521.13 | 4386.22 | 4339.76 | 5927.81 | 5245.56 | 301.63 | 228.77 | 218.87 | 792.21 | 1483.45 |
| 449.59 | 6009.91 | 4484.02 | 4350.82 | 4304.61 | 5870.59 | 5203.42 | 300.92 | 224.52 | 240.31 | 888.01 | 1551.52 |
| 440.65 | 5689.30 | 4254.17 | 4130.12 | 4085.76 | 5536.91 | 4940.21 | 299.37 | 208.25 | 248.43 | 1078.27 | 1538.76 |
| 432.26 | 5323.00 | 3987.05 | 3872.47 | 3830.52 | 5165.56 | 4632.55 | 299.69 | 180.99 | 235.05 | 1729.18 | 1424.73 |
| 425.04 | 4952.29 | 3713.67 | 3608.00 | 3568.70 | 4796.42 | 4316.51 | 301.46 | 166.74 | 234.54 | 1811.99 | 1380.93 |
| 418.15 | 4764.42 | 3580.01 | 3479.93 | 3441.65 | 4598.66 | 4163.86 | 298.85 | 157.55 | 268.29 | 1966.42 | 1479.59 |
| 408.21 | 4322.42 | 3254.27 | 3164.86 | 3129.72 | 4158.07 | 3787.37 | 299.61 | 134.34 | 281.25 | 2465.69 | 1465.09 |
| 400.26 | 3927.45 | 2960.83 | 2880.45 | 2848.26 | 3769.52 | 3447.33 | 301.37 | 119.50 | 258.45 | 2626.46 | 1337.79 |
| 395.26 | 3768.42 | 2844.74 | 2768.44 | 2737.31 | 3608.56 | 3313.57 | 300.16 | 114.95 | 240.91 | 2605.02 | 1259.31 |
| 392.04 | 3699.73 | 2795.82 | 2721.56 | 2690.80 | 3536.34 | 3257.68 | 298.50 | 111.21 | 241.09 | 2716.42 | 1250.49 |
| 388.65 | 3482.89 | 2632.73 | 2562.98 | 2533.98 | 3327.41 | 3067.93 | 300.55 | 101.23 | 239.59 | 2964.20 | 1216.73 |
| 385.43 | 3355.79 | 2538.48 | 2471.68 | 2443.62 | 3201.98 | 2958.78 | 300.44 | 95.67 | 231.74 | 3101.96 | 1172.46 |
| 384.26 | 3390.91 | 2566.90 | 2499.80 | 2471.32 | 3231.43 | 2992.58 | 298.28 | 97.75 | 227.20 | 3022.10 | 1161.84 |
| 382.71 | 3250.16 | 2460.10 | 2395.73 | 2368.45 | 3097.85 | 2867.98 | 300.31 | 90.88 | 223.34 | 3237.07 | 1128.50 |
| 381.09 | 3230.18 | 2446.46 | 2382.81 | 2355.60 | 3075.55 | 2852.63 | 299.12 | 94.59 | 225.99 | 2908.87 | 1144.62 |
| 380.32 | 3240.42 | 2455.22 | 2391.59 | 2364.22 | 3083.12 | 2863.21 | 298.02 | 94.16 | 229.40 | 2965.40 | 1156.88 |
| 378.48 | 3145.93 | 2384.30 | 2322.68 | 2296.07 | 2991.74 | 2780.76 | 298.55 | 89.89 | 236.27 | 3087.27 | 1169.73 |
| 377.26 | 3181.89 | 2413.37 | 2351.44 | 2324.40 | 3021.95 | 2815.33 | 296.31 | 94.11 | 243.22 | 2838.33 | 1205.06 |
| 375.76 | 3134.33 | 2378.26 | 2317.46 | 2290.77 | 2974.69 | 2774.73 | 295.97 | 91.15 | 243.71 | 2962.02 | 1199.35 |
| 374.48 | 3014.23 | 2286.87 | 2228.34 | 2202.69 | 2861.27 | 2668.01 | 297.76 | 85.26 | 232.44 | 3159.27 | 1141.69 |
| 374.32 | 3061.12 | 2323.24 | 2263.98 | 2237.88 | 2904.04 | 2710.74 | 296.36 | 88.93 | 234.83 | 2968.93 | 1159.65 |
| 374.04 | 3079.13 | 2337.44 | 2277.95 | 2251.66 | 2919.95 | 2727.51 | 295.59 | 88.98 | 240.69 | 3007.98 | 1182.00 |
| 372.82 | 3007.13 | 2283.10 | 2225.06 | 2199.37 | 2850.99 | 2664.21 | 296.18 | 83.50 | 251.89 | 3291.56 | 1209.19 |
| 372.15 | 2930.64 | 2224.72 | 2168.09 | 2143.07 | 2779.15 | 2595.97 | 297.48 | 86.47 | 220.17 | 2853.94 | 1095.97 |
| 371.59 | 2927.11 | 2222.55 | 2166.10 | 2141.08 | 2774.68 | 2593.62 | 296.99 | 84.36 | 231.01 | 3026.63 | 1131.33 |
| 372.09 | 3020.77 | 2294.38 | 2236.28 | 2210.41 | 2861.89 | 2677.71 | 295.06 | 86.45 | 244.14 | 3078.13 | 1187.44 |
| 371.09 | 2944.25 | 2236.28 | 2179.66 | 2154.44 | 2789.34 | 2609.92 | 296.01 | 82.08 | 243.79 | 3263.03 | 1174.46 |
| 370.87 | 2997.52 | 2277.67 | 2220.23 | 2194.49 | 2837.79 | 2658.56 | 294.38 | 84.96 | 245.87 | 3147.05 | 1190.08 |
| 369.87 | 2874.04 | 2183.27 | 2128.08 | 2103.44 | 2722.12 | 2548.17 | 296.56 | 77.58 | 262.97 | 3486.86 | 1232.66 |
| 369.32 | 2954.97 | 2246.36 | 2189.96 | 2164.52 | 2795.26 | 2622.39 | 293.85 | 84.46 | 253.05 | 3089.56 | 1213.60 |
| 368.98 | 2896.91 | 2201.82 | 2146.44 | 2121.53 | 2741.23 | 2570.25 | 295.02 | 80.85 | 257.98 | 3258.28 | 1222.00 |
| 367.82 | 2828.18 | 2149.86 | 2095.86 | 2071.52 | 2675.58 | 2509.70 | 295.59 | 78.27 | 258.21 | 3317.35 | 1214.93 |
| 367.26 | 2856.01 | 2171.91 | 2117.56 | 2092.93 | 2699.95 | 2535.76 | 294.28 | 77.33 | 270.23 | 3467.52 | 1258.36 |
| 365.98 | 2729.32 | 2075.24 | 2023.24 | 1999.72 | 2580.88 | 2422.79 | 296.26 | 73.98 | 266.21 | 3460.90 | 1231.59 |

| | | | AVERAGE | SUMS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 48239.23 | 73506.97 | 25630.02 | 7421.37 | 58799.94 | 23325.98 | 35474.0 | 107490.7 | 23326.0 | 1662.8 | 117.2 |
| of Dry Fuel) | | | Total | | | | | | | |
| tuent | | | Loss | Total | Chemical | Sensible | Total | Chem | Grams Produced | |
| $CH_4$ | $H_2O$ Comb | $H_2O$ Fuel | Rate | Loss | Loss 1 | Latent | Output | Loss 2 | CO | HC |
| 1805.46 | 1440.15 | 531.90 | 11240.16 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0.00 |
| 1282.95 | 1493.47 | 531.22 | 11452.58 | 5940.96 | 2606 | 3335.21 | 4335 | 2606 | 192.23 | 11.92 |
| 996.56 | 1528.72 | 532.96 | 8993.71 | 2799.26 | 1173 | 1626.04 | 3367 | 1173 | 85.52 | 5.55 |
| 893.05 | 1551.35 | 536.98 | 7821.78 | 2714.84 | 1120 | 1594.51 | 4161 | 1120 | 80.32 | 5.55 |
| 711.36 | 1578.11 | 539.49 | 7250.75 | 2284.13 | 825 | 1458.74 | 3956 | 825 | 59.60 | 4.01 |
| 854.49 | 1552.87 | 536.08 | 7258.08 | 2286.44 | 956 | 1329.96 | 3954 | 956 | 68.12 | 4.82 |
| 702.61 | 1583.20 | 540.91 | 7058.79 | 2197.02 | 794 | 1402.97 | 3969 | 794 | 57.04 | 3.91 |
| 778.06 | 1568.73 | 538.73 | 6832.02 | 2306.87 | 923 | 1383.40 | 4382 | 923 | 65.50 | 4.70 |
| 323.66 | 1648.61 | 549.13 | 5112.18 | 1899.74 | 434 | 1465.24 | 5462 | 434 | 31.16 | 2.15 |
| 414.25 | 1634.57 | 547.73 | 5635.14 | 2009.03 | 535 | 1474.27 | 5054 | 535 | 38.38 | 2.64 |
| 308.62 | 1661.77 | 552.95 | 5170.28 | 1853.06 | 400 | 1452.99 | 5247 | 400 | 28.71 | 1.98 |
| 366.18 | 1650.20 | 551.20 | 5648.44 | 1853.95 | 443 | 1411.15 | 4648 | 443 | 31.99 | 2.15 |
| 384.94 | 1645.74 | 550.40 | 5716.94 | 1768.59 | 438 | 1330.83 | 4360 | 438 | 31.60 | 2.13 |
| 322.76 | 1653.91 | 550.86 | 5349.09 | 1745.61 | 388 | 1357.15 | 4719 | 388 | 28.08 | 1.88 |
| 290.28 | 1667.13 | 554.07 | 5234.78 | 1767.55 | 361 | 1406.77 | 4921 | 361 | 26.06 | 1.75 |
| 326.39 | 1661.74 | 553.59 | 5446.08 | 1715.62 | 378 | 1337.97 | 4525 | 378 | 27.26 | 1.84 |
| 406.17 | 1644.12 | 550.63 | 5674.62 | 1712.68 | 443 | 1270.10 | 4266 | 443 | 31.74 | 2.19 |
| 701.77 | 1601.66 | 547.17 | 6420.55 | 1828.81 | 685 | 1144.19 | 3814 | 685 | 48.07 | 3.57 |
| 733.85 | 1587.76 | 543.61 | 6459.41 | 1608.37 | 627 | 981.13 | 3324 | 627 | 44.08 | 3.27 |
| 787.40 | 1576.96 | 541.89 | 6778.09 | 1265.79 | 509 | 756.74 | 2434 | 509 | 35.89 | 2.63 |
| 998.92 | 1541.99 | 537.65 | 7424.92 | 924.39 | 427 | 497.03 | 1542 | 427 | 30.04 | 2.22 |
| 1071.65 | 1523.25 | 533.82 | 7470.92 | 845.56 | 415 | 430.52 | 1397 | 415 | 29.12 | 2.17 |
| 1065.89 | 1519.54 | 532.32 | 7337.94 | 830.51 | 412 | 418.38 | 1412 | 412 | 28.89 | 2.16 |
| 1114.57 | 1512.59 | 531.69 | 7478.06 | 719.42 | 366 | 353.77 | 1186 | 366 | 25.61 | 1.92 |
| 1221.15 | 1495.26 | 529.55 | 7767.71 | 659.37 | 353 | 306.74 | 1022 | 353 | 24.67 | 1.86 |
| 1283.84 | 1485.19 | 528.32 | 7899.18 | 700.33 | 386 | 314.28 | 1056 | 386 | 26.97 | 2.04 |
| 1251.31 | 1489.68 | 528.70 | 7778.59 | 660.29 | 360 | 300.17 | 1021 | 360 | 25.16 | 1.90 |
| 1346.44 | 1475.74 | 527.30 | 8029.26 | 681.57 | 386 | 295.20 | 1000 | 386 | 26.96 | 2.05 |
| 1194.45 | 1491.18 | 527.13 | 7586.83 | 629.70 | 338 | 291.49 | 1015 | 338 | 23.69 | 1.78 |
| 1218.69 | 1488.98 | 527.25 | 7680.75 | 608.52 | 329 | 279.33 | 961 | 329 | 23.05 | 1.73 |
| 1266.37 | 1481.35 | 526.32 | 7857.20 | 652.14 | 359 | 293.23 | 992 | 359 | 25.15 | 1.88 |
| 1150.25 | 1494.62 | 526.71 | 7552.30 | 626.83 | 329 | 298.05 | 1017 | 329 | 23.12 | 1.71 |
| 1204.35 | 1487.65 | 526.25 | 7714.49 | 611.19 | 328 | 283.33 | 958 | 328 | 23.03 | 1.71 |
| 1295.85 | 1474.68 | 525.05 | 7914.23 | 582.23 | 326 | 256.60 | 875 | 326 | 22.82 | 1.71 |
| 1209.67 | 1485.05 | 525.53 | 7672.59 | 593.40 | 321 | 272.35 | 939 | 321 | 22.54 | 1.68 |
| 1224.73 | 1484.01 | 525.72 | 7754.11 | 570.45 | 309 | 261.12 | 887 | 309 | 21.72 | 1.61 |
| 1343.75 | 1469.56 | 525.01 | 8174.45 | 555.11 | 313 | 242.37 | 790 | 313 | 21.94 | 1.63 |
| 1160.50 | 1486.51 | 524.24 | 7427.80 | 588.48 | 316 | 272.43 | 981 | 316 | 22.20 | 1.65 |
| 1232.19 | 1478.96 | 524.21 | 7708.68 | 610.73 | 335 | 275.44 | 959 | 335 | 23.55 | 1.75 |
| 1251.93 | 1479.58 | 525.16 | 7852.83 | 592.53 | 325 | 267.93 | 902 | 325 | 22.80 | 1.69 |
| 1332.75 | 1468.98 | 524.39 | 8089.49 | 640.90 | 362 | 279.10 | 929 | 362 | 25.38 | 1.89 |
| 1281.21 | 1475.91 | 524.94 | 7950.02 | 584.86 | 324 | 261.19 | 873 | 324 | 22.73 | 1.69 |
| 1418.67 | 1458.07 | 523.70 | 8460.52 | 574.54 | 331 | 243.47 | 771 | 331 | 23.25 | 1.73 |
| 1248.32 | 1478.19 | 524.53 | 7891.70 | 398.15 | 217 | 180.69 | 601 | 217 | 15.30 | 1.13 |
| 1318.98 | 1469.16 | 523.95 | 8131.20 | 450.16 | 251.82 | 198.34 | 647 | 252 | 17.71 | 1.31 |
| 1341.89 | 1464.86 | 523.27 | 8198.77 | 637.62 | 360.14 | 277.48 | 903 | 360 | 25.34 | 1.87 |
| 1404.16 | 1459.19 | 523.56 | 8460.36 | 585.34 | 334.98 | 250.36 | 785 | 335 | 23.56 | 1.74 |
| 1395.94 | 1456.48 | 522.29 | 8407.39 | 127.29 | 73.10 | 54.19 | 173 | 73 | 5.15 | 0.38 |

# Intertek Testing Services NA Ltd

| | | | |
|---|---|---|---|
| **Manufacturer:** | SBI | **Technicians:** | _____ |
| **Model:** | NG1800 | | _____ |
| **Date:** | 12/02/13 | | _____ |
| **Run:** | 1 | | _____ |
| **Control #:** | G101440749 | | |
| **Test Duration:** | 470 | | |
| **Output Category:** | 2 | | |

**Test Results in Accordance with CSA B415.1-10**

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 64.6% | 69.8% |
| **Combustion Efficiency** | 85.9% | 85.9% |
| **Heat Transfer Efficiency** | 75% | 81.2% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 13,684 | 12,981 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 1.07 | 2.36 | **(lb/h)** |
| **Input (kJ/h)** | 21,190 | 20,101 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 8.38 | 18.47 | **dry lb** |
| **MC wet (%)** | 16.85 | | |
| **MC dry (%)** | 20.26 | | |
| **Particulate (g )** | 50.017 | | |
| **CO (g)** | 1,663 | | |
| **Test Duration (h)** | 7.83 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | 0.47 | 15.51 |
| **g/kg Dry Fuel** | 5.97 | 198.45 |
| **g/h** | 6.39 | 212.27 |
| **lb/MM Btu Output** | 1.08 | 36.05 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 15.58 |

**VERSION: 2.4** **15/04/2010**

Intertek

# TEST FUEL DATA
## EPA Method 5G-3

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 2, 2013 |
| Test Run Number: | 1 |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

**PRE-BURN FUEL PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:00 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 17 | 1.976 | 21.6 | 19.7 | 20.5 |
| 2 | 17 | 1.820 | 21.5 | 19.3 | 21.2 |
| 3 | 17 | 2.168 | 20.3 | 19.5 | 20.8 |
| 4 | 17 | 2.029 | 21.1 | 20.0 | 21.1 |
| 5 | 17 | 1.964 | 18.7 | 20.0 | 20.3 |
| 6 | 16 | 1.864 | 20.3 | 19.5 | 20.2 |
| 7 | 16 | 1.922 | 20.1 | 20.2 | 20.0 |
| 8 | 16 | 1.958 | 21.0 | 20.5 | 20.3 |
| 9 | 16 | 2.217 | 20.9 | 22.2 | 22.7 |
| 10 | 16 | 2.02 | 19.3 | 18.7 | 20.8 |
| 11 | 16 | 1.77 | 19.0 | 19.3 | 18.9 |
| 12 | 16 | 1.81 | 18.9 | 19.7 | 20.0 |
| Total Weight | | 23.520 | Average, %db | | 20.2 |

| Allowable Fuel Load Range: | 4.44 | to | 5.55 |
|---|---|---|---|

**TEST FUEL LOAD PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. 2x4 | Weight, Lb. 4x4 | Moisture, %, Dry Basis | |
| 1 | 15 | 1.681 | | 20.5 | 20.6 | 21.7 |
| 2 | 15 | 1.663 | | 19.3 | 19.2 | 19.3 |
| 3 | 15 | 1.710 | | 21.2 | 20.2 | 21.4 |
| 4 | 15 | | 3.84 | 21.0 | 20.6 | 20.6 |
| 5 | 15 | | 3.436 | 21.9 | 21.7 | 19.3 |
| 6 | 15 | | 3.660 | 21.5 | 20.6 | 21.9 |
| 7 | 15 | 2.182 | | 18.9 | 19.9 | 19.2 |
| 8 | 15 | 1.860 | | 19.4 | 20.0 | 18.9 |
| 9 | 15 | 2.178 | | 19.5 | 19.8 | 19.2 |
| Totals | | 11.274 | 10.940 | | | |
| % of Weight | | 50.8 | 49.2 | | | |
| Total weight, wet, lb. | | 22.21 | | Average Moisture, dry | | 20.27 |
| Total weight, dry, kg | | 8.38 | | Average Moisture, wet | | 16.85 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | November 25, 2013 |
| Test Run Number: | 1a |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **1.08** | |
| Emission-Rate, g/hr: | **4.66** | |
| Adjusted Emission-Rate, g/hr : | **6.53** | |
| Duration of Test, Minutes | 470 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 769.535 | 713.31 |
| Dry Gas Meter Ending Reading, $ft^3$ | 842.783 | 772.635 |
| Barometric Pressure Correction Factor | 1.010 | 1.010 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 1.009 | 1.010 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **74.824** | **60.160** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **147.591** | |
| Total Tunnel Volume, scf | **69367.667** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 927.083 | 1153.045 |
| Sample Particulate Mass, mg | 38.5 | 32.4 |
| Total Emissions, grams | 35.693 | 37.359 |
| Emission-Rate, g/hr | 4.56 | 4.77 |
| Adjusted Emission Rates, g/hr | **6.41** | **6.66** |
| Deviation, % | 1.89% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 72.01 | 68.93 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.004@5 | 0.000@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 97.56 | |
| Maximum Ambient Temperture, ℉ | 84 | |
| Mimimum Ambient Temperature, ℉ | 70 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 22.61 | |
| Dry-Basis Fuel Load Moisture Content, % | 20.97 | |
| Wet-Basis Fuel Load Moisture Content, % | 17.33 | |
| Coal Bed Range, lb. | 4.60 | 5.60 |
| Actual Coal Bed, Lb. | 5.12 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | November 25, 2013 |
| Test Run No: | 1a |

# Temperature Data

| | |
|---|---|
| Firebox Temp Start | 409.32 |
| Firebox Temp End | 311.76 |
| Firebox Delta-T | **97.6** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **72.01** | **68.93** |

| Interval | 10 | Duration of Test, Min | **470** |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| 0 | 0 | 71.35 | 108 | 279.3 | 316.5 | 439 | 469.4 | 406.8 | 414.9 | | 65.94 | 65.08 | 62.17 | 61.875 |
| 1 | 10 | 80.68 | 101.1 | 251.8 | 299.7 | 422.4 | 419 | 389.2 | 393.7 | | 70.4 | 68.01 | 62.425 | 62.16 |
| 2 | 20 | 84.22 | 100.3 | 283.5 | 304.2 | 411 | 374.1 | 358.4 | 361.2 | | 70.81 | 67.65 | 62.55 | 62.225 |
| 3 | 30 | 79.27 | 98.13 | 275 | 330.3 | 392.8 | 347.4 | 333 | 334.6 | | 70.3 | 67.47 | 62.58 | 62.24 |
| 4 | 40 | 82.57 | 99.55 | 285.3 | 326.2 | 376.1 | 326.7 | 320.8 | 317.5 | | 70.18 | 67.46 | 62.665 | 62.27 |
| 5 | 50 | 77.93 | 101.4 | 324.2 | 352.6 | 360 | 319.9 | 315.1 | 309.1 | | 70.54 | 67.35 | 62.885 | 62.55 |
| 6 | 60 | 80.7 | 102.1 | 320.5 | 386.6 | 342.8 | 324.8 | 321.1 | 314.4 | | 70.48 | 67.12 | 62.885 | 62.61 |
| 7 | 70 | 78.56 | 101.7 | 321.1 | 394.6 | 328.4 | 330 | 328.9 | 318.6 | | 70.64 | 67.94 | 62.995 | 62.775 |
| 8 | 80 | 81.8 | 106 | 352.9 | 415 | 313.9 | 339.6 | 339.5 | 330.3 | | 71.05 | 68.65 | 63.13 | 62.86 |
| 9 | 90 | 78.52 | 104.7 | 348.7 | 438.7 | 302.2 | 357.8 | 344.2 | 349.2 | | 71.46 | 68.37 | 63.285 | 63.055 |
| 10 | 100 | 77.9 | 104.6 | 352.1 | 444.3 | 290.9 | 368.9 | 346.3 | 365 | | 71.77 | 68.38 | 63.365 | 63.075 |
| 11 | 110 | 79.69 | 106.5 | 359 | 453.9 | 280.2 | 378.1 | 356 | 375.6 | | 71.85 | 68.46 | 63.42 | 63.085 |
| 12 | 120 | 78.76 | 106.3 | 361.2 | 460 | 272.2 | 391.2 | 372.4 | 382.9 | | 71.89 | 68.77 | 63.385 | 62.855 |
| 13 | 130 | 78.66 | 106.9 | 365.8 | 466.5 | 266.6 | 405.4 | 389.8 | 394 | | 71.93 | 68.64 | 63.335 | 62.85 |
| 14 | 140 | 80.78 | 108.4 | 374.4 | 478.9 | 262.4 | 419.3 | 405 | 405.9 | | 71.92 | 68.93 | 63.29 | 62.86 |
| 15 | 150 | 78.09 | 105.6 | 358 | 477.9 | 259.7 | 436 | 417.3 | 417.3 | | 72.01 | 68.6 | 63.395 | 62.975 |
| 16 | 160 | 81.34 | 103.6 | 334.3 | 459.9 | 257.8 | 453.5 | 423.7 | 427.7 | | 72 | 68.28 | 63.51 | 63.11 |
| 17 | 170 | 77.4 | 98.92 | 303 | 423.9 | 255.9 | 456.1 | 419.2 | 429 | | 71.36 | 68.02 | 63.47 | 63.045 |
| 18 | 180 | 78.34 | 97.47 | 288.3 | 392.5 | 256.1 | 452.3 | 413.3 | 423.5 | | 70.54 | 67.71 | 63.54 | 63.225 |
| 19 | 190 | 81.08 | 96.21 | 270.8 | 370.9 | 256 | 450.1 | 407.4 | 418.1 | | 70.27 | 67.41 | 63.565 | 63.15 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 200 | 76.38 | 93.08 | 254.9 | 347.8 | 256.3 | 440.4 | 397.4 | 409.6 | | 69.95 | 66.66 | 63.625 | 63.235 |
| 21 | 210 | 78.74 | 92.63 | 244.1 | 328.5 | 257.3 | 435 | 389.2 | 403.5 | | 69.63 | 66.16 | 63.445 | 63.1 |
| 22 | 220 | 80.68 | 92.26 | 236.4 | 313.4 | 257.6 | 431.9 | 382.4 | 398.2 | | 69.33 | 65.8 | 63.54 | 63.205 |
| 23 | 230 | 78.01 | 90.41 | 230.6 | 302.6 | 258.7 | 431.4 | 379 | 392.4 | | 69.25 | 65.75 | 63.6 | 63.225 |
| 24 | 240 | 77.67 | 90.31 | 227.5 | 293.8 | 260.4 | 428.7 | 376.3 | 387.6 | | 69.19 | 66 | 63.63 | 63.29 |
| 25 | 250 | 80.48 | 90.72 | 226.2 | 288.4 | 261.8 | 426.6 | 372.6 | 386.2 | | 68.94 | 66.02 | 63.63 | 63.21 |
| 26 | 260 | 77.46 | 89.24 | 225.6 | 285.4 | 264.6 | 427.3 | 371.7 | 385.8 | | 68.79 | 65.93 | 63.625 | 63.255 |
| 27 | 270 | 78.83 | 90.28 | 224.9 | 284.6 | 269 | 427 | 371.4 | 387.7 | | 68.67 | 66.11 | 63.565 | 63.13 |
| 28 | 280 | 79.9 | 90.05 | 222.5 | 283.1 | 271.9 | 425.3 | 368.9 | 386.4 | | 68.6 | 66 | 63.515 | 63.05 |
| 29 | 290 | 76.65 | 88.28 | 220.8 | 280.2 | 275 | 424.2 | 367.7 | 381.9 | | 68.64 | 65.89 | 63.41 | 62.995 |
| 30 | 300 | 81.18 | 90.05 | 218.6 | 279.6 | 276.8 | 421.6 | 367.2 | 378.9 | | 68.64 | 65.81 | 63.345 | 62.96 |
| 31 | 310 | 79.46 | 89.33 | 217.9 | 277.5 | 278.3 | 419.6 | 365.6 | 373.8 | | 68.49 | 65.73 | 63.5 | 63.28 |
| 32 | 320 | 76.03 | 88.06 | 217.6 | 276.5 | 280.4 | 418.6 | 365 | 368.8 | | 68.53 | 65.67 | 63.365 | 62.945 |
| 33 | 330 | 81.09 | 89.8 | 216 | 276.3 | 281.3 | 417.7 | 365.6 | 367 | | 68.36 | 65.62 | 63.21 | 62.77 |
| 34 | 340 | 78.08 | 88.31 | 213.4 | 273 | 281.8 | 416.6 | 363.2 | 362.4 | | 68.31 | 65.48 | 63.23 | 62.81 |
| 35 | 350 | 76.81 | 87.43 | 209.4 | 269.8 | 282.5 | 412 | 359.1 | 358.8 | | 68.16 | 65.34 | 63.13 | 62.695 |
| 36 | 360 | 74.42 | 86.62 | 207.6 | 265.1 | 285.6 | 405.4 | 352.3 | 353.3 | | 68.04 | 65.2 | 63.135 | 62.67 |
| 37 | 370 | 78.8 | 88.19 | 204.3 | 261.9 | 286.1 | 403.5 | 347.5 | 348.3 | | 67.97 | 65.04 | 63.125 | 62.675 |
| 38 | 380 | 75.77 | 86.3 | 202.9 | 258.3 | 288.3 | 405.1 | 344.8 | 341.7 | | 67.86 | 64.99 | 63.095 | 62.655 |
| 39 | 390 | 74.66 | 86.02 | 202.4 | 255.1 | 290.1 | 406.9 | 343.6 | 336.9 | | 67.7 | 64.93 | 63.085 | 62.66 |
| 40 | 400 | 75.47 | 86.38 | 201.6 | 252.7 | 293.9 | 408.3 | 343.1 | 335.1 | | 67.7 | 65.02 | 63.045 | 62.665 |
| 41 | 410 | 75.13 | 85.99 | 200.7 | 251 | 294.7 | 409.9 | 341.9 | 333.1 | | 67.47 | 64.99 | 63.03 | 62.62 |
| 42 | 420 | 75.63 | 85.64 | 198.1 | 249.4 | 294.8 | 400.7 | 340.9 | 331.3 | | 67.3 | 64.95 | 63.02 | 62.66 |
| 43 | 430 | 70.13 | 83.14 | 195.8 | 245.5 | 298.5 | 393.2 | 337.7 | 326 | | 67.18 | 64.77 | 62.98 | 62.595 |
| 44 | 440 | 76.22 | 85.59 | 193.5 | 244.8 | 300.5 | 388.7 | 334.5 | 325 | | 67.03 | 64.84 | 62.95 | 62.575 |
| 45 | 450 | 75.2 | 84.77 | 192.4 | 242.6 | 303.2 | 386.9 | 330.6 | 322.6 | | 67.05 | 64.69 | 62.96 | 62.58 |
| 46 | 460 | 72.72 | 83.85 | 191.3 | 240 | 303.4 | 383.7 | 326.9 | 320.3 | | 67.06 | 64.93 | 62.86 | 62.485 |
| 47 | 470 | 72.02 | 83.44 | 188.6 | 237.1 | 304.6 | 377.3 | 322.1 | 317.7 | | 66.93 | 64.53 | 62.88 | 62.51 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | November 25, 2013 |
| Test Run Number: | 1a |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 30.27 | 50 | Meter Box (A) | 1.002 |
| End | 30.18 | 75 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 470 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.004@5 | 0.000@5 |

| Maximum Vacuum | |
|---|---|
| Train A | Train B |
| 0.00 | 0.00 |

| | Particulate Sampling Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg |
| 0 | 0.015 | 0.00 | 0.00 | 0.055 | 22.61 | 22.61 | 769.535 | 713.310 | 99.96 | 99.96 | 0.00 | 0.00 |
| 10 | 0.015 | 0.00 | 0.00 | 0.058 | 21.55 | 1.06 | 771.096 | 714.545 | 100.93 | 98.57 | 0.00 | 0.00 |
| 20 | 0.015 | 0.00 | 0.00 | 0.063 | 20.68 | 0.87 | 772.646 | 715.841 | 100.12 | 103.35 | 0.00 | 0.00 |
| 30 | 0.015 | 0.00 | 0.00 | 0.060 | 19.65 | 1.03 | 774.184 | 717.063 | 99.15 | 97.26 | 0.00 | 0.00 |
| 40 | 0.015 | 0.00 | 0.00 | 0.063 | 18.76 | 0.89 | 775.726 | 718.314 | 99.52 | 99.69 | 0.00 | 0.00 |
| 50 | 0.015 | 0.00 | 0.00 | 0.070 | 17.70 | 1.06 | 777.253 | 719.515 | 98.67 | 95.81 | 0.00 | 0.00 |
| 60 | 0.015 | 0.00 | 0.00 | 0.068 | 16.71 | 0.99 | 778.803 | 720.748 | 100.22 | 98.41 | 0.00 | 0.00 |
| 70 | 0.015 | 0.00 | 0.00 | 0.070 | 15.77 | 0.94 | 780.359 | 721.961 | 100.55 | 96.75 | 0.00 | 0.00 |
| 80 | 0.015 | 0.00 | 0.00 | 0.073 | 14.69 | 1.08 | 781.917 | 723.298 | 101.04 | 107.03 | 0.00 | 0.00 |
| 90 | 0.015 | 0.00 | 0.00 | 0.073 | 13.61 | 1.08 | 783.466 | 724.609 | 100.31 | 104.79 | 0.00 | 0.00 |
| 100 | 0.015 | 0.00 | 0.00 | 0.073 | 12.65 | 0.96 | 785.010 | 725.835 | 99.96 | 97.99 | 0.00 | 0.00 |
| 110 | 0.015 | 0.00 | 0.00 | 0.075 | 11.62 | 1.03 | 786.564 | 727.061 | 100.77 | 98.15 | 0.00 | 0.00 |
| 120 | 0.015 | 0.00 | 0.00 | 0.075 | 10.49 | 1.13 | 788.145 | 728.371 | 102.51 | 104.90 | 0.00 | 0.00 |
| 130 | 0.015 | 0.00 | 0.00 | 0.075 | 9.41 | 1.08 | 789.651 | 729.584 | 97.71 | 97.19 | 0.00 | 0.00 |
| 140 | 0.015 | 0.00 | 0.00 | 0.078 | 8.27 | 1.14 | 791.194 | 730.872 | 100.25 | 103.33 | 0.00 | 0.00 |
| 150 | 0.015 | 0.00 | 0.00 | 0.073 | 7.30 | 0.97 | 792.739 | 732.118 | 100.11 | 99.69 | 0.00 | 0.00 |
| 160 | 0.015 | 0.00 | 0.00 | 0.070 | 6.58 | 0.72 | 794.285 | 733.342 | 99.98 | 97.73 | 0.00 | 0.00 |
| 170 | 0.015 | 0.00 | 0.00 | 0.065 | 6.06 | 0.52 | 795.834 | 734.582 | 99.76 | 98.61 | 0.00 | 0.00 |
| 180 | 0.015 | 0.00 | 0.00 | 0.063 | 5.68 | 0.38 | 797.384 | 735.828 | 99.68 | 98.93 | 0.00 | 0.00 |
| 190 | 0.015 | 0.00 | 0.00 | 0.058 | 5.32 | 0.36 | 798.934 | 737.075 | 99.56 | 98.91 | 0.00 | 0.00 |
| 200 | 0.015 | 0.00 | 0.00 | 0.055 | 5.01 | 0.31 | 800.494 | 738.317 | 99.91 | 98.22 | 0.00 | 0.00 |
| 210 | 0.015 | 0.00 | 0.00 | 0.055 | 4.81 | 0.20 | 802.055 | 739.553 | 99.97 | 97.73 | 0.00 | 0.00 |
| 220 | 0.015 | 0.00 | 0.00 | 0.053 | 4.60 | 0.21 | 803.617 | 740.782 | 99.98 | 97.12 | 0.00 | 0.00 |
| 230 | 0.015 | 0.00 | 0.00 | 0.050 | 4.41 | 0.19 | 805.180 | 741.989 | 99.87 | 95.22 | 0.00 | 0.00 |
| 240 | 0.015 | 0.00 | 0.00 | 0.050 | 4.16 | 0.25 | 806.743 | 743.263 | 99.85 | 100.48 | 0.00 | 0.00 |
| 250 | 0.015 | 0.00 | 0.00 | 0.050 | 3.92 | 0.24 | 808.304 | 744.546 | 99.76 | 101.25 | 0.00 | 0.00 |
| 260 | 0.015 | 0.00 | 0.00 | 0.050 | 3.68 | 0.24 | 809.867 | 745.819 | 99.76 | 100.31 | 0.00 | 0.00 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 270 | 0.015 | 0.00 | 0.00 | 0.050 | 3.45 | 0.23 | 811.421 | 747.094 | 99.29 | 100.59 | 0.00 | 0.00 |
| 280 | 0.015 | 0.00 | 0.00 | 0.050 | 3.27 | 0.18 | 812.990 | 748.369 | 100.23 | 100.59 | 0.00 | 0.00 |
| 290 | 0.015 | 0.00 | 0.00 | 0.050 | 3.08 | 0.19 | 814.551 | 749.651 | 99.58 | 100.99 | 0.00 | 0.00 |
| 300 | 0.015 | 0.00 | 0.00 | 0.048 | 2.89 | 0.19 | 816.119 | 750.919 | 100.20 | 100.05 | 0.00 | 0.00 |
| 310 | 0.015 | 0.00 | 0.00 | 0.048 | 2.69 | 0.20 | 817.681 | 752.226 | 99.72 | 103.00 | 0.00 | 0.00 |
| 320 | 0.015 | 0.00 | 0.00 | 0.048 | 2.51 | 0.18 | 819.243 | 753.487 | 99.64 | 99.32 | 0.00 | 0.00 |
| 330 | 0.015 | 0.00 | 0.00 | 0.048 | 2.29 | 0.22 | 820.816 | 754.767 | 100.53 | 101.01 | 0.00 | 0.00 |
| 340 | 0.015 | 0.00 | 0.00 | 0.048 | 2.09 | 0.20 | 822.388 | 756.044 | 100.32 | 100.63 | 0.00 | 0.00 |
| 350 | 0.015 | 0.00 | 0.00 | 0.048 | 1.95 | 0.14 | 823.960 | 757.320 | 100.26 | 100.49 | 0.00 | 0.00 |
| 360 | 0.015 | 0.00 | 0.00 | 0.045 | 1.76 | 0.19 | 825.525 | 758.595 | 99.74 | 100.34 | 0.00 | 0.00 |
| 370 | 0.015 | 0.00 | 0.00 | 0.045 | 1.61 | 0.15 | 827.095 | 759.867 | 100.20 | 100.25 | 0.00 | 0.00 |
| 380 | 0.015 | 0.00 | 0.00 | 0.045 | 1.42 | 0.19 | 828.661 | 761.138 | 99.78 | 100.00 | 0.00 | 0.00 |
| 390 | 0.015 | 0.00 | 0.00 | 0.045 | 1.26 | 0.16 | 830.233 | 762.383 | 100.14 | 97.93 | 0.00 | 0.00 |
| 400 | 0.015 | 0.00 | 0.00 | 0.045 | 1.06 | 0.20 | 831.801 | 763.675 | 99.93 | 101.66 | 0.00 | 0.00 |
| 410 | 0.015 | 0.00 | 0.00 | 0.045 | 0.86 | 0.20 | 833.361 | 764.939 | 99.38 | 99.43 | 0.00 | 0.00 |
| 420 | 0.015 | 0.00 | 0.00 | 0.045 | 0.71 | 0.15 | 834.938 | 766.213 | 100.44 | 100.18 | 0.00 | 0.00 |
| 430 | 0.015 | 0.00 | 0.00 | 0.043 | 0.54 | 0.17 | 836.511 | 767.485 | 99.96 | 99.80 | 0.00 | 0.00 |
| 440 | 0.015 | 0.00 | 0.00 | 0.043 | 0.41 | 0.13 | 838.079 | 768.757 | 99.87 | 100.03 | 0.00 | 0.00 |
| 450 | 0.015 | 0.00 | 0.00 | 0.043 | 0.24 | 0.17 | 839.649 | 770.045 | 99.92 | 101.21 | 0.00 | 0.00 |
| 460 | 0.015 | 0.00 | 0.00 | 0.043 | 0.11 | 0.13 | 841.214 | 771.434 | 99.54 | 109.08 | 0.00 | 0.00 |
| 470 | 0.015 | 0.00 | 0.00 | 0.040 | 0.00 | 0.11 | 842.783 | 772.635 | 99.75 | 94.27 | 0.00 | 0.00 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | November 25, 2013 |
| Test Run Number: | 1a |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,°F | Square Root |
| A1 | 0.0100 | 104 | 0.1000 |
| A2 | 0.0150 | 104 | 0.1225 |
| A3 | 0.0150 | 104 | 0.1225 |
| A4 | 0.0125 | 104 | 0.1118 |
| A Center | 0.0150 | 104 | 0.1225 |
| B1 | 0.0075 | 103 | 0.0866 |
| B2 | 0.0150 | 103 | 0.1225 |
| B3 | 0.0150 | 103 | 0.1225 |
| B4 | 0.0125 | 102 | 0.1118 |
| B Center | 0.0150 | 106 | 0.1225 |
| Averages | 0.01325 | 103.66 | 0.1125 |

| | | |
|---|---|---|
| Tunnel Diameter | 8.000 | inches |
| Tunnel Static | -0.063 | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9187 | factor |
| Baro. Pressure | Start | |
| Pitot Factor | 0.99 | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 7.690 | Ft/ Sec |
| Initial Flow | **146.47** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.011045089 | | |
| VS (2) | 0.013737098 | STD Tunnel Flow: | 147.5907812 |

| | | Ending | | 554.2427083 | 74.79051325 | 60.13409117 | 7.630701809 | 99.96453015 | 99.96376709 |
|---|---|---|---|---|---|---|---|---|---|
| 470 | Average | Average | | Tunnel Temp, | STD Sample | STD Sample | Tunnel | Proportional | Proportional |
| Time | Firebox Temp | Firebox | Tunnel Delta-P | R | Ft3 (1) | Ft3 (2) | Velocity | Rate (1) | Rate (2) |
| 0 | 409.32 | | 0.015 | 568 | | | 7.725022136 | | |
| 10 | 384.8 | | 0.015 | 561.1 | 1.596289157 | 1.253471987 | 7.677957416 | 100.9303948 | 98.57137233 |
| 20 | 361.78 | | 0.015 | 560.3 | 1.584661322 | 1.315220646 | 7.67248196 | 100.1237353 | 103.3534468 |
| 30 | 347.62 | | 0.015 | 558.13 | 1.572302709 | 1.240087551 | 7.657610072 | 99.15032002 | 97.26040356 |
| 40 | 333.46 | | 0.015 | 559.55 | 1.576135558 | 1.269443875 | 7.667345168 | 99.51837843 | 99.6894019 |
| 50 | 331.34 | | 0.015 | 561.4 | 1.560146803 | 1.218053685 | 7.680009705 | 98.67154847 | 95.81172739 |
| 60 | 337.94 | | 0.015 | 562.1 | 1.583646067 | 1.250364503 | 7.68479625 | 100.2201834 | 98.41458474 |
| 70 | 340.1 | | 0.015 | 561.7 | 1.589441937 | 1.229694597 | 7.682061447 | 100.5511759 | 96.753239 |
| 80 | 347.66 | | 0.015 | 566 | 1.59107422 | 1.355180873 | 7.711409752 | 101.0389742 | 107.0339406 |
| 90 | 358.42 | | 0.015 | 564.7 | 1.581414599 | 1.328331919 | 7.702548801 | 100.3101574 | 104.7928226 |
| 100 | 363.08 | | 0.015 | 564.6 | 1.576069019 | 1.24216069 | 7.701866768 | 99.96223161 | 97.98605072 |
| 110 | 368.76 | | 0.015 | 566.5 | 1.586110036 | 1.242136943 | 7.714815099 | 100.7682101 | 98.1489079 |
| 120 | 375.74 | | 0.015 | 566.3 | 1.613775843 | 1.327826418 | 7.713453141 | 102.5077651 | 104.9012399 |
| 130 | 384.46 | | 0.015 | 566.9 | 1.537367879 | 1.229518204 | 7.717538296 | 97.70601609 | 97.18611635 |
| 140 | 394.3 | | 0.015 | 568.4 | 1.575273991 | 1.305514558 | 7.727741736 | 100.2474677 | 103.3296099 |
| 150 | 401.64 | | 0.015 | 565.6 | 1.576999393 | 1.262665715 | 7.70868439 | 100.1097785 | 99.69172821 |
| 160 | 404.52 | | 0.015 | 563.6 | 1.577673459 | 1.240051352 | 7.695043105 | 99.97533909 | 97.73299289 |
| 170 | 396.82 | | 0.015 | 558.92 | 1.58085571 | 1.256417292 | 7.663027603 | 99.76020468 | 98.61086449 |
| 180 | 387.54 | | 0.015 | 557.47 | 1.58166477 | 1.262062406 | 7.653081093 | 99.68170688 | 98.92535486 |
| 190 | 380.5 | | 0.015 | 556.21 | 1.581589247 | 1.263256375 | 7.64442741 | 99.56423792 | 98.90697759 |
| 200 | 370.3 | | 0.015 | 553.08 | 1.591610651 | 1.257986799 | 7.622888051 | 99.91279034 | 98.21687155 |
| 210 | 362.7 | | 0.015 | 552.63 | 1.593178582 | 1.252232657 | 7.619786332 | 99.97052248 | 97.72783775 |
| 220 | 356.7 | | 0.015 | 552.26 | 1.593909917 | 1.244890842 | 7.617235083 | 99.98292574 | 97.12233211 |
| 230 | 352.82 | | 0.015 | 550.41 | 1.594747581 | 1.22255965 | 7.604466001 | 99.86777725 | 95.22023565 |
| 240 | 349.36 | | 0.015 | 550.31 | 1.594656214 | 1.290263071 | 7.60377517 | 99.85298357 | 100.4842523 |
| 250 | 347.12 | | 0.015 | 550.72 | 1.592615707 | 1.299576637 | 7.60660718 | 99.76235509 | 101.2472778 |
| 260 | 346.96 | | 0.015 | 549.24 | 1.594671441 | 1.289336542 | 7.59637934 | 99.75681388 | 100.3144293 |
| 270 | 347.94 | | 0.015 | 550.28 | 1.585670767 | 1.291670774 | 7.603567908 | 99.2876332 | 100.5911408 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 280 | 347.12 | | 0.015 | 550.05 | 1.601129376 | 1.291868334 | 7.601978714 | 100.2346283 | 100.5854987 |
| 290 | 345.8 | | 0.015 | 548.28 | 1.593285116 | 1.299097548 | 7.589737696 | 99.5829472 | 100.9854956 |
| 300 | 344.82 | | 0.015 | 550.05 | 1.600628667 | 1.28499683 | 7.601978714 | 100.2032827 | 100.05048 |
| 310 | 342.96 | | 0.015 | 549.33 | 1.594031706 | 1.323709623 | 7.597001697 | 99.72496398 | 102.9972005 |
| 320 | 341.86 | | 0.015 | 548.06 | 1.59444288 | 1.277939654 | 7.588214833 | 99.63531377 | 99.32085179 |
| 330 | 341.58 | | 0.015 | 549.8 | 1.606147028 | 1.297629133 | 7.600250952 | 100.5258931 | 101.0110745 |
| 340 | 339.4 | | 0.015 | 548.31 | 1.605064601 | 1.294488767 | 7.589945335 | 100.321929 | 100.6299844 |
| 350 | 336.44 | | 0.015 | 547.43 | 1.605371421 | 1.293759654 | 7.583852218 | 100.2605536 | 100.4925661 |
| 360 | 332.34 | | 0.015 | 546.62 | 1.598207545 | 1.292807569 | 7.578239451 | 99.73927558 | 100.3442938 |
| 370 | 329.46 | | 0.015 | 548.19 | 1.603344288 | 1.289753331 | 7.589114744 | 100.2034368 | 100.2508927 |
| 380 | 327.64 | | 0.015 | 546.3 | 1.599351053 | 1.288788689 | 7.576020915 | 99.78141884 | 100.0030745 |
| 390 | 326.52 | | 0.015 | 546.02 | 1.605509528 | 1.262412721 | 7.574079164 | 100.1399653 | 97.93133465 |
| 400 | 326.62 | | 0.015 | 546.38 | 1.601546731 | 1.310057536 | 7.57657561 | 99.92572003 | 101.6608654 |
| 410 | 326.12 | | 0.015 | 545.99 | 1.593421271 | 1.281776553 | 7.57387109 | 99.38325775 | 99.43074725 |
| 420 | 323.42 | | 0.015 | 545.64 | 1.610816275 | 1.291818318 | 7.571443133 | 100.4359942 | 100.1775889 |
| 430 | 320.18 | | 0.015 | 543.14 | 1.606853391 | 1.289950769 | 7.554077893 | 99.95911947 | 99.80333774 |
| 440 | 318.7 | | 0.015 | 545.59 | 1.601837671 | 1.290000138 | 7.571096219 | 99.87159314 | 100.0320096 |
| 450 | 317.18 | | 0.015 | 544.77 | 1.603850162 | 1.306214057 | 7.565404552 | 99.92189415 | 101.2131592 |
| 460 | 314.86 | | 0.015 | 543.85 | 1.599048128 | 1.408898457 | 7.559013677 | 99.53856506 | 109.0775302 |
| 470 | 311.76 | 311.76 | 0.015 | 543.44 | 1.603073832 | 1.218146932 | 7.556163829 | 99.75153784 | 94.27390838 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| Sample ID Number: | **101440749MTL-003** |
| Test Date: | **November 25, 2013** |
| Test Run Number: | **1a** |

# EPA Method 28
# Pre Burn Data

| Coal Bed Range | 4.6 | to | 5.6 |
|---|---|---|---|

Average Firebox Temp, °F: 417.32

| Final Coal Bed Wt, lb | 5.12 |
|---|---|

| Interval | 10 |
|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | | Catalyst Outlet | Flue Draft | Fuel Weight | Weight Loss |
| 0 | 0 | 84.89 | 235.6 | 817.4 | 762.5 | 498.1 | 710.3 | 571.1 | 515.2 | 611.44 | | | 8.96 | 3.84 |
| 1 | 0 | 84.43 | 131.1 | 487.3 | 675.8 | 532.4 | 707.3 | 581.2 | 537.4 | 606.82 | | | 7.62 | 1.34 |
| 2 | 0 | 81.52 | 115 | 413.8 | 579.6 | 549.4 | 664 | 560.2 | 524.2 | 575.48 | | | 6.79 | 0.83 |
| 3 | 0 | 78.84 | 103.7 | 363.2 | 519.5 | 515.5 | 620.1 | 532.8 | 502.5 | 538.08 | | | 6.29 | 0.50 |
| 4 | 0 | 76.12 | 102.3 | 315.8 | 457.7 | 487.5 | 575.8 | 498.7 | 479.8 | 499.9 | | | 5.86 | 0.43 |
| 5 | 0 | 72.61 | 102.8 | 288.8 | 394.8 | 472.2 | 550.7 | 464.4 | 467.2 | 469.86 | | | 5.49 | 0.37 |
| 6 | 0 | 70.54 | 92.79 | 256.3 | 351.5 | 455.1 | 509.5 | 436.9 | 445.8 | 439.76 | | | 5.27 | 0.22 |
| 7 | 0 | 76.97 | 93 | 241.6 | 324.3 | 443.2 | 478.5 | 416 | 424.6 | 417.32 | | | 5.12 | 0.15 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | November 25, 2013 |
| Test Run Number: | 1a |

| | |
|---|---|
| Intertek Equipment No.'s | SBI-206 |

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 1 | | 118.6 | |
| B - Rear Filter Catch | Filter | 2 | | 119 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 273.7 | 237.6 | 36.1 |
| Probe & Filter Holder | Probe | 17 | 139747.8 | 139745.4 | 2.4 |
| | | | Total Particulate, mg | | **38.5** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 3 | | 119 | |
| B - Rear Filter Catch | Filter | 4 | | 118.3 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 267 | 237.3 | 29.7 |
| Probe & Filter Holder | Probe | 18 | 147883.6 | 147880.9 | 2.7 |
| | | | Total Particulate, mg | | **32.4** |

Intertek

# TEST FUEL DATA
## EPA Method 5G-3

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | November 25, 2013 |
| Test Run Number: | 1a |

| | | |
|---|---|---|
| Calibration Reference ID | SBI-153 | |
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

**PRE-BURN FUEL PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 16 | 1.732 | 20.2 | 19.1 | 19.8 |
| 2 | 16 | 1.835 | 20.4 | 18.5 | 20.4 |
| 3 | 16 | 1.716 | 20.5 | 18.4 | 20.1 |
| 4 | 16 | 1.752 | 21.0 | 18.7 | 20.8 |
| 5 | 16 | 1.932 | 19.9 | 18.3 | 20.2 |
| 6 | 16 | 1.836 | 19.5 | 18.4 | 20.1 |
| 7 | 16 | 1.904 | 19.5 | 18.0 | 20.2 |
| 8 | 16 | 1.874 | 20.2 | 18.4 | 20.0 |
| 9 | 17 | 2.007 | 20.2 | 18.6 | 20.2 |
| 10 | 17 | 1.98 | 20.1 | 18.7 | 20.8 |
| 11 | 17 | 1.97 | 18.8 | 18.5 | 19.8 |
| 12 | 17 | 1.94 | 20.4 | 19.0 | 20.5 |
| Total Weight | | 22.474 | Average, %db | | 19.6 |

| | | | |
|---|---|---|---|
| Allowable Fuel Load Range: | 4.52 | to | 5.65 |

**TEST FUEL LOAD PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 10:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | | Moisture, %, Dry Basis | |
| | | 2x4 | 4x4 | | |
| 1 | 15 | 2.004 | | 21.7 | 20.9 | 22.1 |
| 2 | 15 | 2.028 | | 22.1 | 21.5 | 22.1 |
| 3 | 15 | 1.693 | | 21.1 | 20.6 | 21.4 |
| 4 | 15 | 1.638 | | 21.4 | 20.0 | 20.5 |
| 5 | 15 | 1.875 | | 20.0 | 19.7 | 21.0 |
| 6 | 15 | 1.699 | | 20.6 | 19.4 | 20.3 |
| 7 | 15 | | 4.162 | 21.7 | 22.0 | 21.4 |
| 8 | 15 | | 4.147 | 21.7 | 22.3 | 22.4 |
| 9 | 15 | | 3.368 | 19.3 | 19.4 | 19.5 |
| Totals | | 10.937 | 11.677 | | | |
| % of Weight | | 48.4 | 51.6 | | | |
| Total weight, wet, lb. | | 22.61 | | Average Moisture, dry | | 20.97 |
| Total weight, dry, kg | | 8.48 | | Average Moisture, wet | | 17.33 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 3, 2013 |
| Test Run Number: | 2 |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **0.97** | |
| Emission-Rate, g/hr: | **4.09** | |
| Adjusted Emission-Rate, g/hr : | **5.86** | |
| Duration of Test, Minutes | 530 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 926.783 | 915.849 |
| Dry Gas Meter Ending Reading, $ft^3$ | 1010.772 | 991.83 |
| Barometric Pressure Correction Factor | 1.002 | 1.002 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 1.000 | 1.001 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **84.370** | **75.788** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **147.746** | |
| Total Tunnel Volume, scf | **78305.211** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 928.116 | 1033.213 |
| Sample Particulate Mass, mg | 36.3 | 37.3 |
| Total Emissions, grams | 33.691 | 38.539 |
| Emission-Rate, g/hr | 3.81 | 4.36 |
| Adjusted Emission Rates, g/hr | **5.53** | **6.18** |
| Deviation, % | 5.57% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 76.04 | 73.03 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.003@5 | 0.0025@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 108.66 | |
| Maximum Ambient Temperture, ℉ | 88 | |
| Mimimum Ambient Temperature, ℉ | 66 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 22.63 | |
| Dry-Basis Fuel Load Moisture Content, % | 20.36 | |
| Wet-Basis Fuel Load Moisture Content, % | 16.92 | |
| Coal Bed Range, lb. | 4.60 | 5.60 |
| Actual Coal Bed, Lb. | 5.16 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | December 3, 2013 |
| Test Run No: | 2 |

# Temperature Data

| | |
|---|---|
| Firebox Temp Start | 410.98 |
| Firebox Temp End | 302.32 |
| Firebox Delta-T | **108.7** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **76.04** | **73.03** |

| Interval | 10 | Duration of Test, Min | 530 |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| 0 | 0 | 85.31 | 100.6 | 251.2 | 314.5 | 443.7 | 469.1 | 409.6 | 418 | | 67.92 | 66.08 | 66.985 | 66.665 |
| 1 | 10 | 85.94 | 104 | 267.4 | 316.5 | 432 | 420.8 | 392.1 | 394.7 | | 73.96 | 72 | 67.13 | 66.695 |
| 2 | 20 | 86.87 | 99.24 | 262.3 | 305.9 | 419 | 376.1 | 360 | 363.9 | | 75.17 | 72.16 | 67.235 | 66.835 |
| 3 | 30 | 87.84 | 103.6 | 310.9 | 329.1 | 400.9 | 347.1 | 332.4 | 341.2 | | 75.41 | 72.55 | 67.345 | 66.93 |
| 4 | 40 | 85.02 | 104.4 | 312 | 363.5 | 382.2 | 328.8 | 316 | 321.7 | | 75.63 | 72.71 | 67.38 | 66.93 |
| 5 | 50 | 84.32 | 103.1 | 301.3 | 377.8 | 366.7 | 320.1 | 306.7 | 314.7 | | 75.82 | 72.81 | 67.59 | 67.11 |
| 6 | 60 | 86.97 | 104 | 313.7 | 379.7 | 350.9 | 315.5 | 300.9 | 316.8 | | 75.92 | 72.68 | 67.745 | 67.315 |
| 7 | 70 | 80.27 | 103.1 | 342.1 | 381.6 | 334.3 | 320.2 | 307 | 322.3 | | 76.04 | 73.03 | 67.775 | 67.3 |
| 8 | 80 | 78.38 | 103.8 | 358.4 | 414.5 | 319.9 | 336.4 | 320.9 | 338 | | 75.86 | 72.89 | 67.88 | 67.315 |
| 9 | 90 | 78.75 | 101 | 325.1 | 421.3 | 307.9 | 348.6 | 330.6 | 351.5 | | 75.7 | 72.76 | 67.87 | 67.28 |
| 10 | 100 | 78.19 | 100.3 | 324.3 | 407.9 | 294.9 | 347.1 | 329.4 | 352.3 | | 75.4 | 72.49 | 67.7 | 67.07 |
| 11 | 110 | 78.38 | 100.7 | 328 | 408.5 | 284.8 | 345.4 | 329.8 | 354.5 | | 75.04 | 72.56 | 67.72 | 67.155 |
| 12 | 120 | 81.93 | 101.9 | 331.3 | 410.4 | 277 | 345.1 | 333.7 | 357.6 | | 74.99 | 72.5 | 67.735 | 67.215 |
| 13 | 130 | 77.56 | 101.8 | 340 | 416.9 | 268.7 | 349.9 | 342.5 | 360.4 | | 75.24 | 72.68 | 67.795 | 67.32 |
| 14 | 140 | 81.68 | 103.8 | 347.9 | 428.9 | 263.1 | 358 | 355.8 | 366.7 | | 75.39 | 72.58 | 67.775 | 67.17 |
| 15 | 150 | 77.32 | 104.1 | 359.9 | 436.7 | 257.3 | 368.8 | 367.2 | 374.4 | | 75.45 | 72.61 | 67.76 | 67.12 |
| 16 | 160 | 80.31 | 105.7 | 366.5 | 449.8 | 254.1 | 382.5 | 379.7 | 384.1 | | 75.63 | 72.82 | 67.715 | 67.145 |
| 17 | 170 | 77.56 | 102.1 | 347.9 | 447.8 | 250.8 | 401.5 | 388.2 | 392.3 | | 75.67 | 72.6 | 67.755 | 67.125 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | 180 | 80.58 | 99.6 | 314.5 | 427.4 | 249.7 | 415.3 | 396.9 | 395.5 | | 75.32 | 72.41 | 67.81 | 67.195 |
| 19 | 190 | 77.28 | 96.14 | 294.1 | 390.5 | 249.9 | 419.4 | 399.2 | 394.3 | | 74.93 | 72.12 | 67.855 | 67.345 |
| 20 | 200 | 81.41 | 95.37 | 276.1 | 366.5 | 251.5 | 422.7 | 402.4 | 393.9 | | 74.71 | 71.8 | 67.785 | 67.25 |
| 21 | 210 | 76.54 | 91.65 | 262.9 | 343.8 | 252.1 | 419.3 | 397.6 | 391 | | 74.34 | 71.58 | 67.95 | 67.525 |
| 22 | 220 | 79.43 | 92.08 | 255.9 | 327.4 | 254.6 | 416.4 | 397 | 387.7 | | 73.98 | 71.4 | 67.995 | 67.51 |
| 23 | 230 | 75.26 | 88.95 | 247.3 | 313.2 | 256.4 | 413.2 | 392.6 | 379.8 | | 73.58 | 70.69 | 67.925 | 67.425 |
| 24 | 240 | 79.45 | 89.93 | 238.8 | 304.1 | 261.1 | 411.8 | 388 | 375.7 | | 73.02 | 70.35 | 67.845 | 67.315 |
| 25 | 250 | 74.58 | 86.7 | 232.5 | 293.9 | 266.7 | 408.6 | 383.9 | 369.8 | | 72.75 | 70.14 | 67.915 | 67.3 |
| 26 | 260 | 77.5 | 87.76 | 227.6 | 288.1 | 272.1 | 404.4 | 379.3 | 367.4 | | 72.56 | 70.22 | 67.9 | 67.315 |
| 27 | 270 | 75.61 | 86.17 | 223.2 | 281.1 | 275.7 | 401 | 372.2 | 361.6 | | 72.48 | 69.84 | 67.87 | 67.405 |
| 28 | 280 | 76.18 | 86.49 | 221.8 | 276.3 | 280.7 | 399.6 | 367.5 | 358.9 | | 72.58 | 70.08 | 67.955 | 67.495 |
| 29 | 290 | 77.75 | 87.04 | 219 | 272.3 | 283.1 | 400.9 | 364.1 | 356.2 | | 72.41 | 70 | 67.97 | 67.535 |
| 30 | 300 | 74.81 | 85.75 | 217.6 | 270.1 | 287.4 | 399.5 | 362.4 | 353.9 | | 72.54 | 69.93 | 67.955 | 67.46 |
| 31 | 310 | 77.83 | 86.78 | 215.1 | 268.1 | 290 | 394.2 | 359.9 | 352.9 | | 72.55 | 70.17 | 68.045 | 67.6 |
| 32 | 320 | 76.92 | 85.9 | 211.6 | 263.8 | 292 | 390.8 | 356.1 | 348.5 | | 72.33 | 70.24 | 67.92 | 67.45 |
| 33 | 330 | 74.91 | 85.13 | 210.8 | 259.8 | 294.8 | 392.3 | 354.3 | 344.7 | | 72.42 | 70.1 | 68 | 67.505 |
| 34 | 340 | 79.29 | 86.82 | 208.9 | 258.4 | 295.3 | 398.4 | 354.1 | 342.8 | | 72.42 | 69.96 | 68.06 | 67.555 |
| 35 | 350 | 75.44 | 84.94 | 207.9 | 256.4 | 295.8 | 403.9 | 353.3 | 340.1 | | 72.39 | 70.16 | 68.08 | 67.575 |
| 36 | 360 | 74.54 | 84.8 | 208.5 | 255.5 | 297 | 407.1 | 353.2 | 339.2 | | 72.24 | 70.33 | 67.965 | 67.42 |
| 37 | 370 | 75.31 | 84.92 | 207.3 | 254.9 | 296.6 | 408.1 | 352.5 | 338.1 | | 71.99 | 70.17 | 67.905 | 67.425 |
| 38 | 380 | 70.39 | 82.48 | 206.8 | 254.1 | 294.8 | 407.8 | 351.5 | 334.4 | | 71.85 | 69.98 | 67.865 | 67.415 |
| 39 | 390 | 66.96 | 80.74 | 205.6 | 252.2 | 293.8 | 408.5 | 349.7 | 332.7 | | 71.56 | 69.64 | 67.87 | 67.325 |
| 40 | 400 | 65.93 | 79.83 | 203.8 | 250.3 | 293 | 409 | 346.7 | 332.9 | | 71.2 | 69.39 | 67.855 | 67.4 |
| 41 | 410 | 68.12 | 80.67 | 201.8 | 249.3 | 293.5 | 406.8 | 344.2 | 333.8 | | 70.88 | 69.15 | 67.82 | 67.33 |
| 42 | 420 | 75.75 | 82.87 | 200.9 | 251.7 | 298.4 | 400.3 | 348.4 | 339.9 | | 71.02 | 69.35 | 67.85 | 67.365 |
| 43 | 430 | 78.49 | 84.22 | 201.9 | 252.8 | 301.8 | 398.1 | 345.9 | 341.2 | | 71.42 | 69.69 | 67.88 | 67.445 |
| 44 | 440 | 79.87 | 85.26 | 202.1 | 252.8 | 304.6 | 395.2 | 342.4 | 341.4 | | 71.62 | 70.02 | 67.81 | 67.355 |
| 45 | 450 | 80.82 | 85.6 | 201.6 | 251.9 | 306.7 | 392.5 | 338.5 | 340.9 | | 71.96 | 70.18 | 67.82 | 67.32 |
| 46 | 460 | 81.54 | 85.95 | 201.4 | 250.7 | 308.5 | 391.1 | 334.8 | 340 | | 72.21 | 70.2 | 67.92 | 67.44 |
| 47 | 470 | 81.47 | 86.49 | 200.7 | 249.8 | 310.1 | 390.1 | 331.9 | 339.4 | | 72.31 | 70.13 | 67.88 | 67.405 |
| 48 | 480 | 82.12 | 86.72 | 199.2 | 248.4 | 311 | 383.5 | 328.7 | 338.6 | | 72.42 | 70.18 | 67.865 | 67.4 |
| 49 | 490 | 82.11 | 86.49 | 196.7 | 246.2 | 311.7 | 375.5 | 324.1 | 336.8 | | 72.45 | 70.27 | 67.915 | 67.4 |
| 50 | 500 | 77.7 | 84.78 | 194.5 | 239.1 | 308.4 | 367.7 | 314.3 | 329.8 | | 72.52 | 70.15 | 67.925 | 67.45 |
| 51 | 510 | 82.56 | 85.09 | 191 | 236.7 | 309.4 | 362.1 | 311.8 | 328.3 | | 72.28 | 70.04 | 67.97 | 67.5 |
| 52 | 520 | 83.07 | 85.21 | 188.6 | 234.2 | 311.3 | 355.5 | 307.8 | 324 | | 72.2 | 69.91 | 67.99 | 67.48 |
| 53 | 530 | 83 | 85.41 | 186.1 | 230.9 | 311.8 | 348.2 | 302.7 | 318 | | 72.24 | 69.99 | 67.95 | 67.46 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 3, 2013 |
| Test Run Number: | 2 |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 29.97 | 85 | Meter Box (A) | 1.002 |
| End | 30.00 | 80 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 530 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.003@5 | 0.0025@5 |

| Maximum Vacuum | | Average Gases, % | | |
|---|---|---|---|---|
| Train A | Train B | O2 | CO2 | CO |
| 0.00 | 0.00 | 14.009 | 5.491 | 1.187 |

| | Particulate Sampling Data | | | | | | | | | | | | Combustion Gasses, % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg | O2 | CO2 | CO |
| 0 | 0.015 | 0.00 | 0.00 | 0.050 | 22.63 | 22.63 | 926.783 | 915.849 | 99.98 | 99.98 | 0.00 | 0.00 | 15.980 | 2.360 | 1.490 |
| 10 | 0.015 | 0.00 | 0.00 | 0.060 | 21.42 | 1.21 | 928.370 | 917.275 | 101.36 | 100.66 | 0.00 | 0.00 | 18.020 | 1.520 | 0.800 |
| 20 | 0.015 | 0.00 | 0.00 | 0.063 | 20.79 | 0.63 | 929.979 | 918.733 | 102.31 | 102.46 | 0.00 | 0.00 | 16.620 | 2.960 | 0.890 |
| 30 | 0.015 | 0.00 | 0.00 | 0.070 | 19.82 | 0.97 | 931.575 | 920.173 | 101.86 | 101.57 | 0.00 | 0.00 | 14.190 | 5.760 | 0.880 |
| 40 | 0.015 | 0.00 | 0.00 | 0.070 | 18.92 | 0.90 | 933.165 | 921.616 | 101.54 | 101.85 | 0.00 | 0.00 | 14.310 | 5.600 | 0.950 |
| 50 | 0.015 | 0.00 | 0.00 | 0.068 | 18.05 | 0.87 | 934.742 | 923.039 | 100.55 | 100.29 | 0.00 | 0.00 | 14.840 | 4.960 | 1.030 |
| 60 | 0.015 | 0.00 | 0.00 | 0.070 | 17.20 | 0.85 | 936.324 | 924.379 | 100.92 | 94.48 | 0.00 | 0.00 | 13.720 | 6.380 | 0.980 |
| 70 | 0.015 | 0.00 | 0.00 | 0.075 | 16.10 | 1.10 | 937.896 | 925.838 | 100.20 | 102.79 | 0.00 | 0.00 | 12.030 | 8.610 | 0.770 |
| 80 | 0.015 | 0.00 | 0.00 | 0.075 | 14.93 | 1.17 | 939.470 | 927.263 | 100.37 | 100.46 | 0.00 | 0.00 | 11.980 | 8.520 | 0.660 |
| 90 | 0.015 | 0.00 | 0.00 | 0.070 | 14.13 | 0.80 | 941.045 | 928.706 | 100.18 | 101.48 | 0.00 | 0.00 | 14.420 | 5.690 | 0.860 |
| 100 | 0.015 | 0.00 | 0.00 | 0.070 | 13.37 | 0.76 | 942.623 | 930.181 | 100.34 | 103.71 | 0.00 | 0.00 | 13.800 | 6.590 | 0.770 |
| 110 | 0.015 | 0.00 | 0.00 | 0.070 | 12.60 | 0.77 | 944.198 | 931.650 | 100.19 | 103.30 | 0.00 | 0.00 | 13.570 | 6.730 | 0.730 |
| 120 | 0.015 | 0.00 | 0.00 | 0.070 | 11.79 | 0.81 | 945.769 | 933.059 | 100.04 | 99.18 | 0.00 | 0.00 | 12.920 | 7.560 | 0.720 |
| 130 | 0.015 | 0.00 | 0.00 | 0.073 | 10.94 | 0.85 | 947.345 | 934.463 | 100.33 | 98.80 | 0.00 | 0.00 | 12.460 | 8.230 | 0.690 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 140 | 0.015 | 0.00 | 0.00 | 0.073 | 10.03 | 0.91 | 948.915 | 935.868 | 100.13 | 99.07 | 0.00 | 0.00 | 12.130 | 8.630 | 0.670 |
| 150 | 0.015 | 0.00 | 0.00 | 0.075 | 9.04 | 0.99 | 950.489 | 937.273 | 100.42 | 99.11 | 0.00 | 0.00 | 11.520 | 9.480 | 0.670 |
| 160 | 0.015 | 0.00 | 0.00 | 0.075 | 8.12 | 0.92 | 952.064 | 938.705 | 100.63 | 101.15 | 0.00 | 0.00 | 11.140 | 9.570 | 0.710 |
| 170 | 0.015 | 0.00 | 0.00 | 0.070 | 7.31 | 0.81 | 953.638 | 940.142 | 100.24 | 101.18 | 0.00 | 0.00 | 12.060 | 8.510 | 0.650 |
| 180 | 0.015 | 0.00 | 0.00 | 0.068 | 6.73 | 0.58 | 955.219 | 941.573 | 100.45 | 100.52 | 0.00 | 0.00 | 13.300 | 6.270 | 1.190 |
| 190 | 0.015 | 0.00 | 0.00 | 0.063 | 6.18 | 0.55 | 956.790 | 943.006 | 99.50 | 100.33 | 0.00 | 0.00 | 13.130 | 6.220 | 1.310 |
| 200 | 0.015 | 0.00 | 0.00 | 0.060 | 5.79 | 0.39 | 958.370 | 944.450 | 100.01 | 101.04 | 0.00 | 0.00 | 13.450 | 5.600 | 1.360 |
| 210 | 0.015 | 0.00 | 0.00 | 0.058 | 5.43 | 0.36 | 959.948 | 945.982 | 99.52 | 106.79 | 0.00 | 0.00 | 13.640 | 5.200 | 1.520 |
| 220 | 0.015 | 0.00 | 0.00 | 0.055 | 5.16 | 0.27 | 961.520 | 947.518 | 99.17 | 107.11 | 0.00 | 0.00 | 13.700 | 5.140 | 1.410 |
| 230 | 0.015 | 0.00 | 0.00 | 0.055 | 4.85 | 0.31 | 963.097 | 948.923 | 99.22 | 97.71 | 0.00 | 0.00 | 13.830 | 4.880 | 1.410 |
| 240 | 0.015 | 0.00 | 0.00 | 0.055 | 4.61 | 0.24 | 964.676 | 950.322 | 99.45 | 97.40 | 0.00 | 0.00 | 14.130 | 4.720 | 1.370 |
| 250 | 0.015 | 0.00 | 0.00 | 0.525 | 4.37 | 0.24 | 966.262 | 951.745 | 99.58 | 98.78 | 0.00 | 0.00 | 14.250 | 4.590 | 1.420 |
| 260 | 0.015 | 0.00 | 0.00 | 0.050 | 4.18 | 0.19 | 967.843 | 953.258 | 99.37 | 105.13 | 0.00 | 0.00 | 14.490 | 4.280 | 1.520 |
| 270 | 0.015 | 0.00 | 0.00 | 0.050 | 4.01 | 0.17 | 969.423 | 954.674 | 99.16 | 98.23 | 0.00 | 0.00 | 14.450 | 4.370 | 1.480 |
| 280 | 0.015 | 0.00 | 0.00 | 0.050 | 3.82 | 0.19 | 971.001 | 956.070 | 99.05 | 96.86 | 0.00 | 0.00 | 14.280 | 4.740 | 1.440 |
| 290 | 0.015 | 0.00 | 0.00 | 0.050 | 3.62 | 0.20 | 972.589 | 957.424 | 99.73 | 93.98 | 0.00 | 0.00 | 14.280 | 4.700 | 1.470 |
| 300 | 0.015 | 0.00 | 0.00 | 0.050 | 3.40 | 0.22 | 974.176 | 958.810 | 99.55 | 96.10 | 0.00 | 0.00 | 14.510 | 4.280 | 1.580 |
| 310 | 0.015 | 0.00 | 0.00 | 0.050 | 3.23 | 0.17 | 975.757 | 960.240 | 99.25 | 99.22 | 0.00 | 0.00 | 14.790 | 3.990 | 1.610 |
| 320 | 0.015 | 0.00 | 0.00 | 0.050 | 3.08 | 0.15 | 977.342 | 961.737 | 99.44 | 103.82 | 0.00 | 0.00 | 14.810 | 4.140 | 1.520 |
| 330 | 0.015 | 0.00 | 0.00 | 0.050 | 2.88 | 0.20 | 978.929 | 963.184 | 99.48 | 100.27 | 0.00 | 0.00 | 14.750 | 4.150 | 1.600 |
| 340 | 0.015 | 0.00 | 0.00 | 0.048 | 2.73 | 0.15 | 980.514 | 964.517 | 99.50 | 92.50 | 0.00 | 0.00 | 14.630 | 4.230 | 1.620 |
| 350 | 0.015 | 0.00 | 0.00 | 0.048 | 2.54 | 0.19 | 982.097 | 965.934 | 99.20 | 98.16 | 0.00 | 0.00 | 14.800 | 3.980 | 1.660 |
| 360 | 0.015 | 0.00 | 0.00 | 0.048 | 2.36 | 0.18 | 983.682 | 967.437 | 99.34 | 104.13 | 0.00 | 0.00 | 14.770 | 4.030 | 1.680 |
| 370 | 0.015 | 0.00 | 0.00 | 0.048 | 2.15 | 0.21 | 985.272 | 968.955 | 99.67 | 105.18 | 0.00 | 0.00 | 14.940 | 4.050 | 1.480 |
| 380 | 0.015 | 0.00 | 0.00 | 0.048 | 2.00 | 0.15 | 986.858 | 970.420 | 99.21 | 101.28 | 0.00 | 0.00 | 14.920 | 4.170 | 1.390 |
| 390 | 0.015 | 0.00 | 0.00 | 0.045 | 1.78 | 0.22 | 988.441 | 971.804 | 98.86 | 95.55 | 0.00 | 0.00 | 14.780 | 4.230 | 1.510 |
| 400 | 0.015 | 0.00 | 0.00 | 0.045 | 1.63 | 0.15 | 990.045 | 973.200 | 100.09 | 96.28 | 0.00 | 0.00 | | | |
| 410 | 0.015 | 0.00 | 0.00 | 0.450 | 1.41 | 0.22 | 991.640 | 974.599 | 99.61 | 96.58 | 0.00 | 0.00 | | | |
| 420 | 0.015 | 0.00 | 0.00 | 0.048 | 1.31 | 0.10 | 993.235 | 976.021 | 99.81 | 98.36 | 0.00 | 0.00 | | | |
| 430 | 0.015 | 0.00 | 0.00 | 0.045 | 1.17 | 0.14 | 994.835 | 977.435 | 100.24 | 97.91 | 0.00 | 0.00 | | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 440 | 0.015 | 0.00 | 0.00 | 0.045 | 1.03 | 0.14 | 996.429 | 978.840 | 99.97 | 97.40 | 0.00 | 0.00 | | | |
| 450 | 0.015 | 0.00 | 0.00 | 0.045 | 0.89 | 0.14 | 998.022 | 980.378 | 99.94 | 106.66 | 0.00 | 0.00 | | | |
| 460 | 0.015 | 0.00 | 0.00 | 0.045 | 0.77 | 0.12 | 999.621 | 981.798 | 100.33 | 98.48 | 0.00 | 0.00 | | | |
| 470 | 0.015 | 0.00 | 0.00 | 0.045 | 0.63 | 0.14 | 1001.212 | 983.205 | 99.88 | 97.64 | 0.00 | 0.00 | | | |
| 480 | 0.015 | 0.00 | 0.00 | 0.045 | 0.52 | 0.11 | 1002.804 | 984.622 | 99.97 | 98.35 | 0.00 | 0.00 | | | |
| 490 | 0.015 | 0.00 | 0.00 | 0.045 | 0.42 | 0.10 | 1004.404 | 986.065 | 100.44 | 100.13 | 0.00 | 0.00 | | | |
| 500 | 0.015 | 0.00 | 0.00 | 0.045 | 0.36 | 0.06 | 1005.992 | 987.593 | 99.53 | 105.86 | 0.00 | 0.00 | | | |
| 510 | 0.015 | 0.00 | 0.00 | 0.045 | 0.19 | 0.17 | 1007.587 | 989.049 | 99.99 | 100.89 | 0.00 | 0.00 | | | |
| 520 | 0.015 | 0.00 | 0.00 | 0.045 | 0.08 | 0.11 | 1009.180 | 990.454 | 99.87 | 97.37 | 0.00 | 0.00 | | | |
| 530 | 0.015 | 0.00 | 0.00 | 0.043 | 0.00 | 0.08 | 1010.772 | 991.830 | 99.83 | 95.38 | 0.00 | 0.00 | | | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 3, 2013 |
| Test Run Number: | 2 |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0100 | 112 | 0.1000 |
| A2 | 0.0125 | 112 | 0.1118 |
| A3 | 0.0150 | 112 | 0.1225 |
| A4 | 0.0125 | 112 | 0.1118 |
| A Center | 0.0150 | 113 | 0.1225 |
| B1 | 0.0100 | 100 | 0.1000 |
| B2 | 0.0150 | 101 | 0.1225 |
| B3 | 0.0150 | 101 | 0.1225 |
| B4 | 0.0125 | 102 | 0.1118 |
| B Center | 0.0150 | 101 | 0.1225 |
| Averages | 0.01325 | 106.65 | 0.1129 |

| | | |
|---|---|---|
| Tunnel Diameter | **8.000** | inches |
| Tunnel Static | **-0.050** | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9215 | factor |
| Baro. Pressure | 29.97 | |
| Pitot Factor | **0.99** | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 7.772 | Ft/ Sec |
| Initial Flow | **145.79** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.009883976 | | |
| VS (2) | 0.011003126 | STD Tunnel Flow: | 147.75 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 530 | | | | 551.9994444 | 84.334 | 75.756 | 7.67 | 99.98 | 99.98 |
| Time | Average Firebox Temp | Ending Average Firebox Temp | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 411.0 | | 0.015 | 560.6 | | | 7.728 | | |
| 10 | 391.2 | | 0.015 | 564 | 1.596 | 1.423 | 7.752 | 101.36 | 100.66 |
| 20 | 365.0 | | 0.015 | 559.24 | 1.617 | 1.455 | 7.719 | 102.31 | 102.46 |
| 30 | 350.1 | | 0.015 | 563.6 | 1.604 | 1.437 | 7.749 | 101.86 | 101.57 |
| 40 | 342.4 | | 0.015 | 564.4 | 1.598 | 1.440 | 7.755 | 101.54 | 101.85 |
| 50 | 337.2 | | 0.015 | 563.1 | 1.584 | 1.419 | 7.746 | 100.55 | 100.29 |
| 60 | 332.8 | | 0.015 | 564 | 1.589 | 1.336 | 7.752 | 100.92 | 94.48 |
| 70 | 333.1 | | 0.015 | 563.1 | 1.579 | 1.455 | 7.746 | 100.20 | 102.79 |
| 80 | 345.9 | | 0.015 | 563.8 | 1.580 | 1.421 | 7.750 | 100.37 | 100.46 |
| 90 | 352.0 | | 0.015 | 561 | 1.581 | 1.439 | 7.731 | 100.18 | 101.48 |
| 100 | 346.3 | | 0.015 | 560.3 | 1.585 | 1.471 | 7.726 | 100.34 | 103.71 |
| 110 | 344.6 | | 0.015 | 560.7 | 1.582 | 1.465 | 7.729 | 100.19 | 103.30 |
| 120 | 344.8 | | 0.015 | 561.9 | 1.578 | 1.405 | 7.737 | 100.04 | 99.18 |
| 130 | 347.7 | | 0.015 | 561.8 | 1.583 | 1.400 | 7.737 | 100.33 | 98.80 |
| 140 | 354.5 | | 0.015 | 563.8 | 1.577 | 1.401 | 7.750 | 100.13 | 99.07 |
| 150 | 360.9 | | 0.015 | 564.1 | 1.581 | 1.401 | 7.753 | 100.42 | 99.11 |
| 160 | 370.0 | | 0.015 | 565.7 | 1.582 | 1.428 | 7.763 | 100.63 | 101.15 |
| 170 | 376.1 | | 0.015 | 562.1 | 1.581 | 1.433 | 7.739 | 100.24 | 101.18 |
| 180 | 377.0 | | 0.015 | 559.6 | 1.588 | 1.427 | 7.722 | 100.45 | 100.52 |
| 190 | 370.7 | | 0.015 | 556.14 | 1.577 | 1.429 | 7.698 | 99.50 | 100.33 |
| 200 | 367.4 | | 0.015 | 555.37 | 1.587 | 1.440 | 7.692 | 100.01 | 101.04 |
| 210 | 360.8 | | 0.015 | 551.65 | 1.584 | 1.527 | 7.666 | 99.52 | 106.79 |
| 220 | 356.6 | | 0.015 | 552.08 | 1.578 | 1.531 | 7.669 | 99.17 | 107.11 |
| 230 | 351.0 | | 0.015 | 548.95 | 1.583 | 1.401 | 7.648 | 99.22 | 97.71 |
| 240 | 348.1 | | 0.015 | 549.93 | 1.585 | 1.395 | 7.655 | 99.45 | 97.40 |
| 250 | 344.6 | | 0.015 | 546.7 | 1.592 | 1.419 | 7.632 | 99.58 | 98.78 |
| 260 | 342.3 | | 0.015 | 547.76 | 1.587 | 1.509 | 7.639 | 99.37 | 105.13 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 270 | 338.3 | | 0.015 | 546.17 | 1.586 | 1.412 | 7.628 | 99.16 | 98.23 |
| 280 | 336.6 | | 0.015 | 546.49 | 1.584 | 1.391 | 7.631 | 99.05 | 96.86 |
| 290 | 335.3 | | 0.015 | 547.04 | 1.594 | 1.349 | 7.634 | 99.73 | 93.98 |
| 300 | 334.7 | | 0.015 | 545.75 | 1.593 | 1.382 | 7.625 | 99.55 | 96.10 |
| 310 | 333.0 | | 0.015 | 546.78 | 1.587 | 1.425 | 7.633 | 99.25 | 99.22 |
| 320 | 330.2 | | 0.015 | 545.9 | 1.591 | 1.492 | 7.626 | 99.44 | 103.82 |
| 330 | 329.2 | | 0.015 | 545.13 | 1.593 | 1.442 | 7.621 | 99.48 | 100.27 |
| 340 | 329.8 | | 0.015 | 546.82 | 1.591 | 1.328 | 7.633 | 99.50 | 92.50 |
| 350 | 329.9 | | 0.015 | 544.94 | 1.589 | 1.412 | 7.620 | 99.20 | 98.16 |
| 360 | 330.4 | | 0.015 | 544.8 | 1.591 | 1.498 | 7.619 | 99.34 | 104.13 |
| 370 | 330.0 | | 0.015 | 544.92 | 1.596 | 1.513 | 7.620 | 99.67 | 105.18 |
| 380 | 328.5 | | 0.015 | 542.48 | 1.592 | 1.460 | 7.602 | 99.21 | 101.28 |
| 390 | 327.4 | | 0.015 | 540.74 | 1.589 | 1.380 | 7.590 | 98.86 | 95.55 |
| 400 | 326.4 | | 0.015 | 539.83 | 1.610 | 1.392 | 7.584 | 100.09 | 96.28 |
| 410 | 325.5 | | 0.015 | 540.67 | 1.602 | 1.395 | 7.590 | 99.61 | 96.58 |
| 420 | 327.7 | | 0.015 | 542.87 | 1.601 | 1.418 | 7.605 | 99.81 | 98.36 |
| 430 | 328.0 | | 0.015 | 544.22 | 1.606 | 1.409 | 7.615 | 100.24 | 97.91 |
| 440 | 327.3 | | 0.015 | 545.26 | 1.601 | 1.401 | 7.622 | 99.97 | 97.40 |
| 450 | 326.1 | | 0.015 | 545.6 | 1.600 | 1.533 | 7.624 | 99.94 | 106.66 |
| 460 | 325.0 | | 0.015 | 545.95 | 1.605 | 1.415 | 7.627 | 100.33 | 98.48 |
| 470 | 324.3 | | 0.015 | 546.49 | 1.597 | 1.403 | 7.631 | 99.88 | 97.64 |
| 480 | 322.0 | | 0.015 | 546.72 | 1.598 | 1.413 | 7.632 | 99.97 | 98.35 |
| 490 | 318.9 | | 0.015 | 546.49 | 1.606 | 1.439 | 7.631 | 100.44 | 100.13 |
| 500 | 311.9 | | 0.015 | 544.78 | 1.594 | 1.523 | 7.619 | 99.53 | 105.86 |
| 510 | 309.7 | | 0.015 | 545.09 | 1.601 | 1.451 | 7.621 | 99.99 | 100.89 |
| 520 | 306.6 | | 0.015 | 545.21 | 1.599 | 1.400 | 7.622 | 99.87 | 97.37 |
| 530 | 302.3 | 302.32 | 0.015 | 545.41 | 1.598 | 1.372 | 7.623 | 99.83 | 95.38 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| ample ID Number: | **101440749MTL-003** |
| Test Date: | **December 3, 2013** |
| est Run Number: | **2** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.6 | to | 5.6 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 412.08 |

| | |
|---|---|
| **Final Coal Bed Wt, lb** | 5.16 |

| Interval | 10 |
|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | | Catalyst Outlet | Flue Draft | Fuel Weight | Weight Loss |
| 0 | 0 | 82.83 | 231.2 | 762.3 | 756.3 | 538.7 | 701.8 | 560.2 | 560.1 | | | | 8.90 | 3.74 |
| 1 | 10 | 82.18 | 137.2 | 457.8 | 638.4 | 566.5 | 687.3 | 565.5 | 576.7 | | | | 7.88 | 1.02 |
| 2 | 20 | 79.37 | 122.3 | 399.4 | 543.9 | 534.3 | 640.1 | 536.1 | 553.8 | | | | 7.13 | 0.75 |
| 3 | 30 | 76.87 | 113.3 | 351.6 | 489.3 | 499.9 | 603.6 | 502 | 531.7 | | | | 6.52 | 0.61 |
| 4 | 40 | 75.33 | 101.6 | 316.9 | 435.5 | 471.5 | 585.8 | 475 | 513.9 | | | | 6.04 | 0.48 |
| 5 | 50 | 78.19 | 107.5 | 313.7 | 401.7 | 452.8 | 570.7 | 465.1 | 490.1 | | | | 5.59 | 0.45 |
| 6 | 60 | 84.86 | 98.55 | 271.9 | 372.4 | 447.9 | 528.2 | 452.7 | 466 | | | | 5.50 | 0.09 |
| 7 | 70 | 83.02 | 94.46 | 251.8 | 338.8 | 433.2 | 494.1 | 426.6 | 436.4 | | | | 5.35 | 0.15 |
| 8 | 80 | 85.92 | 103.7 | 259.3 | 316.5 | 443.8 | 470.3 | 410.6 | 419.2 | 412.08 | | | 5.16 | 0.19 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: December 3, 2013
Test Run Number: 2

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 13 | | 119.4 | |
| B - Rear Filter Catch | Filter | 14 | | 119.3 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 272.3 | 238.7 | 33.6 |
| Probe & Filter Holder | Probe | 25 | 136813.0 | 136810.3 | 2.7 |
| | | | Total Particulate, mg | | **36.3** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 15 | | 118.7 | |
| B - Rear Filter Catch | Filter | 16 | | 118.9 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 272.4 | 237.6 | 34.8 |
| Probe & Filter Holder | Probe | 26 | 139804.3 | 139801.8 | 2.5 |
| | | | Total Particulate, mg | | **37.3** |

Intertek

# TEST FUEL DATA
## EPA Method 5G-3

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 3, 2013 |
| Test Run Number: | 2 |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

**PRE-BURN FUEL PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 16 | 1.660 | 20.1 | 20.2 | 20.2 |
| 2 | 16 | 1.681 | 20.1 | 20.0 | 20.3 |
| 3 | 16 | 1.694 | 20.4 | 19.7 | 20.0 |
| 4 | 16 | 1.870 | 20.5 | 21.9 | 19.6 |
| 5 | 16 | 1.653 | 19.8 | 19.6 | 19.6 |
| 6 | 16 | 1.981 | 20.0 | 19.8 | 20.5 |
| 7 | 16 | 2.020 | 20.3 | 19.8 | 20.0 |
| 8 | 16 | 1.986 | 19.7 | 19.3 | 20.0 |
| 9 | 17 | 1.802 | 20.5 | 20.2 | 20.4 |
| 10 | 17 | 1.71 | 19.9 | 20.8 | 20.8 |
| 11 | 17 | 1.75 | 20.6 | 19.9 | 20.3 |
| 12 | 17 | 1.70 | 20.8 | 20.5 | 20.0 |
| Total Weight | | **21.510** | Average, %db | | **20.2** |

| Allowable Fuel Load Range: | **4.53** | to | **5.66** |
|---|---|---|---|

**TEST FUEL LOAD PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 10:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. 2x4 | Weight, Lb. 4x4 | Moisture, %, Dry Basis | |
| 1 | 15 | 1.630 | | 19.3 | 19.3 | 20.0 |
| 2 | 15 | 1.609 | | 19.2 | 18.8 | 19.2 |
| 3 | 15 | 1.538 | | 19.2 | 19.1 | 20.0 |
| 4 | 15 | | 4.072 | 22.8 | 22.8 | 22.2 |
| 5 | 15 | | 3.431 | 20.0 | 19.5 | 19.2 |
| 6 | 15 | | 4.210 | 22.0 | 21.0 | 22.5 |
| 7 | 15 | 2.122 | | 19.9 | 20.9 | 19.5 |
| 8 | 15 | 1.843 | | 19.8 | 19.0 | 19.3 |
| 9 | 15 | 2.170 | | 22.8 | 22.3 | 20.2 |
| Totals | | 10.912 | 11.713 | | | |
| % of Weight | | 48.2 | 51.8 | | | |
| Total weight, wet, lb. | | **22.625** | | Average Moisture, dry | | **20.36** |
| Total weight, dry, kg | | 8.53 | | Average Moisture, wet | | 16.92 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | November 26, 2013 |
| Test Run Number: | 2a |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **0.90** | |
| Emission-Rate, g/hr: | **5.86** | |
| Adjusted Emission-Rate, g/hr : | **7.89** | |
| Duration of Test, Minutes | 570 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 842.837 | 772.666 |
| Dry Gas Meter Ending Reading, $ft^3$ | 931.007 | 854.345 |
| Barometric Pressure Correction Factor | 1.009 | 1.009 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 1.005 | 1.006 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **89.613** | **82.412** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **147.519** | |
| Total Tunnel Volume, scf | **84085.766** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 938.316 | 1020.314 |
| Sample Particulate Mass, mg | 57.5 | 56.2 |
| Total Emissions, grams | 53.953 | 57.342 |
| Emission-Rate, g/hr | 5.68 | 6.04 |
| Adjusted Emission Rates, g/hr | **7.69** | **8.09** |
| Deviation, % | 2.53% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 76.77 | 72.48 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.002@5 | 0.002@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 114.62 | |
| Maximum Ambient Temperture, ℉ | 87 | |
| Mimimum Ambient Temperature, ℉ | 74 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 22.80 | |
| Dry-Basis Fuel Load Moisture Content, % | 20.76 | |
| Wet-Basis Fuel Load Moisture Content, % | 17.19 | |
| Coal Bed Range, lb. | 4.60 | 5.70 |
| Actual Coal Bed, Lb. | 5.1 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | November 26, 2013 |
| Test Run No: | 2a |

# Temperature Data

| | |
|---|---|
| Firebox Temp Start | 411.7 |
| Firebox Temp End | 297.08 |
| Firebox Delta-T | 114.6 |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| 76.77 | 72.48 |

| Interval | 10 | Duration of Test, Min | 570 |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| 0 | 0 | 75.22 | 114.8 | 267.6 | 325.7 | 420.5 | 478 | 413.3 | 421 | | 67.28 | 64.09 | 64.255 | 63.96 |
| 1 | 10 | 77.06 | 109.9 | 262.9 | 308.8 | 407 | 425.9 | 392.4 | 398.2 | | 74.88 | 69.68 | 64.47 | 64.08 |
| 2 | 20 | 79.39 | 101.7 | 247.1 | 303.3 | 395.7 | 377.9 | 358.9 | 365.8 | | 74.13 | 69.48 | 64.515 | 64.145 |
| 3 | 30 | 81.21 | 101.9 | 269.5 | 301.2 | 380.8 | 345.6 | 331.3 | 337.9 | | 73.98 | 69.86 | 64.59 | 64.24 |
| 4 | 40 | 80 | 103.9 | 298.8 | 311.8 | 364.5 | 323.7 | 314 | 316.3 | | 74.18 | 69.96 | 64.68 | 64.355 |
| 5 | 50 | 81.04 | 101 | 267 | 335.6 | 350.4 | 315.2 | 306.9 | 312.6 | | 74.26 | 69.15 | 64.88 | 64.545 |
| 6 | 60 | 79.91 | 100.1 | 262.3 | 329.2 | 336.6 | 303.4 | 295.3 | 308.8 | | 73.92 | 69.44 | 64.99 | 64.66 |
| 7 | 70 | 74.16 | 102.6 | 282.3 | 338.4 | 322.2 | 300.6 | 293 | 298.8 | | 74.44 | 70.3 | 65.145 | 64.855 |
| 8 | 80 | 74.84 | 105.7 | 307.7 | 350.6 | 308.7 | 308.9 | 300.8 | 303.4 | | 75.03 | 71.09 | 65.185 | 64.87 |
| 9 | 90 | 74.77 | 109.3 | 334.5 | 385 | 297.8 | 324.3 | 313.3 | 322 | | 75.85 | 71.4 | 65.285 | 65.005 |
| 10 | 100 | 74.95 | 108.4 | 318.3 | 404.3 | 287.2 | 337.9 | 329.2 | 333.3 | | 76.35 | 71.39 | 65.375 | 65.045 |
| 11 | 110 | 75.74 | 108 | 311 | 397.4 | 277.2 | 340.3 | 333.7 | 338.1 | | 76.47 | 71.29 | 65.475 | 65.15 |
| 12 | 120 | 74.51 | 108.2 | 314.4 | 393.4 | 268.1 | 339.4 | 335.3 | 341.4 | | 76.55 | 71.58 | 65.575 | 65.245 |
| 13 | 130 | 75.05 | 107.6 | 313.4 | 391.7 | 260.6 | 339.3 | 341.7 | 344.9 | | 76.77 | 71.68 | 65.54 | 65.195 |
| 14 | 140 | 74.92 | 108 | 311 | 392.1 | 254.2 | 341.7 | 347.4 | 350.1 | | 76.61 | 72.06 | 65.585 | 65.2 |
| 15 | 150 | 79.38 | 106.3 | 308.4 | 395.4 | 252.3 | 347 | 354.9 | 359.3 | | 76.18 | 72.48 | 65.765 | 65.445 |
| 16 | 160 | 81.9 | 106.5 | 309.1 | 397.4 | 250.9 | 353.6 | 360.7 | 366.1 | | 76.03 | 71.59 | 65.78 | 65.4 |
| 17 | 170 | 83.33 | 106.7 | 307.8 | 398 | 248.9 | 361.2 | 368.1 | 370.7 | | 76.09 | 71.41 | 65.86 | 65.57 |
| 18 | 180 | 84.42 | 107 | 310 | 397.1 | 247 | 370.3 | 374.5 | 375.9 | | 76.38 | 71.24 | 65.96 | 65.675 |
| 19 | 190 | 85.66 | 107 | 306.2 | 397 | 245.7 | 381.2 | 380.4 | 383.1 | | 76.52 | 71.42 | 66.04 | 65.705 |
| 20 | 200 | 86 | 106.8 | 299.8 | 392.4 | 245.4 | 392.8 | 384.8 | 389.4 | | 76.67 | 71.38 | 66.15 | 65.715 |
| 21 | 210 | 84.51 | 108.2 | 291.5 | 384.9 | 245.2 | 402 | 387.3 | 389.8 | | 76.71 | 71.43 | 66.12 | 65.645 |
| 22 | 220 | 84.03 | 106.7 | 276.1 | 373.1 | 244.4 | 408.6 | 388.1 | 389.5 | | 76.5 | 71.4 | 66.145 | 65.74 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | 230 | 83.93 | 105.5 | 266.8 | 353.4 | 244.7 | 409 | 384.9 | 387.9 | | 76.27 | 70.99 | 66.105 | 65.63 |
| 24 | 240 | 83.57 | 104 | 255.9 | 338.3 | 245.5 | 406.9 | 382.2 | 387 | | 75.99 | 70.73 | 65.93 | 65.385 |
| 25 | 250 | 81.38 | 97.17 | 246.6 | 320.2 | 247.5 | 403.7 | 376.3 | 386.2 | | 74.96 | 70.3 | 65.835 | 65.325 |
| 26 | 260 | 77.8 | 93.22 | 233.9 | 305.3 | 247.2 | 399.7 | 369.7 | 383.4 | | 73.43 | 69.52 | 65.695 | 65.21 |
| 27 | 270 | 78.14 | 92.95 | 226.9 | 294.5 | 249.5 | 394.3 | 366.6 | 381.8 | | 73.1 | 69.32 | 65.665 | 65.27 |
| 28 | 280 | 80.13 | 92.73 | 219.3 | 283.9 | 250.6 | 388.9 | 362.1 | 377.8 | | 72.61 | 68.49 | 65.74 | 65.355 |
| 29 | 290 | 77.09 | 90.59 | 215.2 | 276.1 | 252.9 | 384.7 | 355.1 | 374 | | 72.37 | 68.49 | 65.84 | 65.445 |
| 30 | 300 | 78.56 | 91.13 | 212.4 | 270.9 | 255.6 | 382.5 | 350.6 | 372.8 | | 72.41 | 68.21 | 65.81 | 65.425 |
| 31 | 310 | 79.47 | 90.82 | 209.5 | 266.3 | 256.8 | 381.6 | 345.2 | 370.4 | | 72.02 | 68.18 | 65.775 | 65.485 |
| 32 | 320 | 76.73 | 89.57 | 211.8 | 265.9 | 259.6 | 379.8 | 341.5 | 369.1 | | 71.84 | 68.37 | 65.735 | 65.32 |
| 33 | 330 | 80.99 | 91.3 | 209.5 | 266.6 | 261.1 | 377.8 | 337.4 | 371.3 | | 71.93 | 68.08 | 65.66 | 65.21 |
| 34 | 340 | 79.52 | 90.17 | 206 | 262.2 | 260.5 | 373.9 | 332.2 | 367.5 | | 71.58 | 67.99 | 65.555 | 65.13 |
| 35 | 350 | 82.91 | 91.54 | 203.5 | 259.5 | 262.3 | 370.3 | 328.9 | 364.7 | | 71.7 | 68.14 | 65.465 | 64.985 |
| 36 | 360 | 84.75 | 92.05 | 200.8 | 256.2 | 264.6 | 367.6 | 325.6 | 359.9 | | 71.74 | 68.44 | 65.465 | 65.07 |
| 37 | 370 | 82.11 | 90.4 | 197 | 251.3 | 264.1 | 364.8 | 320.2 | 352.7 | | 71.64 | 68.4 | 65.425 | 65.01 |
| 38 | 380 | 84.1 | 91.29 | 194 | 245.9 | 264.1 | 362 | 315.9 | 347.1 | | 71.67 | 68.35 | 65.315 | 64.935 |
| 39 | 390 | 85.12 | 91.34 | 191.3 | 241.2 | 264.2 | 360 | 311.5 | 341.4 | | 71.63 | 68.3 | 65.2 | 64.83 |
| 40 | 400 | 85.5 | 91.47 | 189 | 237.6 | 263.8 | 358.5 | 307.2 | 337.2 | | 71.69 | 68.16 | 65.18 | 64.76 |
| 41 | 410 | 86.01 | 91.37 | 188.6 | 236.3 | 263.5 | 361.3 | 304.3 | 336.9 | | 71.75 | 68.21 | 65.175 | 64.79 |
| 42 | 420 | 86.08 | 91.23 | 189.3 | 235.8 | 263.1 | 367.4 | 303.4 | 339.6 | | 71.74 | 68.25 | 65.17 | 64.81 |
| 43 | 430 | 86.25 | 91.29 | 190.5 | 236.4 | 262.2 | 376.4 | 303.8 | 342.3 | | 71.61 | 68.26 | 65.085 | 64.69 |
| 44 | 440 | 82.98 | 89.87 | 192.5 | 236.9 | 261.2 | 389.6 | 304.8 | 343 | | 71.37 | 68.08 | 65.05 | 64.7 |
| 45 | 450 | 84.63 | 91.08 | 194.8 | 238.5 | 260.6 | 403.8 | 308.1 | 345.6 | | 71.33 | 68 | 65.05 | 64.74 |
| 46 | 460 | 85.86 | 91.64 | 195.9 | 241.7 | 260.5 | 412.2 | 311.2 | 348.9 | | 71.52 | 67.98 | 65.05 | 64.675 |
| 47 | 470 | 86.59 | 91.76 | 196.5 | 244.1 | 260.6 | 414.2 | 313.3 | 351.2 | | 71.65 | 67.98 | 65.015 | 64.64 |
| 48 | 480 | 82.65 | 90 | 196.5 | 244.2 | 261.8 | 416 | 312.8 | 349.7 | | 71.37 | 67.89 | 64.925 | 64.57 |
| 49 | 490 | 84.75 | 91.16 | 195.6 | 244.6 | 262.8 | 412.7 | 313.3 | 349.3 | | 71.41 | 67.91 | 64.895 | 64.535 |
| 50 | 500 | 85.74 | 91.52 | 195.2 | 244.9 | 263.1 | 411.9 | 314.4 | 347.2 | | 71.4 | 67.85 | 64.8 | 64.47 |
| 51 | 510 | 86.39 | 91.63 | 194.7 | 243.7 | 263.6 | 411.7 | 315.6 | 342.7 | | 71.55 | 67.85 | 64.835 | 64.445 |
| 52 | 520 | 83.48 | 90.25 | 192.3 | 241.6 | 263.9 | 407.8 | 316.1 | 336.8 | | 71.31 | 67.75 | 64.835 | 64.47 |
| 53 | 530 | 84.84 | 90.78 | 189.8 | 238.7 | 265.1 | 396 | 315.5 | 333.4 | | 71.31 | 67.78 | 64.795 | 64.415 |
| 54 | 540 | 85.05 | 88.75 | 186.1 | 235.5 | 265.1 | 386.2 | 313.2 | 330.2 | | 71 | 67.74 | 64.79 | 64.495 |
| 55 | 550 | 84.63 | 87.95 | 184.7 | 234.5 | 265.1 | 379.6 | 310.9 | 327.2 | | 70.66 | 67.45 | 64.74 | 64.41 |
| 56 | 560 | 83.89 | 88.26 | 184.2 | 233 | 265.6 | 373.2 | 307.7 | 323.1 | | 70.54 | 67.41 | 64.735 | 64.415 |
| 57 | 570 | 83.6 | 88.07 | 182.6 | 231.1 | 266.3 | 365.3 | 304 | 318.7 | | 70.49 | 67.41 | 64.77 | 64.445 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | November 26, 2013 |
| Test Run Number: | 2a |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 30.18 | 74 | Meter Box (A) | 1.002 |
| End | 30.21 | 81 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 570 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.002@5 | 0.002@5 |

| Maximum Vacuum | |
|---|---|
| Train A | Train B |
| 0.00 | 0.00 |

| Time | Particulate Sampling Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg |
| 0 | 0.015 | 0.00 | 0.00 | 0.060 | 22.80 | 22.80 | 842.837 | 772.666 | 99.96 | 99.96 | 0.00 | 0.00 |
| 10 | 0.015 | 0.00 | 0.00 | 0.060 | 21.86 | 0.94 | 844.357 | 774.087 | 99.51 | 100.42 | 0.00 | 0.00 |
| 20 | 0.015 | 0.00 | 0.00 | 0.063 | 21.12 | 0.74 | 845.883 | 775.503 | 99.17 | 99.33 | 0.00 | 0.00 |
| 30 | 0.015 | 0.00 | 0.00 | 0.063 | 20.27 | 0.85 | 847.434 | 777.052 | 100.80 | 108.66 | 0.00 | 0.00 |
| 40 | 0.015 | 0.00 | 0.00 | 0.068 | 19.48 | 0.79 | 848.972 | 778.496 | 100.11 | 101.45 | 0.00 | 0.00 |
| 50 | 0.015 | 0.00 | 0.00 | 0.063 | 18.71 | 0.77 | 850.508 | 779.868 | 99.69 | 96.11 | 0.00 | 0.00 |
| 60 | 0.015 | 0.00 | 0.00 | 0.060 | 18.09 | 0.62 | 852.034 | 781.318 | 98.94 | 101.47 | 0.00 | 0.00 |
| 70 | 0.015 | 0.00 | 0.00 | 0.065 | 17.25 | 0.84 | 853.584 | 782.821 | 100.69 | 105.38 | 0.00 | 0.00 |
| 80 | 0.015 | 0.00 | 0.00 | 0.068 | 16.31 | 0.94 | 855.134 | 784.375 | 100.96 | 109.25 | 0.00 | 0.00 |
| 90 | 0.015 | 0.00 | 0.00 | 0.070 | 15.26 | 1.05 | 856.676 | 785.749 | 100.74 | 96.88 | 0.00 | 0.00 |
| 100 | 0.015 | 0.00 | 0.00 | 0.068 | 14.41 | 0.85 | 858.218 | 787.192 | 100.64 | 101.65 | 0.00 | 0.00 |
| 110 | 0.015 | 0.00 | 0.00 | 0.068 | 13.65 | 0.76 | 859.765 | 788.516 | 100.91 | 93.22 | 0.00 | 0.00 |
| 120 | 0.015 | 0.00 | 0.00 | 0.065 | 12.87 | 0.78 | 861.307 | 789.952 | 100.58 | 101.10 | 0.00 | 0.00 |
| 130 | 0.015 | 0.00 | 0.00 | 0.068 | 12.10 | 0.77 | 862.847 | 791.357 | 100.41 | 98.88 | 0.00 | 0.00 |
| 140 | 0.015 | 0.00 | 0.00 | 0.065 | 11.31 | 0.79 | 864.384 | 792.813 | 100.24 | 102.50 | 0.00 | 0.00 |
| 150 | 0.015 | 0.00 | 0.00 | 0.068 | 10.56 | 0.75 | 865.916 | 794.382 | 99.73 | 110.24 | 0.00 | 0.00 |
| 160 | 0.015 | 0.00 | 0.00 | 0.068 | 9.79 | 0.77 | 867.450 | 795.787 | 99.87 | 98.74 | 0.00 | 0.00 |
| 170 | 0.015 | 0.00 | 0.00 | 0.065 | 9.09 | 0.70 | 868.983 | 797.242 | 99.81 | 102.24 | 0.00 | 0.00 |
| 180 | 0.015 | 0.00 | 0.00 | 0.065 | 8.44 | 0.65 | 870.518 | 798.598 | 99.95 | 95.29 | 0.00 | 0.00 |
| 190 | 0.015 | 0.00 | 0.00 | 0.065 | 7.82 | 0.62 | 872.048 | 800.010 | 99.61 | 99.22 | 0.00 | 0.00 |
| 200 | 0.015 | 0.00 | 0.00 | 0.063 | 7.27 | 0.55 | 873.582 | 801.402 | 99.83 | 97.80 | 0.00 | 0.00 |
| 210 | 0.015 | 0.00 | 0.00 | 0.060 | 6.79 | 0.48 | 875.106 | 802.795 | 99.31 | 98.00 | 0.00 | 0.00 |
| 220 | 0.015 | 0.00 | 0.00 | 0.058 | 6.43 | 0.36 | 876.643 | 804.184 | 100.02 | 97.57 | 0.00 | 0.00 |
| 230 | 0.015 | 0.00 | 0.00 | 0.058 | 6.09 | 0.34 | 878.175 | 805.528 | 99.59 | 94.33 | 0.00 | 0.00 |
| 240 | 0.015 | 0.00 | 0.00 | 0.055 | 5.78 | 0.31 | 879.705 | 806.930 | 99.36 | 98.32 | 0.00 | 0.00 |
| 250 | 0.015 | 0.00 | 0.00 | 0.053 | 5.53 | 0.25 | 881.239 | 808.351 | 99.04 | 99.06 | 0.00 | 0.00 |
| 260 | 0.015 | 0.00 | 0.00 | 0.053 | 5.28 | 0.25 | 882.789 | 809.787 | 99.74 | 99.77 | 0.00 | 0.00 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 270 | 0.015 | 0.00 | 0.00 | 0.050 | 5.13 | 0.15 | 884.347 | 811.445 | 100.24 | 115.15 | 0.00 | 0.00 |
| 280 | 0.015 | 0.00 | 0.00 | 0.050 | 4.92 | 0.21 | 885.908 | 812.834 | 100.39 | 96.43 | 0.00 | 0.00 |
| 290 | 0.015 | 0.00 | 0.00 | 0.050 | 4.68 | 0.24 | 887.465 | 814.148 | 99.92 | 91.03 | 0.00 | 0.00 |
| 300 | 0.015 | 0.00 | 0.00 | 0.050 | 4.50 | 0.18 | 889.024 | 815.466 | 100.11 | 91.36 | 0.00 | 0.00 |
| 310 | 0.015 | 0.00 | 0.00 | 0.050 | 4.29 | 0.21 | 890.582 | 816.845 | 100.02 | 95.55 | 0.00 | 0.00 |
| 320 | 0.015 | 0.00 | 0.00 | 0.048 | 4.05 | 0.24 | 892.142 | 818.346 | 100.04 | 103.92 | 0.00 | 0.00 |
| 330 | 0.015 | 0.00 | 0.00 | 0.048 | 3.86 | 0.19 | 893.704 | 819.775 | 100.34 | 99.11 | 0.00 | 0.00 |
| 340 | 0.015 | 0.00 | 0.00 | 0.048 | 3.65 | 0.21 | 895.265 | 821.140 | 100.20 | 94.59 | 0.00 | 0.00 |
| 350 | 0.015 | 0.00 | 0.00 | 0.045 | 3.50 | 0.15 | 896.830 | 822.579 | 100.60 | 99.87 | 0.00 | 0.00 |
| 360 | 0.015 | 0.00 | 0.00 | 0.045 | 3.36 | 0.14 | 898.388 | 824.023 | 100.19 | 100.24 | 0.00 | 0.00 |
| 370 | 0.015 | 0.00 | 0.00 | 0.045 | 3.17 | 0.19 | 899.961 | 825.475 | 101.01 | 100.66 | 0.00 | 0.00 |
| 380 | 0.015 | 0.00 | 0.00 | 0.045 | 3.03 | 0.14 | 901.505 | 826.920 | 99.25 | 100.27 | 0.00 | 0.00 |
| 390 | 0.015 | 0.00 | 0.00 | 0.045 | 2.89 | 0.14 | 903.064 | 828.359 | 100.24 | 99.88 | 0.00 | 0.00 |
| 400 | 0.015 | 0.00 | 0.00 | 0.043 | 2.73 | 0.16 | 904.622 | 829.783 | 100.19 | 98.86 | 0.00 | 0.00 |
| 410 | 0.015 | 0.00 | 0.00 | 0.043 | 2.54 | 0.19 | 906.180 | 831.240 | 100.19 | 101.14 | 0.00 | 0.00 |
| 420 | 0.015 | 0.00 | 0.00 | 0.043 | 2.39 | 0.15 | 907.738 | 832.707 | 100.17 | 101.82 | 0.00 | 0.00 |
| 430 | 0.015 | 0.00 | 0.00 | 0.043 | 2.22 | 0.17 | 909.295 | 834.154 | 100.13 | 100.46 | 0.00 | 0.00 |
| 440 | 0.015 | 0.00 | 0.00 | 0.043 | 2.02 | 0.20 | 910.851 | 835.604 | 99.95 | 100.53 | 0.00 | 0.00 |
| 450 | 0.015 | 0.00 | 0.00 | 0.043 | 1.84 | 0.18 | 912.406 | 837.041 | 99.99 | 99.73 | 0.00 | 0.00 |
| 460 | 0.015 | 0.00 | 0.00 | 0.045 | 1.65 | 0.19 | 913.962 | 838.463 | 100.11 | 98.76 | 0.00 | 0.00 |
| 470 | 0.015 | 0.00 | 0.00 | 0.045 | 1.49 | 0.16 | 915.518 | 839.862 | 100.12 | 97.17 | 0.00 | 0.00 |
| 480 | 0.015 | 0.00 | 0.00 | 0.045 | 1.33 | 0.16 | 917.070 | 841.335 | 99.72 | 102.17 | 0.00 | 0.00 |
| 490 | 0.015 | 0.00 | 0.00 | 0.043 | 1.13 | 0.20 | 918.625 | 842.789 | 100.03 | 100.96 | 0.00 | 0.00 |
| 500 | 0.015 | 0.00 | 0.00 | 0.045 | 0.98 | 0.15 | 920.172 | 844.220 | 99.56 | 99.41 | 0.00 | 0.00 |
| 510 | 0.015 | 0.00 | 0.00 | 0.045 | 0.83 | 0.15 | 921.723 | 845.659 | 99.82 | 99.98 | 0.00 | 0.00 |
| 520 | 0.015 | 0.00 | 0.00 | 0.043 | 0.63 | 0.20 | 923.270 | 847.112 | 99.44 | 100.82 | 0.00 | 0.00 |
| 530 | 0.015 | 0.00 | 0.00 | 0.043 | 0.52 | 0.11 | 924.817 | 848.560 | 99.50 | 100.53 | 0.00 | 0.00 |
| 540 | 0.015 | 0.00 | 0.00 | 0.043 | 0.39 | 0.13 | 926.364 | 849.965 | 99.32 | 97.35 | 0.00 | 0.00 |
| 550 | 0.015 | 0.00 | 0.00 | 0.043 | 0.23 | 0.16 | 927.913 | 851.413 | 99.38 | 100.27 | 0.00 | 0.00 |
| 560 | 0.015 | 0.00 | 0.00 | 0.040 | 0.07 | 0.16 | 929.459 | 852.845 | 99.22 | 99.19 | 0.00 | 0.00 |
| 570 | 0.015 | 0.00 | 0.00 | 0.040 | 0.00 | 0.07 | 931.007 | 854.345 | 99.32 | 103.88 | 0.00 | 0.00 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | November 26, 2013 |
| Test Run Number: | 2a |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0100 | 106 | 0.1000 |
| A2 | 0.0125 | 106 | 0.1118 |
| A3 | 0.0150 | 106 | 0.1225 |
| A4 | 0.0125 | 106 | 0.1118 |
| A Center | 0.0150 | 107 | 0.1225 |
| B1 | 0.0100 | 121 | 0.1000 |
| B2 | 0.0125 | 121 | 0.1118 |
| B3 | 0.0150 | 122 | 0.1225 |
| B4 | 0.0150 | 121 | 0.1225 |
| B Center | 0.0150 | 123 | 0.1225 |
| Averages | 0.01325 | 113.89 | 0.1129 |

| | | |
|---|---|---|
| Tunnel Diameter | 8.000 | inches |
| Tunnel Static | 0.058 | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9215 | factor |
| Baro. Pressure | 30.18 | |
| Pitot Factor | 0.99 | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 7.794 | Ft/ Sec |
| Initial Flow | **145.38** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.009226791 | | |
| VS (2) | 0.010032994 | STD Tunnel Flow: | 147.52 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 557.5887931 | 89.575 | 82.377 | 7.68 | 99.96 | 99.96 |
| 570 | | Ending Average Firebox Temp | | | | | | | |
| Time | Firebox Temp | | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 411.7 | | 0.015 | 574.8 | | | 7.798 | | |
| 10 | 386.5 | | 0.015 | 569.9 | 1.547 | 1.436 | 7.765 | 99.51 | 100.42 |
| 20 | 360.3 | | 0.015 | 561.7 | 1.553 | 1.430 | 7.709 | 99.17 | 99.33 |
| 30 | 339.4 | | 0.015 | 561.9 | 1.578 | 1.564 | 7.710 | 100.80 | 108.66 |
| 40 | 326.1 | | 0.015 | 563.9 | 1.564 | 1.458 | 7.724 | 100.11 | 101.45 |
| 50 | 324.1 | | 0.015 | 561 | 1.562 | 1.385 | 7.704 | 99.69 | 96.11 |
| 60 | 314.7 | | 0.015 | 560.1 | 1.551 | 1.463 | 7.698 | 98.94 | 101.47 |
| 70 | 310.6 | | 0.015 | 562.6 | 1.575 | 1.516 | 7.715 | 100.69 | 105.38 |
| 80 | 314.5 | | 0.015 | 565.7 | 1.575 | 1.568 | 7.737 | 100.96 | 109.25 |
| 90 | 328.5 | | 0.015 | 569.3 | 1.567 | 1.386 | 7.761 | 100.74 | 96.88 |
| 100 | 338.4 | | 0.015 | 568.4 | 1.566 | 1.455 | 7.755 | 100.64 | 101.65 |
| 110 | 337.3 | | 0.015 | 568 | 1.571 | 1.335 | 7.752 | 100.91 | 93.22 |
| 120 | 335.5 | | 0.015 | 568.2 | 1.566 | 1.447 | 7.754 | 100.58 | 101.10 |
| 130 | 335.6 | | 0.015 | 567.6 | 1.564 | 1.416 | 7.749 | 100.41 | 98.88 |
| 140 | 337.1 | | 0.015 | 568 | 1.561 | 1.468 | 7.752 | 100.24 | 102.50 |
| 150 | 341.8 | | 0.015 | 566.3 | 1.555 | 1.581 | 7.741 | 99.73 | 110.24 |
| 160 | 345.7 | | 0.015 | 566.5 | 1.557 | 1.416 | 7.742 | 99.87 | 98.74 |
| 170 | 349.4 | | 0.015 | 566.7 | 1.556 | 1.466 | 7.743 | 99.81 | 102.24 |
| 180 | 353.0 | | 0.015 | 567 | 1.558 | 1.366 | 7.745 | 99.95 | 95.29 |
| 190 | 357.5 | | 0.015 | 567 | 1.552 | 1.422 | 7.745 | 99.61 | 99.22 |
| 200 | 361.0 | | 0.015 | 566.8 | 1.556 | 1.402 | 7.744 | 99.83 | 97.80 |
| 210 | 361.8 | | 0.015 | 568.2 | 1.546 | 1.403 | 7.754 | 99.31 | 98.00 |
| 220 | 360.7 | | 0.015 | 566.7 | 1.559 | 1.399 | 7.743 | 100.02 | 97.57 |
| 230 | 356.0 | | 0.015 | 565.5 | 1.554 | 1.354 | 7.735 | 99.59 | 94.33 |
| 240 | 352.0 | | 0.015 | 564 | 1.553 | 1.413 | 7.725 | 99.36 | 98.32 |
| 250 | 346.8 | | 0.015 | 557.17 | 1.557 | 1.432 | 7.678 | 99.04 | 99.06 |
| 260 | 341.1 | | 0.015 | 553.22 | 1.574 | 1.448 | 7.651 | 99.74 | 99.77 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 270 | 337.3 | | 0.015 | 552.95 | 1.582 | 1.671 | 7.649 | 100.24 | 115.15 |
| 280 | 332.7 | | 0.015 | 552.73 | 1.585 | 1.400 | 7.647 | 100.39 | 96.43 |
| 290 | 328.6 | | 0.015 | 550.59 | 1.580 | 1.324 | 7.632 | 99.92 | 91.03 |
| 300 | 326.5 | | 0.015 | 551.13 | 1.582 | 1.328 | 7.636 | 100.11 | 91.36 |
| 310 | 324.1 | | 0.015 | 550.82 | 1.581 | 1.389 | 7.634 | 100.02 | 95.55 |
| 320 | 323.2 | | 0.015 | 549.57 | 1.584 | 1.513 | 7.625 | 100.04 | 103.92 |
| 330 | 322.8 | | 0.015 | 551.3 | 1.586 | 1.441 | 7.637 | 100.34 | 99.11 |
| 340 | 319.3 | | 0.015 | 550.17 | 1.585 | 1.376 | 7.630 | 100.20 | 94.59 |
| 350 | 317.1 | | 0.015 | 551.54 | 1.590 | 1.451 | 7.639 | 100.60 | 99.87 |
| 360 | 314.8 | | 0.015 | 552.05 | 1.582 | 1.456 | 7.643 | 100.19 | 100.24 |
| 370 | 310.6 | | 0.015 | 550.4 | 1.598 | 1.464 | 7.631 | 101.01 | 100.66 |
| 380 | 307.0 | | 0.015 | 551.29 | 1.569 | 1.457 | 7.637 | 99.25 | 100.27 |
| 390 | 303.7 | | 0.015 | 551.34 | 1.584 | 1.452 | 7.638 | 100.24 | 99.88 |
| 400 | 300.9 | | 0.015 | 551.47 | 1.583 | 1.437 | 7.639 | 100.19 | 98.86 |
| 410 | 300.5 | | 0.015 | 551.37 | 1.583 | 1.470 | 7.638 | 100.19 | 101.14 |
| 420 | 301.9 | | 0.015 | 551.23 | 1.583 | 1.480 | 7.637 | 100.17 | 101.82 |
| 430 | 304.2 | | 0.015 | 551.29 | 1.583 | 1.460 | 7.637 | 100.13 | 100.46 |
| 440 | 307.1 | | 0.015 | 549.87 | 1.582 | 1.463 | 7.627 | 99.95 | 100.53 |
| 450 | 311.3 | | 0.015 | 551.08 | 1.581 | 1.450 | 7.636 | 99.99 | 99.73 |
| 460 | 314.9 | | 0.015 | 551.64 | 1.582 | 1.435 | 7.640 | 100.11 | 98.76 |
| 470 | 316.7 | | 0.015 | 551.76 | 1.582 | 1.412 | 7.641 | 100.12 | 97.17 |
| 480 | 316.9 | | 0.015 | 550 | 1.578 | 1.487 | 7.628 | 99.72 | 102.17 |
| 490 | 316.5 | | 0.015 | 551.16 | 1.581 | 1.468 | 7.636 | 100.03 | 100.96 |
| 500 | 316.3 | | 0.015 | 551.52 | 1.573 | 1.445 | 7.639 | 99.56 | 99.41 |
| 510 | 315.5 | | 0.015 | 551.63 | 1.577 | 1.453 | 7.640 | 99.82 | 99.98 |
| 520 | 313.2 | | 0.015 | 550.25 | 1.573 | 1.467 | 7.630 | 99.44 | 100.82 |
| 530 | 309.7 | | 0.015 | 550.78 | 1.573 | 1.462 | 7.634 | 99.50 | 100.53 |
| 540 | 306.0 | | 0.015 | 548.75 | 1.573 | 1.418 | 7.620 | 99.32 | 97.35 |
| 550 | 303.5 | | 0.015 | 547.95 | 1.575 | 1.462 | 7.614 | 99.38 | 100.27 |
| 560 | 300.5 | | 0.015 | 548.26 | 1.572 | 1.446 | 7.616 | 99.22 | 99.19 |
| 570 | 297.1 | 297.08 | 0.015 | 548.07 | 1.574 | 1.514 | 7.615 | 99.32 | 103.88 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| Sample ID Number: | **101440749MTL-003** |
| Test Date: | **November 26, 2013** |
| Test Run Number: | **2a** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.6 | to | 5.7 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 414.84 |

| | |
|---|---|
| Final Coal Bed Wt, lb | 5.1 |

| Interval | 10 |
|---|---|

| Time | | Temperature Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Flue Draft | Fuel Weight | Weight Loss |
| 0 | 0 | 81.22 | 177.2 | 596.5 | 709.2 | 514.8 | 702.6 | 571.7 | 549.4 | | | 8.55 | **3.45** |
| 1 | 10 | 80.38 | 128.2 | 453.7 | 633.5 | 523.1 | 680.1 | 565.6 | 556.8 | | | 7.44 | 1.11 |
| 2 | 20 | 78.29 | 115.3 | 396.9 | 565.4 | 496.7 | 635.3 | 533.1 | 540.5 | | | 6.66 | 0.78 |
| 3 | 30 | 75.36 | 105.9 | 343 | 500.5 | 470.8 | 594.1 | 500.7 | 514.2 | | | 6.17 | 0.49 |
| 4 | 40 | 71.47 | 115.3 | 308.1 | 438.8 | 444.8 | 561.2 | 474.8 | 488.7 | | | 5.83 | 0.34 |
| 5 | 50 | 69.41 | 108.9 | 282.4 | 393.7 | 439.9 | 534.5 | 455.9 | 466 | | | 5.51 | 0.32 |
| 6 | 60 | 68.27 | 102.8 | 257.5 | 355.3 | 431.5 | 503.3 | 432.6 | 440.5 | | | 5.26 | 0.25 |
| 7 | 70 | 78.21 | 147.8 | 297.1 | 329 | 423.9 | 481 | 416.3 | 424 | | | 5.10 | 0.16 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: November 26, 2013
Test Run Number: 2a

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 5 | | 118.1 | |
| B - Rear Filter Catch | Filter | 6 | | 118.9 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 290 | 237 | 53 |
| Probe & Filter Holder | Probe | 19 | 140113.0 | 140108.5 | 4.5 |
| | | | Total Particulate, mg | | **57.5** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 7 | | 119 | |
| B - Rear Filter Catch | Filter | 8 | | 118.3 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 288.4 | 237.3 | 51.1 |
| Probe & Filter Holder | Probe | 20 | 139064.1 | 139059.0 | 5.1 |
| | | | Total Particulate, mg | | **56.2** |

**TEST FUEL DATA**
**EPA Method 5G-3**

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| Sample ID Number: | **101440749MTL-003** |
| Test Date: | **November 26, 2013** |
| Test Run Number: | **2a** |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

| PRE-BURN FUEL PROPERTIES | | | | | |
|---|---|---|---|---|---|
| Eq. ID No.: | SBI-214 | Time: | 9:00 | Temp.,℉: | 70 |
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 16 | 1.562 | 22.7 | 22.4 | 23.1 |
| 2 | 16 | 1.987 | 22.0 | 21.5 | 22.3 |
| 3 | 16 | 1.892 | 21.9 | 21.2 | 22.6 |
| 4 | 16 | 2.025 | 22.0 | 21.6 | 22.5 |
| 5 | 16 | 1.883 | 21.3 | 20.8 | 21.4 |
| 6 | 16 | 1.956 | 23.8 | 21.9 | 23.8 |
| 7 | 16 | 1.928 | 22.3 | 21.5 | 22.5 |
| 8 | 16 | 1.988 | 23.8 | 22.0 | 23.8 |
| 9 | 17 | 1.862 | 22.3 | 20.6 | 22.7 |
| 10 | 17 | 1.87 | 22.4 | 20.1 | 22.3 |
| 11 | 17 | 1.91 | 22.3 | 20.4 | 22.3 |
| 12 | 17 | 1.69 | 22.7 | 21.9 | 23.0 |
| Total Weight | | **22.549** | Average, %db | | **22.2** |
| Allowable Fuel Load Range: | | | | to | |

| TEST FUEL LOAD PROPERTIES | | | | | | |
|---|---|---|---|---|---|---|
| Eq. ID No.: | SBI-214 | | Time: | 10:00 | Temp.,℉: | 70 |
| Piece No. | Length, In. | Weight, Lb. | | Moisture, %, Dry Basis | | |
| | | 2x4 | 4x4 | | | |
| 1 | 15 | | 4.39 | 22.2 | 20.0 | 22.4 |
| 2 | 15 | | 3.54 | 22.4 | 22.0 | 21.7 |
| 3 | 15 | | 4.37 | 21.3 | 21.6 | 19.4 |
| 4 | 15 | 1.858 | | 20.1 | 18.7 | 19.3 |
| 5 | 15 | 1.941 | | 21.3 | 21.0 | 20.2 |
| 6 | 15 | 1.630 | | 19.5 | 19.1 | 19.8 |
| 7 | 15 | 1.561 | | 20.5 | 19.7 | 20.4 |
| 8 | 15 | 1.915 | | 21.9 | 20.3 | 21.3 |
| 9 | 15 | 1.593 | | 21.7 | 21.1 | 21.7 |
| Totals | | 10.498 | 12.306 | | | |
| % of Weight | | 46.0 | 54.0 | | | |
| Total weight, wet, lb. | | **22.80** | | Average Moisture, dry | | **20.76** |
| Total weight, dry, kg | | 8.57 | | Average Moisture, wet | | 17.19 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 4, 2013 |
| Test Run Number: | 3 |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **1.19** | |
| Emission-Rate, g/hr: | **2.78** | |
| Adjusted Emission-Rate, g/hr : | **4.26** | |
| Duration of Test, Minutes | 420 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 1010.795 | 991.855 |
| Dry Gas Meter Ending Reading, $ft^3$ | 1075.674 | 1051.681 |
| Barometric Pressure Correction Factor | 1.008 | 1.008 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 0.999 | 0.999 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **65.452** | **59.918** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **145.020** | |
| Total Tunnel Volume, scf | **60908.508** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 930.588 | 1016.524 |
| Sample Particulate Mass, mg | 20.7 | 19.4 |
| Total Emissions, grams | 19.263 | 19.721 |
| Emission-Rate, g/hr | 2.75 | 2.82 |
| Adjusted Emission Rates, g/hr | **4.22** | **4.30** |
| Deviation, % | 0.97% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 81.73 | 78.19 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.001@5 | 0.0025@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 70.42 | |
| Maximum Ambient Temperture, ℉ | 88 | |
| Mimimum Ambient Temperature, ℉ | 75 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 22.00 | |
| Dry-Basis Fuel Load Moisture Content, % | 20.23 | |
| Wet-Basis Fuel Load Moisture Content, % | 16.83 | |
| Coal Bed Range, lb. | 4.40 | 5.40 |
| Actual Coal Bed, Lb. | 4.85 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | December 4, 2013 |
| Test Run No: | 3 |

## Temperature Data

| | |
|---|---|
| Firebox Temp Start | 414.3 |
| Firebox Temp End | 343.88 |
| Firebox Delta-T | **70.4** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **81.73** | **78.19** |

| Interval | 10 | Duration of Test, Min | **420** |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| 0 | 0 | 79.99 | 102.5 | 271.3 | 325.7 | 434.3 | 476.6 | 413.1 | 421.8 | | 69.46 | 68.03 | 68.645 | 68.295 |
| 1 | 10 | 85.09 | 106.4 | 274.6 | 307.7 | 439.2 | 427 | 392.2 | 401.3 | | 77.61 | 75.67 | 68.69 | 68.32 |
| 2 | 20 | 87.83 | 107.4 | 321.1 | 326.7 | 418.9 | 382.6 | 361.1 | 370.2 | | 78.68 | 76.46 | 68.76 | 68.465 |
| 3 | 30 | 82.08 | 112.7 | 359.7 | 361.2 | 390.2 | 357.9 | 335.1 | 349.6 | | 79.47 | 77.34 | 68.795 | 68.5 |
| 4 | 40 | 80.78 | 117.2 | 417.9 | 416.8 | 373 | 356.6 | 331.3 | 342.6 | | 80.71 | 77.95 | 68.9 | 68.6 |
| 5 | 50 | 77.94 | 119.8 | 435.1 | 482.7 | 357.1 | 373.8 | 345.2 | 357.7 | | 81.57 | 77.64 | 68.965 | 68.64 |
| 6 | 60 | 77.25 | 118.7 | 429.8 | 498.6 | 340.7 | 394.1 | 363.3 | 380.1 | | 81.73 | 77.53 | 68.925 | 68.61 |
| 7 | 70 | 81.5 | 118.7 | 421.9 | 492.9 | 333.4 | 409.8 | 378.2 | 397 | | 81.58 | 77.82 | 68.99 | 68.625 |
| 8 | 80 | 79.55 | 117.3 | 414.7 | 490.5 | 324.2 | 423.5 | 386.5 | 410.5 | | 81.33 | 77.82 | 69.01 | 68.575 |
| 9 | 90 | 78.03 | 115.7 | 407.2 | 484.7 | 313.4 | 434.2 | 394.9 | 421.5 | | 81.01 | 77.59 | 69.005 | 68.57 |
| 10 | 100 | 77.35 | 114.3 | 406 | 479.1 | 305 | 445.9 | 404.1 | 430 | | 80.87 | 77.57 | 69 | 68.49 |
| 11 | 110 | 82.52 | 115.3 | 406.3 | 480.2 | 297.8 | 459.6 | 415.1 | 439.1 | | 80.83 | 78.03 | 68.985 | 68.5 |
| 12 | 120 | 79.56 | 113.6 | 399.1 | 479.1 | 293.1 | 475.2 | 423.5 | 447 | | 80.78 | 78.19 | 69.01 | 68.53 |
| 13 | 130 | 78.6 | 109.5 | 377.3 | 465.2 | 289.8 | 484.7 | 428.7 | 450 | | 80.14 | 76.84 | 68.945 | 68.545 |
| 14 | 140 | 77.93 | 106.1 | 353.1 | 437.9 | 286.8 | 485.6 | 426.6 | 444.2 | | 79.22 | 75.97 | 68.88 | 68.305 |
| 15 | 150 | 79.38 | 104.2 | 334.2 | 412.2 | 286.2 | 484.1 | 423.7 | 438.9 | | 78.57 | 75.52 | 68.745 | 68.28 |
| 16 | 160 | 77.67 | 100.1 | 311.2 | 385.3 | 285.5 | 479.3 | 420.3 | 433.3 | | 77.77 | 74.76 | 68.765 | 68.255 |
| 17 | 170 | 80.01 | 98.67 | 293.7 | 359.8 | 285.1 | 463.4 | 414.6 | 426.3 | | 77.01 | 74.4 | 68.685 | 68.24 |
| 18 | 180 | 77.62 | 96.11 | 282.7 | 340.1 | 285.3 | 449.2 | 405.9 | 415.2 | | 76.39 | 74.03 | 68.73 | 68.34 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 190 | 79.08 | 95.44 | 275.7 | 326.9 | 288.5 | 436.4 | 397.6 | 408.4 | | 76.3 | 73.71 | 68.765 | 68.27 |
| 20 | 200 | 80.32 | 94.56 | 267 | 316 | 289.4 | 427.5 | 389.6 | 402.3 | | 75.94 | 73.51 | 68.725 | 68.335 |
| 21 | 210 | 77.58 | 92.69 | 260.3 | 305.7 | 290.1 | 423 | 383.5 | 396.1 | | 75.75 | 73.29 | 68.815 | 68.42 |
| 22 | 220 | 81.38 | 93.73 | 252.9 | 297 | 291.8 | 419.9 | 379.2 | 392.4 | | 75.49 | 73.22 | 68.69 | 68.22 |
| 23 | 230 | 76.06 | 90.86 | 251.6 | 288 | 290.8 | 417.5 | 374.1 | 385.6 | | 74.91 | 72.56 | 68.51 | 67.97 |
| 24 | 240 | 78.47 | 91.96 | 252.8 | 288.7 | 293.5 | 413.7 | 372.2 | 383.4 | | 74.91 | 72.34 | 68.515 | 68.095 |
| 25 | 250 | 79.64 | 91.76 | 249.3 | 286.2 | 294.4 | 411.4 | 369.6 | 380.1 | | 74.75 | 72.34 | 68.5 | 68.08 |
| 26 | 260 | 76.8 | 89.91 | 243.7 | 282.8 | 298.9 | 405.4 | 365.8 | 374.9 | | 74.75 | 72.26 | 68.545 | 68.135 |
| 27 | 270 | 79.18 | 90.76 | 238.3 | 277.2 | 302.3 | 399.2 | 360.6 | 369 | | 74.69 | 72.25 | 68.54 | 68.185 |
| 28 | 280 | 80.13 | 90.51 | 235 | 271.3 | 300.7 | 397.3 | 354.9 | 362.1 | | 74.52 | 71.91 | 68.515 | 68.1 |
| 29 | 290 | 76.79 | 88.91 | 234.2 | 267.4 | 301.3 | 399.9 | 353.3 | 356.7 | | 74.43 | 71.96 | 68.525 | 68.17 |
| 30 | 300 | 80.71 | 90.76 | 233.6 | 265.4 | 301.9 | 405.4 | 352.9 | 355.9 | | 74.59 | 72.5 | 68.615 | 68.24 |
| 31 | 310 | 80.15 | 90.09 | 232.5 | 264.2 | 300.4 | 410.3 | 351 | 354 | | 74.54 | 72.51 | 68.675 | 68.305 |
| 32 | 320 | 77.56 | 88.95 | 231.5 | 262.4 | 300.5 | 411.6 | 349.2 | 352.9 | | 74.41 | 72.37 | 68.645 | 68.22 |
| 33 | 330 | 78.03 | 89.27 | 231.8 | 261.7 | 300.9 | 412.9 | 348.2 | 353.2 | | 74.38 | 72.33 | 68.59 | 68.255 |
| 34 | 340 | 80.49 | 90.14 | 230.3 | 261.2 | 299.4 | 414.9 | 347.1 | 353.4 | | 74.41 | 72.39 | 68.605 | 68.185 |
| 35 | 350 | 75.46 | 88.2 | 232.1 | 260.8 | 299 | 421.3 | 346.7 | 353.8 | | 74.36 | 72.13 | 68.59 | 68.215 |
| 36 | 360 | 79.43 | 90.27 | 234.7 | 262.7 | 300.7 | 429 | 348.4 | 358.2 | | 74.42 | 72.24 | 68.575 | 68.18 |
| 37 | 370 | 80.07 | 90.24 | 235.4 | 264.3 | 303.1 | 439.1 | 349.2 | 359.2 | | 74.53 | 72.1 | 68.655 | 68.26 |
| 38 | 380 | 77.84 | 89.5 | 235.9 | 265.2 | 303.4 | 447.6 | 351.5 | 358.8 | | 74.44 | 72.23 | 68.605 | 68.185 |
| 39 | 390 | 82.55 | 89.35 | 234.1 | 268.5 | 307.2 | 452.8 | 360.6 | 364.3 | | 74.33 | 72.13 | 68.62 | 68.205 |
| 40 | 400 | 84.01 | 90.26 | 234.1 | 269.1 | 310.1 | 447.1 | 363.9 | 364.2 | | 74.4 | 72.2 | 68.6 | 68.2 |
| 41 | 410 | 84.84 | 90.6 | 231.1 | 269 | 311.3 | 438.7 | 364.9 | 362.3 | | 74.51 | 72.6 | 68.64 | 68.27 |
| 42 | 420 | 85.28 | 90.67 | 226.9 | 265.1 | 312.8 | 424.8 | 358.7 | 358 | | 74.4 | 72.45 | 68.54 | 68.1 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 4, 2013 |
| Test Run Number: | 3 |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 30.15 | 71 | Meter Box (A) | 1.002 |
| End | 30.18 | 76 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 420 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.001@5 | 0.0025@5 |

| Maximum Vacuum | | Average Gases, % | | |
|---|---|---|---|---|
| Train A | Train B | O2 | CO2 | CO |
| 0.00 | 0.00 | 14.185 | 5.101 | 0.966 |

| | Particulate Sampling Data | | | | | | | | | | | | Combustion Gasses, % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg | O2 | CO2 | CO |
| 0 | 0.015 | 0.00 | 0.00 | 0.055 | 22.00 | 22.00 | 1010.795 | 991.855 | 99.98 | 99.98 | 0.00 | 0.00 | 16.700 | 0.730 | 0.690 |
| 10 | 0.015 | 0.00 | 0.00 | 0.068 | 20.95 | 1.05 | 1012.384 | 993.238 | 103.51 | 97.69 | 0.00 | 0.00 | 17.210 | 3.790 | 0.500 |
| 20 | 0.015 | 0.00 | 0.00 | 0.070 | 20.01 | 0.94 | 1013.945 | 994.705 | 101.76 | 103.69 | 0.00 | 0.00 | 15.050 | 4.560 | 0.570 |
| 30 | 0.015 | 0.00 | 0.00 | 0.078 | 18.96 | 1.05 | 1015.484 | 996.141 | 100.79 | 101.96 | 0.00 | 0.00 | 13.250 | 6.780 | 0.590 |
| 40 | 0.015 | 0.00 | 0.00 | 0.083 | 17.45 | 1.51 | 1017.010 | 997.486 | 100.31 | 95.86 | 0.00 | 0.00 | 10.170 | 10.140 | 0.390 |
| 50 | 0.015 | 0.00 | 0.00 | 0.085 | 15.86 | 1.59 | 1018.536 | 998.793 | 100.52 | 93.35 | 0.00 | 0.00 | 10.640 | 9.940 | 0.360 |
| 60 | 0.015 | 0.00 | 0.00 | 0.090 | 14.41 | 1.45 | 1020.059 | 1000.144 | 100.24 | 96.41 | 0.00 | 0.00 | 11.850 | 8.640 | 0.360 |
| 70 | 0.015 | 0.00 | 0.00 | 0.083 | 13.22 | 1.19 | 1021.575 | 1001.572 | 99.76 | 101.90 | 0.00 | 0.00 | 11.240 | 9.400 | 0.350 |
| 80 | 0.015 | 0.00 | 0.00 | 0.080 | 12.02 | 1.20 | 1023.099 | 1002.966 | 100.17 | 99.36 | 0.00 | 0.00 | 11.220 | 9.430 | 0.330 |
| 90 | 0.015 | 0.00 | 0.00 | 0.080 | 10.87 | 1.15 | 1024.635 | 1004.365 | 100.82 | 99.58 | 0.00 | 0.00 | 11.440 | 9.210 | 0.330 |
| 100 | 0.015 | 0.00 | 0.00 | 0.080 | 9.72 | 1.15 | 1026.152 | 1005.765 | 99.45 | 99.55 | 0.00 | 0.00 | 11.190 | 9.440 | 0.340 |
| 110 | 0.015 | 0.00 | 0.00 | 0.080 | 8.65 | 1.07 | 1027.672 | 1007.209 | 99.73 | 102.76 | 0.00 | 0.00 | 10.890 | 9.880 | 0.340 |
| 120 | 0.015 | 0.00 | 0.00 | 0.080 | 7.56 | 1.09 | 1029.202 | 1008.704 | 100.24 | 106.23 | 0.00 | 0.00 | 11.410 | 8.970 | 0.320 |
| 130 | 0.015 | 0.00 | 0.00 | 0.075 | 6.82 | 0.74 | 1030.730 | 1010.210 | 99.76 | 106.63 | 0.00 | 0.00 | 12.770 | 7.250 | 0.380 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 140 | 0.015 | 0.00 | 0.00 | 0.070 | 6.22 | 0.60 | 1032.256 | 1011.620 | 99.34 | 99.58 | 0.00 | 0.00 | 13.290 | 6.370 | 0.630 |
| 150 | 0.015 | 0.00 | 0.00 | 0.070 | 5.69 | 0.53 | 1033.786 | 1013.038 | 99.46 | 99.98 | 0.00 | 0.00 | 13.690 | 5.670 | 0.810 |
| 160 | 0.015 | 0.00 | 0.00 | 0.065 | 5.24 | 0.45 | 1035.318 | 1014.444 | 99.23 | 98.78 | 0.00 | 0.00 | 14.050 | 4.710 | 1.130 |
| 170 | 0.015 | 0.00 | 0.00 | 0.065 | 4.98 | 0.26 | 1036.852 | 1015.890 | 99.24 | 101.46 | 0.00 | 0.00 | 14.270 | 4.500 | 1.090 |
| 180 | 0.015 | 0.00 | 0.00 | 0.060 | 4.71 | 0.27 | 1038.389 | 1017.360 | 99.20 | 102.89 | 0.00 | 0.00 | 14.380 | 4.320 | 1.210 |
| 190 | 0.015 | 0.00 | 0.00 | 0.060 | 4.46 | 0.25 | 1039.922 | 1018.762 | 98.88 | 98.08 | 0.00 | 0.00 | 14.470 | 4.190 | 1.240 |
| 200 | 0.015 | 0.00 | 0.00 | 0.060 | 4.24 | 0.22 | 1041.475 | 1020.226 | 100.09 | 102.32 | 0.00 | 0.00 | 14.650 | 3.910 | 1.350 |
| 210 | 0.015 | 0.00 | 0.00 | 0.060 | 4.04 | 0.20 | 1043.030 | 1021.588 | 100.04 | 95.02 | 0.00 | 0.00 | 14.830 | 3.760 | 1.390 |
| 220 | 0.015 | 0.00 | 0.00 | 0.058 | 3.81 | 0.23 | 1044.582 | 1023.013 | 99.96 | 99.55 | 0.00 | 0.00 | 15.000 | 3.590 | 1.400 |
| 230 | 0.015 | 0.00 | 0.00 | 0.055 | 3.59 | 0.22 | 1046.138 | 1024.428 | 99.99 | 98.64 | 0.00 | 0.00 | 14.680 | 4.250 | 1.070 |
| 240 | 0.015 | 0.00 | 0.00 | 0.055 | 3.40 | 0.19 | 1047.696 | 1025.854 | 100.22 | 99.48 | 0.00 | 0.00 | 14.570 | 4.330 | 1.060 |
| 250 | 0.015 | 0.00 | 0.00 | 0.055 | 3.16 | 0.24 | 1049.254 | 1027.309 | 100.21 | 101.49 | 0.00 | 0.00 | 15.040 | 3.670 | 1.230 |
| 260 | 0.015 | 0.00 | 0.00 | 0.055 | 2.96 | 0.20 | 1050.813 | 1028.759 | 100.09 | 100.96 | 0.00 | 0.00 | 15.700 | 2.970 | 1.310 |
| 270 | 0.015 | 0.00 | 0.00 | 0.055 | 2.80 | 0.16 | 1052.365 | 1030.187 | 99.72 | 99.49 | 0.00 | 0.00 | 15.680 | 3.040 | 1.330 |
| 280 | 0.015 | 0.00 | 0.00 | 0.053 | 2.60 | 0.20 | 1053.920 | 1031.614 | 99.90 | 99.42 | 0.00 | 0.00 | 15.310 | 3.470 | 1.310 |
| 290 | 0.015 | 0.00 | 0.00 | 0.053 | 2.40 | 0.20 | 1055.472 | 1033.039 | 99.56 | 99.12 | 0.00 | 0.00 | 15.380 | 3.350 | 1.350 |
| 300 | 0.015 | 0.00 | 0.00 | 0.053 | 2.22 | 0.18 | 1057.026 | 1034.486 | 99.84 | 100.81 | 0.00 | 0.00 | 15.270 | 3.410 | 1.390 |
| 310 | 0.015 | 0.00 | 0.00 | 0.053 | 2.04 | 0.18 | 1058.576 | 1035.932 | 99.51 | 100.66 | 0.00 | 0.00 | 15.400 | 3.260 | 1.390 |
| 320 | 0.015 | 0.00 | 0.00 | 0.053 | 1.86 | 0.18 | 1060.132 | 1037.369 | 99.79 | 99.95 | 0.00 | 0.00 | 15.530 | 3.180 | 1.440 |
| 330 | 0.015 | 0.00 | 0.00 | 0.053 | 1.64 | 0.22 | 1061.681 | 1038.802 | 99.39 | 99.69 | 0.00 | 0.00 | 15.400 | 3.280 | 1.420 |
| 340 | 0.015 | 0.00 | 0.00 | 0.050 | 1.43 | 0.21 | 1063.237 | 1040.252 | 99.91 | 100.97 | 0.00 | 0.00 | 15.110 | 3.840 | 1.230 |
| 350 | 0.015 | 0.00 | 0.00 | 0.053 | 1.22 | 0.21 | 1064.789 | 1041.667 | 99.48 | 98.35 | 0.00 | 0.00 | 14.980 | 3.990 | 1.180 |
| 360 | 0.015 | 0.00 | 0.00 | 0.053 | 0.99 | 0.23 | 1066.345 | 1043.052 | 99.93 | 96.46 | 0.00 | 0.00 | 14.890 | 4.170 | 1.080 |
| 370 | 0.015 | 0.00 | 0.00 | 0.053 | 0.79 | 0.20 | 1067.903 | 1044.476 | 100.04 | 99.15 | 0.00 | 0.00 | 15.010 | 3.910 | 1.250 |
| 380 | 0.015 | 0.00 | 0.00 | 0.053 | 0.58 | 0.21 | 1069.462 | 1045.896 | 100.04 | 98.82 | 0.00 | 0.00 | 15.040 | 3.850 | 1.280 |
| 390 | 0.015 | 0.00 | 0.00 | 0.055 | 0.37 | 0.21 | 1071.020 | 1047.337 | 99.96 | 100.27 | 0.00 | 0.00 | 15.390 | 3.520 | 1.270 |
| 400 | 0.015 | 0.00 | 0.00 | 0.055 | 0.17 | 0.20 | 1072.572 | 1048.750 | 99.67 | 98.40 | 0.00 | 0.00 | 15.300 | 3.580 | 1.300 |
| 410 | 0.015 | 0.00 | 0.00 | 0.055 | 0.02 | 0.15 | 1074.129 | 1050.269 | 100.01 | 105.80 | 0.00 | 0.00 | 16.350 | 2.540 | 1.230 |
| 420 | 0.015 | 0.00 | 0.00 | 0.055 | 0.00 | 0.02 | 1075.674 | 1051.681 | 99.26 | 98.39 | 0.00 | 0.00 | 16.270 | 2.560 | 1.320 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 4, 2013 |
| Test Run Number: | 3 |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0100 | 108 | 0.1000 |
| A2 | 0.0125 | 108 | 0.1118 |
| A3 | 0.0150 | 108 | 0.1225 |
| A4 | 0.0125 | 108 | 0.1118 |
| A Center | 0.0150 | 109 | 0.1225 |
| B1 | 0.0075 | 110 | 0.0866 |
| B2 | 0.0150 | 111 | 0.1225 |
| B3 | 0.0150 | 111 | 0.1225 |
| B4 | 0.0125 | 111 | 0.1118 |
| B Center | 0.0150 | 113 | 0.1225 |
| Averages | 0.013 | 109.73 | 0.1112 |

| | | |
|---|---|---|
| Tunnel Diameter | 8.000 | inches |
| Tunnel Static | -0.055 | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9078 | factor |
| Baro. Pressure | 30.15 | |
| Pitot Factor | 0.99 | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 7.654 | Ft/ Sec |
| Initial Flow | **143.67** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.01243088 | | |
| VS (2) | 0.013578789 | STD Tunnel Flow: | 145.02 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 420 | | | | 559.3876744 | 65.425 | 59.895 | 7.58 | 99.98 | 99.98 |
| Time | Average Firebox Temp | Ending Average Firebox Temp | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 414.3 | | 0.015 | 562.5 | | | 7.604 | | |
| 10 | 393.5 | | 0.015 | 566.4 | 1.602 | 1.385 | 7.630 | 103.51 | 97.69 |
| 20 | 371.9 | | 0.015 | 567.4 | 1.574 | 1.468 | 7.637 | 101.76 | 103.69 |
| 30 | 358.8 | | 0.015 | 572.7 | 1.552 | 1.437 | 7.673 | 100.79 | 101.96 |
| 40 | 364.1 | | 0.015 | 577.2 | 1.538 | 1.346 | 7.703 | 100.31 | 95.86 |
| 50 | 383.3 | | 0.015 | 579.8 | 1.538 | 1.308 | 7.720 | 100.52 | 93.35 |
| 60 | 395.4 | | 0.015 | 578.7 | 1.535 | 1.352 | 7.713 | 100.24 | 96.41 |
| 70 | 402.3 | | 0.015 | 578.7 | 1.528 | 1.429 | 7.713 | 99.76 | 101.90 |
| 80 | 407.0 | | 0.015 | 577.3 | 1.536 | 1.395 | 7.703 | 100.17 | 99.36 |
| 90 | 409.7 | | 0.015 | 575.7 | 1.548 | 1.400 | 7.693 | 100.82 | 99.58 |
| 100 | 412.8 | | 0.015 | 574.3 | 1.529 | 1.401 | 7.683 | 99.45 | 99.55 |
| 110 | 418.4 | | 0.015 | 575.3 | 1.532 | 1.445 | 7.690 | 99.73 | 102.76 |
| 120 | 423.6 | | 0.015 | 573.6 | 1.542 | 1.496 | 7.679 | 100.24 | 106.23 |
| 130 | 423.7 | | 0.015 | 569.5 | 1.540 | 1.507 | 7.651 | 99.76 | 106.63 |
| 140 | 416.2 | | 0.015 | 566.1 | 1.538 | 1.412 | 7.628 | 99.34 | 99.58 |
| 150 | 409.0 | | 0.015 | 564.2 | 1.543 | 1.420 | 7.615 | 99.46 | 99.98 |
| 160 | 400.7 | | 0.015 | 560.1 | 1.545 | 1.408 | 7.588 | 99.23 | 98.78 |
| 170 | 389.8 | | 0.015 | 558.67 | 1.547 | 1.448 | 7.578 | 99.24 | 101.46 |
| 180 | 379.1 | | 0.015 | 556.11 | 1.550 | 1.472 | 7.561 | 99.20 | 102.89 |
| 190 | 371.6 | | 0.015 | 555.44 | 1.546 | 1.404 | 7.556 | 98.88 | 98.08 |
| 200 | 365.0 | | 0.015 | 554.56 | 1.566 | 1.466 | 7.550 | 100.09 | 102.32 |
| 210 | 359.7 | | 0.015 | 552.69 | 1.568 | 1.363 | 7.537 | 100.04 | 95.02 |
| 220 | 356.1 | | 0.015 | 553.73 | 1.565 | 1.427 | 7.544 | 99.96 | 99.55 |
| 230 | 351.2 | | 0.015 | 550.86 | 1.570 | 1.418 | 7.525 | 99.99 | 98.64 |
| 240 | 350.3 | | 0.015 | 551.96 | 1.572 | 1.428 | 7.532 | 100.22 | 99.48 |
| 250 | 348.3 | | 0.015 | 551.76 | 1.572 | 1.457 | 7.531 | 100.21 | 101.49 |
| 260 | 345.6 | | 0.015 | 549.91 | 1.573 | 1.452 | 7.518 | 100.09 | 100.96 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 270 | 341.7 | | 0.015 | 550.76 | 1.566 | 1.430 | 7.524 | 99.72 | 99.49 |
| 280 | 337.3 | | 0.015 | 550.51 | 1.569 | 1.429 | 7.522 | 99.90 | 99.42 |
| 290 | 335.7 | | 0.015 | 548.91 | 1.566 | 1.427 | 7.511 | 99.56 | 99.12 |
| 300 | 336.3 | | 0.015 | 550.76 | 1.567 | 1.449 | 7.524 | 99.84 | 100.81 |
| 310 | 336.0 | | 0.015 | 550.09 | 1.563 | 1.448 | 7.520 | 99.51 | 100.66 |
| 320 | 335.3 | | 0.015 | 548.95 | 1.569 | 1.439 | 7.512 | 99.79 | 99.95 |
| 330 | 335.4 | | 0.015 | 549.27 | 1.562 | 1.435 | 7.514 | 99.39 | 99.69 |
| 340 | 335.2 | | 0.015 | 550.14 | 1.569 | 1.452 | 7.520 | 99.91 | 100.97 |
| 350 | 336.3 | | 0.015 | 548.2 | 1.565 | 1.417 | 7.507 | 99.48 | 98.35 |
| 360 | 339.8 | | 0.015 | 550.27 | 1.570 | 1.387 | 7.521 | 99.93 | 96.46 |
| 370 | 343.0 | | 0.015 | 550.24 | 1.571 | 1.426 | 7.521 | 100.04 | 99.15 |
| 380 | 345.3 | | 0.015 | 549.5 | 1.572 | 1.422 | 7.515 | 100.04 | 98.82 |
| 390 | 350.7 | | 0.015 | 549.35 | 1.571 | 1.443 | 7.514 | 99.96 | 100.27 |
| 400 | 350.9 | | 0.015 | 550.26 | 1.565 | 1.415 | 7.521 | 99.67 | 98.40 |
| 410 | 349.2 | | 0.015 | 550.6 | 1.570 | 1.521 | 7.523 | 100.01 | 105.80 |
| 420 | 343.9 | 343.88 | 0.015 | 550.67 | 1.559 | 1.414 | 7.523 | 99.26 | 98.39 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| ample ID Number: | **101440749MTL-003** |
| Test Date: | **December 4, 2013** |
| Test Run Number: | **3** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.4 | to | 5.4 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 419.14 |

| | |
|---|---|
| Final Coal Bed Wt, lb | 4.85 |

| | |
|---|---|
| Interval | 10 |

| Time | | Temperature Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Flue Draft | Fuel Weight | Weight Loss |
| 0 | 0 | 71.82 | 104.2 | 333.1 | 425.9 | 444 | 539.4 | 468.5 | 472.5 | | | 5.58 | **0.73** |
| 1 | 10 | 70.94 | 100.6 | 314.2 | 394.8 | 450.9 | 525.1 | 456.3 | 455.1 | | | 5.28 | 0.30 |
| 2 | 20 | 69.06 | 95.66 | 287.9 | 359.8 | 441.6 | 500.9 | 435.3 | 436.8 | | | 5.07 | 0.21 |
| 3 | 30 | 81.18 | 135.9 | 300 | 335.9 | 432.7 | 482.2 | 418.9 | 426 | | | 4.85 | 0.22 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: December 4, 2013
Test Run Number: 3

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 17 | | 119 | |
| B - Rear Filter Catch | Filter | 18 | | 119.1 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 257.9 | 238.1 | 19.8 |
| Probe & Filter Holder | Probe | 27 | 136890.0 | 136889.1 | 0.9 |
| | | | Total Particulate, mg | | **20.7** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 19 | | 119.4 | |
| B - Rear Filter Catch | Filter | 20 | | 119.1 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 256.5 | 238.5 | 18 |
| Probe & Filter Holder | Probe | 28 | 136216.9 | 136215.5 | 1.4 |
| | | | Total Particulate, mg | | **19.4** |

**Manufacturer:** SBI
**Model:** NG1800
**Date:** 12/02/13
**Run:** 3
**Control #:** G101440749
**Test Duration:** 420 min

| | HHV | LHV |
|---|---|---|
| Eff | 68.48% | 74.02% |
| Comb Eff | 91.86% | 91.86% |
| HT Eff | 74.55% | 80.58% |
| Output | 16,089 | kJ/h |
| Burn Rate | 1.19 | kg/h |
| Grams CO | 973 | g |
| Input | 23,493 | kJ/h |
| MC wet | 16.83 | |

Ultimate $CO_2$
$CO_{2\text{-ult}}$ 19.64
$F_0$
1.059

| | |
|---|---|
| Overall Heating Efficiency: | 68.48% |
| Combustion Efficiency: | 91.86% |
| Heat Transfer Efficiency: | 74.55% |
| Heat Output: | 15,262 Btu/h |
| Heat Input: | 22,286 Btu/h |
| Burn Duration: | 7.00 h |
| Burn Rate: | 2.61 lb/h |
| Stack Temp: | 296.0 Deg. F |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Averages | 0.97 | 5.10 | 2.72 | 20.54 | 14.96 | 146.33 | 26.57 | 84.7% | 72.4% | 61.7% |
| INPUT DATA | | | | Oxygen Calculation | | | Input Data | | Combust | Heat | Net |
| Elapsed Time | Weight emaining (k | % CO [e] | % $CO_2$ [d] | Excess Air EA | Total $O_2$ | Calc. % $O_2$ [g] | Flue Gas (ºC) | Room Temp (ºC) | Eff % | Transfer % | Eff % |
| 0 | 9.98 | 0.69 | 0.73 | 1283.3% | 20.85 | 19.77 | 132.9 | 26.7 | 64.5% | 17.9% | 11.5% |
| 10 | 9.51 | 0.50 | 3.79 | 357.9% | 20.66 | 16.62 | 134.8 | 29.5 | 91.3% | 72.0% | 65.8% |
| 20 | 9.08 | 0.57 | 4.56 | 282.9% | 20.60 | 15.76 | 160.6 | 31.0 | 91.6% | 71.3% | 65.3% |
| 30 | 8.60 | 0.59 | 6.78 | 166.5% | 20.45 | 13.38 | 182.1 | 27.8 | 93.8% | 74.4% | 69.8% |
| 40 | 7.92 | 0.39 | 10.14 | 86.5% | 20.24 | 9.91 | 214.4 | 27.1 | 97.1% | 76.6% | 74.4% |
| 50 | 7.20 | 0.36 | 9.94 | 90.7% | 20.26 | 10.14 | 223.9 | 25.5 | 97.3% | 75.6% | 73.6% |
| 60 | 6.54 | 0.36 | 8.64 | 118.3% | 20.35 | 11.53 | 221.0 | 25.1 | 97.0% | 74.0% | 71.8% |
| 70 | 6.00 | 0.35 | 9.40 | 101.5% | 20.30 | 10.72 | 216.6 | 27.5 | 97.3% | 75.6% | 73.6% |
| 80 | 5.45 | 0.33 | 9.43 | 101.3% | 20.30 | 10.70 | 212.6 | 26.4 | 97.5% | 75.9% | 74.0% |
| 90 | 4.93 | 0.33 | 9.21 | 105.9% | 20.31 | 10.94 | 208.4 | 25.6 | 97.4% | 75.9% | 73.9% |
| 100 | 4.41 | 0.34 | 9.44 | 100.8% | 20.29 | 10.68 | 207.8 | 25.2 | 97.4% | 76.2% | 74.2% |
| 110 | 3.92 | 0.34 | 9.88 | 92.2% | 20.27 | 10.22 | 207.9 | 28.1 | 97.5% | 76.9% | 75.0% |
| 120 | 3.43 | 0.32 | 8.97 | 111.4% | 20.33 | 11.20 | 203.9 | 26.4 | 97.4% | 76.0% | 74.0% |
| 130 | 3.09 | 0.38 | 7.25 | 157.4% | 20.44 | 13.00 | 191.8 | 25.9 | 96.3% | 74.2% | 71.5% |
| 140 | 2.82 | 0.63 | 6.37 | 180.6% | 20.48 | 13.79 | 178.4 | 25.5 | 93.0% | 73.7% | 68.5% |
| 150 | 2.58 | 0.81 | 5.67 | 203.1% | 20.51 | 14.44 | 167.9 | 26.3 | 90.2% | 73.1% | 66.0% |
| 160 | 2.38 | 1.13 | 4.71 | 236.4% | 20.55 | 15.28 | 155.1 | 25.4 | 84.7% | 71.7% | 60.7% |
| 170 | 2.26 | 1.09 | 4.50 | 251.4% | 20.57 | 15.53 | 145.4 | 26.7 | 84.6% | 72.5% | 61.3% |
| 180 | 2.14 | 1.21 | 4.32 | 255.2% | 20.57 | 15.65 | 139.3 | 25.3 | 82.7% | 72.5% | 59.9% |
| 190 | 2.02 | 1.24 | 4.19 | 261.7% | 20.58 | 15.77 | 135.4 | 26.2 | 82.0% | 72.7% | 59.6% |
| 200 | 1.92 | 1.35 | 3.91 | 273.4% | 20.59 | 16.01 | 130.6 | 26.8 | 79.7% | 72.4% | 57.8% |
| 210 | 1.83 | 1.39 | 3.76 | 281.4% | 20.60 | 16.14 | 126.8 | 25.3 | 78.7% | 72.2% | 56.8% |
| 220 | 1.73 | 1.40 | 3.59 | 293.6% | 20.61 | 16.32 | 122.7 | 27.4 | 77.9% | 72.5% | 56.5% |
| 230 | 1.63 | 1.07 | 4.25 | 269.2% | 20.59 | 15.80 | 122.0 | 24.5 | 84.2% | 74.6% | 62.8% |
| 240 | 1.54 | 1.06 | 4.33 | 264.4% | 20.58 | 15.72 | 122.7 | 25.8 | 84.5% | 75.0% | 63.4% |
| 250 | 1.43 | 1.23 | 3.67 | 300.9% | 20.62 | 16.33 | 120.7 | 26.5 | 80.3% | 73.0% | 58.6% |
| 260 | 1.34 | 1.31 | 2.97 | 358.9% | 20.66 | 17.03 | 117.6 | 24.9 | 76.1% | 70.0% | 53.3% |
| 270 | 1.27 | 1.33 | 3.04 | 349.5% | 20.65 | 16.95 | 114.6 | 26.2 | 76.2% | 71.2% | 54.2% |
| 280 | 1.18 | 1.31 | 3.47 | 310.9% | 20.62 | 16.50 | 112.8 | 26.7 | 78.5% | 73.6% | 57.7% |
| 290 | 1.09 | 1.35 | 3.35 | 317.9% | 20.63 | 16.60 | 112.3 | 24.9 | 77.4% | 72.8% | 56.4% |
| 300 | 1.01 | 1.39 | 3.41 | 309.2% | 20.62 | 16.52 | 112.0 | 27.1 | 77.2% | 73.5% | 56.7% |
| 310 | 0.93 | 1.39 | 3.26 | 322.4% | 20.63 | 16.68 | 111.4 | 26.8 | 76.5% | 72.9% | 55.8% |
| 320 | 0.84 | 1.44 | 3.18 | 325.2% | 20.63 | 16.73 | 110.8 | 25.3 | 75.5% | 72.4% | 54.7% |
| 330 | 0.74 | 1.42 | 3.28 | 317.9% | 20.63 | 16.64 | 111.0 | 25.6 | 76.3% | 72.8% | 55.5% |
| 340 | 0.65 | 1.23 | 3.84 | 287.4% | 20.61 | 16.15 | 110.2 | 26.9 | 80.9% | 75.4% | 61.0% |
| 350 | 0.55 | 1.18 | 3.99 | 279.9% | 20.60 | 16.02 | 111.2 | 24.1 | 82.0% | 75.3% | 61.8% |
| 360 | 0.45 | 1.08 | 4.17 | 274.2% | 20.59 | 15.88 | 112.6 | 26.4 | 83.8% | 76.0% | 63.7% |
| 370 | 0.36 | 1.25 | 3.91 | 280.7% | 20.60 | 16.06 | 113.0 | 26.7 | 80.9% | 75.1% | 60.8% |
| 380 | 0.26 | 1.28 | 3.85 | 282.9% | 20.60 | 16.11 | 113.3 | 25.5 | 80.3% | 74.7% | 60.0% |
| 390 | 0.17 | 1.27 | 3.52 | 310.1% | 20.62 | 16.47 | 112.3 | 28.1 | 79.2% | 74.1% | 58.6% |
| 400 | 0.08 | 1.30 | 3.58 | 302.5% | 20.62 | 16.39 | 112.3 | 28.9 | 79.0% | 74.4% | 58.8% |
| 410 | 0.01 | 1.23 | 2.54 | 421.0% | 20.69 | 17.54 | 110.6 | 29.4 | 74.6% | 69.8% | 52.1% |
| 420 | 0.00 | 1.32 | 2.56 | 406.3% | 20.68 | 17.46 | 108.3 | 29.6 | 73.5% | 70.4% | 51.8% |
| 430 | 0.26 | 1.52 | 4.01 | 255.2% | 20.57 | 15.80 | 96.2 | 20.7 | 78.2% | 76.9% | 60.2% |
| 440 | 0.20 | 1.56 | 3.81 | 265.8% | 20.59 | 16.00 | 95.8 | 21.9 | 77.0% | 76.5% | 59.0% |
| 450 | 0.11 | 1.56 | 3.71 | 272.7% | 20.59 | 16.10 | 94.7 | 22.4 | 76.6% | 76.5% | 58.6% |
| 460 | 0.03 | 1.59 | 3.54 | 282.9% | 20.60 | 16.27 | 94.1 | 21.1 | 75.6% | 75.8% | 57.3% |
| 470 | 0.00 | 1.55 | 3.46 | 292.1% | 20.61 | 16.37 | 92.8 | 23.1 | 75.6% | 76.1% | 57.6% |

| Air Fuel Ratio (A/F) | |
|---|---|
| Dry Molecular Weight ($M_d$) | 29.41 |
| Dry Moles Exhaust Gas ($N_r$): | 575.32 |
| Air Fuel Ratio (A/F) | 16.41 |

%HC 1.32

| | | |
|---|---|---|
| Combustion Efficiency: | 91.86% | |
| Total Input (kJ): | 164,453 | 155,976 |
| Total Output (kJ): | 112,621 | 106,815 |
| Efficiency: | 68.48% | |
| Total CO (g): | 973.37 | |

16,089 kJ/h

23,493 kJ/h

1.186 kg/h

146.6 Deg. C

| 21.63 | 2.91 | 70.81 | 2.42 | 70.81 | 164528 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Air | Wet Wt | % Wet | Dry Wt. | % Dry | | Fuel Properties | | | | Mw | |
| Fuel Ratio | Now Wt | Consumed x | Now $Wt_{dn}$ | Comsumed y | Total Input | Carbon /12= [a] | Hydrogen /1= [b] | Oxygen /16= [c] | Calorific Value | Moisture Fuel Burnt | [h] |
| 78.8 | 9.98 | 0.00 | 8.30 | 0.00 | 0 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.81 |
| 27.2 | 9.51 | 4.77 | 7.91 | 4.77 | 11355 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.09 |
| 22.7 | 9.08 | 9.04 | 7.55 | 9.04 | 7438 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.11 |
| 15.9 | 8.60 | 13.81 | 7.15 | 13.81 | 9569 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.25 |
| 11.2 | 7.92 | 20.68 | 6.58 | 20.68 | 11587 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.56 |
| 11.5 | 7.20 | 27.91 | 5.98 | 27.91 | 11363 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.56 |
| 13.1 | 6.54 | 34.50 | 5.44 | 34.50 | 9868 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.47 |
| 12.1 | 6.00 | 39.91 | 4.99 | 39.91 | 8933 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.53 |
| 12.1 | 5.45 | 45.36 | 4.54 | 45.36 | 8784 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.54 |
| 12.4 | 4.93 | 50.59 | 4.10 | 50.59 | 8597 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.52 |
| 12.1 | 4.41 | 55.82 | 3.67 | 55.82 | 8298 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.54 |
| 11.6 | 3.92 | 60.68 | 3.26 | 60.68 | 8074 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.56 |
| 12.7 | 3.43 | 65.63 | 2.85 | 65.63 | 6840 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.51 |
| 15.4 | 3.09 | 69.00 | 2.57 | 69.00 | 5009 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.37 |
| 16.7 | 2.82 | 71.73 | 2.35 | 71.73 | 4224 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.21 |
| 17.9 | 2.58 | 74.14 | 2.15 | 74.14 | 3663 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 79.08 |
| 19.6 | 2.38 | 76.18 | 1.98 | 76.18 | 2654 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.88 |
| 20.5 | 2.26 | 77.36 | 1.88 | 77.36 | 1981 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.88 |
| 20.7 | 2.14 | 78.59 | 1.78 | 78.59 | 1944 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.82 |
| 21.0 | 2.02 | 79.73 | 1.68 | 79.73 | 1757 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.80 |
| 21.6 | 1.92 | 80.73 | 1.60 | 80.73 | 1570 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.73 |
| 22.0 | 1.83 | 81.64 | 1.52 | 81.64 | 1607 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.71 |
| 22.7 | 1.73 | 82.68 | 1.44 | 82.68 | 1682 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.69 |
| 21.6 | 1.63 | 83.68 | 1.35 | 83.68 | 1532 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.88 |
| 21.3 | 1.54 | 84.54 | 1.28 | 84.54 | 1607 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.89 |
| 23.2 | 1.43 | 85.64 | 1.19 | 85.64 | 1645 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.77 |
| 26.4 | 1.34 | 86.54 | 1.12 | 86.54 | 1346 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.69 |
| 25.8 | 1.27 | 87.27 | 1.06 | 87.27 | 1346 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.68 |
| 23.7 | 1.18 | 88.18 | 0.98 | 88.18 | 1495 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.72 |
| 24.1 | 1.09 | 89.09 | 0.91 | 89.09 | 1420 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.70 |
| 23.5 | 1.01 | 89.91 | 0.84 | 89.91 | 1346 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.68 |
| 24.3 | 0.93 | 90.73 | 0.77 | 90.73 | 1346 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.67 |
| 24.4 | 0.84 | 91.55 | 0.70 | 91.55 | 1495 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.65 |
| 24.0 | 0.74 | 92.55 | 0.62 | 92.55 | 1607 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.66 |
| 22.5 | 0.65 | 93.50 | 0.54 | 93.50 | 1570 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.78 |
| 22.1 | 0.55 | 94.45 | 0.46 | 94.45 | 1645 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.81 |
| 21.8 | 0.45 | 95.50 | 0.37 | 95.50 | 1607 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.87 |
| 22.1 | 0.36 | 96.41 | 0.30 | 96.41 | 1532 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.78 |
| 22.2 | 0.26 | 97.36 | 0.22 | 97.36 | 1570 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.76 |
| 23.7 | 0.17 | 98.32 | 0.14 | 98.32 | 1532 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.74 |
| 23.2 | 0.08 | 99.23 | 0.06 | 99.23 | 1308 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.73 |
| 29.9 | 0.01 | 99.91 | 0.01 | 99.91 | 710 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.69 |
| 29.0 | 0.00 | 100.00 | 0.00 | 100.00 | 75 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.83 | 78.66 |
| 20.5 | 0.26 | 97.39 | 0.22 | 97.39 | 999 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.67 |
| 21.0 | 0.20 | 98.06 | 0.19 | 97.78 | 1097 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.63 |
| 21.4 | 0.11 | 98.87 | 0.11 | 98.71 | 1541 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.63 |
| 21.9 | 0.03 | 99.68 | 0.03 | 99.64 | 1371 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.60 |
| 22.5 | 0.00 | 100.00 | 0.00 | 100.00 | 300 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.85 | 78.62 |

Moisture Content $M_{Cwb}$: 16.83

| | | | | |
|---|---|---|---|---|
| | Moisture of Wood (wet basis): | 16.83 | Dry kg : | 8.30 |
| (Btu) | Initial Dry Weight $Wt_{do}$ (kg): | 8.30 | CA: | 48.73 |
| (Btu) | Moisture Content Dry | 20.24 | HY: | 6.87 |
| | | | OX: | 43.9 |

| | | | | | |
|---|---|---|---|---|---|
| Load Weight (kg): | **9.98** | | | | |
| Fuel Heating | **HHV** | **LHV** | | **HHV** | **LHV** |
| Value in kJ/kg - CV: | **19,810** | **18,329** | Btu/lb | **8522.5** | **7885.2** |

| **20.95** | **1.52** | **5.00** | **0.12** | **0.15** | **32.14** | **118.68** | **7.74** | **0.94** | **592.74** | **32.65** | **11.24** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mass Balance** | | | | **kg Wood pe** | | | | | | | |
| **(moles/100 mole dry flue gas)** | | | | **00 mole df** | **Moles per kg of Dry Wood** | | | | | | **Moisture** |
| **[u]** | **[w]** | **[j]** | **[k]** | **Nk** | **$CO_2$** | **$O_2$** | **CO** | **HC** | **$N_2$** | **$H_2O$** | **Present** |
| 20.90 | 0.37 | 1.12 | 0.07 | 0.04 | 20.01 | 542.00 | 18.92 | 1.89 | 2160.42 | 30.75 | 11.24 |
| 20.98 | 1.07 | 3.58 | 0.05 | 0.11 | 35.67 | 156.40 | 4.71 | 0.43 | 744.44 | 33.65 | 11.24 |
| 20.99 | 1.28 | 4.27 | 0.06 | 0.13 | 35.87 | 123.96 | 4.48 | 0.45 | 622.39 | 33.61 | 11.24 |
| 21.02 | 1.83 | 6.16 | 0.06 | 0.18 | 37.22 | 73.44 | 3.24 | 0.35 | 435.06 | 33.81 | 11.24 |
| 21.10 | 2.60 | 8.86 | 0.04 | 0.26 | 39.15 | 38.26 | 1.51 | 0.16 | 307.17 | 34.21 | 11.24 |
| 21.10 | 2.55 | 8.67 | 0.04 | 0.25 | 39.25 | 40.04 | 1.42 | 0.14 | 314.14 | 34.24 | 11.24 |
| 21.08 | 2.22 | 7.57 | 0.03 | 0.22 | 39.03 | 52.07 | 1.63 | 0.15 | 359.04 | 34.22 | 11.24 |
| 21.10 | 2.41 | 8.21 | 0.03 | 0.24 | 39.21 | 44.72 | 1.46 | 0.14 | 331.75 | 34.24 | 11.24 |
| 21.10 | 2.41 | 8.22 | 0.03 | 0.24 | 39.31 | 44.60 | 1.38 | 0.13 | 331.55 | 34.27 | 11.24 |
| 21.09 | 2.36 | 8.03 | 0.03 | 0.23 | 39.28 | 46.63 | 1.41 | 0.13 | 339.13 | 34.26 | 11.24 |
| 21.10 | 2.42 | 8.24 | 0.03 | 0.24 | 39.26 | 44.44 | 1.41 | 0.13 | 330.81 | 34.25 | 11.24 |
| 21.10 | 2.52 | 8.61 | 0.03 | 0.25 | 39.33 | 40.66 | 1.35 | 0.13 | 316.71 | 34.26 | 11.24 |
| 21.09 | 2.29 | 7.83 | 0.03 | 0.23 | 39.29 | 49.04 | 1.40 | 0.13 | 348.24 | 34.27 | 11.24 |
| 21.05 | 1.89 | 6.41 | 0.03 | 0.19 | 38.61 | 69.20 | 2.02 | 0.18 | 422.66 | 34.16 | 11.24 |
| 21.01 | 1.74 | 5.84 | 0.07 | 0.17 | 36.77 | 79.62 | 3.64 | 0.40 | 457.26 | 33.72 | 11.24 |
| 20.98 | 1.62 | 5.37 | 0.09 | 0.16 | 35.20 | 89.62 | 5.03 | 0.59 | 490.90 | 33.35 | 11.24 |
| 20.92 | 1.47 | 4.78 | 0.14 | 0.15 | 32.14 | 104.28 | 7.71 | 0.96 | 538.33 | 32.61 | 11.24 |
| 20.92 | 1.41 | 4.57 | 0.13 | 0.14 | 32.09 | 110.70 | 7.77 | 0.95 | 562.46 | 32.61 | 11.24 |
| 20.91 | 1.40 | 4.50 | 0.15 | 0.14 | 31.03 | 112.42 | 8.69 | 1.09 | 566.23 | 32.35 | 11.24 |
| 20.90 | 1.38 | 4.41 | 0.16 | 0.14 | 30.62 | 115.24 | 9.06 | 1.14 | 575.78 | 32.25 | 11.24 |
| 20.88 | 1.34 | 4.25 | 0.17 | 0.13 | 29.38 | 120.29 | 10.14 | 1.29 | 591.65 | 31.95 | 11.24 |
| 20.88 | 1.31 | 4.15 | 0.18 | 0.13 | 28.81 | 123.70 | 10.65 | 1.35 | 603.03 | 31.82 | 11.24 |
| 20.87 | 1.27 | 4.02 | 0.18 | 0.13 | 28.35 | 128.89 | 11.06 | 1.40 | 621.44 | 31.71 | 11.24 |
| 20.92 | 1.34 | 4.35 | 0.13 | 0.13 | 31.82 | 118.33 | 8.01 | 0.98 | 590.61 | 32.57 | 11.24 |
| 20.92 | 1.36 | 4.41 | 0.13 | 0.14 | 32.02 | 116.27 | 7.84 | 0.96 | 583.33 | 32.61 | 11.24 |
| 20.89 | 1.24 | 3.97 | 0.15 | 0.12 | 29.64 | 131.91 | 9.93 | 1.24 | 636.20 | 32.05 | 11.24 |
| 20.87 | 1.09 | 3.43 | 0.16 | 0.11 | 27.28 | 156.44 | 12.03 | 1.50 | 722.72 | 31.52 | 11.24 |
| 20.87 | 1.12 | 3.50 | 0.17 | 0.11 | 27.35 | 152.45 | 11.96 | 1.50 | 707.86 | 31.52 | 11.24 |
| 20.88 | 1.22 | 3.85 | 0.16 | 0.12 | 28.64 | 136.19 | 10.81 | 1.36 | 649.78 | 31.81 | 11.24 |
| 20.87 | 1.20 | 3.78 | 0.17 | 0.12 | 28.07 | 139.15 | 11.31 | 1.43 | 659.49 | 31.67 | 11.24 |
| 20.87 | 1.23 | 3.86 | 0.18 | 0.12 | 27.97 | 135.48 | 11.40 | 1.44 | 645.33 | 31.63 | 11.24 |
| 20.87 | 1.19 | 3.73 | 0.18 | 0.12 | 27.57 | 141.05 | 11.76 | 1.49 | 665.34 | 31.55 | 11.24 |
| 20.86 | 1.18 | 3.70 | 0.18 | 0.12 | 27.02 | 142.20 | 12.24 | 1.55 | 668.27 | 31.41 | 11.24 |
| 20.86 | 1.20 | 3.77 | 0.18 | 0.12 | 27.43 | 139.15 | 11.88 | 1.51 | 657.82 | 31.51 | 11.24 |
| 20.90 | 1.29 | 4.11 | 0.15 | 0.13 | 30.00 | 126.19 | 9.61 | 1.20 | 615.55 | 32.13 | 11.24 |
| 20.90 | 1.31 | 4.20 | 0.15 | 0.13 | 30.63 | 122.97 | 9.06 | 1.12 | 605.03 | 32.28 | 11.24 |
| 20.92 | 1.33 | 4.29 | 0.13 | 0.13 | 31.62 | 120.45 | 8.19 | 1.00 | 598.07 | 32.52 | 11.24 |
| 20.90 | 1.31 | 4.18 | 0.16 | 0.13 | 30.02 | 123.32 | 9.60 | 1.20 | 604.74 | 32.12 | 11.24 |
| 20.89 | 1.30 | 4.15 | 0.16 | 0.13 | 29.70 | 124.28 | 9.87 | 1.24 | 607.55 | 32.04 | 11.24 |
| 20.89 | 1.22 | 3.87 | 0.16 | 0.12 | 29.03 | 135.82 | 10.47 | 1.31 | 649.40 | 31.91 | 11.24 |
| 20.88 | 1.24 | 3.94 | 0.16 | 0.12 | 28.97 | 132.62 | 10.52 | 1.32 | 637.15 | 31.88 | 11.24 |
| 20.87 | 0.97 | 3.01 | 0.15 | 0.10 | 26.44 | 182.52 | 12.80 | 1.57 | 819.08 | 31.38 | 11.24 |
| 20.86 | 1.00 | 3.09 | 0.16 | 0.10 | 25.83 | 176.23 | 13.32 | 1.66 | 793.74 | 31.21 | 11.24 |
| 20.87 | 1.41 | 4.45 | 0.20 | 0.14 | 28.58 | 112.65 | 10.83 | 1.40 | 560.68 | 31.73 | 11.26 |
| 20.86 | 1.37 | 4.31 | 0.20 | 0.14 | 27.91 | 117.17 | 11.43 | 1.48 | 576.00 | 31.57 | 11.26 |
| 20.86 | 1.35 | 4.23 | 0.20 | 0.13 | 27.67 | 120.11 | 11.64 | 1.50 | 586.49 | 31.52 | 11.26 |
| 20.85 | 1.31 | 4.10 | 0.21 | 0.13 | 27.08 | 124.42 | 12.16 | 1.57 | 601.25 | 31.38 | 11.26 |
| 20.85 | 1.28 | 4.01 | 0.20 | 0.13 | 27.11 | 128.28 | 12.14 | 1.56 | 615.88 | 31.40 | 11.26 |

| | | | | | | | | | | | SUMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 419.48 | 4809.67 | 3602.10 | 3498.47 | 3460.60 | 4668.41 | 4185.11 | 299.72 | 6965.89 | 16223.14 | 95118.77 | 80989.66 |
| Stack Temp K | Heat Content Change - Ambient to Stack Temperature Flue Gas Constituent | | | | | | Room Temp K | Energy Losses (kJ/kg Flue Gas Constit | | | |
| | $CO_2$ | $O_2$ | CO | $N_2$ | $CH_4$ | $H_2O$ | | $CO_2$ | $O_2$ | CO | $N_2$ |
| 406.09 | 4227.49 | 3184.10 | 3096.94 | 3062.48 | 4063.89 | 3706.19 | 299.81 | 84.60 | 1725.78 | 5410.83 | 6616.25 |
| 407.93 | 4194.84 | 3156.35 | 3069.18 | 3035.19 | 4039.41 | 3672.72 | 302.64 | 149.64 | 493.65 | 1346.23 | 2259.50 |
| 433.76 | 5214.87 | 3901.14 | 3787.81 | 3747.04 | 5071.42 | 4530.89 | 304.17 | 187.08 | 483.57 | 1285.99 | 2332.14 |
| 455.21 | 6247.16 | 4655.50 | 4515.84 | 4468.16 | 6114.42 | 5400.34 | 300.97 | 232.52 | 341.91 | 931.20 | 1943.92 |
| 487.54 | 7671.90 | 5679.92 | 5500.26 | 5444.14 | 7590.65 | 6574.63 | 300.25 | 300.35 | 217.31 | 434.39 | 1672.27 |
| 497.09 | 8150.91 | 6024.68 | 5831.66 | 5772.67 | 8086.19 | 6969.96 | 298.67 | 319.91 | 241.21 | 410.55 | 1813.45 |
| 494.15 | 8036.25 | 5943.99 | 5754.56 | 5696.14 | 7963.57 | 6878.14 | 298.29 | 313.68 | 309.50 | 469.61 | 2045.14 |
| 489.76 | 7753.74 | 5737.41 | 5555.17 | 5498.65 | 7678.39 | 6640.01 | 300.65 | 304.04 | 256.59 | 421.28 | 1824.17 |
| 485.76 | 7620.43 | 5644.67 | 5466.84 | 5410.91 | 7533.46 | 6534.90 | 299.57 | 299.54 | 251.78 | 396.80 | 1794.00 |
| 481.59 | 7471.17 | 5539.83 | 5366.73 | 5311.52 | 7373.38 | 6415.69 | 298.72 | 293.43 | 258.33 | 405.79 | 1801.27 |
| 480.93 | 7456.60 | 5530.22 | 5357.72 | 5302.54 | 7356.40 | 6405.01 | 298.34 | 292.77 | 245.76 | 407.77 | 1754.14 |
| 481.09 | 7354.04 | 5450.73 | 5279.86 | 5225.66 | 7262.69 | 6311.66 | 301.22 | 289.21 | 221.63 | 390.14 | 1655.00 |
| 477.09 | 7243.20 | 5374.84 | 5207.91 | 5154.12 | 7139.53 | 6226.15 | 299.57 | 284.55 | 263.57 | 403.91 | 1794.88 |
| 464.98 | 6740.38 | 5014.86 | 4862.38 | 4811.47 | 6615.15 | 5814.11 | 299.04 | 260.21 | 347.04 | 582.46 | 2033.59 |
| 451.54 | 6178.79 | 4610.31 | 4473.43 | 4425.90 | 6034.90 | 5350.08 | 298.67 | 227.22 | 367.09 | 1045.50 | 2023.77 |
| 441.04 | 5701.94 | 4263.18 | 4138.76 | 4094.33 | 5550.17 | 4950.51 | 299.47 | 200.68 | 382.05 | 1443.69 | 2009.89 |
| 428.26 | 5199.72 | 3898.98 | 3787.99 | 3746.73 | 5036.58 | 4531.82 | 298.52 | 167.14 | 406.57 | 2211.62 | 2016.99 |
| 418.54 | 4743.47 | 3563.24 | 3463.37 | 3425.32 | 4580.70 | 4143.96 | 299.82 | 152.20 | 394.46 | 2226.30 | 1926.59 |
| 412.43 | 4540.06 | 3415.85 | 3321.45 | 3284.68 | 4372.40 | 3974.58 | 298.49 | 140.90 | 384.03 | 2488.75 | 1859.87 |
| 408.54 | 4347.90 | 3273.43 | 3183.49 | 3148.14 | 4182.61 | 3809.66 | 299.31 | 133.12 | 377.24 | 2592.96 | 1812.64 |
| 403.71 | 4121.86 | 3106.01 | 3021.35 | 2987.65 | 3959.13 | 3615.84 | 299.99 | 121.11 | 373.63 | 2901.56 | 1767.64 |
| 399.98 | 4026.70 | 3037.73 | 2955.77 | 2922.63 | 3860.24 | 3537.62 | 298.47 | 116.00 | 375.77 | 3045.38 | 1762.44 |
| 395.87 | 3777.12 | 2850.67 | 2774.06 | 2742.89 | 3618.29 | 3320.24 | 300.58 | 107.09 | 367.42 | 3159.55 | 1704.55 |
| 395.15 | 3860.44 | 2915.87 | 2838.07 | 2806.07 | 3693.05 | 3397.03 | 297.63 | 122.85 | 345.05 | 2290.05 | 1657.28 |
| 395.82 | 3836.65 | 2896.64 | 2819.05 | 2787.33 | 3673.03 | 3374.17 | 298.97 | 122.84 | 336.80 | 2240.27 | 1625.93 |
| 393.87 | 3732.10 | 2818.50 | 2743.19 | 2712.28 | 3571.22 | 3283.43 | 299.62 | 110.63 | 371.78 | 2838.65 | 1725.55 |
| 390.76 | 3665.09 | 2770.69 | 2697.35 | 2666.81 | 3500.95 | 3228.78 | 298.04 | 99.98 | 433.44 | 3437.39 | 1927.35 |
| 387.76 | 3492.09 | 2640.87 | 2571.20 | 2542.04 | 3333.60 | 3077.85 | 299.36 | 95.50 | 402.61 | 3416.77 | 1799.40 |
| 385.93 | 3397.19 | 2569.82 | 2502.21 | 2473.79 | 3241.42 | 2995.32 | 299.89 | 97.30 | 349.98 | 3087.08 | 1607.42 |
| 385.48 | 3449.99 | 2611.07 | 2542.68 | 2513.74 | 3288.95 | 3043.87 | 298.03 | 96.85 | 363.33 | 3230.36 | 1657.78 |
| 385.15 | 3353.20 | 2536.80 | 2470.11 | 2442.05 | 3198.89 | 2956.92 | 300.21 | 93.78 | 343.68 | 3254.41 | 1575.93 |
| 384.54 | 3340.22 | 2527.48 | 2461.17 | 2433.18 | 3185.41 | 2946.25 | 299.90 | 92.09 | 356.50 | 3355.64 | 1618.89 |
| 383.98 | 3372.61 | 2553.09 | 2486.37 | 2458.04 | 3213.88 | 2976.51 | 298.46 | 91.13 | 363.05 | 3493.16 | 1642.64 |
| 384.15 | 3369.41 | 2550.44 | 2483.73 | 2455.44 | 3211.35 | 2973.33 | 298.72 | 92.42 | 354.91 | 3390.09 | 1615.24 |
| 383.32 | 3283.28 | 2484.96 | 2419.89 | 2392.35 | 3129.89 | 2896.88 | 300.09 | 98.51 | 313.58 | 2742.99 | 1472.60 |
| 384.32 | 3430.71 | 2597.55 | 2529.78 | 2500.93 | 3268.22 | 3028.51 | 297.29 | 105.09 | 319.43 | 2586.49 | 1513.14 |
| 385.76 | 3405.27 | 2576.25 | 2508.54 | 2480.03 | 3248.45 | 3002.92 | 299.50 | 107.68 | 310.30 | 2338.25 | 1483.23 |
| 386.15 | 3407.52 | 2577.53 | 2509.69 | 2481.19 | 3251.50 | 3004.26 | 299.86 | 102.28 | 317.87 | 2739.67 | 1500.48 |
| 386.43 | 3466.18 | 2622.45 | 2553.56 | 2524.54 | 3306.29 | 3056.83 | 298.62 | 102.94 | 325.93 | 2819.48 | 1533.78 |
| 385.43 | 3325.39 | 2515.05 | 2448.77 | 2420.98 | 3173.92 | 2931.31 | 301.23 | 96.54 | 341.60 | 2989.70 | 1572.18 |
| 385.43 | 3294.34 | 2491.13 | 2425.36 | 2397.87 | 3145.24 | 2903.27 | 302.04 | 95.44 | 330.38 | 3002.73 | 1527.81 |
| 383.76 | 3208.85 | 2427.12 | 2363.20 | 2336.38 | 3062.23 | 2828.90 | 302.51 | 84.83 | 443.01 | 3653.24 | 1913.68 |
| 381.43 | 3104.67 | 2349.38 | 2287.77 | 2261.75 | 2960.49 | 2738.69 | 302.75 | 80.21 | 414.04 | 3800.08 | 1795.24 |
| 369.32 | 2954.97 | 2246.36 | 2189.96 | 2164.52 | 2795.26 | 2622.39 | 293.85 | 84.46 | 253.05 | 3089.56 | 1213.60 |
| 368.98 | 2896.91 | 2201.82 | 2146.44 | 2121.53 | 2741.23 | 2570.25 | 295.02 | 80.85 | 257.98 | 3258.28 | 1222.00 |
| 367.82 | 2828.18 | 2149.86 | 2095.86 | 2071.52 | 2675.58 | 2509.70 | 295.59 | 78.27 | 258.21 | 3317.35 | 1214.93 |
| 367.26 | 2856.01 | 2171.91 | 2117.56 | 2092.93 | 2699.95 | 2535.76 | 294.28 | 77.33 | 270.23 | 3467.52 | 1258.36 |
| 365.98 | 2729.32 | 2075.24 | 2023.24 | 1999.72 | 2580.88 | 2422.79 | 296.26 | 73.98 | 266.21 | 3460.90 | 1231.59 |

| | | | AVERAGE | SUMS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 36013.57 | 67664.52 | 23278.24 | 7587.30 | 51832.38 | 13388.30 | 38444.1 | 112695.6 | 13388.3 | 973.4 | 63.8 |
| of Dry Fuel) | | | Total | | | | | | | |
| tuent | | | Loss | Total | Chemical | Sensible an | Total | Chem | Grams Produced | |
| $CH_4$ | $H_2O$ Comb | $H_2O$ Fuel M | Rate | Loss | Loss 1 | Latent Loss | Output | Loss 2 | CO | HC |
| 1685.83 | 1466.11 | 535.97 | 17525.37 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0.00 |
| 388.41 | 1603.33 | 535.59 | 6776.35 | 3884.27 | 985 | 2899.24 | 7471 | 985 | 75.53 | 3.98 |
| 406.64 | 1630.28 | 545.24 | 6870.94 | 2579.85 | 628 | 1951.56 | 4858 | 628 | 47.14 | 2.73 |
| 317.25 | 1669.41 | 555.02 | 5991.23 | 2893.88 | 595 | 2298.96 | 6675 | 595 | 43.80 | 2.74 |
| 141.78 | 1728.93 | 568.22 | 5063.25 | 2961.53 | 331 | 2630.07 | 8625 | 331 | 24.66 | 1.48 |
| 128.26 | 1744.00 | 572.66 | 5230.04 | 2999.88 | 304 | 2696.24 | 8363 | 304 | 22.83 | 1.31 |
| 137.68 | 1739.79 | 571.63 | 5587.02 | 2782.98 | 297 | 2485.75 | 7085 | 297 | 22.68 | 1.22 |
| 126.48 | 1732.90 | 568.95 | 5234.41 | 2360.43 | 243 | 2117.56 | 6573 | 243 | 18.43 | 1.02 |
| 115.58 | 1730.52 | 567.77 | 5155.99 | 2286.15 | 223 | 2062.73 | 6498 | 223 | 17.08 | 0.91 |
| 116.78 | 1726.30 | 566.43 | 5168.33 | 2242.87 | 223 | 2019.78 | 6354 | 223 | 17.10 | 0.90 |
| 120.84 | 1725.48 | 566.31 | 5113.07 | 2141.71 | 218 | 1923.88 | 6156 | 218 | 16.59 | 0.90 |
| 118.33 | 1722.56 | 565.26 | 4962.14 | 2022.31 | 204 | 1818.39 | 6051 | 204 | 15.44 | 0.86 |
| 112.52 | 1720.28 | 564.30 | 5144.01 | 1776.14 | 175 | 1600.66 | 5064 | 175 | 13.55 | 0.69 |
| 164.66 | 1700.36 | 559.67 | 5648.01 | 1427.99 | 186 | 1241.89 | 3581 | 186 | 14.32 | 0.74 |
| 360.31 | 1662.97 | 554.45 | 6241.30 | 1330.70 | 296 | 1034.95 | 2893 | 296 | 21.71 | 1.37 |
| 527.34 | 1631.23 | 549.96 | 6744.83 | 1247.16 | 360 | 887.16 | 2416 | 360 | 26.03 | 1.74 |
| 856.14 | 1581.60 | 545.25 | 7785.32 | 1042.94 | 406 | 636.54 | 1611 | 406 | 28.93 | 2.05 |
| 854.29 | 1569.11 | 540.89 | 7663.84 | 766.39 | 305 | 461.46 | 1215 | 305 | 21.76 | 1.53 |
| 971.63 | 1550.99 | 538.99 | 7935.14 | 778.54 | 336 | 442.33 | 1165 | 336 | 23.88 | 1.71 |
| 1015.39 | 1540.95 | 537.13 | 8009.43 | 710.27 | 317 | 393.26 | 1046 | 317 | 22.50 | 1.61 |
| 1149.17 | 1520.44 | 534.95 | 8368.49 | 663.17 | 318 | 345.00 | 907 | 318 | 22.51 | 1.63 |
| 1209.99 | 1511.46 | 534.08 | 8555.12 | 694.10 | 342 | 351.83 | 913 | 342 | 24.19 | 1.76 |
| 1255.13 | 1499.73 | 531.63 | 8625.11 | 732.32 | 372 | 360.53 | 950 | 372 | 26.29 | 1.91 |
| 873.74 | 1542.60 | 532.49 | 7364.06 | 569.67 | 243 | 326.97 | 963 | 243 | 17.35 | 1.21 |
| 854.06 | 1543.94 | 532.24 | 7256.08 | 588.70 | 249 | 339.73 | 1019 | 249 | 17.81 | 1.24 |
| 1104.57 | 1514.48 | 531.22 | 8196.87 | 680.50 | 325 | 355.76 | 964 | 325 | 23.09 | 1.64 |
| 1342.44 | 1487.59 | 530.60 | 9258.78 | 628.90 | 322 | 306.79 | 717 | 322 | 22.88 | 1.63 |
| 1339.20 | 1483.15 | 528.91 | 9065.54 | 615.77 | 321 | 295.16 | 730 | 321 | 22.76 | 1.63 |
| 1212.42 | 1493.86 | 527.98 | 8376.05 | 632.16 | 322 | 310.04 | 863 | 322 | 22.85 | 1.64 |
| 1273.38 | 1489.00 | 528.52 | 8639.23 | 619.42 | 321 | 298.91 | 801 | 321 | 22.71 | 1.64 |
| 1289.88 | 1484.50 | 527.55 | 8569.73 | 582.10 | 306 | 275.65 | 763 | 306 | 21.68 | 1.57 |
| 1328.08 | 1480.14 | 527.43 | 8758.77 | 594.94 | 316 | 279.08 | 751 | 316 | 22.36 | 1.62 |
| 1389.06 | 1474.69 | 527.77 | 8981.51 | 677.85 | 366 | 312.05 | 817 | 366 | 25.86 | 1.88 |
| 1346.44 | 1479.07 | 527.73 | 8805.91 | 714.44 | 381 | 332.94 | 893 | 381 | 26.98 | 1.96 |
| 1070.07 | 1505.65 | 526.87 | 7730.28 | 612.59 | 300 | 312.56 | 957 | 300 | 21.32 | 1.52 |
| 1002.99 | 1516.95 | 528.35 | 7572.44 | 628.66 | 296 | 332.87 | 1016 | 296 | 21.06 | 1.49 |
| 893.45 | 1527.64 | 528.06 | 7188.63 | 583.23 | 260 | 322.97 | 1024 | 260 | 18.61 | 1.30 |
| 1072.43 | 1508.87 | 528.08 | 7769.66 | 601.05 | 293 | 308.32 | 931 | 293 | 20.79 | 1.49 |
| 1107.32 | 1506.89 | 528.67 | 7925.01 | 628.02 | 309 | 319.16 | 942 | 309 | 21.91 | 1.57 |
| 1168.70 | 1496.41 | 527.26 | 8192.38 | 633.75 | 319 | 314.37 | 899 | 319 | 22.69 | 1.62 |
| 1179.32 | 1494.39 | 526.94 | 8157.02 | 538.67 | 274 | 264.46 | 770 | 274 | 19.45 | 1.39 |
| 1404.61 | 1468.40 | 526.11 | 9493.89 | 340.35 | 180 | 160.29 | 370 | 180 | 12.85 | 0.90 |
| 1480.95 | 1457.57 | 525.09 | 9553.18 | 36.05 | 20 | 16.25 | 39 | 20 | 1.41 | 0.10 |
| 1248.32 | 1478.19 | 524.53 | 7891.70 | 398.15 | 217 | 180.69 | 601 | 217 | 15.30 | 1.13 |
| 1318.98 | 1469.16 | 523.95 | 8131.20 | 450.16 | 251.82 | 198.34 | 647 | 252 | 17.71 | 1.31 |
| 1341.89 | 1464.86 | 523.27 | 8198.77 | 637.62 | 360.14 | 277.48 | 903 | 360 | 25.34 | 1.87 |
| 1404.16 | 1459.19 | 523.56 | 8460.36 | 585.34 | 334.98 | 250.36 | 785 | 335 | 23.56 | 1.74 |
| 1395.94 | 1456.48 | 522.29 | 8407.39 | 127.29 | 73.10 | 54.19 | 173 | 73 | 5.15 | 0.38 |

# Intertek Testing Services NA Ltd

| | | | |
|---|---|---|---|
| **Manufacturer:** | SBI | | **Technicians:** |
| **Model:** | NG1800 | | _____ |
| **Date:** | 12/02/13 | | _____ |
| **Run:** | 3 | | _____ |
| **Control #:** | G101440749 | | _____ |
| **Test Duration:** | 420 | | |
| **Output Category:** | 2 | | |

**Test Results in Accordance with CSA B415.1-10**

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 68.5% | 74.0% |
| **Combustion Efficiency** | 91.9% | 91.9% |
| **Heat Transfer Efficiency** | 75% | 80.6% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 16,089 | 15,262 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 1.19 | 2.61 | **(lb/h)** |
| **Input (kJ/h)** | 23,493 | 22,286 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 8.30 | 18.30 | **dry lb** |
| **MC wet (%)** | 16.83 | | |
| **MC dry (%)** | 20.24 | | |
| **Particulate (g )** | 19.492 | | |
| **CO (g)** | 973 | | |
| **Test Duration (h)** | 7.00 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | 0.17 | 8.64 |
| **g/kg Dry Fuel** | 2.35 | 117.25 |
| **g/h** | 2.78 | 139.05 |
| **lb/MM Btu Output** | 0.40 | 20.09 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 16.41 |

**Version: 2.4** **15/04/2010**

**TEST FUEL DATA**
**EPA Method 5G-3**

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 4, 2013 |
| Test Run Number: | 3 |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

| PRE-BURN FUEL PROPERTIES | | | | | |
|---|---|---|---|---|---|
| Eq. ID No.: | SBI-214 | Time: | 9:30 | Temp.,℉: | 70 |
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 16 | 1.629 | 22.4 | 20.9 | 22.2 |
| 2 | 16 | 1.699 | 23.8 | 21.4 | 23.8 |
| 3 | 16 | 1.790 | 19.5 | 20.0 | 20.6 |
| 4 | 16 | 1.794 | 19.0 | 19.8 | 20.0 |
| 5 | 16 | 1.892 | 19.7 | 20.6 | 19.8 |
| 6 | 16 | 1.893 | 19.5 | 19.5 | 19.7 |
| 7 | 16 | 1.925 | 19.3 | 19.5 | 19.2 |
| 8 | 16 | 1.816 | 20.2 | 19.2 | 19.3 |
| 9 | 17 | 1.729 | 21.9 | 21.1 | 20.9 |
| 10 | 17 | 1.91 | 23.8 | 21.6 | 22.1 |
| 11 | 17 | 1.87 | 21.9 | 20.9 | 22.0 |
| 12 | 17 | 1.82 | 21.9 | 20.3 | 21.7 |
| Total Weight | | **21.761** | Average, %db | | **20.8** |

| | | | |
|---|---|---|---|
| Allowable Fuel Load Range: | **4.40** | to | **5.50** |

| TEST FUEL LOAD PROPERTIES | | | | | | |
|---|---|---|---|---|---|---|
| Eq. ID No.: | SBI-214 | | Time: | 10:00 | Temp.,℉: | 70 |
| Piece No. | Length, In. | Weight, Lb. | | Moisture, %, Dry Basis | | |
| | | 2x4 | 4x4 | | | |
| 1 | 15 | 1.711 | | 18.9 | 19.2 | 19.7 |
| 2 | 15 | 1.539 | | 19.3 | 19.8 | 18.7 |
| 3 | 15 | 1.723 | | 18.8 | 19.3 | 19.2 |
| 4 | 15 | | 3.755 | 21.9 | 21.5 | 22.2 |
| 5 | 15 | | 3.410 | 19.2 | 19.7 | 19.0 |
| 6 | 15 | | 3.817 | 21.9 | 22.2 | 22.6 |
| 7 | 15 | 2.150 | | 20.6 | 21.9 | 21.5 |
| 8 | 15 | 1.775 | | 19.9 | 18.7 | 19.2 |
| 9 | 15 | 2.119 | | 20.3 | 21.0 | 20.0 |
| Totals | | 11.017 | 10.982 | | | |
| % of Weight | | 50.1 | 49.9 | | | |
| Total weight, wet, lb. | | **21.999** | | Average Moisture, dry | | **20.23** |
| Total weight, dry, kg | | 8.30 | | Average Moisture, wet | | 16.83 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 5, 2013 |
| Test Run Number: | 4 |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **1.06** | |
| Emission-Rate, g/hr: | **3.25** | |
| Adjusted Emission-Rate, g/hr : | **4.84** | |
| Duration of Test, Minutes | 470 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 1075.709 | 1051.721 |
| Dry Gas Meter Ending Reading, $ft^3$ | 1150.603 | 1121.869 |
| Barometric Pressure Correction Factor | 1.001 | 1.001 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 1.000 | 1.000 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **75.116** | **69.843** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **141.760** | |
| Total Tunnel Volume, scf | **66627.237** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 886.993 | 953.954 |
| Sample Particulate Mass, mg | 28.2 | 27.2 |
| Total Emissions, grams | 25.013 | 25.948 |
| Emission-Rate, g/hr | 3.19 | 3.31 |
| Adjusted Emission Rates, g/hr | **4.77** | **4.92** |
| Deviation, % | 1.52% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 80.23 | 77.66 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.0015@5 | 0.002@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 93.14 | |
| Maximum Ambient Temperture, ℉ | 88 | |
| Mimimum Ambient Temperature, ℉ | 76 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 21.90 | |
| Dry-Basis Fuel Load Moisture Content, % | 20.17 | |
| Wet-Basis Fuel Load Moisture Content, % | 16.78 | |
| Coal Bed Range, lb. | 4.40 | 5.40 |
| Actual Coal Bed, Lb. | 5.23 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | December 5, 2013 |
| Test Run No: | 4 |

## Temperature Data

| | |
|---|---|
| Firebox Temp Start | 412.18 |
| Firebox Temp End | 319.04 |
| Firebox Delta-T | **93.1** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **80.23** | **77.66** |

| Interval | 10 | Duration of Test, Min | **470** |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| **0** | **0** | 82.1 | 106.9 | 267.7 | 316.1 | 459.3 | 462.2 | 410.4 | 412.9 | | 68.52 | 67.27 | 67.355 | 67.18 |
| **1** | **10** | 85.38 | 104.2 | 244.4 | 292.6 | 456.2 | 417.3 | 387.8 | 392.2 | | 77.59 | 75.22 | 67.385 | 67.08 |
| **2** | **20** | 87.19 | 106.1 | 311.3 | 311 | 441.2 | 375.1 | 356.6 | 362.3 | | 78.24 | 76.29 | 67.535 | 67.145 |
| **3** | **30** | 87.2 | 106.5 | 312 | 344.5 | 422.2 | 353 | 338.5 | 340.7 | | 78.33 | 76.19 | 67.595 | 67.195 |
| **4** | **40** | 86.16 | 109.9 | 342.1 | 369.4 | 402.7 | 338.7 | 325.9 | 328.3 | | 78.74 | 76.4 | 67.615 | 67.185 |
| **5** | **50** | 88.14 | 114.1 | 381.6 | 421 | 384.2 | 339.2 | 326.9 | 330.3 | | 79.46 | 77.05 | 67.675 | 67.27 |
| **6** | **60** | 79.76 | 115.4 | 415.8 | 466.5 | 363.6 | 355.2 | 338.3 | 342.5 | | 80.23 | 77.35 | 67.75 | 67.32 |
| **7** | **70** | 78.29 | 111.9 | 389.8 | 485.5 | 348.1 | 375.6 | 353.7 | 363.2 | | 79.75 | 76.41 | 67.915 | 67.59 |
| **8** | **80** | 81.48 | 112 | 385.4 | 473.8 | 333.9 | 386.2 | 360.8 | 377.5 | | 79.56 | 77.32 | 67.975 | 67.57 |
| **9** | **90** | 79.52 | 111.8 | 387.9 | 477.1 | 319.4 | 396 | 369.4 | 386.5 | | 79.66 | 77.38 | 67.945 | 67.48 |
| **10** | **100** | 77.63 | 111.7 | 392.3 | 485.3 | 307.3 | 406.5 | 376.5 | 398.4 | | 79.64 | 77.5 | 68.07 | 67.72 |
| **11** | **110** | 77.01 | 110.6 | 389.9 | 489.2 | 298.2 | 421.3 | 387.9 | 408.8 | | 79.69 | 77.66 | 68.265 | 67.915 |
| **12** | **120** | 82.57 | 110.6 | 383 | 493.8 | 292.1 | 437.6 | 401.8 | 419.1 | | 79.38 | 76.58 | 68.125 | 67.67 |
| **13** | **130** | 79.05 | 107.7 | 364.4 | 484.4 | 286 | 451.1 | 408.8 | 427.5 | | 79.03 | 76.24 | 68.18 | 67.8 |
| **14** | **140** | 77.68 | 103.6 | 341.6 | 456.1 | 282.1 | 458.8 | 409.2 | 432.7 | | 78.41 | 75.77 | 68.205 | 67.745 |
| **15** | **150** | 81.69 | 101 | 310.5 | 421.1 | 279.7 | 462.4 | 407.1 | 434.3 | | 77.7 | 75.2 | 68.25 | 67.95 |
| **16** | **160** | 78.07 | 97.47 | 292.1 | 386.3 | 277.2 | 456.6 | 400.8 | 429.6 | | 77.02 | 74.34 | 68.245 | 67.81 |
| **17** | **170** | 81.63 | 96.13 | 274.5 | 360.9 | 276.7 | 453.5 | 397.2 | 423.8 | | 76.21 | 74 | 68.21 | 67.78 |
| **18** | **180** | 76.55 | 92.78 | 260.9 | 338.7 | 276.5 | 440.7 | 389 | 414.4 | | 75.72 | 73.77 | 68.23 | 67.825 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 190 | 80.87 | 93.02 | 250.9 | 321.8 | 276.9 | 432.6 | 380.9 | 410.1 | | 75.15 | 73.24 | 68.175 | 67.735 |
| 20 | 200 | 75.89 | 89.81 | 244.1 | 308 | 276.4 | 428.5 | 373.5 | 403.8 | | 74.69 | 72.84 | 68.15 | 67.735 |
| 21 | 210 | 78.85 | 90.44 | 238.1 | 299.4 | 277.3 | 427.6 | 368.9 | 402.4 | | 74.55 | 72.85 | 68.245 | 67.825 |
| 22 | 220 | 79.06 | 89.68 | 232.9 | 292 | 276.4 | 430.5 | 364.8 | 398.5 | | 74.34 | 72.41 | 68.255 | 67.885 |
| 23 | 230 | 77.51 | 88.55 | 230.8 | 287.1 | 277.1 | 437.2 | 362.8 | 395.2 | | 74.25 | 72.46 | 68.325 | 68.015 |
| 24 | 240 | 80.26 | 89.81 | 229.3 | 282.8 | 279.2 | 444.4 | 362.4 | 392.5 | | 74.2 | 72.65 | 68.355 | 68.015 |
| 25 | 250 | 78.87 | 88.69 | 227.3 | 278.5 | 280 | 441.5 | 361.9 | 388.6 | | 74.17 | 72.59 | 68.455 | 68.08 |
| 26 | 260 | 76.84 | 87.62 | 225.5 | 276.1 | 283.9 | 435.9 | 361.7 | 386 | | 74.08 | 72.4 | 68.32 | 67.945 |
| 27 | 270 | 79.7 | 88.73 | 223.9 | 274.6 | 286.4 | 433.6 | 359 | 386.2 | | 74.07 | 72.6 | 68.34 | 67.955 |
| 28 | 280 | 79.12 | 88.02 | 221.9 | 272.8 | 286.8 | 431.6 | 355.6 | 384.7 | | 73.64 | 72.04 | 68.205 | 67.835 |
| 29 | 290 | 77.06 | 87.15 | 221.7 | 271.8 | 292.1 | 429.5 | 353.4 | 383.3 | | 73.58 | 71.68 | 68.145 | 67.75 |
| 30 | 300 | 81.02 | 88.62 | 217.8 | 271.1 | 291.3 | 423.5 | 349.3 | 381.9 | | 73.54 | 71.61 | 68.085 | 67.65 |
| 31 | 310 | 80.94 | 88.49 | 215.5 | 268.6 | 293.3 | 414.1 | 344.3 | 376.2 | | 73.37 | 71.54 | 68.07 | 67.81 |
| 32 | 320 | 77.82 | 87.04 | 215.3 | 265.1 | 296.5 | 406.9 | 338.7 | 370 | | 73.55 | 71.52 | 68.095 | 67.76 |
| 33 | 330 | 82.57 | 89.07 | 213.4 | 263.2 | 297.7 | 403.1 | 334.4 | 367.1 | | 73.66 | 71.56 | 68.155 | 67.865 |
| 34 | 340 | 80.47 | 87.91 | 212.4 | 260.2 | 297.6 | 400.6 | 330.2 | 362.8 | | 73.71 | 71.67 | 68.21 | 67.895 |
| 35 | 350 | 77.4 | 86.57 | 212.8 | 258.4 | 299.8 | 401.9 | 327.7 | 359.6 | | 73.79 | 71.49 | 68.205 | 67.84 |
| 36 | 360 | 82.23 | 88.61 | 210.8 | 258.1 | 299 | 405.2 | 326.3 | 359.3 | | 73.7 | 71.8 | 68.245 | 67.795 |
| 37 | 370 | 85.1 | 89.78 | 210.7 | 257.6 | 301.2 | 409.7 | 326.2 | 359.7 | | 73.86 | 72.17 | 68.155 | 67.79 |
| 38 | 380 | 82.51 | 88.18 | 210.1 | 256.4 | 300.6 | 411.3 | 324.9 | 358.3 | | 73.57 | 71.86 | 68.115 | 67.745 |
| 39 | 390 | 85.23 | 89.82 | 209.9 | 255.6 | 301.3 | 411 | 325.6 | 358.4 | | 73.88 | 72.25 | 68.175 | 67.72 |
| 40 | 400 | 84.13 | 88.89 | 208.4 | 254.4 | 301.6 | 409.4 | 324.7 | 356 | | 73.76 | 72.12 | 68.12 | 67.73 |
| 41 | 410 | 85.03 | 86.91 | 206.1 | 254.7 | 303.9 | 409.4 | 326.9 | 356.4 | | 73.52 | 71.71 | 68.17 | 67.78 |
| 42 | 420 | 85.4 | 87.69 | 206.1 | 254.3 | 303.3 | 412.6 | 326.2 | 355.4 | | 73.64 | 71.46 | 68.13 | 67.78 |
| 43 | 430 | 85.72 | 87.67 | 205.2 | 252.9 | 302 | 410 | 324.7 | 353.1 | | 73.74 | 71.12 | 68.275 | 67.98 |
| 44 | 440 | 85.89 | 88.07 | 204.6 | 251.8 | 301.9 | 408.1 | 323.4 | 350.2 | | 73.65 | 71.14 | 68.285 | 67.97 |
| 45 | 450 | 85.95 | 87.98 | 203.5 | 250.4 | 301.1 | 404.8 | 322.2 | 347.7 | | 73.79 | 71.28 | 68.42 | 68.15 |
| 46 | 460 | 86.42 | 87.96 | 201.5 | 248.4 | 300.2 | 398.5 | 320.1 | 343.8 | | 73.87 | 71.46 | 68.45 | 68.115 |
| 47 | 470 | 86.21 | 88.15 | 199.8 | 245.7 | 299.2 | 393.7 | 317.7 | 338.9 | | 73.74 | 71.58 | 68.445 | 68.09 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 5, 2013 |
| Test Run Number: | 4 |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 30.06 | 78 | Meter Box (A) | 1.002 |
| End | 29.85 | 100 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 470 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.0015@5 | 0.002@5 |

| Maximum Vacuum | | Average Gases, % | | |
|---|---|---|---|---|
| Train A | Train B | O2 | CO2 | CO |
| 0.00 | 0.00 | 14.172 | 4.930 | 1.129 |

| | Particulate Sampling Data | | | | | | | | | | | | Combustion Gasses, % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg | O2 | CO2 | CO |
| 0 | 0.015 | 0.00 | 0.00 | 0.055 | 21.90 | 21.90 | 1075.709 | 1051.721 | 99.97 | 99.97 | 0.00 | 0.00 | 16.580 | 2.520 | 1.130 |
| 10 | 0.015 | 0.00 | 0.00 | 0.058 | 21.15 | 0.75 | 1077.330 | 1053.152 | 102.63 | 96.72 | 0.00 | 0.00 | 18.130 | 1.450 | 0.560 |
| 20 | 0.015 | 0.00 | 0.00 | 0.070 | 20.19 | 0.96 | 1078.939 | 1054.699 | 102.01 | 104.72 | 0.00 | 0.00 | 14.350 | 5.410 | 0.650 |
| 30 | 0.015 | 0.00 | 0.00 | 0.070 | 19.10 | 1.09 | 1080.525 | 1056.249 | 100.58 | 104.95 | 0.00 | 0.00 | 14.830 | 4.850 | 0.810 |
| 40 | 0.015 | 0.00 | 0.00 | 0.075 | 18.02 | 1.08 | 1082.104 | 1057.748 | 100.43 | 101.80 | 0.00 | 0.00 | 12.970 | 7.100 | 0.640 |
| 50 | 0.015 | 0.00 | 0.00 | 0.078 | 16.77 | 1.25 | 1083.684 | 1059.230 | 100.85 | 101.00 | 0.00 | 0.00 | 11.190 | 9.450 | 0.440 |
| 60 | 0.015 | 0.00 | 0.00 | 0.083 | 15.22 | 1.55 | 1085.258 | 1060.699 | 100.57 | 100.22 | 0.00 | 0.00 | 9.380 | 10.490 | 0.750 |
| 70 | 0.015 | 0.00 | 0.00 | 0.078 | 13.89 | 1.33 | 1086.842 | 1062.099 | 100.87 | 95.17 | 0.00 | 0.00 | 12.170 | 8.130 | 0.420 |
| 80 | 0.015 | 0.00 | 0.00 | 0.078 | 12.76 | 1.13 | 1088.408 | 1063.664 | 99.72 | 106.40 | 0.00 | 0.00 | 11.530 | 8.920 | 0.510 |
| 90 | 0.015 | 0.00 | 0.00 | 0.078 | 11.62 | 1.14 | 1089.981 | 1065.225 | 100.15 | 106.13 | 0.00 | 0.00 | 11.180 | 9.130 | 0.370 |
| 100 | 0.015 | 0.00 | 0.00 | 0.080 | 10.45 | 1.17 | 1091.552 | 1066.728 | 99.99 | 102.13 | 0.00 | 0.00 | 10.630 | 9.690 | 0.420 |
| 110 | 0.015 | 0.00 | 0.00 | 0.080 | 9.27 | 1.18 | 1093.130 | 1068.249 | 100.31 | 103.22 | 0.00 | 0.00 | 10.450 | 9.770 | 0.440 |
| 120 | 0.015 | 0.00 | 0.00 | 0.078 | 8.26 | 1.01 | 1094.710 | 1069.623 | 100.46 | 93.29 | 0.00 | 0.00 | 10.620 | 9.540 | 0.410 |
| 130 | 0.015 | 0.00 | 0.00 | 0.075 | 7.38 | 0.88 | 1096.288 | 1071.042 | 100.07 | 96.07 | 0.00 | 0.00 | 11.780 | 8.360 | 0.440 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 140 | 0.015 | 0.00 | 0.00 | 0.070 | 6.62 | 0.76 | 1097.866 | 1072.471 | 99.70 | 96.41 | 0.00 | 0.00 | 12.430 | 7.070 | 0.790 |
| 150 | 0.015 | 0.00 | 0.00 | 0.065 | 6.13 | 0.49 | 1099.450 | 1073.939 | 99.84 | 98.77 | 0.00 | 0.00 | 13.600 | 5.380 | 1.070 |
| 160 | 0.015 | 0.00 | 0.00 | 0.065 | 5.61 | 0.52 | 1101.027 | 1075.379 | 99.09 | 96.61 | 0.00 | 0.00 | 13.700 | 5.250 | 1.150 |
| 170 | 0.015 | 0.00 | 0.00 | 0.060 | 5.31 | 0.30 | 1102.614 | 1076.881 | 99.60 | 100.65 | 0.00 | 0.00 | 14.130 | 4.460 | 1.200 |
| 180 | 0.015 | 0.00 | 0.00 | 0.060 | 5.04 | 0.27 | 1104.191 | 1078.399 | 98.67 | 101.41 | 0.00 | 0.00 | 14.310 | 4.240 | 1.250 |
| 190 | 0.015 | 0.00 | 0.00 | 0.058 | 4.84 | 0.20 | 1105.775 | 1079.929 | 99.14 | 102.25 | 0.00 | 0.00 | 14.280 | 4.290 | 1.250 |
| 200 | 0.015 | 0.00 | 0.00 | 0.055 | 4.59 | 0.25 | 1107.362 | 1081.460 | 99.04 | 102.02 | 0.00 | 0.00 | 14.400 | 4.200 | 1.330 |
| 210 | 0.015 | 0.00 | 0.00 | 0.055 | 4.41 | 0.18 | 1108.953 | 1082.996 | 99.33 | 102.40 | 0.00 | 0.00 | 14.490 | 4.170 | 1.250 |
| 220 | 0.015 | 0.00 | 0.00 | 0.053 | 4.20 | 0.21 | 1110.540 | 1084.529 | 99.01 | 102.11 | 0.00 | 0.00 | 14.530 | 4.160 | 1.260 |
| 230 | 0.015 | 0.00 | 0.00 | 0.053 | 4.02 | 0.18 | 1112.124 | 1086.060 | 98.71 | 101.85 | 0.00 | 0.00 | 14.340 | 4.270 | 1.390 |
| 240 | 0.015 | 0.00 | 0.00 | 0.050 | 3.77 | 0.25 | 1113.715 | 1087.595 | 99.26 | 102.23 | 0.00 | 0.00 | 14.280 | 4.980 | 1.030 |
| 250 | 0.015 | 0.00 | 0.00 | 0.053 | 3.56 | 0.21 | 1115.319 | 1089.114 | 99.95 | 101.05 | 0.00 | 0.00 | 14.450 | 4.400 | 1.070 |
| 260 | 0.015 | 0.00 | 0.00 | 0.050 | 3.39 | 0.17 | 1116.922 | 1090.623 | 99.81 | 100.32 | 0.00 | 0.00 | 14.590 | 4.150 | 1.230 |
| 270 | 0.015 | 0.00 | 0.00 | 0.050 | 3.18 | 0.21 | 1118.525 | 1092.157 | 99.91 | 102.08 | 0.00 | 0.00 | 14.480 | 4.260 | 1.220 |
| 280 | 0.015 | 0.00 | 0.00 | 0.050 | 3.00 | 0.18 | 1120.129 | 1093.702 | 99.93 | 102.77 | 0.00 | 0.00 | 14.700 | 4.090 | 1.200 |
| 290 | 0.015 | 0.00 | 0.00 | 0.050 | 2.83 | 0.17 | 1121.742 | 1095.159 | 100.42 | 96.85 | 0.00 | 0.00 | 14.870 | 3.960 | 1.200 |
| 300 | 0.015 | 0.00 | 0.00 | 0.050 | 2.67 | 0.16 | 1123.340 | 1096.676 | 99.64 | 101.00 | 0.00 | 0.00 | 15.200 | 3.690 | 1.220 |
| 310 | 0.015 | 0.00 | 0.00 | 0.050 | 2.51 | 0.16 | 1124.950 | 1098.156 | 100.37 | 98.49 | 0.00 | 0.00 | 15.180 | 3.530 | 1.340 |
| 320 | 0.015 | 0.00 | 0.00 | 0.050 | 2.33 | 0.18 | 1126.547 | 1099.632 | 99.43 | 98.10 | 0.00 | 0.00 | 15.050 | 3.720 | 1.320 |
| 330 | 0.015 | 0.00 | 0.00 | 0.050 | 2.19 | 0.14 | 1128.155 | 1101.080 | 100.29 | 96.38 | 0.00 | 0.00 | 15.130 | 3.590 | 1.350 |
| 340 | 0.015 | 0.00 | 0.00 | 0.050 | 2.03 | 0.16 | 1129.760 | 1102.597 | 99.98 | 100.91 | 0.00 | 0.00 | 15.060 | 3.710 | 1.320 |
| 350 | 0.015 | 0.00 | 0.00 | 0.050 | 1.83 | 0.20 | 1131.362 | 1104.019 | 99.68 | 94.46 | 0.00 | 0.00 | 15.130 | 3.730 | 1.290 |
| 360 | 0.015 | 0.00 | 0.00 | 0.050 | 1.71 | 0.12 | 1132.970 | 1105.514 | 100.23 | 99.50 | 0.00 | 0.00 | 15.190 | 3.600 | 1.370 |
| 370 | 0.015 | 0.00 | 0.00 | 0.048 | 1.53 | 0.18 | 1134.572 | 1107.050 | 99.98 | 102.34 | 0.00 | 0.00 | 15.120 | 3.570 | 1.400 |
| 380 | 0.015 | 0.00 | 0.00 | 0.048 | 1.40 | 0.13 | 1136.195 | 1108.495 | 101.15 | 96.15 | 0.00 | 0.00 | 15.240 | 3.280 | 1.610 |
| 390 | 0.015 | 0.00 | 0.00 | 0.050 | 1.22 | 0.18 | 1137.780 | 1109.965 | 98.92 | 97.96 | 0.00 | 0.00 | 15.390 | 3.340 | 1.440 |
| 400 | 0.015 | 0.00 | 0.00 | 0.048 | 1.06 | 0.16 | 1139.390 | 1111.492 | 100.40 | 101.67 | 0.00 | 0.00 | 15.480 | 3.160 | 1.560 |
| 410 | 0.015 | 0.00 | 0.00 | 0.048 | 0.90 | 0.16 | 1140.989 | 1112.956 | 99.53 | 97.29 | 0.00 | 0.00 | 15.350 | 3.330 | 1.500 |
| 420 | 0.015 | 0.00 | 0.00 | 0.048 | 0.73 | 0.17 | 1142.590 | 1114.432 | 99.73 | 98.16 | 0.00 | 0.00 | 15.520 | 3.010 | 1.620 |
| 430 | 0.015 | 0.00 | 0.00 | 0.048 | 0.54 | 0.19 | 1144.193 | 1115.929 | 99.82 | 99.52 | 0.00 | 0.00 | 15.480 | 3.010 | 1.750 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 440 | 0.015 | 0.00 | 0.00 | 0.048 | 0.38 | 0.16 | 1145.794 | 1117.376 | 99.73 | 96.23 | 0.00 | 0.00 | 15.490 | 2.850 | 1.870 |
| 450 | 0.015 | 0.00 | 0.00 | 0.048 | 0.25 | 0.13 | 1147.400 | 1118.809 | 100.01 | 95.26 | 0.00 | 0.00 | 15.860 | 2.430 | 1.900 |
| 460 | 0.015 | 0.00 | 0.00 | 0.048 | 0.12 | 0.13 | 1148.995 | 1120.332 | 99.32 | 101.25 | 0.00 | 0.00 | 16.050 | 2.460 | 1.660 |
| 470 | 0.015 | 0.00 | 0.00 | 0.475 | 0.00 | 0.12 | 1150.603 | 1121.869 | 100.15 | 102.20 | 0.00 | 0.00 | 15.970 | 2.490 | 1.780 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 5, 2013 |
| Test Run Number: | 4 |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0100 | 109 | 0.1000 |
| A2 | 0.0100 | 109 | 0.1000 |
| A3 | 0.0125 | 109 | 0.1118 |
| A4 | 0.0125 | 109 | 0.1118 |
| A Center | 0.0150 | 110 | 0.1225 |
| B1 | 0.0100 | 107 | 0.1000 |
| B2 | 0.0125 | 107 | 0.1118 |
| B3 | 0.0150 | 108 | 0.1225 |
| B4 | 0.0125 | 107 | 0.1118 |
| B Center | 0.0150 | 108 | 0.1225 |
| Averages | 0.0125 | 108.17 | 0.1087 |

| | | |
|---|---|---|
| Tunnel Diameter | **8.000** | inches |
| Tunnel Static | **-0.055** | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.8876 | factor |
| Baro. Pressure | 30.06 | |
| Pitot Factor | **0.99** | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 7.485 | Ft/ Sec |
| Initial Flow | **140.46** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.010662593 | | |
| VS (2) | 0.01146745 | STD Tunnel Flow: | 141.76 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 470 | | | | 555.8189583 | 75.084 | 69.814 | 7.42 | 99.97 | 99.97 |
| Time | Average Firebox Temp | Ending Average Firebox Temp | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 412.2 | | 0.015 | 566.9 | | | 7.490 | | |
| 10 | 389.2 | | 0.015 | 564.2 | 1.627 | 1.426 | 7.472 | 102.63 | 96.72 |
| 20 | 369.2 | | 0.015 | 566.1 | 1.615 | 1.541 | 7.485 | 102.01 | 104.72 |
| 30 | 359.8 | | 0.015 | 566.5 | 1.592 | 1.544 | 7.488 | 100.58 | 104.95 |
| 40 | 353.0 | | 0.015 | 569.9 | 1.585 | 1.493 | 7.510 | 100.43 | 101.80 |
| 50 | 360.3 | | 0.015 | 574.1 | 1.585 | 1.476 | 7.538 | 100.85 | 101.00 |
| 60 | 373.2 | | 0.015 | 575.4 | 1.579 | 1.463 | 7.546 | 100.57 | 100.22 |
| 70 | 385.2 | | 0.015 | 571.9 | 1.589 | 1.394 | 7.523 | 100.87 | 95.17 |
| 80 | 386.4 | | 0.015 | 572 | 1.570 | 1.558 | 7.524 | 99.72 | 106.40 |
| 90 | 389.7 | | 0.015 | 571.8 | 1.578 | 1.554 | 7.522 | 100.15 | 106.13 |
| 100 | 394.8 | | 0.015 | 571.7 | 1.575 | 1.496 | 7.522 | 99.99 | 102.13 |
| 110 | 401.1 | | 0.015 | 570.6 | 1.582 | 1.513 | 7.515 | 100.31 | 103.22 |
| 120 | 408.9 | | 0.015 | 570.6 | 1.584 | 1.368 | 7.515 | 100.46 | 93.29 |
| 130 | 411.6 | | 0.015 | 567.7 | 1.582 | 1.412 | 7.495 | 100.07 | 96.07 |
| 140 | 407.8 | | 0.015 | 563.6 | 1.582 | 1.422 | 7.468 | 99.70 | 96.41 |
| 150 | 400.9 | | 0.015 | 561 | 1.588 | 1.460 | 7.451 | 99.84 | 98.77 |
| 160 | 390.1 | | 0.015 | 557.47 | 1.581 | 1.433 | 7.428 | 99.09 | 96.61 |
| 170 | 382.4 | | 0.015 | 556.13 | 1.591 | 1.495 | 7.419 | 99.60 | 100.65 |
| 180 | 371.9 | | 0.015 | 552.78 | 1.581 | 1.511 | 7.396 | 98.67 | 101.41 |
| 190 | 364.5 | | 0.015 | 553.02 | 1.588 | 1.523 | 7.398 | 99.14 | 102.25 |
| 200 | 358.0 | | 0.015 | 549.81 | 1.591 | 1.524 | 7.376 | 99.04 | 102.02 |
| 210 | 355.1 | | 0.015 | 550.44 | 1.595 | 1.528 | 7.381 | 99.33 | 102.40 |
| 220 | 352.4 | | 0.015 | 549.68 | 1.591 | 1.525 | 7.376 | 99.01 | 102.11 |
| 230 | 351.9 | | 0.015 | 548.55 | 1.587 | 1.523 | 7.368 | 98.71 | 101.85 |
| 240 | 352.3 | | 0.015 | 549.81 | 1.594 | 1.527 | 7.376 | 99.26 | 102.23 |
| 250 | 350.1 | | 0.015 | 548.69 | 1.607 | 1.511 | 7.369 | 99.95 | 101.05 |
| 260 | 348.7 | | 0.015 | 547.62 | 1.606 | 1.501 | 7.362 | 99.81 | 100.32 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 270 | 348.0 | | 0.015 | 548.73 | 1.606 | 1.526 | 7.369 | 99.91 | 102.08 |
| 280 | 346.3 | | 0.015 | 548.02 | 1.608 | 1.537 | 7.364 | 99.93 | 102.77 |
| 290 | 346.0 | | 0.015 | 547.15 | 1.617 | 1.450 | 7.359 | 100.42 | 96.85 |
| 300 | 343.4 | | 0.015 | 548.62 | 1.602 | 1.510 | 7.368 | 99.64 | 101.00 |
| 310 | 339.3 | | 0.015 | 548.49 | 1.614 | 1.473 | 7.368 | 100.37 | 98.49 |
| 320 | 335.4 | | 0.015 | 547.04 | 1.601 | 1.469 | 7.358 | 99.43 | 98.10 |
| 330 | 333.1 | | 0.015 | 549.07 | 1.612 | 1.440 | 7.371 | 100.29 | 96.38 |
| 340 | 330.3 | | 0.015 | 547.91 | 1.609 | 1.510 | 7.364 | 99.98 | 100.91 |
| 350 | 329.5 | | 0.015 | 546.57 | 1.606 | 1.415 | 7.355 | 99.68 | 94.46 |
| 360 | 329.6 | | 0.015 | 548.61 | 1.612 | 1.488 | 7.368 | 100.23 | 99.50 |
| 370 | 330.9 | | 0.015 | 549.78 | 1.606 | 1.529 | 7.376 | 99.98 | 102.34 |
| 380 | 330.3 | | 0.015 | 548.18 | 1.627 | 1.438 | 7.365 | 101.15 | 96.15 |
| 390 | 330.4 | | 0.015 | 549.82 | 1.589 | 1.463 | 7.376 | 98.92 | 97.96 |
| 400 | 329.2 | | 0.015 | 548.89 | 1.614 | 1.520 | 7.370 | 100.40 | 101.67 |
| 410 | 330.3 | | 0.015 | 546.91 | 1.603 | 1.457 | 7.357 | 99.53 | 97.29 |
| 420 | 330.4 | | 0.015 | 547.69 | 1.605 | 1.469 | 7.362 | 99.73 | 98.16 |
| 430 | 328.5 | | 0.015 | 547.67 | 1.607 | 1.489 | 7.362 | 99.82 | 99.52 |
| 440 | 327.1 | | 0.015 | 548.07 | 1.605 | 1.440 | 7.365 | 99.73 | 96.23 |
| 450 | 325.2 | | 0.015 | 547.98 | 1.609 | 1.425 | 7.364 | 100.01 | 95.26 |
| 460 | 322.2 | | 0.015 | 547.96 | 1.598 | 1.515 | 7.364 | 99.32 | 101.25 |
| 470 | 319.0 | 319.04 | 0.015 | 548.15 | 1.611 | 1.529 | 7.365 | 100.15 | 102.20 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| ample ID Number: | **101440749MTL-003** |
| Test Date: | **December 5, 2013** |
| Test Run Number: | **4** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.4 | to | 5.4 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 418.4 |

| | |
|---|---|
| Final Coal Bed Wt, lb | 5.23 |

| | |
|---|---|
| Interval | 10 |

| Time | | Temperature Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Flue Draft | Fuel Weight | Weight Loss |
| 0 | 0 | 79.44 | 231.1 | 765.6 | 734.7 | 548.8 | 661.3 | 552.8 | 525.8 | | | 8.83 | 3.60 |
| 1 | 10 | 81.67 | 137.3 | 483.2 | 653.6 | 572.7 | 664.6 | 566.7 | 550.5 | | | 7.51 | 1.32 |
| 2 | 20 | 79.86 | 121.1 | 417.3 | 566.4 | 543.9 | 624.1 | 542.3 | 532.4 | | | 6.76 | 0.75 |
| 3 | 30 | 76.82 | 110.5 | 363.8 | 497.1 | 511.4 | 587.5 | 510.3 | 510.2 | | | 6.18 | 0.58 |
| 4 | 40 | 75.46 | 104.1 | 334 | 450.9 | 493.8 | 556.8 | 488 | 485.3 | | | 5.76 | 0.42 |
| 5 | 50 | 79.52 | 103.3 | 294.8 | 405 | 481.5 | 529.7 | 469.3 | 466.9 | | | 5.43 | 0.33 |
| 6 | 60 | 83.98 | 98.02 | 266.6 | 359.3 | 460 | 498.3 | 446.1 | 445.2 | | | 5.38 | 0.05 |
| 7 | 70 | 82.49 | 94.31 | 249.3 | 326.4 | 450.1 | 472.2 | 420.3 | 423 | | | 5.23 | 0.15 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: December 5, 2013
Test Run Number: 4

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 21 | | 119 | |
| B - Rear Filter Catch | Filter | 22 | | 118.9 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 264.5 | 237.9 | 26.6 |
| Probe & Filter Holder | Probe | 31 | 137096.7 | 137095.1 | 1.6 |
| | | | Total Particulate, mg | | **28.2** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 23 | | 118.7 | |
| B - Rear Filter Catch | Filter | 24 | | 118.2 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 262.2 | 236.9 | 25.3 |
| Probe & Filter Holder | Probe | 32 | 136009.0 | 136007.1 | 1.9 |
| | | | Total Particulate, mg | | **27.2** |

nufacturer: SBI
Model: NG1800
Date: 12/05/13
Run: 4
Control #: 3101440749
t Duration: 470 min

| | HHV | LHV |
|---|---|---|
| Eff | 67.10% | 72.52% |
| Comb Eff | 89.61% | 89.61% |
| HT Eff | 74.88% | 80.93% |
| Output | 14,033 | kJ/h |
| Burn Rate | 1.06 | kg/h |
| Grams CO | 1,230 | g |
| Input | 20,914 | kJ/h |
| MC wet | 16.78 | |

Ultimate $CO_2$
$CO_{2\text{-ult}}$ 19.64
$F_0$
1.059

| | | |
|---|---|---|
| Overall Heating Efficiency: | 67.10% | |
| Combustion Efficiency: | 89.61% | |
| Heat Transfer Efficiency: | 74.88% | |
| Heat Output: | 13,312 | Btu/h |
| Heat Input: | 19,839 | Btu/h |
| Burn Duration: | 7.83 | h |
| Burn Rate: | 2.33 | lb/h |
| Stack Temp: | 265.7 | Deg. F |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Averages | 1.13 | 4.93 | 2.59 | 20.54 | 15.05 | 129.88 | 27.49 | 82.9% | 75.0% | 62.3% |
| INPUT DATA | | | | Oxygen Calculation | | | Input Data | | Combust | Heat | Net |
| Elapsed Time | Weight emaining (k | % CO [e] | % $CO_2$ [d] | Excess Air EA | Total $O_2$ | Calc. % $O_2$ [g] | Flue Gas (ºC) | Room Temp (ºC) | Eff % | Transfer % | Eff % |
| 0 | 9.94 | 1.13 | 2.52 | 438.2% | 20.70 | 17.61 | 130.9 | 27.8 | 76.0% | 64.8% | 49.3% |
| 10 | 9.60 | 0.56 | 1.45 | 877.3% | 20.81 | 19.08 | 118.0 | 29.7 | 79.6% | 54.6% | 43.5% |
| 20 | 9.16 | 0.65 | 5.41 | 224.1% | 20.54 | 14.80 | 155.2 | 30.7 | 91.7% | 74.5% | 68.3% |
| 30 | 8.67 | 0.81 | 4.85 | 247.0% | 20.57 | 15.31 | 155.6 | 30.7 | 88.8% | 72.9% | 64.7% |
| 40 | 8.18 | 0.64 | 7.10 | 153.8% | 20.43 | 13.01 | 172.3 | 30.1 | 93.5% | 76.1% | 71.2% |
| 50 | 7.61 | 0.44 | 9.45 | 98.6% | 20.29 | 10.62 | 194.2 | 31.2 | 96.6% | 77.6% | 74.9% |
| 60 | 6.91 | 0.75 | 10.49 | 74.8% | 20.20 | 9.33 | 213.2 | 26.5 | 94.6% | 76.9% | 72.8% |
| 70 | 6.30 | 0.42 | 8.13 | 129.7% | 20.38 | 12.04 | 198.8 | 25.7 | 96.3% | 75.1% | 72.3% |
| 80 | 5.79 | 0.51 | 8.92 | 108.3% | 20.32 | 11.14 | 196.3 | 27.5 | 95.8% | 76.5% | 73.3% |
| 90 | 5.27 | 0.37 | 9.13 | 106.8% | 20.31 | 11.00 | 197.7 | 26.4 | 97.0% | 76.7% | 74.4% |
| 100 | 4.74 | 0.42 | 9.69 | 94.3% | 20.27 | 10.37 | 200.2 | 25.4 | 96.8% | 77.0% | 74.6% |
| 110 | 4.21 | 0.44 | 9.77 | 92.4% | 20.27 | 10.28 | 198.8 | 25.0 | 96.6% | 77.2% | 74.6% |
| 120 | 3.75 | 0.41 | 9.54 | 97.4% | 20.28 | 10.54 | 195.0 | 28.1 | 96.8% | 77.5% | 75.0% |
| 130 | 3.35 | 0.44 | 8.36 | 123.2% | 20.36 | 11.78 | 184.7 | 26.1 | 96.2% | 76.7% | 73.7% |
| 140 | 3.00 | 0.79 | 7.07 | 149.9% | 20.42 | 12.96 | 172.0 | 25.4 | 92.0% | 75.6% | 69.6% |
| 150 | 2.78 | 1.07 | 5.38 | 204.5% | 20.51 | 14.60 | 154.7 | 27.6 | 86.8% | 74.0% | 64.2% |
| 160 | 2.55 | 1.15 | 5.25 | 206.9% | 20.52 | 14.69 | 144.5 | 25.6 | 85.7% | 74.6% | 63.9% |
| 170 | 2.41 | 1.20 | 4.46 | 247.0% | 20.57 | 15.51 | 134.7 | 27.6 | 83.2% | 73.9% | 61.5% |
| 180 | 2.29 | 1.25 | 4.24 | 257.8% | 20.58 | 15.71 | 127.2 | 24.8 | 82.0% | 73.8% | 60.5% |
| 190 | 2.20 | 1.25 | 4.29 | 254.6% | 20.57 | 15.66 | 121.6 | 27.2 | 82.2% | 75.1% | 61.7% |
| 200 | 2.08 | 1.33 | 4.20 | 255.2% | 20.57 | 15.71 | 117.8 | 24.4 | 81.0% | 75.0% | 60.7% |
| 210 | 2.00 | 1.25 | 4.17 | 262.4% | 20.58 | 15.79 | 114.5 | 26.0 | 81.8% | 75.6% | 61.8% |
| 220 | 1.91 | 1.26 | 4.16 | 262.4% | 20.58 | 15.79 | 111.6 | 26.1 | 81.6% | 76.0% | 62.1% |
| 230 | 1.82 | 1.39 | 4.27 | 247.0% | 20.57 | 15.60 | 110.4 | 25.3 | 80.5% | 76.3% | 61.4% |
| 240 | 1.71 | 1.03 | 4.98 | 226.8% | 20.54 | 15.05 | 109.6 | 26.8 | 86.4% | 78.5% | 67.8% |
| 250 | 1.62 | 1.07 | 4.40 | 259.1% | 20.58 | 15.64 | 108.5 | 26.0 | 84.6% | 77.2% | 65.3% |
| 260 | 1.54 | 1.23 | 4.15 | 265.1% | 20.58 | 15.82 | 107.5 | 24.9 | 81.9% | 76.4% | 62.6% |
| 270 | 1.44 | 1.22 | 4.26 | 258.4% | 20.58 | 15.71 | 106.6 | 26.5 | 82.4% | 77.1% | 63.5% |
| 280 | 1.36 | 1.20 | 4.09 | 271.3% | 20.59 | 15.90 | 105.5 | 26.2 | 82.1% | 76.7% | 63.0% |
| 290 | 1.28 | 1.20 | 3.96 | 280.7% | 20.60 | 16.04 | 105.4 | 25.0 | 81.7% | 76.2% | 62.3% |
| 300 | 1.21 | 1.22 | 3.69 | 300.1% | 20.62 | 16.32 | 103.2 | 27.2 | 80.5% | 76.1% | 61.2% |
| 310 | 1.14 | 1.34 | 3.53 | 303.3% | 20.62 | 16.42 | 101.9 | 27.2 | 78.3% | 75.7% | 59.3% |
| 320 | 1.06 | 1.32 | 3.72 | 289.7% | 20.61 | 16.23 | 101.8 | 25.5 | 79.4% | 76.0% | 60.3% |
| 330 | 0.99 | 1.35 | 3.59 | 297.6% | 20.61 | 16.35 | 100.8 | 28.1 | 78.5% | 76.2% | 59.8% |
| 340 | 0.92 | 1.32 | 3.71 | 290.5% | 20.61 | 16.24 | 100.2 | 26.9 | 79.3% | 76.5% | 60.7% |
| 350 | 0.83 | 1.29 | 3.73 | 291.3% | 20.61 | 16.23 | 100.4 | 25.2 | 79.8% | 76.3% | 60.8% |
| 360 | 0.78 | 1.37 | 3.60 | 295.2% | 20.61 | 16.33 | 99.3 | 27.9 | 78.3% | 76.4% | 59.8% |
| 370 | 0.69 | 1.40 | 3.57 | 295.2% | 20.61 | 16.34 | 99.3 | 29.5 | 77.8% | 76.6% | 59.6% |
| 380 | 0.64 | 1.61 | 3.28 | 301.7% | 20.62 | 16.53 | 98.9 | 28.1 | 74.1% | 75.3% | 55.8% |
| 390 | 0.55 | 1.44 | 3.34 | 310.9% | 20.62 | 16.56 | 98.8 | 29.6 | 76.3% | 75.8% | 57.9% |
| 400 | 0.48 | 1.56 | 3.16 | 316.2% | 20.63 | 16.69 | 98.0 | 29.0 | 74.0% | 75.2% | 55.6% |
| 410 | 0.41 | 1.50 | 3.33 | 306.7% | 20.62 | 16.54 | 96.7 | 29.5 | 75.6% | 76.1% | 57.5% |
| 420 | 0.33 | 1.62 | 3.01 | 324.3% | 20.63 | 16.81 | 96.7 | 29.7 | 72.6% | 74.9% | 54.3% |
| 430 | 0.25 | 1.75 | 3.01 | 312.7% | 20.63 | 16.74 | 96.2 | 29.8 | 71.2% | 74.9% | 53.3% |
| 440 | 0.17 | 1.87 | 2.85 | 316.2% | 20.63 | 16.84 | 95.9 | 29.9 | 69.0% | 74.3% | 51.2% |
| 450 | 0.11 | 1.90 | 2.43 | 353.6% | 20.65 | 17.27 | 95.3 | 30.0 | 65.8% | 72.3% | 47.6% |
| 460 | 0.05 | 1.66 | 2.46 | 376.8% | 20.67 | 17.38 | 94.2 | 30.2 | 68.6% | 72.9% | 50.0% |
| 470 | 0.00 | 1.78 | 2.49 | 360.0% | 20.66 | 17.28 | 93.2 | 30.1 | 67.5% | 73.2% | 49.4% |

| Air Fuel Ratio (A/F) | |
|---|---|
| Dry Molecular Weight ($M_d$) | 29.39 |
| Dry Moles Exhaust Gas ($N_r$): | 575.98 |
| Air Fuel Ratio (A/F) | 16.42 |

%HC
1.32

| | | |
|---|---|---|
| Combustion Efficiency: | 89.61% | |
| Total Input (kJ): | 163,827 | 155,382 |
| Total Output (kJ): | 109,923 | 104,256 |
| Efficiency: | 67.10% | |
| Total CO (g): | 1230.00 | |

14,033 kJ/h
20,914 kJ/h

1.056 kg/h

129.9 Deg. C

| 20.81 | 2.83 | 71.48 | 2.36 | 71.46 | 164341 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.90 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Air | Wet Wt | % Wet | Dry Wt. | % Dry | | Fuel Properties | | | | Mw | |
| Fuel Ratio | Now Wt | Consumed x | Now $Wt_{dp}$ | Comsumed y | Total Input | Carbon /12= [a] | Hydrogen /1= [b] | Oxygen /16= [c] | Calorific Value | Moisture Fuel Burnt | [h] |
| 31.0 | 9.94 | 0.00 | 8.27 | 0.00 | 0 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.74 |
| 57.0 | 9.60 | 3.43 | 7.99 | 3.43 | 9215 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.91 |
| 19.2 | 9.16 | 7.82 | 7.62 | 7.82 | 7667 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.14 |
| 20.5 | 8.67 | 12.79 | 7.21 | 12.79 | 8116 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.03 |
| 15.1 | 8.18 | 17.72 | 6.80 | 17.72 | 8714 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.25 |
| 11.9 | 7.61 | 23.43 | 6.33 | 23.43 | 10472 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.49 |
| 10.4 | 6.91 | 30.51 | 5.75 | 30.51 | 10771 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.43 |
| 13.8 | 6.30 | 36.58 | 5.24 | 36.58 | 9200 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.41 |
| 12.5 | 5.79 | 41.74 | 4.82 | 41.74 | 8490 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.43 |
| 12.4 | 5.27 | 46.95 | 4.39 | 46.95 | 8639 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.50 |
| 11.7 | 4.74 | 52.29 | 3.95 | 52.29 | 8789 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.52 |
| 11.5 | 4.21 | 57.68 | 3.50 | 57.68 | 8191 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.51 |
| 11.8 | 3.75 | 62.29 | 3.12 | 62.29 | 7069 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.51 |
| 13.4 | 3.35 | 66.30 | 2.79 | 66.30 | 6134 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.42 |
| 14.8 | 3.00 | 69.77 | 2.50 | 69.77 | 4675 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 79.18 |
| 17.9 | 2.78 | 72.01 | 2.31 | 72.01 | 3777 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.95 |
| 18.0 | 2.55 | 74.39 | 2.12 | 74.39 | 3067 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.91 |
| 20.2 | 2.41 | 75.76 | 2.00 | 75.76 | 2132 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.83 |
| 20.8 | 2.29 | 76.99 | 1.90 | 76.99 | 1758 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.80 |
| 20.6 | 2.20 | 77.90 | 1.83 | 77.90 | 1683 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.80 |
| 20.6 | 2.08 | 79.04 | 1.73 | 79.04 | 1608 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.76 |
| 21.0 | 2.00 | 79.86 | 1.67 | 79.86 | 1459 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.79 |
| 21.0 | 1.91 | 80.82 | 1.59 | 80.82 | 1459 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.79 |
| 20.1 | 1.82 | 81.65 | 1.52 | 81.65 | 1608 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.74 |
| 19.2 | 1.71 | 82.79 | 1.42 | 82.79 | 1720 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.94 |
| 21.0 | 1.62 | 83.75 | 1.34 | 83.75 | 1421 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.89 |
| 21.2 | 1.54 | 84.52 | 1.28 | 84.52 | 1421 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.80 |
| 20.8 | 1.44 | 85.48 | 1.20 | 85.48 | 1459 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.81 |
| 21.6 | 1.36 | 86.30 | 1.13 | 86.30 | 1309 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.81 |
| 22.1 | 1.28 | 87.08 | 1.07 | 87.08 | 1234 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.80 |
| 23.2 | 1.21 | 87.81 | 1.01 | 87.81 | 1197 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.77 |
| 23.3 | 1.14 | 88.54 | 0.95 | 88.54 | 1272 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.71 |
| 22.5 | 1.06 | 89.36 | 0.88 | 89.36 | 1197 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.73 |
| 22.9 | 0.99 | 90.00 | 0.83 | 90.00 | 1122 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.71 |
| 22.6 | 0.92 | 90.73 | 0.77 | 90.73 | 1346 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.73 |
| 22.6 | 0.83 | 91.64 | 0.69 | 91.64 | 1197 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.75 |
| 22.8 | 0.78 | 92.19 | 0.65 | 92.19 | 1122 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.70 |
| 22.8 | 0.69 | 93.01 | 0.58 | 93.01 | 1159 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.69 |
| 23.0 | 0.64 | 93.61 | 0.53 | 93.61 | 1159 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.58 |
| 23.6 | 0.55 | 94.43 | 0.46 | 94.43 | 1272 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.66 |
| 23.8 | 0.48 | 95.16 | 0.40 | 95.16 | 1197 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.59 |
| 23.3 | 0.41 | 95.89 | 0.34 | 95.89 | 1234 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.63 |
| 24.2 | 0.33 | 96.67 | 0.28 | 96.67 | 1346 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.56 |
| 23.4 | 0.25 | 97.53 | 0.20 | 97.53 | 1103 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.50 |
| 23.5 | 0.17 | 98.26 | 0.16 | 98.01 | 949 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.44 |
| 25.5 | 0.11 | 98.86 | 0.11 | 98.69 | 1113 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.40 |
| 27.0 | 0.05 | 99.45 | 0.05 | 99.37 | 1585 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.50 |
| 26.0 | 0.00 | 100.00 | 0.00 | 100.00 | 514 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.78 | 78.45 |

Moisture Content $M_{Cwb}$: 16.78

| | | | | |
|---|---|---|---|---|
| | Moisture of Wood (wet basis): | 16.78 | Dry kg : | 8.27 |
| (Btu) | Initial Dry Weight $Wt_{do}$ (kg): | 8.27 | CA: | 48.73 |
| (Btu) | Moisture Content Dry | 20.16 | HY: | 6.87 |
| | | | OX: | 43.9 |

| | | | | | |
|---|---|---|---|---|---|
| Load Weight (kg): | **9.94** | | | | |
| Fuel Heating | **HHV** | **LHV** | | **HHV** | **LHV** |
| Value in kJ/kg - CV: | **19,810** | **18,329** | Btu/lb | **8522.5** | **7885.2** |

| **20.93** | **1.53** | **4.96** | **0.14** | **0.15** | **31.14** | **113.44** | **8.60** | **1.07** | **570.31** | **32.38** | **11.20** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mass Balance** | | | | **kg Wood pe** | | | | | | | |
| **(moles/100 mole dry flue gas)** | | | | **00 mole df** | **Moles per kg of Dry Wood** | | | | | | **Moisture** |
| **[u]** | **[w]** | **[j]** | **[k]** | **Nk** | **$CO_2$** | **$O_2$** | **CO** | **HC** | **$N_2$** | **$H_2O$** | **Present** |
| 20.88 | 0.93 | 2.93 | 0.14 | 0.09 | 27.16 | 189.86 | 12.18 | 1.47 | 848.67 | 31.58 | 11.20 |
| 20.93 | 0.51 | 1.64 | 0.05 | 0.05 | 28.71 | 377.78 | 11.09 | 1.01 | 1562.70 | 32.51 | 11.20 |
| 20.99 | 1.51 | 5.04 | 0.07 | 0.15 | 36.01 | 98.55 | 4.33 | 0.47 | 526.79 | 33.58 | 11.20 |
| 20.96 | 1.42 | 4.68 | 0.09 | 0.14 | 34.40 | 108.61 | 5.75 | 0.66 | 560.60 | 33.20 | 11.20 |
| 21.02 | 1.92 | 6.46 | 0.07 | 0.19 | 37.09 | 67.96 | 3.34 | 0.38 | 414.01 | 33.77 | 11.20 |
| 21.09 | 2.45 | 8.31 | 0.05 | 0.24 | 38.81 | 43.60 | 1.81 | 0.19 | 326.49 | 34.14 | 11.20 |
| 21.07 | 2.79 | 9.40 | 0.09 | 0.28 | 37.77 | 33.61 | 2.70 | 0.34 | 286.00 | 33.84 | 11.20 |
| 21.06 | 2.12 | 7.18 | 0.04 | 0.21 | 38.62 | 57.17 | 2.00 | 0.20 | 377.23 | 34.12 | 11.20 |
| 21.07 | 2.34 | 7.91 | 0.06 | 0.23 | 38.38 | 47.94 | 2.19 | 0.24 | 341.71 | 34.04 | 11.20 |
| 21.09 | 2.35 | 7.99 | 0.04 | 0.23 | 39.07 | 47.07 | 1.58 | 0.16 | 340.25 | 34.21 | 11.20 |
| 21.09 | 2.50 | 8.50 | 0.04 | 0.25 | 38.95 | 41.69 | 1.69 | 0.18 | 319.59 | 34.16 | 11.20 |
| 21.09 | 2.53 | 8.58 | 0.05 | 0.25 | 38.87 | 40.88 | 1.75 | 0.19 | 316.37 | 34.14 | 11.20 |
| 21.09 | 2.46 | 8.37 | 0.04 | 0.24 | 38.96 | 43.04 | 1.67 | 0.17 | 324.74 | 34.17 | 11.20 |
| 21.07 | 2.18 | 7.39 | 0.05 | 0.22 | 38.57 | 54.35 | 2.03 | 0.21 | 366.46 | 34.11 | 11.20 |
| 21.00 | 1.96 | 6.54 | 0.09 | 0.19 | 36.28 | 66.48 | 4.05 | 0.48 | 406.28 | 33.55 | 11.20 |
| 20.94 | 1.62 | 5.30 | 0.13 | 0.16 | 33.36 | 90.52 | 6.63 | 0.82 | 489.51 | 32.88 | 11.20 |
| 20.93 | 1.61 | 5.25 | 0.14 | 0.16 | 32.74 | 91.63 | 7.17 | 0.90 | 492.12 | 32.73 | 11.20 |
| 20.91 | 1.43 | 4.61 | 0.15 | 0.14 | 31.33 | 108.92 | 8.43 | 1.05 | 553.77 | 32.42 | 11.20 |
| 20.90 | 1.39 | 4.46 | 0.16 | 0.14 | 30.64 | 113.56 | 9.03 | 1.13 | 569.50 | 32.25 | 11.20 |
| 20.90 | 1.40 | 4.50 | 0.16 | 0.14 | 30.73 | 112.18 | 8.95 | 1.12 | 564.51 | 32.27 | 11.20 |
| 20.89 | 1.40 | 4.48 | 0.17 | 0.14 | 30.08 | 112.51 | 9.53 | 1.21 | 564.07 | 32.11 | 11.20 |
| 20.90 | 1.37 | 4.40 | 0.16 | 0.14 | 30.52 | 115.53 | 9.15 | 1.15 | 576.62 | 32.23 | 11.20 |
| 20.90 | 1.37 | 4.40 | 0.16 | 0.14 | 30.44 | 115.54 | 9.22 | 1.16 | 576.44 | 32.21 | 11.20 |
| 20.89 | 1.44 | 4.58 | 0.18 | 0.14 | 29.85 | 109.07 | 9.72 | 1.24 | 550.49 | 32.04 | 11.20 |
| 20.94 | 1.51 | 4.94 | 0.13 | 0.15 | 33.12 | 100.09 | 6.85 | 0.84 | 525.07 | 32.85 | 11.20 |
| 20.92 | 1.38 | 4.48 | 0.13 | 0.14 | 32.06 | 113.99 | 7.80 | 0.95 | 574.83 | 32.62 | 11.20 |
| 20.90 | 1.36 | 4.37 | 0.15 | 0.14 | 30.61 | 116.67 | 9.07 | 1.13 | 581.16 | 32.25 | 11.20 |
| 20.90 | 1.39 | 4.46 | 0.15 | 0.14 | 30.87 | 113.82 | 8.84 | 1.11 | 571.05 | 32.31 | 11.20 |
| 20.90 | 1.34 | 4.30 | 0.15 | 0.13 | 30.69 | 119.31 | 9.00 | 1.12 | 591.32 | 32.28 | 11.20 |
| 20.90 | 1.31 | 4.19 | 0.15 | 0.13 | 30.44 | 123.30 | 9.22 | 1.15 | 605.76 | 32.23 | 11.20 |
| 20.90 | 1.25 | 3.98 | 0.15 | 0.12 | 29.75 | 131.56 | 9.84 | 1.22 | 635.17 | 32.08 | 11.20 |
| 20.88 | 1.24 | 3.92 | 0.17 | 0.12 | 28.59 | 132.98 | 10.85 | 1.37 | 637.52 | 31.79 | 11.20 |
| 20.88 | 1.28 | 4.07 | 0.17 | 0.13 | 29.16 | 127.21 | 10.35 | 1.30 | 617.19 | 31.92 | 11.20 |
| 20.88 | 1.26 | 3.98 | 0.17 | 0.13 | 28.67 | 130.56 | 10.78 | 1.36 | 628.59 | 31.80 | 11.20 |
| 20.88 | 1.28 | 4.06 | 0.17 | 0.13 | 29.14 | 127.53 | 10.37 | 1.31 | 618.37 | 31.91 | 11.20 |
| 20.89 | 1.28 | 4.06 | 0.16 | 0.13 | 29.38 | 127.85 | 10.16 | 1.28 | 620.20 | 31.97 | 11.20 |
| 20.88 | 1.27 | 4.00 | 0.17 | 0.13 | 28.57 | 129.55 | 10.87 | 1.38 | 624.50 | 31.77 | 11.20 |
| 20.87 | 1.27 | 4.00 | 0.18 | 0.13 | 28.30 | 129.56 | 11.10 | 1.41 | 623.85 | 31.70 | 11.20 |
| 20.84 | 1.26 | 3.90 | 0.21 | 0.12 | 26.26 | 132.35 | 12.89 | 1.67 | 629.05 | 31.19 | 11.20 |
| 20.86 | 1.22 | 3.83 | 0.18 | 0.12 | 27.46 | 136.21 | 11.84 | 1.51 | 646.78 | 31.51 | 11.20 |
| 20.85 | 1.21 | 3.76 | 0.20 | 0.12 | 26.21 | 138.42 | 12.94 | 1.66 | 651.86 | 31.20 | 11.20 |
| 20.86 | 1.24 | 3.86 | 0.19 | 0.12 | 27.06 | 134.42 | 12.19 | 1.56 | 638.99 | 31.40 | 11.20 |
| 20.84 | 1.19 | 3.68 | 0.21 | 0.12 | 25.39 | 141.81 | 13.66 | 1.76 | 662.53 | 31.00 | 11.20 |
| 20.82 | 1.23 | 3.76 | 0.23 | 0.12 | 24.63 | 136.97 | 14.32 | 1.87 | 642.27 | 30.79 | 11.20 |
| 20.81 | 1.22 | 3.71 | 0.25 | 0.12 | 23.42 | 138.44 | 15.37 | 2.02 | 644.69 | 30.49 | 11.20 |
| 20.79 | 1.13 | 3.38 | 0.25 | 0.11 | 21.66 | 153.96 | 16.93 | 2.22 | 698.71 | 30.08 | 11.20 |
| 20.82 | 1.07 | 3.24 | 0.21 | 0.11 | 23.17 | 163.64 | 15.63 | 2.02 | 739.23 | 30.49 | 11.20 |
| 20.81 | 1.11 | 3.34 | 0.23 | 0.11 | 22.57 | 156.64 | 16.14 | 2.10 | 711.25 | 30.32 | 11.20 |

| | | | | | | | | | | | SUMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 403.03 | 4090.29 | 3072.91 | 2986.87 | 2954.04 | 3949.21 | 3573.85 | 300.64 | 6455.46 | 14723.32 | 117898.91 | 74235.49 |
| Stack Temp K | Heat Content Change - Ambient to Stack Temperature Flue Gas Constituent | | | | | | Room Temp K | Energy Losses (kJ/kg Flue Gas Consti | | | |
| | $CO_2$ | $O_2$ | CO | $N_2$ | $CH_4$ | $H_2O$ | | $CO_2$ | $O_2$ | CO | $N_2$ |
| 404.09 | 4100.07 | 3088.68 | 3004.27 | 2970.81 | 3940.20 | 3595.33 | 300.98 | 111.37 | 586.41 | 3483.03 | 2521.25 |
| 391.15 | 3498.65 | 2641.92 | 2571.27 | 2542.31 | 3348.41 | 3077.64 | 302.81 | 100.46 | 998.08 | 3166.79 | 3972.86 |
| 428.32 | 4999.63 | 3744.70 | 3637.05 | 3597.66 | 4852.05 | 4350.92 | 303.81 | 180.05 | 369.05 | 1240.23 | 1895.20 |
| 428.71 | 5015.73 | 3756.45 | 3648.39 | 3608.89 | 4868.37 | 4364.45 | 303.82 | 172.56 | 407.99 | 1646.98 | 2023.13 |
| 445.43 | 5743.81 | 4287.14 | 4160.20 | 4115.92 | 5607.03 | 4975.57 | 303.24 | 213.04 | 291.35 | 960.07 | 1704.05 |
| 467.37 | 6640.32 | 4932.52 | 4780.59 | 4730.95 | 6534.20 | 5715.68 | 304.34 | 257.72 | 215.08 | 520.04 | 1544.58 |
| 486.37 | 7642.63 | 5660.27 | 5481.74 | 5425.70 | 7557.27 | 6552.64 | 299.68 | 288.68 | 190.22 | 779.05 | 1551.75 |
| 471.93 | 7046.45 | 5235.20 | 5074.19 | 5021.45 | 6931.66 | 6066.79 | 298.87 | 272.12 | 299.30 | 574.71 | 1894.24 |
| 469.48 | 6873.11 | 5107.13 | 4950.24 | 4898.75 | 6759.59 | 5918.65 | 300.64 | 263.76 | 244.82 | 631.78 | 1673.97 |
| 470.87 | 6974.72 | 5182.31 | 5023.03 | 4970.80 | 6860.23 | 6005.65 | 299.55 | 272.53 | 243.92 | 456.07 | 1691.30 |
| 473.32 | 7120.52 | 5289.11 | 5126.16 | 5072.94 | 7006.98 | 6128.84 | 298.50 | 277.31 | 220.49 | 486.36 | 1621.27 |
| 471.98 | 7076.01 | 5257.88 | 5096.35 | 5043.34 | 6959.18 | 6093.34 | 298.16 | 275.06 | 214.97 | 504.34 | 1595.54 |
| 468.15 | 6792.43 | 5047.94 | 4893.05 | 4842.12 | 6678.57 | 5850.34 | 301.24 | 264.65 | 217.26 | 482.07 | 1572.43 |
| 457.82 | 6423.23 | 4785.79 | 4641.99 | 4593.03 | 6288.79 | 5551.13 | 299.29 | 247.77 | 260.10 | 583.96 | 1683.14 |
| 445.15 | 5912.30 | 4417.51 | 4287.86 | 4241.99 | 5761.37 | 5128.62 | 298.53 | 214.47 | 293.66 | 1164.46 | 1723.44 |
| 427.87 | 5098.03 | 3821.23 | 3712.08 | 3671.73 | 4941.35 | 4440.90 | 300.76 | 170.05 | 345.89 | 1902.05 | 1797.34 |
| 417.65 | 4747.63 | 3567.85 | 3468.23 | 3430.05 | 4581.44 | 4149.89 | 298.74 | 155.45 | 326.93 | 2054.53 | 1687.98 |
| 407.87 | 4266.14 | 3211.36 | 3123.00 | 3088.35 | 4105.09 | 3737.23 | 300.72 | 133.66 | 349.80 | 2411.80 | 1710.24 |
| 400.32 | 4062.27 | 3064.71 | 2982.07 | 2948.62 | 3893.99 | 3569.11 | 297.90 | 124.48 | 348.03 | 2583.56 | 1679.23 |
| 394.76 | 3742.40 | 2825.31 | 2749.59 | 2718.66 | 3583.17 | 3291.02 | 300.30 | 115.01 | 316.94 | 2558.76 | 1534.72 |
| 390.98 | 3693.47 | 2792.32 | 2718.45 | 2687.66 | 3527.69 | 3254.05 | 297.53 | 111.10 | 314.17 | 2721.47 | 1516.02 |
| 387.65 | 3494.56 | 2642.91 | 2573.23 | 2544.03 | 3335.60 | 3080.29 | 299.18 | 106.64 | 305.35 | 2612.30 | 1466.95 |
| 384.76 | 3372.41 | 2552.06 | 2485.14 | 2456.87 | 3215.65 | 2974.97 | 299.29 | 102.64 | 294.87 | 2631.70 | 1416.24 |
| 383.59 | 3357.85 | 2542.15 | 2475.78 | 2447.55 | 3199.31 | 2963.84 | 298.43 | 100.24 | 277.28 | 2774.20 | 1347.36 |
| 382.76 | 3265.59 | 2471.93 | 2407.30 | 2379.87 | 3112.22 | 2881.83 | 299.96 | 108.17 | 247.42 | 1955.25 | 1249.61 |
| 381.65 | 3249.97 | 2461.12 | 2397.01 | 2369.65 | 3095.14 | 2869.60 | 299.19 | 104.20 | 280.55 | 2225.18 | 1362.16 |
| 380.65 | 3252.46 | 2464.14 | 2400.23 | 2372.78 | 3095.01 | 2873.54 | 298.06 | 99.55 | 287.50 | 2588.89 | 1378.95 |
| 379.76 | 3155.69 | 2390.46 | 2328.38 | 2301.77 | 3003.73 | 2787.49 | 299.65 | 97.41 | 272.08 | 2522.20 | 1314.43 |
| 378.65 | 3122.97 | 2366.41 | 2305.13 | 2278.75 | 2970.96 | 2759.72 | 299.33 | 95.84 | 282.33 | 2568.77 | 1347.47 |
| 378.54 | 3162.19 | 2396.79 | 2334.88 | 2308.12 | 3006.84 | 2795.38 | 298.18 | 96.26 | 295.52 | 2632.06 | 1398.16 |
| 376.37 | 2990.39 | 2266.55 | 2208.00 | 2182.70 | 2843.52 | 2643.48 | 300.38 | 88.97 | 298.18 | 2805.54 | 1386.38 |
| 375.09 | 2940.42 | 2229.32 | 2171.89 | 2146.97 | 2794.60 | 2600.30 | 300.34 | 84.07 | 296.46 | 3094.97 | 1368.73 |
| 374.98 | 3002.18 | 2277.06 | 2218.63 | 2193.12 | 2851.30 | 2656.32 | 298.61 | 87.55 | 289.66 | 2951.23 | 1353.57 |
| 373.93 | 2858.64 | 2167.44 | 2111.63 | 2087.40 | 2716.60 | 2528.16 | 301.24 | 81.96 | 282.98 | 3073.75 | 1312.11 |
| 373.37 | 2880.84 | 2185.09 | 2129.03 | 2104.55 | 2735.91 | 2549.06 | 300.08 | 83.94 | 278.67 | 2955.99 | 1301.40 |
| 373.59 | 2954.99 | 2242.06 | 2184.72 | 2159.56 | 2804.74 | 2615.79 | 298.37 | 86.81 | 286.66 | 2897.39 | 1339.36 |
| 372.48 | 2807.56 | 2129.47 | 2074.83 | 2050.98 | 2666.41 | 2484.16 | 301.06 | 80.20 | 275.88 | 3098.90 | 1280.83 |
| 372.43 | 2744.26 | 2080.76 | 2027.20 | 2003.93 | 2607.82 | 2427.08 | 302.65 | 77.67 | 269.58 | 3163.56 | 1250.15 |
| 372.09 | 2785.92 | 2113.17 | 2058.97 | 2035.29 | 2645.62 | 2465.17 | 301.21 | 73.15 | 279.67 | 3673.96 | 1280.30 |
| 371.98 | 2723.57 | 2065.24 | 2012.12 | 1989.01 | 2587.79 | 2409.03 | 302.72 | 74.80 | 281.30 | 3374.74 | 1286.45 |
| 371.15 | 2713.39 | 2058.16 | 2005.38 | 1982.32 | 2576.69 | 2401.02 | 302.11 | 71.12 | 284.89 | 3687.61 | 1292.20 |
| 369.87 | 2642.76 | 2004.93 | 1953.60 | 1931.11 | 2508.88 | 2339.04 | 302.61 | 71.52 | 269.51 | 3473.49 | 1233.96 |
| 369.87 | 2634.88 | 1998.87 | 1947.66 | 1925.25 | 2501.59 | 2331.93 | 302.82 | 66.89 | 283.46 | 3893.12 | 1275.54 |
| 369.37 | 2607.94 | 1978.57 | 1927.92 | 1905.73 | 2475.71 | 2308.30 | 302.99 | 64.23 | 271.00 | 4079.57 | 1223.99 |
| 369.04 | 2590.90 | 1965.74 | 1915.45 | 1893.40 | 2459.31 | 2293.38 | 303.09 | 60.69 | 272.14 | 4379.02 | 1220.65 |
| 368.43 | 2565.04 | 1946.37 | 1896.63 | 1874.78 | 2434.23 | 2270.86 | 303.12 | 55.55 | 299.66 | 4824.32 | 1309.93 |
| 367.32 | 2510.35 | 1905.22 | 1856.62 | 1835.22 | 2381.56 | 2222.99 | 303.38 | 58.15 | 311.78 | 4452.72 | 1356.66 |
| 366.37 | 2476.88 | 1880.25 | 1832.40 | 1811.25 | 2348.84 | 2194.02 | 303.27 | 55.91 | 294.53 | 4596.39 | 1288.25 |

| | | | AVERAGE | SUMS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 45956.85 | 73958.17 | 25563.58 | 7474.83 | 53903.98 | 17024.02 | 36880.0 | 110436.8 | 17024.0 | 1230.0 | 82.5 |
| of Dry Fuel) | | | Total | | | | | | | |
| tuent | | | Loss | Total | Chemical | Sensible an | Total | Chem | Grams Produced | |
| $CH_4$ | $H_2O$ Comb | $H_2O$ Fuel M | Rate | Loss | Loss 1 | Latent Loss | Output | Loss 2 | CO | HC |
| 1314.32 | 1502.21 | 532.82 | 10051.40 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0.00 |
| 901.29 | 1529.26 | 527.02 | 11195.75 | 5208.11 | 1878 | 3330.53 | 4007 | 1878 | 144.44 | 7.51 |
| 422.60 | 1622.50 | 541.28 | 6270.91 | 2427.00 | 637 | 1790.43 | 5240 | 637 | 46.89 | 2.92 |
| 593.23 | 1604.52 | 541.43 | 6989.85 | 2863.61 | 908 | 1955.75 | 5252 | 908 | 65.91 | 4.34 |
| 338.62 | 1652.69 | 548.28 | 5708.10 | 2510.93 | 564 | 1946.70 | 6203 | 564 | 41.18 | 2.66 |
| 173.30 | 1696.04 | 556.57 | 4963.34 | 2623.72 | 361 | 2262.44 | 7848 | 361 | 26.75 | 1.63 |
| 304.86 | 1709.83 | 565.94 | 5390.32 | 2930.85 | 580 | 2350.95 | 7840 | 580 | 41.11 | 2.95 |
| 178.37 | 1707.47 | 560.50 | 5486.71 | 2548.20 | 344 | 2203.78 | 6652 | 344 | 25.94 | 1.48 |
| 217.69 | 1698.04 | 558.84 | 5288.89 | 2266.61 | 359 | 1907.92 | 6223 | 359 | 26.33 | 1.66 |
| 139.13 | 1709.75 | 559.82 | 5072.51 | 2212.18 | 256 | 1956.54 | 6427 | 256 | 19.34 | 1.08 |
| 160.58 | 1711.57 | 561.20 | 5038.78 | 2235.53 | 283 | 1952.90 | 6553 | 283 | 20.97 | 1.27 |
| 169.92 | 1709.32 | 560.80 | 5029.96 | 2079.67 | 275 | 1805.12 | 6111 | 275 | 20.27 | 1.25 |
| 156.81 | 1702.47 | 558.08 | 4953.77 | 1767.60 | 225 | 1542.98 | 5301 | 225 | 16.73 | 1.00 |
| 186.91 | 1688.91 | 554.72 | 5205.51 | 1611.73 | 235 | 1376.38 | 4522 | 235 | 17.60 | 1.03 |
| 433.54 | 1647.46 | 549.99 | 6027.01 | 1422.32 | 372 | 1049.97 | 3253 | 372 | 26.78 | 1.83 |
| 735.25 | 1591.71 | 542.29 | 7084.57 | 1350.89 | 497 | 853.48 | 2426 | 497 | 35.42 | 2.51 |
| 803.52 | 1574.76 | 539.03 | 7142.19 | 1105.69 | 438 | 667.72 | 1961 | 438 | 31.09 | 2.22 |
| 942.11 | 1546.43 | 534.40 | 7628.42 | 820.91 | 358 | 463.29 | 1311 | 358 | 25.40 | 1.81 |
| 1014.03 | 1533.30 | 532.52 | 7815.16 | 693.46 | 316 | 377.02 | 1064 | 316 | 22.45 | 1.61 |
| 1005.32 | 1525.22 | 529.41 | 7585.38 | 644.43 | 300 | 344.07 | 1039 | 300 | 21.30 | 1.53 |
| 1079.09 | 1516.22 | 528.99 | 7787.06 | 632.16 | 306 | 326.08 | 976 | 306 | 21.65 | 1.57 |
| 1025.35 | 1516.28 | 527.05 | 7559.92 | 556.63 | 266 | 290.81 | 902 | 266 | 18.86 | 1.35 |
| 1034.43 | 1511.92 | 525.87 | 7517.65 | 553.52 | 268 | 285.55 | 905 | 268 | 19.01 | 1.36 |
| 1108.74 | 1503.75 | 525.74 | 7637.32 | 620.01 | 313 | 307.06 | 988 | 313 | 22.09 | 1.61 |
| 748.22 | 1538.93 | 524.82 | 6372.41 | 553.41 | 233 | 320.29 | 1167 | 233 | 16.66 | 1.16 |
| 851.40 | 1527.70 | 524.69 | 6875.88 | 493.29 | 219 | 274.12 | 928 | 219 | 15.66 | 1.09 |
| 1013.49 | 1510.83 | 524.73 | 7403.94 | 531.17 | 257 | 274.54 | 890 | 257 | 18.22 | 1.30 |
| 987.35 | 1510.78 | 523.77 | 7228.02 | 532.19 | 257 | 275.55 | 926 | 257 | 18.22 | 1.30 |
| 1000.77 | 1508.48 | 523.45 | 7327.11 | 484.16 | 234 | 249.88 | 825 | 234 | 16.66 | 1.18 |
| 1023.83 | 1507.22 | 523.85 | 7476.90 | 465.82 | 226 | 239.61 | 768 | 226 | 16.09 | 1.14 |
| 1091.49 | 1495.24 | 522.15 | 7687.96 | 464.46 | 234 | 230.55 | 732 | 234 | 16.64 | 1.18 |
| 1221.66 | 1480.27 | 521.67 | 8067.82 | 517.87 | 275 | 242.55 | 754 | 275 | 19.51 | 1.41 |
| 1164.20 | 1488.06 | 522.30 | 7856.56 | 474.64 | 247 | 227.63 | 722 | 247 | 17.50 | 1.26 |
| 1215.64 | 1478.59 | 520.86 | 7965.89 | 451.17 | 241 | 209.73 | 671 | 241 | 17.10 | 1.23 |
| 1166.17 | 1484.41 | 521.09 | 7791.70 | 529.57 | 278 | 251.14 | 817 | 278 | 19.73 | 1.42 |
| 1138.79 | 1489.41 | 521.84 | 7760.26 | 468.83 | 242 | 226.54 | 728 | 242 | 17.19 | 1.23 |
| 1228.69 | 1475.83 | 520.37 | 7960.69 | 450.88 | 244 | 207.26 | 671 | 244 | 17.24 | 1.25 |
| 1258.35 | 1470.92 | 519.73 | 8009.97 | 468.79 | 257 | 211.53 | 691 | 257 | 18.19 | 1.32 |
| 1487.27 | 1448.32 | 520.16 | 8762.83 | 512.85 | 300 | 212.60 | 647 | 300 | 21.12 | 1.56 |
| 1345.28 | 1461.32 | 519.53 | 8343.41 | 535.56 | 301 | 234.36 | 736 | 301 | 21.28 | 1.55 |
| 1484.98 | 1446.55 | 519.44 | 8786.79 | 530.84 | 311 | 220.17 | 666 | 311 | 21.89 | 1.61 |
| 1393.13 | 1454.13 | 518.74 | 8414.50 | 524.24 | 301 | 222.77 | 710 | 301 | 21.26 | 1.56 |
| 1574.17 | 1435.13 | 518.66 | 9046.97 | 614.88 | 369 | 245.40 | 732 | 369 | 26.00 | 1.92 |
| 1666.35 | 1424.83 | 518.40 | 9248.37 | 514.99 | 318 | 196.83 | 588 | 318 | 22.32 | 1.66 |
| 1801.05 | 1410.41 | 518.23 | 9662.19 | 462.74 | 294.33 | 168.41 | 486 | 294 | 20.61 | 1.55 |
| 1982.22 | 1390.95 | 517.98 | 10380.60 | 583.16 | 380.27 | 202.89 | 530 | 380 | 26.64 | 2.00 |
| 1798.77 | 1408.48 | 517.44 | 9904.00 | 792.45 | 497.50 | 294.96 | 793 | 497 | 35.02 | 2.58 |
| 1874.56 | 1399.75 | 517.12 | 10026.52 | 260.26 | 167.07 | 93.19 | 254 | 167 | 11.73 | 0.87 |

# Intertek Testing Services NA Ltd

| | |
|---|---|
| **Manufacturer:** | SBI |
| **Model:** | NG1800 |
| **Date:** | 12/05/13 |
| **Run:** | 4 |
| **Control #:** | G101440749 |
| **Test Duration:** | 470 |
| **Output Category:** | 2 |

**Technicians:**

_____

_____

_____

**Test Results in Accordance with CSA B415.1-10**

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 67.1% | 72.5% |
| **Combustion Efficiency** | 89.6% | 89.6% |
| **Heat Transfer Efficiency** | 75% | 80.9% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 14,033 | 13,312 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 1.06 | 2.33 | **(lb/h)** |
| **Input (kJ/h)** | 20,914 | 19,839 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 8.27 | 18.23 | **dry lb** |
| **MC wet (%)** | 16.78 | | |
| **MC dry (%)** | 20.16 | | |
| **Particulate (g )** | 25.4805 | | |
| **CO (g)** | 1,230 | | |
| **Test Duration (h)** | 7.83 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | 0.23 | 11.19 |
| **g/kg Dry Fuel** | 3.08 | 148.73 |
| **g/h** | 3.25 | 157.02 |
| **lb/MM Btu Output** | 0.54 | 26.01 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 16.42 |

**Version: 2.4** **15/04/2010**

**TEST FUEL DATA**
**EPA Method 5G-3**

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 5, 2013 |
| Test Run Number: | 4 |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

**PRE-BURN FUEL PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:00 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 16 | 1.804 | 21.9 | 21.7 | 21.4 |
| 2 | 16 | 1.588 | 21.0 | 20.5 | 21.0 |
| 3 | 16 | 1.586 | 21.7 | 21.1 | 21.7 |
| 4 | 16 | 1.634 | 22.2 | 21.6 | 22.2 |
| 5 | 16 | 1.841 | 21.2 | 20.9 | 21.6 |
| 6 | 16 | 1.815 | 21.9 | 20.8 | 21.2 |
| 7 | 16 | 1.623 | 20.6 | 22.2 | 21.2 |
| 8 | 16 | 1.683 | 22.3 | 21.2 | 21.9 |
| 9 | 17 | 2.006 | 21.5 | 20.2 | 22.3 |
| 10 | 17 | 1.70 | 22.1 | 20.4 | 21.7 |
| 11 | 17 | 1.66 | 21.2 | 19.8 | 20.2 |
| 12 | 17 | 1.64 | 21.9 | 22.0 | 21.5 |
| Total Weight | | **20.578** | Average, %db | | **21.4** |

| Allowable Fuel Load Range: | **4.38** | to | **5.48** |
|---|---|---|---|

**TEST FUEL LOAD PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. 2x4 | Weight, Lb. 4x4 | Moisture, %, Dry Basis | |
| 1 | 15 | 1.560 | | 19.2 | 19.4 | 19.3 |
| 2 | 15 | 1.511 | | 18.7 | 20.2 | 18.6 |
| 3 | 15 | 1.834 | | 19.8 | 19.3 | 19.7 |
| 4 | 15 | | 3.623 | 22.2 | 20.4 | 20.4 |
| 5 | 15 | | 3.435 | 21.1 | 19.7 | 19.2 |
| 6 | 15 | | 3.747 | 21.9 | 21.7 | 23.8 |
| 7 | 15 | 2.095 | | 20.1 | 21.2 | 19.9 |
| 8 | 15 | 2.001 | | 19.5 | 19.8 | 19.2 |
| 9 | 15 | 2.097 | | 19.5 | 20.4 | 20.5 |
| Totals | | 11.098 | 10.805 | | | |
| % of Weight | | 50.7 | 49.3 | | | |
| Total weight, wet, lb. | | **21.903** | | Average Moisture, dry | | **20.17** |
| Total weight, dry, kg | | 8.27 | | Average Moisture, wet | | 16.79 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 6, 2013 |
| Test Run Number: | 5 |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **1.45** | |
| Emission-Rate, g/hr: | **2.64** | |
| Adjusted Emission-Rate, g/hr : | **4.07** | |
| Duration of Test, Minutes | 350 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 1150.623 | 1121.906 |
| Dry Gas Meter Ending Reading, $ft^3$ | 1206.095 | 1176.258 |
| Barometric Pressure Correction Factor | 1.001 | 1.001 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 0.998 | 0.999 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **55.537** | **54.019** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **143.793** | |
| Total Tunnel Volume, scf | **50327.531** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 906.205 | 931.659 |
| Sample Particulate Mass, mg | 17.2 | 16.3 |
| Total Emissions, grams | 15.587 | 15.186 |
| Emission-Rate, g/hr | 2.67 | 2.60 |
| Adjusted Emission Rates, g/hr | **4.11** | **4.03** |
| Deviation, % | 1.08% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 85.34 | 83.53 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.0015@5 | 0.002@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 76.66 | |
| Maximum Ambient Temperture, ℉ | 87 | |
| Mimimum Ambient Temperature, ℉ | 71 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 22.46 | |
| Dry-Basis Fuel Load Moisture Content, % | 20.54 | |
| Wet-Basis Fuel Load Moisture Content, % | 17.04 | |
| Coal Bed Range, lb. | 4.50 | 5.60 |
| Actual Coal Bed, Lb. | 4.82 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | December 6, 2013 |
| Test Run No: | 5 |

## Temperature Data

| | |
|---|---|
| Firebox Temp Start | 449.86 |
| Firebox Temp End | 373.2 |
| Firebox Delta-T | **76.7** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **85.34** | **83.53** |

| Interval | 10 | Duration of Test, Min | **350** |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| 0 | 0 | 71.43 | 109.4 | 315.1 | 367.6 | 463 | 517.2 | 450.4 | 451.1 | | 69.21 | 67.64 | 67.93 | 67.7 |
| 1 | 10 | 81.08 | 115.9 | 336.4 | 335.3 | 462.5 | 457.4 | 423.5 | 424.3 | | 79.31 | 77.61 | 68.17 | 67.89 |
| 2 | 20 | 86.58 | 121.5 | 398.3 | 381.7 | 451.1 | 411.4 | 389.7 | 394.9 | | 81.44 | 79.08 | 68.29 | 67.955 |
| 3 | 30 | 83.06 | 131.2 | 467.2 | 446.7 | 432.5 | 401.4 | 373.1 | 383.2 | | 83.28 | 81.3 | 68.375 | 68.1 |
| 4 | 40 | 79.9 | 139.2 | 519.3 | 539 | 410 | 417.6 | 383 | 391 | | 85.34 | 83.53 | 68.57 | 68.23 |
| 5 | 50 | 76.23 | 133.9 | 491.6 | 549.1 | 393.2 | 438.9 | 400.5 | 412.9 | | 84.51 | 81.57 | 68.635 | 68.255 |
| 6 | 60 | 75.86 | 133.6 | 495.4 | 554.1 | 374.3 | 459.7 | 414.9 | 433.4 | | 84.87 | 81.94 | 68.715 | 68.325 |
| 7 | 70 | 75.07 | 129.3 | 471.4 | 536.8 | 359 | 472.1 | 425.5 | 450.8 | | 84.64 | 80.32 | 68.875 | 68.665 |
| 8 | 80 | 74.74 | 127.1 | 460.7 | 522.4 | 345.3 | 482.8 | 435 | 462.7 | | 84.19 | 79.45 | 68.955 | 68.58 |
| 9 | 90 | 74.94 | 125.5 | 457.6 | 515.3 | 335.3 | 498.8 | 445.7 | 472.8 | | 83.52 | 79.1 | 68.92 | 68.64 |
| 10 | 100 | 76.17 | 123.4 | 448.2 | 511.1 | 326.2 | 514.5 | 454.6 | 479.3 | | 83.23 | 78.89 | 69.025 | 68.685 |
| 11 | 110 | 82.18 | 119.4 | 416.5 | 497.8 | 322.2 | 526 | 461 | 486 | | 82.57 | 78.61 | 69.045 | 68.66 |
| 12 | 120 | 78.83 | 115 | 394.4 | 466 | 316.6 | 527.4 | 456.3 | 481.6 | | 81.54 | 77.98 | 69.06 | 68.685 |
| 13 | 130 | 78.83 | 111.4 | 376.6 | 439.6 | 313.1 | 528 | 452.1 | 473.6 | | 80.71 | 77.4 | 69.01 | 68.605 |
| 14 | 140 | 77.52 | 108 | 356.3 | 415.5 | 311 | 523.7 | 449.2 | 466.2 | | 79.92 | 76.25 | 69.13 | 68.865 |
| 15 | 150 | 81.51 | 105.7 | 334.7 | 392.2 | 310 | 514 | 445.8 | 458.9 | | 79.12 | 76.11 | 69.165 | 68.68 |
| 16 | 160 | 78.73 | 103.1 | 321.5 | 367.7 | 309.9 | 501.1 | 438.6 | 450.8 | | 78.46 | 75.61 | 69.04 | 68.595 |
| 17 | 170 | 79.55 | 101.7 | 310.4 | 351.2 | 310.1 | 490.4 | 431 | 444.1 | | 77.81 | 75.1 | 69 | 68.51 |
| 18 | 180 | 78.75 | 100.1 | 301.6 | 337.4 | 312.7 | 482.7 | 426 | 437.4 | | 77.39 | 74.89 | 68.965 | 68.505 |
| 19 | 190 | 79.89 | 99.68 | 301.2 | 329.4 | 313.3 | 482.9 | 420.7 | 429.6 | | 77.1 | 74.71 | 68.905 | 68.435 |
| 20 | 200 | 78.64 | 98.56 | 296.8 | 325.8 | 318.4 | 480.3 | 418.2 | 426.3 | | 77.05 | 74.57 | 68.885 | 68.4 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 210 | 80.61 | 98.44 | 290.5 | 320.8 | 322 | 469.6 | 411.9 | 420.3 | | 76.66 | 74.41 | 68.86 | 68.515 |
| 22 | 220 | 77.56 | 96.49 | 283.9 | 313.2 | 326.2 | 459.7 | 405.1 | 412.4 | | 76.6 | 74.23 | 68.94 | 68.52 |
| 23 | 230 | 81.91 | 97.25 | 278.6 | 307.3 | 328.3 | 453.1 | 399.1 | 406 | | 76.41 | 74.29 | 68.98 | 68.6 |
| 24 | 240 | 76.96 | 95.07 | 275 | 300.7 | 329.7 | 448.5 | 392.8 | 397.3 | | 76.11 | 74.09 | 68.93 | 68.575 |
| 25 | 250 | 79.27 | 95.47 | 271.3 | 296 | 332 | 450.5 | 388.1 | 392.9 | | 76.08 | 74.07 | 68.945 | 68.62 |
| 26 | 260 | 79.04 | 95.14 | 270.4 | 291.6 | 331.5 | 458.4 | 384.9 | 388.9 | | 75.95 | 73.87 | 68.865 | 68.42 |
| 27 | 270 | 77.13 | 94.29 | 271.6 | 290.3 | 332.6 | 472.5 | 384.5 | 388.9 | | 75.84 | 73.59 | 68.765 | 68.305 |
| 28 | 280 | 83.64 | 94.68 | 269 | 292.1 | 335.7 | 474.5 | 390.6 | 395.7 | | 75.52 | 73.61 | 68.785 | 68.4 |
| 29 | 290 | 85.61 | 95.52 | 270.3 | 292.9 | 340.5 | 478.3 | 391.5 | 397.4 | | 75.58 | 73.67 | 68.735 | 68.29 |
| 30 | 300 | 86.76 | 96.42 | 272.2 | 293.7 | 343.7 | 484.5 | 391.9 | 397.3 | | 75.7 | 73.94 | 68.685 | 68.315 |
| 31 | 310 | 83.58 | 97.27 | 274.8 | 292.7 | 341.1 | 492.2 | 387.5 | 393.6 | | 75.94 | 74.12 | 68.645 | 68.26 |
| 32 | 320 | 85.07 | 98 | 272.9 | 293 | 342.2 | 492.9 | 387.9 | 394.4 | | 76.09 | 74 | 68.66 | 68.305 |
| 33 | 330 | 83.47 | 95.29 | 267.7 | 289.9 | 341 | 486.7 | 386.5 | 392.1 | | 76.08 | 73.61 | 68.695 | 68.365 |
| 34 | 340 | 86.58 | 95.91 | 265.5 | 289.8 | 342.5 | 479.1 | 386.4 | 391.9 | | 76.04 | 73.52 | 68.685 | 68.285 |
| 35 | 350 | 87.18 | 96.33 | 262.3 | 287.1 | 342.1 | 468.2 | 381.2 | 387.4 | | 76.05 | 73.71 | 68.74 | 68.3 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 6, 2013 |
| Test Run Number: | 5 |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 29.91 | 78 | Meter Box (A) | 1.002 |
| End | 29.97 | 78 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 350 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.0015@5 | 0.002@5 |

| Maximum Vacuum | | Average Gases, % | | |
|---|---|---|---|---|
| Train A | Train B | O2 | CO2 | CO |
| 0.00 | 0.00 | 13.579 | 5.878 | 0.826 |

| | Particulate Sampling Data | | | | | | | | | | | | Combustion Gasses, % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg | O2 | CO2 | CO |
| 0 | 0.015 | 0.00 | 0.00 | 0.058 | 22.46 | 22.46 | 1150.623 | 1121.906 | 99.98 | 99.97 | 0.00 | 0.00 | 16.480 | 0.700 | 0.720 |
| 10 | 0.015 | 0.00 | 0.00 | 0.075 | 21.23 | 1.23 | 1152.248 | 1123.369 | 103.34 | 94.94 | 0.00 | 0.00 | 13.980 | 5.530 | 0.590 |
| 20 | 0.015 | 0.00 | 0.00 | 0.083 | 19.85 | 1.38 | 1153.845 | 1124.825 | 102.03 | 94.93 | 0.00 | 0.00 | 13.190 | 7.700 | 0.500 |
| 30 | 0.015 | 0.00 | 0.00 | 0.088 | 18.23 | 1.62 | 1155.418 | 1126.292 | 101.32 | 96.42 | 0.00 | 0.00 | 9.680 | 10.740 | 0.490 |
| 40 | 0.015 | 0.00 | 0.00 | 0.093 | 16.18 | 2.05 | 1156.982 | 1127.796 | 101.38 | 99.49 | 0.00 | 0.00 | 8.570 | 11.620 | 0.570 |
| 50 | 0.015 | 0.00 | 0.00 | 0.090 | 14.40 | 1.78 | 1158.548 | 1129.295 | 101.05 | 98.72 | 0.00 | 0.00 | 9.370 | 11.510 | 0.410 |
| 60 | 0.015 | 0.00 | 0.00 | 0.090 | 12.60 | 1.80 | 1160.113 | 1130.880 | 100.94 | 104.34 | 0.00 | 0.00 | 9.940 | 10.280 | 0.400 |
| 70 | 0.015 | 0.00 | 0.00 | 0.088 | 11.16 | 1.44 | 1161.685 | 1132.499 | 100.99 | 106.12 | 0.00 | 0.00 | 10.390 | 9.970 | 0.360 |
| 80 | 0.015 | 0.00 | 0.00 | 0.085 | 9.79 | 1.37 | 1163.259 | 1134.055 | 100.92 | 101.82 | 0.00 | 0.00 | 10.510 | 10.000 | 0.350 |
| 90 | 0.015 | 0.00 | 0.00 | 0.085 | 8.45 | 1.34 | 1164.836 | 1135.602 | 100.98 | 101.08 | 0.00 | 0.00 | 10.550 | 9.890 | 0.310 |
| 100 | 0.015 | 0.00 | 0.00 | 0.085 | 7.28 | 1.17 | 1166.405 | 1137.152 | 100.27 | 101.09 | 0.00 | 0.00 | 10.840 | 9.360 | 0.300 |
| 110 | 0.015 | 0.00 | 0.00 | 0.080 | 6.51 | 0.77 | 1167.978 | 1138.699 | 100.17 | 100.55 | 0.00 | 0.00 | 12.640 | 7.780 | 0.330 |
| 120 | 0.015 | 0.00 | 0.00 | 0.078 | 5.83 | 0.68 | 1169.551 | 1140.258 | 99.79 | 100.94 | 0.00 | 0.00 | 13.050 | 6.920 | 0.490 |
| 130 | 0.015 | 0.00 | 0.00 | 0.075 | 5.23 | 0.60 | 1171.132 | 1141.825 | 99.99 | 101.15 | 0.00 | 0.00 | 13.210 | 6.530 | 0.600 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 140 | 0.015 | 0.00 | 0.00 | 0.073 | 4.77 | 0.46 | 1172.712 | 1143.359 | 99.61 | 98.68 | 0.00 | 0.00 | 13.800 | 5.450 | 0.820 |
| 150 | 0.015 | 0.00 | 0.00 | 0.070 | 4.43 | 0.34 | 1174.296 | 1144.920 | 99.65 | 100.25 | 0.00 | 0.00 | 14.090 | 4.820 | 0.980 |
| 160 | 0.015 | 0.00 | 0.00 | 0.068 | 4.16 | 0.27 | 1175.879 | 1146.481 | 99.38 | 100.03 | 0.00 | 0.00 | 14.190 | 4.730 | 1.030 |
| 170 | 0.015 | 0.00 | 0.00 | 0.065 | 3.88 | 0.28 | 1177.466 | 1148.044 | 99.52 | 100.05 | 0.00 | 0.00 | 14.440 | 4.400 | 1.180 |
| 180 | 0.015 | 0.00 | 0.00 | 0.065 | 3.66 | 0.22 | 1179.052 | 1149.607 | 99.32 | 99.91 | 0.00 | 0.00 | 14.570 | 5.200 | 0.970 |
| 190 | 0.015 | 0.00 | 0.00 | 0.065 | 3.32 | 0.34 | 1180.642 | 1151.172 | 99.54 | 100.02 | 0.00 | 0.00 | 14.000 | 5.050 | 0.860 |
| 200 | 0.015 | 0.00 | 0.00 | 0.065 | 3.06 | 0.26 | 1182.224 | 1152.742 | 98.95 | 100.24 | 0.00 | 0.00 | 14.580 | 4.480 | 0.940 |
| 210 | 0.015 | 0.00 | 0.00 | 0.063 | 2.88 | 0.18 | 1183.818 | 1154.318 | 99.69 | 100.59 | 0.00 | 0.00 | 14.850 | 4.010 | 1.100 |
| 220 | 0.015 | 0.00 | 0.00 | 0.063 | 2.68 | 0.20 | 1185.415 | 1155.827 | 99.69 | 96.15 | 0.00 | 0.00 | 15.000 | 4.100 | 1.030 |
| 230 | 0.015 | 0.00 | 0.00 | 0.060 | 2.45 | 0.23 | 1186.993 | 1157.425 | 98.56 | 101.87 | 0.00 | 0.00 | 15.050 | 3.980 | 1.070 |
| 240 | 0.015 | 0.00 | 0.00 | 0.060 | 2.22 | 0.23 | 1188.586 | 1159.024 | 99.32 | 101.74 | 0.00 | 0.00 | 15.090 | 3.930 | 1.080 |
| 250 | 0.015 | 0.00 | 0.00 | 0.060 | 2.01 | 0.21 | 1190.181 | 1160.616 | 99.47 | 101.32 | 0.00 | 0.00 | 15.110 | 3.920 | 1.190 |
| 260 | 0.015 | 0.00 | 0.00 | 0.060 | 1.76 | 0.25 | 1191.766 | 1162.220 | 98.84 | 102.09 | 0.00 | 0.00 | 14.810 | 4.280 | 1.100 |
| 270 | 0.015 | 0.00 | 0.00 | 0.060 | 1.52 | 0.24 | 1193.356 | 1163.781 | 99.09 | 99.30 | 0.00 | 0.00 | 15.030 | 4.080 | 1.010 |
| 280 | 0.015 | 0.00 | 0.00 | 0.060 | 1.33 | 0.19 | 1194.955 | 1165.369 | 99.68 | 101.04 | 0.00 | 0.00 | 14.910 | 4.190 | 1.040 |
| 290 | 0.015 | 0.00 | 0.00 | 0.060 | 1.11 | 0.22 | 1196.545 | 1166.925 | 99.21 | 99.10 | 0.00 | 0.00 | 14.820 | 4.350 | 1.040 |
| 300 | 0.015 | 0.00 | 0.00 | 0.060 | 0.88 | 0.23 | 1198.135 | 1168.505 | 99.30 | 100.70 | 0.00 | 0.00 | 14.640 | 4.560 | 1.040 |
| 310 | 0.015 | 0.00 | 0.00 | 0.060 | 0.69 | 0.19 | 1199.729 | 1170.118 | 99.63 | 102.90 | 0.00 | 0.00 | 14.980 | 4.200 | 1.060 |
| 320 | 0.015 | 0.00 | 0.00 | 0.060 | 0.53 | 0.16 | 1201.319 | 1171.622 | 99.44 | 96.00 | 0.00 | 0.00 | 15.340 | 3.730 | 1.080 |
| 330 | 0.015 | 0.00 | 0.00 | 0.060 | 0.34 | 0.19 | 1202.909 | 1173.148 | 99.19 | 97.15 | 0.00 | 0.00 | 15.400 | 3.490 | 1.240 |
| 340 | 0.015 | 0.00 | 0.00 | 0.060 | 0.14 | 0.20 | 1204.507 | 1174.694 | 99.75 | 98.50 | 0.00 | 0.00 | 15.870 | 3.110 | 1.180 |
| 350 | 0.015 | 0.00 | 0.00 | 0.058 | 0.00 | 0.14 | 1206.095 | 1176.258 | 99.15 | 99.68 | 0.00 | 0.00 | 15.880 | 3.030 | 1.270 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 6, 2013 |
| Test Run Number: | 5 |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0100 | 117 | 0.1000 |
| A2 | 0.0125 | 117 | 0.1118 |
| A3 | 0.0150 | 118 | 0.1225 |
| A4 | 0.0125 | 118 | 0.1118 |
| A Center | 0.0150 | 117 | 0.1225 |
| B1 | 0.0100 | 123 | 0.1000 |
| B2 | 0.0125 | 123 | 0.1118 |
| B3 | 0.0150 | 123 | 0.1225 |
| B4 | 0.0125 | 122 | 0.1118 |
| B Center | 0.0150 | 124 | 0.1225 |
| Averages | 0.013 | 120.06 | 0.1115 |

| | | |
|---|---|---|
| Tunnel Diameter | **8.000** | inches |
| Tunnel Static | **-0.058** | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9106 | factor |
| Baro. Pressure | 29.91 | |
| Pitot Factor | **0.99** | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 7.778 | Ft/ Sec |
| Initial Flow | **142.25** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.014636013 | | |
| VS (2) | 0.015047106 | STD Tunnel Flow: | 143.79 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 350 | | | | 568.1725 | 55.512 | 53.995 | 7.69 | 99.98 | 99.97 |
| Time | Average Firebox Temp | Ending Average Firebox Temp | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 449.9 | | 0.015 | 569.4 | | | 7.703 | | |
| 10 | 420.6 | | 0.015 | 575.9 | 1.628 | 1.455 | 7.746 | 103.34 | 94.94 |
| 20 | 405.8 | | 0.015 | 581.5 | 1.600 | 1.448 | 7.784 | 102.03 | 94.93 |
| 30 | 407.4 | | 0.015 | 591.2 | 1.575 | 1.458 | 7.849 | 101.32 | 96.42 |
| 40 | 428.1 | | 0.015 | 599.2 | 1.566 | 1.495 | 7.902 | 101.38 | 99.49 |
| 50 | 438.9 | | 0.015 | 593.9 | 1.568 | 1.490 | 7.867 | 101.05 | 98.72 |
| 60 | 447.3 | | 0.015 | 593.6 | 1.566 | 1.575 | 7.865 | 100.94 | 104.34 |
| 70 | 448.8 | | 0.015 | 589.3 | 1.573 | 1.608 | 7.836 | 100.99 | 106.12 |
| 80 | 449.6 | | 0.015 | 587.1 | 1.575 | 1.545 | 7.821 | 100.92 | 101.82 |
| 90 | 453.6 | | 0.015 | 585.5 | 1.578 | 1.536 | 7.811 | 100.98 | 101.08 |
| 100 | 457.1 | | 0.015 | 583.4 | 1.570 | 1.539 | 7.797 | 100.27 | 101.09 |
| 110 | 458.6 | | 0.015 | 579.4 | 1.573 | 1.536 | 7.770 | 100.17 | 100.55 |
| 120 | 449.6 | | 0.015 | 575 | 1.573 | 1.548 | 7.740 | 99.79 | 100.94 |
| 130 | 441.3 | | 0.015 | 571.4 | 1.582 | 1.556 | 7.716 | 99.99 | 101.15 |
| 140 | 433.1 | | 0.015 | 568 | 1.580 | 1.523 | 7.693 | 99.61 | 98.68 |
| 150 | 424.2 | | 0.015 | 565.7 | 1.584 | 1.550 | 7.678 | 99.65 | 100.25 |
| 160 | 413.6 | | 0.015 | 563.1 | 1.583 | 1.550 | 7.660 | 99.38 | 100.03 |
| 170 | 405.4 | | 0.015 | 561.7 | 1.588 | 1.553 | 7.650 | 99.52 | 100.05 |
| 180 | 399.2 | | 0.015 | 560.1 | 1.587 | 1.553 | 7.639 | 99.32 | 99.91 |
| 190 | 395.2 | | 0.015 | 559.68 | 1.591 | 1.555 | 7.637 | 99.54 | 100.02 |
| 200 | 393.8 | | 0.015 | 558.56 | 1.583 | 1.560 | 7.629 | 98.95 | 100.24 |
| 210 | 388.9 | | 0.015 | 558.44 | 1.595 | 1.565 | 7.628 | 99.69 | 100.59 |
| 220 | 383.3 | | 0.015 | 556.49 | 1.598 | 1.499 | 7.615 | 99.69 | 96.15 |
| 230 | 378.8 | | 0.015 | 557.25 | 1.579 | 1.587 | 7.620 | 98.56 | 101.87 |
| 240 | 373.8 | | 0.015 | 555.07 | 1.594 | 1.588 | 7.605 | 99.32 | 101.74 |
| 250 | 371.9 | | 0.015 | 555.47 | 1.596 | 1.581 | 7.608 | 99.47 | 101.32 |
| 260 | 371.1 | | 0.015 | 555.14 | 1.586 | 1.594 | 7.606 | 98.84 | 102.09 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 270 | 373.8 | | 0.015 | 554.29 | 1.591 | 1.551 | 7.600 | 99.09 | 99.30 |
| 280 | 377.7 | | 0.015 | 554.68 | 1.600 | 1.578 | 7.602 | 99.68 | 101.04 |
| 290 | 380.1 | | 0.015 | 555.52 | 1.591 | 1.546 | 7.608 | 99.21 | 99.10 |
| 300 | 382.2 | | 0.015 | 556.42 | 1.592 | 1.570 | 7.614 | 99.30 | 100.70 |
| 310 | 381.4 | | 0.015 | 557.27 | 1.596 | 1.603 | 7.620 | 99.63 | 102.90 |
| 320 | 382.1 | | 0.015 | 558 | 1.592 | 1.495 | 7.625 | 99.44 | 96.00 |
| 330 | 379.2 | | 0.015 | 555.29 | 1.592 | 1.516 | 7.607 | 99.19 | 97.15 |
| 340 | 377.9 | | 0.015 | 555.91 | 1.600 | 1.536 | 7.611 | 99.75 | 98.50 |
| 350 | 373.2 | 373.2 | 0.015 | 556.33 | 1.589 | 1.554 | 7.614 | 99.15 | 99.68 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| ample ID Number: | **101440749MTL-003** |
| Test Date: | **December 6, 2013** |
| Test Run Number: | **5** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.5 | to | 5.6 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 451.74 |

| | |
|---|---|
| Final Coal Bed Wt, lb | 4.82 |

| Interval | 10 |
|---|---|

| Time | | Temperature Data | | | | | | | | | Flue Draft | Fuel Weight | Weight Loss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | | | |
| 0 | 0 | 82.76 | 236.2 | 704.7 | 715.4 | 552 | 656.9 | 546.1 | 545.7 | | | 9.42 | **4.60** |
| 1 | 10 | 83.51 | 149.7 | 514.4 | 618.7 | 552.3 | 652.5 | 555.6 | 559.5 | | | 8.37 | 1.05 |
| 2 | 20 | 80.42 | 135.2 | 462.8 | 552.7 | 529.5 | 626.1 | 536.9 | 550.8 | | | 7.41 | 0.96 |
| 3 | 30 | 78.43 | 126.8 | 432.5 | 511.8 | 495 | 599.2 | 515.3 | 533.1 | | | 6.62 | 0.79 |
| 4 | 40 | 76.33 | 116.9 | 394.4 | 472.4 | 478 | 572.4 | 500.8 | 510.4 | | | 6.05 | 0.57 |
| 5 | 50 | 75.42 | 122.8 | 406.4 | 445.4 | 464.6 | 573 | 495.5 | 488.6 | | | 5.30 | 0.75 |
| 6 | 60 | 74.1 | 106.9 | 340.4 | 409.8 | 460.4 | 546 | 480.8 | 473.1 | | | 5.02 | 0.28 |
| 7 | 70 | 71.14 | 112.1 | 319.8 | 370.4 | 464.7 | 518.5 | 452.6 | 452.5 | | | 4.82 | 0.20 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: December 6, 2013
Test Run Number: 5

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 25 | | 118.1 | |
| B - Rear Filter Catch | Filter | 26 | | 117.1 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 251.7 | 235.2 | 16.5 |
| Probe & Filter Holder | Probe | 33 | 135990.6 | 135989.9 | 0.7 |
| | | | Total Particulate, mg | | **17.2** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 27 | | 118.2 | |
| B - Rear Filter Catch | Filter | 28 | | 115.2 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 248.2 | 233.4 | 14.8 |
| Probe & Filter Holder | Probe | 34 | 108413.5 | 108412.0 | 1.5 |
| | | | Total Particulate, mg | | **16.3** |

**Manufacturer:** SBI
**Model:** NG1800
**Date:** 12/06/13
**Run:** 5
**Control #:** G101440749
**Test Duration:** 350 min

| | HHV | LHV |
|---|---|---|
| Eff | 68.91% | 74.47% |
| Comb Eff | 93.60% | 93.60% |
| HT Eff | 73.62% | 79.57% |
| Output | 19,782 | kJ/h |
| Burn Rate | 1.45 | kg/h |
| Grams CO | 780 | g |
| Input | 28,709 | kJ/h |
| MC wet | 17.04 | |

Ultimate $CO_2$
$CO_{2\text{-ult}}$ 19.64
$F_0$
1.060

| | | |
|---|---|---|
| Overall Heating Efficiency: | 68.91% | |
| Combustion Efficiency: | 93.60% | |
| Heat Transfer Efficiency: | 73.62% | |
| Heat Output: | 18,765 | Btu/h |
| Heat Input: | 27,233 | Btu/h |
| Burn Duration: | 5.83 | h |
| Burn Rate: | 3.19 | lb/h |
| Stack Temp: | 344.3 | Deg. F |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Averages | 0.83 | 5.88 | 2.45 | 20.50 | 14.21 | 173.07 | 26.73 | 87.8% | 70.6% | 62.6% |
| INPUT DATA | | | | Oxygen Calculation | | | Input Data | | Combust | Heat | Net |
| Elapsed Time | Weight emaining (k | % CO [e] | % $CO_2$ [d] | Excess Air EA | Total $O_2$ | Calc. % $O_2$ [g] | Flue Gas (ºC) | Room Temp (ºC) | Eff % | Transfer % | Eff % |
| 0 | 10.19 | 0.72 | 0.70 | 1283.3% | 20.85 | 19.79 | 157.3 | 21.9 | 62.9% | -3.1% | -2.0% |
| 10 | 9.63 | 0.59 | 5.53 | 221.0% | 20.54 | 14.71 | 169.1 | 27.3 | 92.6% | 72.8% | 67.4% |
| 20 | 9.01 | 0.50 | 7.70 | 139.5% | 20.40 | 12.45 | 203.5 | 30.3 | 95.3% | 74.3% | 70.8% |
| 30 | 8.27 | 0.49 | 10.74 | 74.9% | 20.20 | 9.21 | 241.8 | 28.4 | 96.5% | 75.4% | 72.8% |
| 40 | 7.34 | 0.57 | 11.62 | 61.1% | 20.14 | 8.23 | 270.7 | 26.6 | 96.2% | 74.3% | 71.5% |
| 50 | 6.53 | 0.41 | 11.51 | 64.8% | 20.15 | 8.44 | 255.3 | 24.6 | 97.3% | 75.1% | 73.1% |
| 60 | 5.72 | 0.40 | 10.28 | 83.9% | 20.23 | 9.75 | 257.4 | 24.4 | 97.1% | 73.5% | 71.4% |
| 70 | 5.06 | 0.36 | 9.97 | 90.2% | 20.26 | 10.11 | 244.1 | 23.9 | 97.3% | 74.0% | 72.1% |
| 80 | 4.44 | 0.35 | 10.00 | 89.8% | 20.26 | 10.08 | 238.2 | 23.7 | 97.4% | 74.5% | 72.6% |
| 90 | 3.83 | 0.31 | 9.89 | 92.6% | 20.27 | 10.22 | 236.4 | 23.9 | 97.7% | 74.5% | 72.8% |
| 100 | 3.30 | 0.30 | 9.36 | 103.3% | 20.30 | 10.79 | 231.2 | 24.5 | 97.7% | 74.2% | 72.5% |
| 110 | 2.95 | 0.33 | 7.78 | 142.2% | 20.40 | 12.46 | 213.6 | 27.9 | 97.0% | 73.4% | 71.2% |
| 120 | 2.65 | 0.49 | 6.92 | 165.1% | 20.45 | 13.29 | 201.3 | 26.0 | 94.9% | 72.6% | 68.9% |
| 130 | 2.37 | 0.60 | 6.53 | 175.5% | 20.47 | 13.64 | 191.4 | 26.0 | 93.5% | 72.7% | 67.9% |
| 140 | 2.16 | 0.82 | 5.45 | 213.3% | 20.53 | 14.67 | 180.2 | 25.3 | 89.7% | 70.9% | 63.6% |
| 150 | 2.01 | 0.98 | 4.82 | 238.7% | 20.56 | 15.25 | 168.2 | 27.5 | 86.7% | 70.6% | 61.2% |
| 160 | 1.89 | 1.03 | 4.73 | 241.0% | 20.56 | 15.31 | 160.8 | 26.0 | 85.9% | 71.0% | 61.0% |
| 170 | 1.76 | 1.18 | 4.40 | 252.0% | 20.57 | 15.58 | 154.7 | 26.4 | 83.3% | 70.7% | 58.9% |
| 180 | 1.66 | 0.97 | 5.20 | 218.4% | 20.53 | 14.85 | 149.8 | 26.0 | 87.6% | 73.9% | 64.7% |
| 190 | 1.51 | 0.86 | 5.05 | 232.4% | 20.55 | 15.07 | 149.6 | 26.6 | 88.6% | 73.6% | 65.2% |
| 200 | 1.39 | 0.94 | 4.48 | 262.4% | 20.58 | 15.63 | 147.1 | 25.9 | 86.4% | 72.1% | 62.3% |
| 210 | 1.31 | 1.10 | 4.01 | 284.4% | 20.60 | 16.04 | 143.6 | 27.0 | 83.1% | 70.9% | 58.9% |
| 220 | 1.22 | 1.03 | 4.10 | 282.9% | 20.60 | 15.99 | 139.9 | 25.3 | 84.2% | 71.6% | 60.3% |
| 230 | 1.11 | 1.07 | 3.98 | 289.0% | 20.61 | 16.09 | 137.0 | 27.7 | 83.4% | 71.9% | 59.9% |
| 240 | 1.01 | 1.08 | 3.93 | 292.1% | 20.61 | 16.14 | 135.0 | 25.0 | 83.1% | 71.6% | 59.5% |
| 250 | 0.91 | 1.19 | 3.92 | 284.4% | 20.60 | 16.09 | 132.9 | 26.3 | 81.7% | 72.0% | 58.8% |
| 260 | 0.80 | 1.10 | 4.28 | 265.1% | 20.58 | 15.75 | 132.4 | 26.1 | 83.9% | 73.4% | 61.6% |
| 270 | 0.69 | 1.01 | 4.08 | 285.9% | 20.60 | 16.02 | 133.1 | 25.1 | 84.4% | 72.5% | 61.2% |
| 280 | 0.60 | 1.04 | 4.19 | 275.6% | 20.59 | 15.88 | 131.7 | 28.7 | 84.4% | 73.6% | 62.1% |
| 290 | 0.50 | 1.04 | 4.35 | 264.4% | 20.58 | 15.71 | 132.4 | 29.8 | 84.8% | 74.2% | 62.9% |
| 300 | 0.40 | 1.04 | 4.56 | 250.8% | 20.57 | 15.49 | 133.4 | 30.4 | 85.4% | 74.8% | 63.8% |
| 310 | 0.31 | 1.06 | 4.20 | 273.4% | 20.59 | 15.86 | 134.9 | 28.7 | 84.1% | 73.2% | 61.6% |
| 320 | 0.24 | 1.08 | 3.73 | 308.4% | 20.62 | 16.35 | 133.8 | 29.5 | 82.4% | 71.7% | 59.0% |
| 330 | 0.15 | 1.24 | 3.49 | 315.3% | 20.63 | 16.52 | 130.9 | 28.6 | 79.4% | 70.9% | 56.3% |
| 340 | 0.06 | 1.18 | 3.11 | 357.9% | 20.66 | 16.96 | 129.7 | 30.3 | 78.5% | 69.5% | 54.6% |
| 350 | 0.00 | 1.27 | 3.03 | 356.8% | 20.66 | 16.99 | 127.9 | 30.7 | 76.9% | 69.4% | 53.4% |

| Air Fuel Ratio (A/F) | |
|---|---|
| Dry Molecular Weight ($M_d$) | 29.51 |
| Dry Moles Exhaust Gas ($N_r$): | 529.65 |
| Air Fuel Ratio (A/F) | 15.12 |

%HC
1.32

| | | |
|---|---|---|
| Combustion Efficiency: | 93.60% | |
| Total Input (kJ): | 167,468 | 158,835 |
| Total Output (kJ): | 115,395 | 109,446 |
| Efficiency: | 68.91% | |
| Total CO (g): | 779.61 | |

19,782 kJ/h
28,709 kJ/h

1.449 kg/h

173.5 Deg. C

| 20.20 | 2.86 | 71.92 | 2.37 | 71.92 | 167990 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.09 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Air Fuel Ratio | Wet Wt Now Wt | % Wet Consumed x | Dry Wt. Now $Wt_{dn}$ | % Dry Comsumed y | Total Input | Fuel Properties Carbon /12= [a] | Hydrogen /1= [b] | Oxygen /16= [c] | Calorific Value | Mw Moisture Fuel Burnt | [h] |
| 78.6 | 10.19 | 0.00 | 8.45 | 0.00 | 0 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.79 |
| 19.1 | 9.63 | 5.47 | 7.99 | 5.47 | 14309 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.17 |
| 14.3 | 9.01 | 11.62 | 7.47 | 11.62 | 11185 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.35 |
| 10.5 | 8.27 | 18.83 | 6.86 | 18.83 | 13683 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.56 |
| 9.7 | 7.34 | 27.96 | 6.09 | 27.96 | 14279 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.58 |
| 9.9 | 6.53 | 35.88 | 5.42 | 35.88 | 13347 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.64 |
| 11.1 | 5.72 | 43.90 | 4.74 | 43.90 | 12080 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.57 |
| 11.4 | 5.06 | 50.31 | 4.20 | 50.31 | 10477 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.56 |
| 11.4 | 4.44 | 56.41 | 3.69 | 56.41 | 10104 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.57 |
| 11.6 | 3.83 | 62.38 | 3.18 | 62.38 | 9358 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.58 |
| 12.2 | 3.30 | 67.59 | 2.74 | 67.59 | 7233 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.55 |
| 14.5 | 2.95 | 71.01 | 2.45 | 71.01 | 5406 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.43 |
| 15.8 | 2.65 | 74.04 | 2.19 | 74.04 | 4772 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.30 |
| 16.4 | 2.37 | 76.71 | 1.97 | 76.71 | 3952 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.23 |
| 18.5 | 2.16 | 78.76 | 1.80 | 78.76 | 2983 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.06 |
| 19.9 | 2.01 | 80.28 | 1.67 | 80.28 | 2274 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.95 |
| 20.0 | 1.89 | 81.48 | 1.57 | 81.48 | 2051 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.93 |
| 20.5 | 1.76 | 82.72 | 1.46 | 82.72 | 1864 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.84 |
| 18.7 | 1.66 | 83.70 | 1.38 | 83.70 | 2088 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.98 |
| 19.6 | 1.51 | 85.22 | 1.25 | 85.22 | 2237 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 79.02 |
| 21.3 | 1.39 | 86.38 | 1.15 | 86.38 | 1640 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.95 |
| 22.4 | 1.31 | 87.18 | 1.08 | 87.18 | 1417 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.85 |
| 22.4 | 1.22 | 88.07 | 1.01 | 88.07 | 1603 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.88 |
| 22.7 | 1.11 | 89.09 | 0.92 | 89.09 | 1715 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.86 |
| 22.8 | 1.01 | 90.12 | 0.84 | 90.12 | 1640 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.85 |
| 22.3 | 0.91 | 91.05 | 0.76 | 91.05 | 1715 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.80 |
| 21.3 | 0.80 | 92.16 | 0.66 | 92.16 | 1827 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.87 |
| 22.5 | 0.69 | 93.23 | 0.57 | 93.23 | 1603 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.89 |
| 21.9 | 0.60 | 94.08 | 0.50 | 94.08 | 1529 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.89 |
| 21.3 | 0.50 | 95.06 | 0.42 | 95.06 | 1678 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.90 |
| 20.5 | 0.40 | 96.08 | 0.33 | 96.08 | 1566 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.91 |
| 21.8 | 0.31 | 96.93 | 0.26 | 96.93 | 1305 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.88 |
| 23.8 | 0.24 | 97.64 | 0.20 | 97.64 | 1305 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.84 |
| 24.0 | 0.15 | 98.49 | 0.13 | 98.49 | 1454 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.75 |
| 26.4 | 0.06 | 99.38 | 0.05 | 99.38 | 1790 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.75 |
| 26.3 | 0.00 | 100.00 | 0.00 | 100.00 | 522 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.04 | 78.71 |

Moisture Content $M_{Cwb}$: 17.04

Moisture of Wood (wet basis): 17.04

(Btu) Initial Dry Weight $Wt_{do}$ (kg): 8.45

(Btu) Moisture Content Dry 20.54

Dry kg : 8.45

CA: 48.73

HY: 6.87

OX: 43.9

Load Weight (kg): **10.19**

| Fuel Heating Value in kJ/kg - CV: | **HHV** | **LHV** | | **HHV** | **LHV** |
|---|---|---|---|---|---|
| | **19,810** | **18,329** | Btu/lb | **8522.5** | **7885.2** |

| **20.98** | **1.67** | **5.56** | **0.10** | **0.17** | **33.86** | **107.17** | **6.22** | **0.73** | **553.72** | **33.05** | **11.41** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mass Balance (moles/100 mole dry flue gas)** | | | | **kg Wood per 100 mole dry** | **Moles per kg of Dry Wood** | | | | | | **Moisture Present** |
| **[u]** | **[w]** | **[j]** | **[k]** | **Nk** | **$CO_2$** | **$O_2$** | **CO** | **HC** | **$N_2$** | **$H_2O$** | |
| 20.90 | 0.37 | 1.12 | 0.07 | 0.04 | 19.13 | 540.83 | 19.68 | 2.00 | 2153.72 | 30.53 | 11.41 |
| 21.00 | 1.52 | 5.10 | 0.06 | 0.15 | 36.51 | 97.11 | 3.89 | 0.41 | 522.63 | 33.70 | 11.41 |
| 21.05 | 2.03 | 6.88 | 0.05 | 0.20 | 38.08 | 61.56 | 2.47 | 0.26 | 392.41 | 34.00 | 11.41 |
| 21.10 | 2.78 | 9.43 | 0.06 | 0.28 | 38.84 | 33.32 | 1.77 | 0.20 | 287.68 | 34.11 | 11.41 |
| 21.11 | 3.02 | 10.23 | 0.07 | 0.30 | 38.68 | 27.40 | 1.90 | 0.23 | 264.92 | 34.06 | 11.41 |
| 21.13 | 2.95 | 10.03 | 0.05 | 0.29 | 39.26 | 28.78 | 1.40 | 0.16 | 271.63 | 34.21 | 11.41 |
| 21.10 | 2.64 | 8.98 | 0.04 | 0.26 | 39.13 | 37.13 | 1.52 | 0.16 | 302.84 | 34.20 | 11.41 |
| 21.10 | 2.55 | 8.70 | 0.04 | 0.25 | 39.25 | 39.80 | 1.42 | 0.14 | 313.24 | 34.24 | 11.41 |
| 21.11 | 2.56 | 8.71 | 0.03 | 0.25 | 39.30 | 39.62 | 1.38 | 0.14 | 312.70 | 34.25 | 11.41 |
| 21.11 | 2.52 | 8.59 | 0.03 | 0.25 | 39.46 | 40.78 | 1.24 | 0.11 | 317.52 | 34.29 | 11.41 |
| 21.10 | 2.39 | 8.14 | 0.03 | 0.24 | 39.44 | 45.47 | 1.26 | 0.11 | 335.17 | 34.30 | 11.41 |
| 21.07 | 2.00 | 6.83 | 0.03 | 0.20 | 39.02 | 62.48 | 1.65 | 0.14 | 398.34 | 34.24 | 11.41 |
| 21.04 | 1.84 | 6.21 | 0.05 | 0.18 | 37.86 | 72.68 | 2.68 | 0.27 | 433.86 | 33.97 | 11.41 |
| 21.02 | 1.77 | 5.96 | 0.07 | 0.18 | 37.04 | 77.36 | 3.40 | 0.37 | 449.39 | 33.78 | 11.41 |
| 20.97 | 1.57 | 5.19 | 0.10 | 0.16 | 34.94 | 94.02 | 5.26 | 0.62 | 506.88 | 33.29 | 11.41 |
| 20.94 | 1.46 | 4.77 | 0.12 | 0.15 | 33.24 | 105.14 | 6.76 | 0.82 | 544.45 | 32.89 | 11.41 |
| 20.94 | 1.45 | 4.73 | 0.13 | 0.14 | 32.80 | 106.20 | 7.14 | 0.87 | 547.30 | 32.78 | 11.41 |
| 20.91 | 1.41 | 4.55 | 0.15 | 0.14 | 31.36 | 111.04 | 8.41 | 1.05 | 561.83 | 32.43 | 11.41 |
| 20.95 | 1.55 | 5.08 | 0.12 | 0.15 | 33.75 | 96.38 | 6.30 | 0.76 | 512.68 | 33.00 | 11.41 |
| 20.96 | 1.48 | 4.88 | 0.10 | 0.15 | 34.29 | 102.32 | 5.84 | 0.69 | 536.51 | 33.15 | 11.41 |
| 20.94 | 1.36 | 4.46 | 0.11 | 0.14 | 33.05 | 115.33 | 6.94 | 0.83 | 582.45 | 32.87 | 11.41 |
| 20.91 | 1.29 | 4.17 | 0.13 | 0.13 | 31.21 | 124.84 | 8.56 | 1.05 | 613.58 | 32.43 | 11.41 |
| 20.92 | 1.29 | 4.20 | 0.12 | 0.13 | 31.85 | 124.17 | 8.00 | 0.97 | 612.71 | 32.59 | 11.41 |
| 20.92 | 1.28 | 4.12 | 0.13 | 0.13 | 31.36 | 126.78 | 8.43 | 1.02 | 621.30 | 32.47 | 11.41 |
| 20.92 | 1.27 | 4.09 | 0.13 | 0.13 | 31.20 | 128.11 | 8.57 | 1.04 | 625.91 | 32.44 | 11.41 |
| 20.90 | 1.29 | 4.15 | 0.15 | 0.13 | 30.43 | 124.88 | 9.24 | 1.15 | 611.71 | 32.23 | 11.41 |
| 20.92 | 1.36 | 4.40 | 0.13 | 0.14 | 31.67 | 116.59 | 8.14 | 1.00 | 583.62 | 32.52 | 11.41 |
| 20.93 | 1.28 | 4.17 | 0.12 | 0.13 | 31.95 | 125.45 | 7.91 | 0.95 | 617.82 | 32.62 | 11.41 |
| 20.92 | 1.32 | 4.28 | 0.13 | 0.13 | 31.93 | 121.04 | 7.92 | 0.96 | 601.10 | 32.60 | 11.41 |
| 20.93 | 1.36 | 4.41 | 0.13 | 0.14 | 32.18 | 116.26 | 7.69 | 0.93 | 583.71 | 32.65 | 11.41 |
| 20.93 | 1.41 | 4.59 | 0.13 | 0.14 | 32.50 | 110.39 | 7.41 | 0.90 | 562.37 | 32.72 | 11.41 |
| 20.92 | 1.33 | 4.30 | 0.13 | 0.13 | 31.81 | 120.13 | 8.03 | 0.98 | 597.36 | 32.57 | 11.41 |
| 20.91 | 1.22 | 3.92 | 0.13 | 0.12 | 30.81 | 135.07 | 8.92 | 1.08 | 651.18 | 32.36 | 11.41 |
| 20.89 | 1.20 | 3.82 | 0.15 | 0.12 | 29.16 | 138.02 | 10.36 | 1.29 | 658.06 | 31.95 | 11.41 |
| 20.89 | 1.09 | 3.46 | 0.14 | 0.11 | 28.62 | 156.05 | 10.86 | 1.33 | 724.76 | 31.86 | 11.41 |
| 20.88 | 1.10 | 3.46 | 0.16 | 0.11 | 27.74 | 155.56 | 11.63 | 1.44 | 720.60 | 31.63 | 11.41 |

| | | | | | | | | | | | SUMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **446.22** | **5936.24** | **4420.11** | **4286.60** | **4241.53** | **5818.20** | **5125.91** | **299.88** | **7480.84** | **15019.34** | **64194.19** | **77670.55** |
| **Stack Temp K** | **Heat Content Change - Ambient to Stack Temperature Flue Gas Constituent** | | | | | | **Room Temp K** | **Energy Losses (kJ/kg Flue Gas Consti** | | | |
| | **$CO_2$** | **$O_2$** | **CO** | **$N_2$** | **$CH_4$** | **$H_2O$** | | **$CO_2$** | **$O_2$** | **CO** | **$N_2$** |
| 430.43 | 5422.94 | 4067.49 | 3951.97 | 3908.87 | 5250.35 | 4728.10 | 295.06 | 103.76 | 2199.82 | 5646.29 | 8418.62 |
| 442.26 | 5717.58 | 4272.93 | 4147.74 | 4103.32 | 5569.66 | 4961.10 | 300.42 | 208.73 | 414.96 | 1118.37 | 2144.52 |
| 476.65 | 7074.62 | 5246.00 | 5082.13 | 5029.84 | 6981.56 | 6075.48 | 303.47 | 269.39 | 322.95 | 712.30 | 1973.77 |
| 514.93 | 8830.62 | 6499.65 | 6284.54 | 6222.42 | 8820.59 | 7509.05 | 301.52 | 342.94 | 216.54 | 512.55 | 1790.05 |
| 543.87 | 10197.18 | 7464.51 | 7207.18 | 7138.12 | 10275.30 | 8608.18 | 299.76 | 394.45 | 204.51 | 550.65 | 1891.01 |
| 528.48 | 9581.20 | 7038.20 | 6801.77 | 6735.28 | 9600.76 | 8125.95 | 297.72 | 376.12 | 202.55 | 405.24 | 1829.51 |
| 530.59 | 9683.82 | 7110.85 | 6871.30 | 6804.27 | 9709.58 | 8208.79 | 297.52 | 378.91 | 264.02 | 441.31 | 2060.61 |
| 517.26 | 9104.12 | 6703.82 | 6482.67 | 6418.44 | 9087.51 | 7746.02 | 297.08 | 357.36 | 266.78 | 410.29 | 2010.52 |
| 511.32 | 8846.86 | 6522.50 | 6309.37 | 6246.43 | 8812.95 | 7539.60 | 296.89 | 347.68 | 258.43 | 397.94 | 1953.29 |
| 509.59 | 8766.25 | 6465.19 | 6254.47 | 6191.96 | 8728.01 | 7474.16 | 297.01 | 345.92 | 263.67 | 357.77 | 1966.05 |
| 504.37 | 8509.13 | 6281.37 | 6078.10 | 6017.05 | 8459.28 | 7263.86 | 297.69 | 335.58 | 285.62 | 365.39 | 2016.71 |
| 486.76 | 7608.18 | 5632.74 | 5454.58 | 5398.92 | 7527.60 | 6520.02 | 301.03 | 296.85 | 351.96 | 477.37 | 2150.63 |
| 474.48 | 7145.54 | 5305.68 | 5141.73 | 5088.45 | 7036.02 | 6147.29 | 299.17 | 270.52 | 385.64 | 772.40 | 2207.66 |
| 464.59 | 6718.77 | 4999.05 | 4847.12 | 4796.36 | 6593.34 | 5795.88 | 299.17 | 248.85 | 386.73 | 979.56 | 2155.44 |
| 453.32 | 6263.33 | 4671.87 | 4532.79 | 4484.71 | 6120.79 | 5420.96 | 298.44 | 218.84 | 439.27 | 1511.54 | 2273.23 |
| 441.32 | 5668.45 | 4236.84 | 4112.86 | 4068.78 | 5520.42 | 4919.43 | 300.66 | 188.41 | 445.47 | 1940.27 | 2215.27 |
| 433.98 | 5417.80 | 4057.08 | 3940.25 | 3897.62 | 5259.70 | 4713.56 | 299.11 | 177.70 | 430.85 | 2049.40 | 2133.16 |
| 427.82 | 5141.17 | 3854.58 | 3744.73 | 3703.97 | 4980.94 | 4480.03 | 299.57 | 161.21 | 428.01 | 2411.22 | 2081.02 |
| 422.93 | 4953.43 | 3718.03 | 3613.11 | 3573.57 | 4789.84 | 4322.90 | 299.12 | 167.19 | 358.33 | 1804.56 | 1832.09 |
| 422.71 | 4919.93 | 3692.57 | 3588.28 | 3549.03 | 4758.15 | 4293.17 | 299.76 | 168.69 | 377.81 | 1673.34 | 1904.08 |
| 420.26 | 4844.38 | 3638.30 | 3536.14 | 3497.33 | 4679.78 | 4230.98 | 299.06 | 160.12 | 419.60 | 1987.09 | 2037.03 |
| 416.76 | 4656.68 | 3499.11 | 3401.31 | 3363.89 | 4494.52 | 4069.79 | 300.16 | 145.31 | 436.84 | 2451.56 | 2064.02 |
| 413.09 | 4569.00 | 3437.17 | 3342.06 | 3305.09 | 4401.30 | 3999.21 | 298.46 | 145.50 | 426.79 | 2290.76 | 2025.06 |
| 410.15 | 4354.49 | 3276.16 | 3185.60 | 3150.34 | 4193.84 | 3812.01 | 300.88 | 136.54 | 415.35 | 2412.55 | 1957.32 |
| 408.15 | 4376.80 | 3296.29 | 3206.00 | 3170.34 | 4208.00 | 3836.68 | 298.13 | 136.54 | 422.29 | 2453.56 | 1984.35 |
| 406.09 | 4242.78 | 3195.89 | 3108.48 | 3073.87 | 4077.99 | 3720.01 | 299.41 | 129.10 | 399.11 | 2642.85 | 1880.32 |
| 405.59 | 4227.01 | 3184.44 | 3097.44 | 3062.94 | 4061.89 | 3706.85 | 299.28 | 133.88 | 371.27 | 2328.86 | 1787.60 |
| 406.26 | 4295.09 | 3236.00 | 3147.66 | 3112.59 | 4126.71 | 3766.97 | 298.22 | 137.24 | 405.95 | 2263.26 | 1923.02 |
| 404.82 | 4097.13 | 3085.42 | 3000.84 | 2967.47 | 3939.66 | 3591.14 | 301.84 | 130.81 | 373.46 | 2266.41 | 1783.74 |
| 405.54 | 4085.02 | 3075.10 | 2990.51 | 2957.32 | 3930.64 | 3578.69 | 302.93 | 131.47 | 357.51 | 2200.48 | 1726.22 |
| 406.59 | 4104.14 | 3088.37 | 3003.15 | 2969.87 | 3951.49 | 3593.72 | 303.57 | 133.38 | 340.94 | 2119.74 | 1670.16 |
| 408.04 | 4231.57 | 3184.48 | 3096.66 | 3062.34 | 4073.69 | 3705.64 | 301.81 | 134.60 | 382.56 | 2296.64 | 1829.32 |
| 406.98 | 4156.20 | 3127.92 | 3041.69 | 3007.97 | 4000.81 | 3639.87 | 302.63 | 128.05 | 422.48 | 2551.58 | 1958.73 |
| 404.09 | 4070.94 | 3066.23 | 2982.31 | 2949.12 | 3913.30 | 3569.01 | 301.74 | 118.72 | 423.21 | 2963.13 | 1940.69 |
| 402.87 | 3954.33 | 2978.08 | 2896.49 | 2864.28 | 3801.92 | 3466.28 | 303.47 | 113.18 | 464.73 | 3104.60 | 2075.91 |
| 401.09 | 3868.31 | 2914.20 | 2834.58 | 2803.01 | 3717.23 | 3392.27 | 303.81 | 107.31 | 453.33 | 3323.38 | 2019.86 |

| | | | AVERAGE | SUMS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 23664.01 | 58464.58 | 20168.37 | 7407.27 | 52073.49 | 10717.38 | 41356.1 | 115916.6 | 10717.4 | 779.6 | 51.0 |
| of Dry Fuel) | | | Total | | | | | | | |
| tuent | | | Loss | Total | Chemical | Sensible an | Total | Chem | Grams Produced | |
| $CH_4$ | $H_2O$ Comb | $H_2O$ Fuel M | Rate | Loss | Loss 1 | Latent Loss | Output | Loss 2 | CO | HC |
| 1789.59 | 1486.50 | 555.69 | 20200.26 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0.00 |
| 368.60 | 1648.92 | 558.35 | 6462.45 | 4667.98 | 1061 | 3607.24 | 9641 | 1061 | 78.77 | 4.76 |
| 234.50 | 1701.50 | 571.07 | 5785.49 | 3266.54 | 526 | 2740.09 | 7918 | 526 | 39.09 | 2.36 |
| 184.00 | 1756.08 | 587.43 | 5389.60 | 3722.63 | 472 | 3250.45 | 9960 | 472 | 34.27 | 2.26 |
| 209.37 | 1790.65 | 599.97 | 5640.61 | 4065.86 | 536 | 3529.60 | 10214 | 536 | 38.30 | 2.68 |
| 141.74 | 1782.04 | 594.47 | 5331.67 | 3592.31 | 361 | 3231.20 | 9755 | 361 | 26.38 | 1.70 |
| 145.95 | 1784.39 | 595.41 | 5670.60 | 3457.81 | 351 | 3107.05 | 8622 | 351 | 25.99 | 1.58 |
| 128.21 | 1770.59 | 590.13 | 5533.88 | 2926.60 | 279 | 2647.36 | 7550 | 279 | 20.99 | 1.21 |
| 122.94 | 1764.12 | 587.78 | 5432.18 | 2770.58 | 261 | 2509.95 | 7333 | 261 | 19.64 | 1.12 |
| 103.09 | 1764.15 | 587.03 | 5387.68 | 2545.09 | 214 | 2331.51 | 6813 | 214 | 16.36 | 0.87 |
| 99.83 | 1757.31 | 584.63 | 5445.07 | 1988.07 | 167 | 1821.36 | 5245 | 167 | 12.92 | 0.65 |
| 126.31 | 1728.80 | 576.14 | 5708.06 | 1557.70 | 162 | 1395.71 | 3848 | 162 | 12.65 | 0.61 |
| 245.67 | 1702.70 | 571.89 | 6156.47 | 1483.09 | 241 | 1241.63 | 3289 | 241 | 18.08 | 1.06 |
| 333.24 | 1681.03 | 567.88 | 6352.72 | 1267.34 | 258 | 1009.22 | 2685 | 258 | 19.01 | 1.19 |
| 551.25 | 1644.32 | 563.60 | 7202.05 | 1084.36 | 306 | 777.93 | 1898 | 306 | 22.16 | 1.48 |
| 730.82 | 1607.98 | 557.88 | 7686.09 | 882.39 | 303 | 579.45 | 1392 | 303 | 21.72 | 1.50 |
| 779.27 | 1595.91 | 555.53 | 7721.83 | 799.30 | 289 | 509.89 | 1251 | 289 | 20.70 | 1.44 |
| 937.33 | 1571.12 | 552.86 | 8142.77 | 766.25 | 312 | 454.60 | 1098 | 312 | 22.16 | 1.58 |
| 682.62 | 1593.49 | 551.07 | 6989.35 | 736.63 | 259 | 477.28 | 1351 | 259 | 18.58 | 1.29 |
| 614.38 | 1599.87 | 550.73 | 6888.89 | 777.91 | 256 | 522.31 | 1459 | 256 | 18.46 | 1.24 |
| 738.56 | 1584.42 | 550.02 | 7476.84 | 619.15 | 223 | 395.79 | 1021 | 223 | 16.08 | 1.09 |
| 936.64 | 1557.84 | 548.18 | 8140.39 | 582.18 | 240 | 342.28 | 835 | 240 | 17.14 | 1.20 |
| 864.51 | 1563.27 | 547.38 | 7863.27 | 636.35 | 253 | 383.51 | 967 | 253 | 18.13 | 1.25 |
| 916.61 | 1551.58 | 545.24 | 7935.20 | 686.98 | 286 | 401.46 | 1028 | 286 | 20.44 | 1.42 |
| 933.31 | 1550.60 | 545.52 | 8026.17 | 664.64 | 278 | 386.82 | 976 | 278 | 19.88 | 1.38 |
| 1024.45 | 1537.08 | 544.19 | 8157.10 | 706.19 | 315 | 391.59 | 1009 | 315 | 22.39 | 1.59 |
| 893.34 | 1550.64 | 544.04 | 7609.63 | 701.76 | 294 | 407.31 | 1125 | 294 | 21.02 | 1.47 |
| 850.59 | 1557.16 | 544.73 | 7681.94 | 621.68 | 250 | 372.02 | 981 | 250 | 17.92 | 1.23 |
| 858.72 | 1550.54 | 542.72 | 7506.39 | 579.22 | 239 | 340.20 | 949 | 239 | 17.12 | 1.19 |
| 835.58 | 1552.60 | 542.58 | 7346.43 | 622.18 | 255 | 367.31 | 1056 | 255 | 18.25 | 1.27 |
| 807.20 | 1556.11 | 542.75 | 7170.27 | 566.78 | 229 | 337.46 | 999 | 229 | 16.40 | 1.14 |
| 873.58 | 1552.71 | 544.03 | 7613.42 | 501.50 | 207 | 294.58 | 803 | 207 | 14.81 | 1.03 |
| 968.40 | 1540.46 | 543.28 | 8112.96 | 534.41 | 230 | 304.62 | 770 | 230 | 16.45 | 1.14 |
| 1151.85 | 1518.65 | 542.47 | 8658.71 | 635.54 | 299 | 336.15 | 818 | 299 | 21.29 | 1.51 |
| 1190.66 | 1511.23 | 541.29 | 9001.61 | 813.18 | 385 | 428.46 | 976 | 385 | 27.47 | 1.93 |
| 1291.30 | 1498.20 | 540.45 | 9233.82 | 243.30 | 121 | 122.72 | 279 | 121 | 8.58 | 0.61 |

# Intertek Testing Services NA Ltd

| | |
|---|---|
| **Manufacturer:** | SBI |
| **Model:** | NG1800 |
| **Date:** | 12/06/13 |
| **Run:** | 5 |
| **Control #:** | G101440749 |
| **Test Duration:** | 350 |
| **Output Category:** | 3 |

**Technicians:**

_____

_____

_____

**Test Results in Accordance with CSA B415.1-10**

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 68.9% | 74.5% |
| **Combustion Efficiency** | 93.6% | 93.6% |
| **Heat Transfer Efficiency** | 74% | 79.6% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 19,782 | 18,765 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 1.45 | 3.19 | **(lb/h)** |
| **Input (kJ/h)** | 28,709 | 27,233 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 8.45 | 18.63 | **dry lb** |
| **MC wet (%)** | 17.04 | | |
| **MC dry (%)** | 20.54 | | |
| **Particulate (g )** | 15.3865 | | |
| **CO (g)** | 780 | | |
| **Test Duration (h)** | 5.83 | | |

| Emissions | Particulate | CO |
|---|---|---|
| **g/MJ Output** | 0.13 | 6.76 |
| **g/kg Dry Fuel** | 1.82 | 92.22 |
| **g/h** | 2.64 | 133.65 |
| **lb/MM Btu Output** | 0.31 | 15.70 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 15.12 |

**Version: 2.4** **15/04/2010**

**TEST FUEL DATA**
**EPA Method 5G-3**

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 6, 2013. |
| Test Run Number: | 5 |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

**PRE-BURN FUEL PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 8:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 16 | 1.845 | 20.2 | 20.4 | 21.2 |
| 2 | 16 | 1.965 | 21.7 | 20.5 | 21.5 |
| 3 | 16 | 1.859 | 20.3 | 20.0 | 20.6 |
| 4 | 16 | 1.886 | 22.3 | 20.0 | 23.8 |
| 5 | 16 | 1.527 | 19.3 | 20.0 | 19.8 |
| 6 | 16 | 1.560 | 20.3 | 20.2 | 20.4 |
| 7 | 16 | 1.543 | 20.3 | 20.9 | 19.4 |
| 8 | 16 | 1.551 | 21.5 | 20.3 | 22.0 |
| 9 | 17 | 2.031 | 21.9 | 20.3 | 21.9 |
| 10 | 17 | 2.03 | 20.6 | 20.1 | 21.9 |
| 11 | 17 | 1.98 | 20.2 | 20.2 | 20.3 |
| 12 | 17 | 1.93 | 20.2 | 19.9 | 20.5 |
| Total Weight | | **21.710** | Average, %db | | **20.7** |

| Allowable Fuel Load Range: | **4.49** | to | **5.62** |
|---|---|---|---|

**TEST FUEL LOAD PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:00 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. 2x4 | Weight, Lb. 4x4 | Moisture, %, Dry Basis | |
| 1 | 15 | 1.496 | | 19.3 | 19.1 | 19.1 |
| 2 | 15 | 1.384 | | 19.2 | 19.2 | 18.9 |
| 3 | 15 | 1.446 | | 18.9 | 19.4 | 19.5 |
| 4 | 15 | | 3.970 | 22.3 | 21.9 | 21.4 |
| 5 | 15 | | 3.514 | 20.2 | 20.0 | 19.4 |
| 6 | 15 | | 4.515 | 22.6 | 22.4 | 23.1 |
| 7 | 15 | 2.200 | | 21.7 | 21.4 | 20.5 |
| 8 | 15 | 1.854 | | 20.3 | 21.0 | 20.9 |
| 9 | 15 | 2.085 | | 20.3 | 21.5 | 21.2 |
| Totals | | 10.465 | 11.999 | | | |
| % of Weight | | 46.6 | 53.4 | | | |
| Total weight, wet, lb. | | **22.464** | | Average Moisture, dry | | **20.54** |
| Total weight, dry, kg | | 8.45 | | Average Moisture, wet | | 17.04 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 9, 2013 |
| Test Run Number: | 6 |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **3.01** | |
| Emission-Rate, g/hr: | **4.35** | |
| Adjusted Emission-Rate, g/hr : | **6.17** | |
| Duration of Test, Minutes | 170 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 1206.121 | 1176.279 |
| Dry Gas Meter Ending Reading, $ft^3$ | 1232.949 | 1201.49 |
| Barometric Pressure Correction Factor | 1.007 | 1.007 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 1.009 | 1.009 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **27.294** | **25.464** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **147.209** | |
| Total Tunnel Volume, scf | **25025.447** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 916.898 | 982.782 |
| Sample Particulate Mass, mg | 13.4 | 12.6 |
| Total Emissions, grams | 12.286 | 12.383 |
| Emission-Rate, g/hr | 4.34 | 4.37 |
| Adjusted Emission Rates, g/hr | **6.15** | **6.19** |
| Deviation, % | 0.33% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 85.7 | 79.05 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.0015@5 | 0.006@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 34.94 | |
| Maximum Ambient Temperture, ℉ | 77 | |
| Mimimum Ambient Temperature, ℉ | 69 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 22.66 | |
| Dry-Basis Fuel Load Moisture Content, % | 20.70 | |
| Wet-Basis Fuel Load Moisture Content, % | 17.15 | |
| Coal Bed Range, lb. | 4.60 | 5.60 |
| Actual Coal Bed, Lb. | 5.34 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | December 9, 2013 |
| Test Run No: | 6 |

## Temperature Data

| | |
|---|---|
| Firebox Temp Start | 481.12 |
| Firebox Temp End | 446.18 |
| Firebox Delta-T | **34.9** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **85.7** | **79.05** |

| Interval | 10 | Duration of Test, Min | **170** |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| 0 | 0 | 74.31 | 187.5 | 570.4 | 509.5 | 316.5 | 607.7 | 491.6 | 480.3 | | 65.17 | 66.12 | 62.495 | 62.285 |
| 1 | 10 | 72.03 | 177.8 | 543.2 | 474.6 | 358.1 | 525.4 | 489.1 | 478.4 | | 80.43 | 72.17 | 62.815 | 62.54 |
| 2 | 20 | 71.59 | 185.2 | 637.5 | 533.4 | 358.6 | 459.9 | 462.6 | 452.4 | | 80.21 | 72.09 | 63.01 | 62.735 |
| 3 | 30 | 73.55 | 215.9 | 765.3 | 664.7 | 347.9 | 453.2 | 465.9 | 457 | | 84.48 | 77.28 | 63.03 | 62.67 |
| 4 | 40 | 76.64 | 219.6 | 785.6 | 734.8 | 335.9 | 481.6 | 495.5 | 491.2 | | 82.7 | 76.41 | 63.125 | 62.8 |
| 5 | 50 | 76.86 | 204.3 | 716.1 | 708.4 | 323.5 | 523.8 | 523.7 | 525.5 | | 80.86 | 79.05 | 63.27 | 62.94 |
| 6 | 60 | 77.25 | 190.1 | 664.9 | 655.3 | 312.3 | 564.3 | 543.4 | 550.8 | | 78.48 | 77.26 | 63.525 | 63.19 |
| 7 | 70 | 76.43 | 182.6 | 644.9 | 618.3 | 305.6 | 608.2 | 554.6 | 565 | | 85.7 | 77.71 | 63.625 | 63.25 |
| 8 | 80 | 76.04 | 175.7 | 617.7 | 595 | 302.9 | 658.9 | 565.9 | 570.4 | | 77.43 | 76.03 | 63.71 | 63.28 |
| 9 | 90 | 76.18 | 165.5 | 576.5 | 560 | 308 | 685.7 | 566.2 | 571 | | 73.96 | 73.21 | 63.725 | 63.285 |
| 10 | 100 | 74.74 | 152.3 | 535.1 | 523.5 | 313 | 689.4 | 556.2 | 570.9 | | 77.63 | 70.92 | 63.73 | 63.215 |
| 11 | 110 | 74.07 | 144.2 | 504.1 | 482 | 320.5 | 711.7 | 543.8 | 559 | | 78.37 | 70.23 | 63.815 | 63.28 |
| 12 | 120 | 72.72 | 136.9 | 472.4 | 448.1 | 329.2 | 700.5 | 530.1 | 541 | | 78.03 | 69.02 | 63.815 | 63.26 |
| 13 | 130 | 71.53 | 132.6 | 451.8 | 422.3 | 335.6 | 684.5 | 514.3 | 522.4 | | 77.29 | 69.08 | 63.825 | 63.355 |
| 14 | 140 | 71.23 | 128 | 431.1 | 401.9 | 338.9 | 674.6 | 499.9 | 506.4 | | 77.9 | 69.7 | 63.87 | 63.31 |
| 15 | 150 | 70.34 | 124.3 | 413 | 382.4 | 343.3 | 654.1 | 481.7 | 489.9 | | 79.37 | 70.71 | 63.865 | 63.44 |
| 16 | 160 | 69.55 | 122 | 402.7 | 367 | 345.2 | 640.3 | 464.1 | 474.4 | | 79.99 | 71.68 | 63.885 | 63.34 |
| 17 | 170 | 69.11 | 121.4 | 401.9 | 357.4 | 347.5 | 613.4 | 450 | 462.6 | | 79.87 | 72.14 | 63.995 | 63.5 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 9, 2013 |
| Test Run Number: | 6 |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 30.21 | 81 | Meter Box (A) | 1.002 |
| End | 30.03 | 81 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 170 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.0015@5 | 0.006@5 |

| Maximum Vacuum | |
|---|---|
| Train A | Train B |
| 0.00 | 0.00 |

| Time | Particulate Sampling Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg |
| 0 | 0.015 | 0.00 | 0.00 | 0.100 | 22.66 | 22.66 | 1206.121 | 1176.279 | 99.76 | 99.78 | 0.00 | 0.00 |
| 10 | 0.015 | 0.00 | 0.00 | 0.093 | 20.41 | 2.25 | 1207.713 | 1177.674 | 102.04 | 95.12 | 0.00 | 0.00 |
| 20 | 0.015 | 0.00 | 0.00 | 0.100 | 18.10 | 2.31 | 1209.287 | 1179.111 | 101.43 | 98.54 | 0.00 | 0.00 |
| 30 | 0.015 | 0.00 | 0.00 | 0.110 | 15.13 | 2.97 | 1210.825 | 1180.578 | 101.44 | 102.92 | 0.00 | 0.00 |
| 40 | 0.015 | 0.00 | 0.00 | 0.108 | 12.16 | 2.97 | 1212.309 | 1182.017 | 98.13 | 101.23 | 0.00 | 0.00 |
| 50 | 0.015 | 0.00 | 0.00 | 0.103 | 9.76 | 2.40 | 1213.743 | 1183.526 | 93.72 | 104.93 | 0.00 | 0.00 |
| 60 | 0.015 | 0.00 | 0.00 | 0.100 | 7.84 | 1.92 | 1215.269 | 1185.045 | 98.61 | 104.44 | 0.00 | 0.00 |
| 70 | 0.015 | 0.00 | 0.00 | 0.100 | 6.12 | 1.72 | 1216.885 | 1186.500 | 103.81 | 99.45 | 0.00 | 0.00 |
| 80 | 0.015 | 0.00 | 0.00 | 0.950 | 4.65 | 1.47 | 1218.518 | 1187.947 | 104.32 | 98.36 | 0.00 | 0.00 |
| 90 | 0.015 | 0.00 | 0.00 | 0.925 | 3.60 | 1.05 | 1220.091 | 1189.396 | 99.67 | 97.71 | 0.00 | 0.00 |
| 100 | 0.015 | 0.00 | 0.00 | 0.090 | 2.85 | 0.75 | 1221.658 | 1190.853 | 98.24 | 97.22 | 0.00 | 0.00 |
| 110 | 0.015 | 0.00 | 0.00 | 0.085 | 2.26 | 0.59 | 1223.235 | 1192.335 | 98.19 | 98.22 | 0.00 | 0.00 |
| 120 | 0.015 | 0.00 | 0.00 | 0.083 | 1.82 | 0.44 | 1224.852 | 1193.859 | 100.07 | 100.39 | 0.00 | 0.00 |
| 130 | 0.015 | 0.00 | 0.00 | 0.080 | 1.37 | 0.45 | 1226.468 | 1195.338 | 99.65 | 97.06 | 0.00 | 0.00 |
| 140 | 0.015 | 0.00 | 0.00 | 0.080 | 0.96 | 0.41 | 1228.087 | 1196.849 | 99.44 | 98.78 | 0.00 | 0.00 |
| 150 | 0.015 | 0.00 | 0.00 | 0.078 | 0.53 | 0.43 | 1229.707 | 1198.372 | 99.19 | 99.23 | 0.00 | 0.00 |
| 160 | 0.015 | 0.00 | 0.00 | 0.075 | 0.15 | 0.38 | 1231.325 | 1199.893 | 98.86 | 98.92 | 0.00 | 0.00 |
| 170 | 0.015 | 0.00 | 0.00 | 0.075 | 0.00 | 0.15 | 1232.949 | 1201.490 | 99.16 | 103.78 | 0.00 | 0.00 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 9, 2013 |
| Test Run Number: | 6 |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0100 | 175 | 0.1000 |
| A2 | 0.0125 | 175 | 0.1118 |
| A3 | 0.0150 | 172 | 0.1225 |
| A4 | 0.0150 | 177 | 0.1225 |
| A Center | 0.0125 | 177 | 0.1118 |
| B1 | 0.0100 | 185 | 0.1000 |
| B2 | 0.0150 | 183 | 0.1225 |
| B3 | 0.0150 | 187 | 0.1225 |
| B4 | 0.0125 | 185 | 0.1118 |
| B Center | 0.0150 | 186 | 0.1225 |
| Averages | 0.01325 | 180.1 | 0.1142 |

| | | |
|---|---|---|
| Tunnel Diameter | **8.000** | inches |
| Tunnel Static | **-0.083** | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9748 | factor |
| Baro. Pressure | 30.21 | |
| Pitot Factor | **0.99** | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 8.334 | Ft/ Sec |
| Initial Flow | **139.50** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.030308801 | | |
| VS (2) | 0.03248582 | STD Tunnel Flow: | 147.21 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 170 | | | | 624.7722222 | 27.279 | 25.451 | 8.61 | 99.76 | 99.78 |
| Time | Average Firebox Temp | Ending Average Firebox Temp | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 481.1 | | 0.015 | 647.5 | | | 8.767 | | |
| 10 | 465.1 | | 0.015 | 637.8 | 1.621 | 1.410 | 8.702 | 102.04 | 95.12 |
| 20 | 453.4 | | 0.015 | 645.2 | 1.602 | 1.452 | 8.752 | 101.43 | 98.54 |
| 30 | 477.7 | | 0.015 | 675.9 | 1.565 | 1.482 | 8.958 | 101.44 | 102.92 |
| 40 | 507.8 | | 0.015 | 679.6 | 1.510 | 1.454 | 8.982 | 98.13 | 101.23 |
| 50 | 521.0 | | 0.015 | 664.3 | 1.459 | 1.524 | 8.880 | 93.72 | 104.93 |
| 60 | 525.2 | | 0.015 | 650.1 | 1.552 | 1.533 | 8.785 | 98.61 | 104.44 |
| 70 | 530.3 | | 0.015 | 642.6 | 1.643 | 1.469 | 8.734 | 103.81 | 99.45 |
| 80 | 538.6 | | 0.015 | 635.7 | 1.660 | 1.460 | 8.687 | 104.32 | 98.36 |
| 90 | 538.2 | | 0.015 | 625.5 | 1.599 | 1.462 | 8.617 | 99.67 | 97.71 |
| 100 | 530.6 | | 0.015 | 612.3 | 1.593 | 1.471 | 8.526 | 98.24 | 97.22 |
| 110 | 523.4 | | 0.015 | 604.2 | 1.603 | 1.496 | 8.469 | 98.19 | 98.22 |
| 120 | 509.8 | | 0.015 | 596.9 | 1.643 | 1.538 | 8.418 | 100.07 | 100.39 |
| 130 | 495.8 | | 0.015 | 592.6 | 1.642 | 1.492 | 8.388 | 99.65 | 97.06 |
| 140 | 484.3 | | 0.015 | 588 | 1.645 | 1.525 | 8.355 | 99.44 | 98.78 |
| 150 | 470.3 | | 0.015 | 584.3 | 1.646 | 1.537 | 8.329 | 99.19 | 99.23 |
| 160 | 458.2 | | 0.015 | 582 | 1.644 | 1.535 | 8.312 | 98.86 | 98.92 |
| 170 | 446.2 | 446.18 | 0.015 | 581.4 | 1.650 | 1.611 | 8.308 | 99.16 | 103.78 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| ample ID Number: | **101440749MTL-003** |
| Test Date: | **December 9, 2013** |
| est Run Number: | **6** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.6 | to | 5.6 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 465.38 |

| | |
|---|---|
| Final Coal Bed Wt, lb | 5.34 |

| Interval | 10 |
|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | | Catalyst Outlet | Flue Draft | Fuel Weight | Weight Loss |
| 0 | 0 | 65.07 | 223 | 370.8 | 187.7 | 68.67 | 117.3 | 107.9 | 96.55 | | | | 21.77 | 16.43 |
| 1 | 10 | 67.97 | 128.9 | 365.6 | 230.2 | 110.3 | 190.6 | 160.5 | 158.2 | | | | 19.23 | 2.54 |
| 2 | 20 | 66.19 | 149.6 | 457 | 378 | 157.8 | 206.2 | 187.3 | 190.1 | | | | 16.84 | 2.39 |
| 3 | 30 | 68.27 | 175.6 | 555.9 | 472.5 | 196.2 | 232.1 | 232.3 | 225.8 | | | | 14.63 | 2.21 |
| 4 | 40 | 67.54 | 191.7 | 670.6 | 564.2 | 215 | 289.9 | 291 | 278.8 | | | | 12.14 | 2.49 |
| 5 | 50 | 70.48 | 196.8 | 684.3 | 637.3 | 227.1 | 383.4 | 367.4 | 349.8 | | | | 9.57 | 2.57 |
| 6 | 60 | 72.07 | 179 | 622.4 | 621.8 | 244.9 | 467.2 | 432.4 | 407.9 | | | | 7.76 | 1.81 |
| 7 | 70 | 71.79 | 164.3 | 559.2 | 559.2 | 271.6 | 511.7 | 468.1 | 440.6 | | | | 6.59 | 1.17 |
| 8 | 80 | 72.74 | 161.4 | 553.2 | 516.9 | 300.3 | 565.6 | 482.4 | 461.7 | 465.38 | | | 5.34 | 1.25 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: December 9, 2013
Test Run Number: 6

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 29 | | 118.6 | |
| B - Rear Filter Catch | Filter | 30 | | 117.9 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 247.7 | 236.5 | 11.2 |
| Probe & Filter Holder | Probe | 35 | 107842.1 | 107839.9 | 2.2 |
| | | | Total Particulate, mg | | **13.4** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 31 | | 118.3 | |
| B - Rear Filter Catch | Filter | 32 | | 118.1 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 246.2 | 236.4 | 9.8 |
| Probe & Filter Holder | Probe | 36 | 108502.3 | 108499.5 | 2.8 |
| | | | Total Particulate, mg | | **12.6** |

**TEST FUEL DATA**
**EPA Method 5G-3**

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 9, 2013 |
| Test Run Number: | 6 |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

**PRE-BURN FUEL PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:30 | Temp.,℉: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 8 | 0.937 | 22.5 | 23.1 | 23.8 |
| 2 | 8 | 0.866 | 20.9 | 19.0 | 20.6 |
| 3 | 8 | 0.945 | 23.1 | 19.8 | 22.6 |
| 4 | 8 | 0.892 | 24.2 | 22.4 | 24.4 |
| 5 | 8 | 0.916 | 21.7 | 21.9 | 21.9 |
| 6 | 8 | 0.922 | 23.3 | 21.7 | 22.3 |
| 7 | 8 | 0.908 | 21.1 | 22.1 | 20.5 |
| 8 | 8 | 1.034 | 19.2 | 18.3 | 19.3 |
| 9 | 8 | 0.912 | 22.3 | 21.9 | 22.0 |
| 10 | 8 | 0.959 | 21.9 | 21.0 | 22.3 |
| 11 | 8 | 0.844 | 23.8 | 22.8 | 23.2 |
| 12 | 8 | 0.882 | 22.0 | 20.9 | 21.9 |
| 17 | 17 | 1.909 | 21.9 | 20.8 | 21.9 |
| 18 | 17 | 1.954 | 22.0 | 21.0 | 21.9 |
| 19 | 17 | 1.838 | 21.6 | 21.2 | 22.4 |
| 20 | 17 | 1.865 | 22.3 | 21.3 | 21.7 |
| 21 | 17 | 1.869 | 22.1 | 21.9 | 21.9 |
| Total Weight | | 20.452 | Average, %db | | 21.8 |

Allowable Fuel Load Range: **4.53** to **5.66**

**TEST FUEL LOAD PROPERTIES**

| Eq. ID No.: | SBI-214 | | Time: | 10:30 | Temp.,℉: | 70 |
|---|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | | Moisture, %, Dry Basis | | |
| | | 2x4 | 4x4 | | | |
| 1 | 15 | 1.589 | | 19.1 | 19.3 | 19.5 |
| 2 | 15 | | 3.446 | 19.0 | 18.7 | 19.9 |
| 3 | 15 | 2.374 | | 20.2 | 20.5 | 22.0 |
| 4 | 15 | 1.743 | | 18.9 | 19.2 | 19.9 |
| 5 | 15 | | 3.646 | 21.1 | 19.5 | 20.6 |
| 6 | 15 | 1.999 | | 19.7 | 19.5 | 20.0 |
| 7 | 15 | 1.731 | | 19.7 | 20.0 | 19.7 |
| 8 | 15 | | 3.829 | 20.0 | 20.0 | 20.0 |
| 9 | 15 | 2.301 | | 20.9 | 21.9 | 23.0 |
| Totals | | 11.737 | 10.921 | | | |
| % of Weight | | 51.8 | 48.2 | | | |
| Total weight, wet, lb. | | 22.658 | | Average Moisture, dry | | 20.07 |
| Total weight, dry, kg | | 8.56 | | Average Moisture, wet | | 16.71 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 10, 2013 |
| Test Run Number: | 7 |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **2.85** | |
| Emission-Rate, g/hr: | **6.26** | |
| Adjusted Emission-Rate, g/hr : | **8.34** | |
| Duration of Test, Minutes | 180 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 1232.97 | 1201.456 |
| Dry Gas Meter Ending Reading, $ft^3$ | 1261.381 | 1229.069 |
| Barometric Pressure Correction Factor | 0.996 | 0.996 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 1.001 | 1.002 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **28.385** | **27.387** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **137.894** | |
| Total Tunnel Volume, scf | **24820.902** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 874.445 | 906.288 |
| Sample Particulate Mass, mg | 21.7 | 20.5 |
| Total Emissions, grams | 18.975 | 18.579 |
| Emission-Rate, g/hr | 6.33 | 6.19 |
| Adjusted Emission Rates, g/hr | **8.41** | **8.27** |
| Deviation, % | 0.88% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 88.36 | 83.12 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.0025@5 | 0.0045@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 48.38 | |
| Maximum Ambient Temperture, ℉ | 85 | |
| Mimimum Ambient Temperature, ℉ | 69 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 22.67 | |
| Dry-Basis Fuel Load Moisture Content, % | 20.08 | |
| Wet-Basis Fuel Load Moisture Content, % | 16.72 | |
| Coal Bed Range, lb. | 4.60 | 5.60 |
| Actual Coal Bed, Lb. | 4.64 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | December 10, 2013 |
| Test Run No: | 7 |

# Temperature Data

| | |
|---|---|
| Firebox Temp Start | 485.38 |
| Firebox Temp End | 437 |
| Firebox Delta-T | **48.4** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **88.36** | **83.12** |

| Interval | 10 | Duration of Test, Min | 180 |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| 0 | 0 | 77.42 | 161.7 | 487 | 476 | 377.9 | 568.8 | 495.7 | 508.5 | | 67.87 | 66.97 | 66.7 | 66.615 |
| 1 | 10 | 79.3 | 188.3 | 565.4 | 455 | 406.4 | 495.3 | 474.6 | 492.2 | | 82.93 | 78.94 | 66.9 | 66.665 |
| 2 | 20 | 84.77 | 222.5 | 756 | 609.4 | 404.6 | 465.3 | 456.9 | 479.7 | | 87.07 | 81.88 | 66.95 | 66.645 |
| 3 | 30 | 84.3 | 241.5 | 820.8 | 725.8 | 395.6 | 487.8 | 469.9 | 493.3 | | 88.36 | 83.12 | 67.065 | 66.785 |
| 4 | 40 | 84.4 | 231.3 | 773.9 | 759.4 | 383.4 | 531 | 504.2 | 524.6 | | 85.42 | 79.76 | 67.215 | 66.96 |
| 5 | 50 | 84.29 | 205.2 | 674.9 | 693.4 | 379.4 | 585.6 | 533.3 | 552.2 | | 82.99 | 78.89 | 67.405 | 67.12 |
| 6 | 60 | 82.73 | 191.7 | 632.3 | 629 | 374.8 | 628.1 | 549.8 | 563.3 | | 80.58 | 76.58 | 67.55 | 67.205 |
| 7 | 70 | 81 | 181.8 | 597 | 587 | 372.3 | 655 | 556 | 567.7 | | 78.22 | 75.58 | 67.615 | 67.275 |
| 8 | 80 | 79.72 | 173.2 | 565.6 | 560.3 | 372.4 | 643.1 | 552.8 | 563.5 | | 75.25 | 74.43 | 67.63 | 67.345 |
| 9 | 90 | 78.4 | 163 | 526.2 | 523.5 | 374.2 | 631.3 | 536.7 | 556.6 | | 74.22 | 69.93 | 67.74 | 67.365 |
| 10 | 100 | 76.45 | 157.5 | 503.7 | 484.9 | 376.5 | 621.8 | 517.7 | 548.2 | | 72.94 | 68.67 | 67.675 | 67.085 |
| 11 | 110 | 75.24 | 149.9 | 466 | 456.2 | 378.7 | 603.3 | 502.8 | 537.9 | | 72.15 | 68.76 | 67.665 | 67.205 |
| 12 | 120 | 73.66 | 143 | 441.6 | 422.3 | 380.2 | 584.1 | 487.2 | 521.6 | | 71.89 | 68.68 | 67.61 | 67.125 |
| 13 | 130 | 72.8 | 141.8 | 433.1 | 400.8 | 379.9 | 588.1 | 474.4 | 508 | | 71.96 | 69.65 | 67.625 | 67.095 |
| 14 | 140 | 71.72 | 138.3 | 416.8 | 386.4 | 379.7 | 586.4 | 464.1 | 501.7 | | 71.65 | 70.1 | 67.63 | 67.165 |
| 15 | 150 | 70.19 | 134.7 | 400 | 371.6 | 381.2 | 579 | 452.4 | 493 | | 71.53 | 70.27 | 67.6 | 67.13 |
| 16 | 160 | 69.74 | 131.5 | 387.9 | 357.6 | 386.8 | 570.7 | 440.7 | 483.2 | | 71.33 | 70.03 | 67.51 | 66.98 |
| 17 | 170 | 68.78 | 130.1 | 383.4 | 346.9 | 387.4 | 563.2 | 429.6 | 473.1 | | 71.65 | 70.06 | 67.49 | 66.965 |
| 18 | 180 | 69.35 | 131.2 | 393.6 | 344.2 | 388 | 566.6 | 422.3 | 463.9 | | 71.61 | 69.98 | 67.435 | 66.885 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 10, 2013 |
| Test Run Number: | 7 |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 29.83 | 43 | Meter Box (A) | 1.002 |
| End | 29.77 | 45 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 180 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.0025@5 | 0.0045@5 |

| Maximum Vacuum | | Average Gases, % | | |
|---|---|---|---|---|
| Train A | Train B | O2 | CO2 | CO |
| 0.00 | 0.00 | 13.166 | 7.441 | 1.027 |

| Time | Particulate Sampling Data | | | | | | | | | | | | Combustion Gasses, % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg | O2 | CO2 | CO |
| 0 | 0.015 | 0.00 | 0.00 | 0.073 | 22.66 | 22.66 | 1232.970 | 1201.456 | 99.88 | 99.81 | 0.00 | 0.00 | 20.630 | 3.770 | 1.100 |
| 10 | 0.015 | 0.00 | 0.00 | 0.095 | 20.33 | 2.33 | 1234.561 | 1202.889 | 102.37 | 94.84 | 0.00 | 0.00 | 19.060 | 3.020 | 0.800 |
| 20 | 0.015 | 0.00 | 0.00 | 0.108 | 17.24 | 3.09 | 1236.112 | 1204.363 | 102.39 | 100.10 | 0.00 | 0.00 | 17.510 | 8.560 | 1.080 |
| 30 | 0.015 | 0.00 | 0.00 | 0.110 | 14.05 | 3.19 | 1237.626 | 1205.810 | 101.31 | 99.60 | 0.00 | 0.00 | 14.730 | 13.200 | 1.140 |
| 40 | 0.015 | 0.00 | 0.00 | 0.105 | 11.18 | 2.87 | 1238.910 | 1207.037 | 85.27 | 83.81 | 0.00 | 0.00 | 10.810 | 15.040 | 1.390 |
| 50 | 0.015 | 0.00 | 0.00 | 0.100 | 9.14 | 2.04 | 1240.564 | 1208.533 | 107.70 | 100.21 | 0.00 | 0.00 | 7.910 | 12.920 | 0.860 |
| 60 | 0.015 | 0.00 | 0.00 | 0.098 | 7.46 | 1.68 | 1242.108 | 1209.999 | 99.49 | 97.18 | 0.00 | 0.00 | 7.490 | 10.590 | 0.780 |
| 70 | 0.015 | 0.00 | 0.00 | 0.095 | 6.02 | 1.44 | 1243.769 | 1211.336 | 106.20 | 87.94 | 0.00 | 0.00 | 8.540 | 9.750 | 0.780 |
| 80 | 0.015 | 0.00 | 0.00 | 0.090 | 4.86 | 1.16 | 1245.316 | 1213.020 | 98.24 | 110.01 | 0.00 | 0.00 | 9.610 | 9.250 | 0.780 |
| 90 | 0.015 | 0.00 | 0.00 | 0.088 | 4.02 | 0.84 | 1246.883 | 1214.659 | 98.69 | 106.20 | 0.00 | 0.00 | 10.490 | 8.470 | 0.780 |
| 100 | 0.015 | 0.00 | 0.00 | 0.085 | 3.28 | 0.74 | 1248.483 | 1216.271 | 100.33 | 104.04 | 0.00 | 0.00 | 11.280 | 7.310 | 0.850 |
| 110 | 0.015 | 0.00 | 0.00 | 0.083 | 2.78 | 0.50 | 1250.094 | 1217.900 | 100.40 | 104.47 | 0.00 | 0.00 | 12.160 | 6.590 | 0.890 |
| 120 | 0.015 | 0.00 | 0.00 | 0.080 | 2.31 | 0.47 | 1251.705 | 1219.427 | 99.84 | 97.38 | 0.00 | 0.00 | 12.890 | 5.810 | 1.020 |
| 130 | 0.015 | 0.00 | 0.00 | 0.080 | 1.81 | 0.50 | 1253.319 | 1221.069 | 99.92 | 104.62 | 0.00 | 0.00 | 13.520 | 5.040 | 1.210 |
| 140 | 0.015 | 0.00 | 0.00 | 0.078 | 1.30 | 0.51 | 1254.933 | 1222.719 | 99.63 | 104.81 | 0.00 | 0.00 | 14.120 | 5.060 | 1.140 |
| 150 | 0.015 | 0.00 | 0.00 | 0.075 | 0.93 | 0.37 | 1256.543 | 1224.351 | 99.09 | 103.36 | 0.00 | 0.00 | 14.440 | 4.690 | 1.180 |
| 160 | 0.015 | 0.00 | 0.00 | 0.075 | 0.53 | 0.40 | 1258.156 | 1225.949 | 99.02 | 100.96 | 0.00 | 0.00 | 14.700 | 4.340 | 1.230 |
| 170 | 0.015 | 0.00 | 0.00 | 0.075 | 0.20 | 0.33 | 1259.766 | 1227.567 | 98.73 | 102.11 | 0.00 | 0.00 | 15.000 | 4.050 | 1.260 |
| 180 | 0.015 | 0.00 | 0.00 | 0.075 | 0.00 | 0.20 | 1261.381 | 1229.069 | 99.14 | 94.89 | 0.00 | 0.00 | 15.260 | 3.920 | 1.240 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 10, 2013 |
| Test Run Number: | 7 |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0100 | 178 | 0.1000 |
| A2 | 0.0125 | 175 | 0.1118 |
| A3 | 0.0150 | 181 | 0.1225 |
| A4 | 0.0150 | 181 | 0.1225 |
| A Center | 0.0150 | 180 | 0.1225 |
| B1 | 0.0100 | 168 | 0.1000 |
| B2 | 0.0125 | 169 | 0.1118 |
| B3 | 0.0150 | 171 | 0.1225 |
| B4 | 0.0125 | 169 | 0.1118 |
| B Center | 0.0150 | 170 | 0.1225 |
| Averages | 0.01325 | 174.28 | 0.1129 |

| | | |
|---|---|---|
| Tunnel Diameter | **8.000** | inches |
| Tunnel Static | **-0.070** | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9215 | factor |
| Baro. Pressure | 29.83 | |
| Pitot Factor | **0.99** | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 8.242 | Ft/ Sec |
| Initial Flow | **137.48** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.027591624 | | |
| VS (2) | 0.028595533 | STD Tunnel Flow: | 137.89 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 180 | | | | 629.3789474 | 28.371 | 27.375 | 8.21 | 99.88 | 99.81 |
| Time | Average Firebox Temp | Ending Average Firebox Temp | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 485.4 | | 0.015 | 621.7 | | | 8.164 | | |
| 10 | 464.7 | | 0.015 | 648.3 | 1.590 | 1.422 | 8.337 | 102.37 | 94.84 |
| 20 | 483.2 | | 0.015 | 682.5 | 1.550 | 1.462 | 8.554 | 102.39 | 100.10 |
| 30 | 514.5 | | 0.015 | 701.5 | 1.513 | 1.435 | 8.672 | 101.31 | 99.60 |
| 40 | 540.5 | | 0.015 | 691.3 | 1.283 | 1.217 | 8.609 | 85.27 | 83.81 |
| 50 | 548.8 | | 0.015 | 665.2 | 1.652 | 1.483 | 8.445 | 107.70 | 100.21 |
| 60 | 549.0 | | 0.015 | 651.7 | 1.542 | 1.453 | 8.359 | 99.49 | 97.18 |
| 70 | 547.6 | | 0.015 | 641.8 | 1.658 | 1.325 | 8.295 | 106.20 | 87.94 |
| 80 | 538.4 | | 0.015 | 633.2 | 1.544 | 1.669 | 8.239 | 98.24 | 110.01 |
| 90 | 524.5 | | 0.015 | 623 | 1.564 | 1.624 | 8.173 | 98.69 | 106.20 |
| 100 | 509.8 | | 0.015 | 617.5 | 1.597 | 1.598 | 8.136 | 100.33 | 104.04 |
| 110 | 495.8 | | 0.015 | 609.9 | 1.608 | 1.615 | 8.086 | 100.40 | 104.47 |
| 120 | 479.1 | | 0.015 | 603 | 1.608 | 1.514 | 8.040 | 99.84 | 97.38 |
| 130 | 470.2 | | 0.015 | 601.8 | 1.611 | 1.628 | 8.032 | 99.92 | 104.62 |
| 140 | 463.7 | | 0.015 | 598.3 | 1.611 | 1.635 | 8.009 | 99.63 | 104.81 |
| 150 | 455.4 | | 0.015 | 594.7 | 1.607 | 1.618 | 7.985 | 99.09 | 103.36 |
| 160 | 447.8 | | 0.015 | 591.5 | 1.611 | 1.584 | 7.963 | 99.02 | 100.96 |
| 170 | 440.0 | | 0.015 | 590.1 | 1.608 | 1.604 | 7.954 | 98.73 | 102.11 |
| 180 | 437.0 | 437 | 0.015 | 591.2 | 1.613 | 1.490 | 7.961 | 99.14 | 94.89 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| ample ID Number: | **101440749MTL-003** |
| Test Date: | **December 10, 2013** |
| est Run Number: | **7** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.6 | to | 5.6 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 484.92 |

| | |
|---|---|
| Final Coal Bed Wt, lb | 4.64 |

| Interval | 10 |
|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | | Catalyst Outlet | Flue Draft | Fuel Weight | Weight Loss |
| 0 | 0 | 67.3 | 222.6 | 450 | 165.5 | 73.05 | 113.2 | 110.6 | 95.13 | | | | 23.22 | **18.58** |
| 1 | 10 | 70.7 | 117.5 | 340.1 | 246.3 | 113.4 | 170.1 | 160.4 | 160.3 | | | | 19.32 | 3.90 |
| 2 | 20 | 71.07 | 134.2 | 450.2 | 309.8 | 160.2 | 180.2 | 181.6 | 191.8 | | | | 17.51 | 1.81 |
| 3 | 30 | 73.53 | 147.4 | 502.8 | 414.1 | 192.5 | 210.8 | 215.3 | 229.6 | | | | 15.53 | 1.98 |
| 4 | 40 | 73.21 | 170.7 | 615.1 | 503.4 | 211.3 | 259.7 | 266.3 | 272.7 | | | | 13.40 | 2.13 |
| 5 | 50 | 76.94 | 193 | 656.2 | 587.4 | 222 | 330.7 | 332.6 | 335.7 | | | | 11.13 | 2.27 |
| 6 | 60 | 77.89 | 187.7 | 631.4 | 603.2 | 236 | 403.9 | 394.1 | 400.7 | | | | 9.31 | 1.82 |
| 7 | 70 | 76.26 | 178.9 | 603.2 | 570.8 | 258.7 | 475.7 | 438.7 | 455 | | | | 7.84 | 1.47 |
| 8 | 80 | 76.97 | 172.3 | 574.8 | 546.5 | 295.9 | 524.4 | 470.4 | 492.7 | 465.98 | | | 6.49 | 1.35 |
| 9 | 90 | 77.08 | 161.1 | 519.6 | 513.6 | 341.3 | 560.5 | 490.5 | 502.8 | 481.74 | | | 5.42 | 1.07 |
| 10 | 100 | 78.1 | 166 | 491.9 | 479 | 374.4 | 567.5 | 495.7 | 508 | 484.92 | | | 4.64 | 0.78 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: December 10, 2013
Test Run Number: 7

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 33 | | 117 | |
| B - Rear Filter Catch | Filter | 34 | | 117.1 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 251.9 | 234.1 | 17.8 |
| Probe & Filter Holder | Probe | 17 | 139749.7 | 139745.8 | 3.9 |
| | | | Total Particulate, mg | | **21.7** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 35 | | 115.2 | |
| B - Rear Filter Catch | Filter | 36 | | 117.1 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 247.6 | 232.3 | 15.3 |
| Probe & Filter Holder | Probe | 18 | 147887.3 | 147882.1 | 5.2 |
| | | | Total Particulate, mg | | **20.5** |

**Manufacturer:** SBI
**Model:** NG1800
**Date:** 12/10/13
**Run:** 7
**Control #:** G101440749
**Test Duration:** 180 min

| | HHV | LHV |
|---|---|---|
| Eff | 55.41% | 59.89% |
| Comb Eff | 90.45% | 90.45% |
| HT Eff | 61.26% | 66.22% |
| Output | 31,334 | kJ/h |
| Burn Rate | 2.85 | kg/h |
| Grams CO | 1,153 | g |
| Input | 56,545 | kJ/h |
| MC wet | 16.72 | |

Ultimate $CO_2$
$CO_{2\text{-ult}}$ 19.64
$F_0$
1.061

| | |
|---|---|
| Overall Heating Efficiency: | 55.41% |
| Combustion Efficiency: | 90.45% |
| Heat Transfer Efficiency: | 61.26% |

| Air Fuel Ratio (A/F) | |
|---|---|
| Dry Molecular Weight ($M_d$) | 29.69 |
| Dry Moles Exhaust Gas ($N_r$): | 434.21 |
| Air Fuel Ratio (A/F) | 12.38 |

| | | | | |
|---|---|---|---|---|
| Heat Output: | 29,724 | Btu/h | 31,334 | kJ/h |
| Heat Input: | 53,639 | Btu/h | 56,545 | kJ/h |
| Burn Duration: | 3.00 | h | | |
| Burn Rate: | 6.29 | lb/h | 2.854 | kg/h |
| Stack Temp: | 541.0 | Deg. F | 282.8 | Deg. C |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Averages | 1.03 | 7.44 | 1.71 | 20.38 | 12.43 | 281.20 | 25.04 | 88.6% | 63.7% | 56.7% | 15.91 | 3.11 | 69.78 | 2.59 |
| INPUT DATA | | | | Oxygen Calculation | | | Input Data | | Combust | Heat | Net | Air | Wet Wt | % Wet | Dry Wt. |
| Elapsed Time | Weight emaining (k | % CO [e] | % $CO_2$ [d] | Excess Air EA | Total $O_2$ | Calc. % $O_2$ [g] | Flue Gas (ºC) | Room Temp (ºC) | Eff % | Transfer % | Eff % | Fuel Ratio | Now Wt | Consumed x | Now $Wt_{dn}$ |
| 0 | 10.28 | 1.10 | 3.77 | 303.3% | 20.62 | 16.30 | 252.8 | 25.2 | 82.3% | 52.1% | 42.8% | 23.5 | 10.28 | 0.00 | 8.56 |
| 10 | 9.22 | 0.80 | 3.02 | 414.2% | 20.69 | 17.27 | 296.3 | 26.3 | 83.9% | 35.0% | 29.4% | 30.1 | 9.22 | 10.29 | 7.68 |
| 20 | 7.82 | 1.08 | 8.56 | 103.8% | 20.30 | 11.20 | 402.2 | 29.3 | 90.9% | 59.0% | 53.7% | 12.1 | 7.82 | 23.93 | 6.51 |
| 30 | 6.37 | 1.14 | 13.20 | 37.0% | 19.99 | 6.22 | 438.2 | 29.1 | 93.4% | 66.0% | 61.7% | 8.2 | 6.37 | 38.00 | 5.31 |
| 40 | 5.07 | 1.39 | 15.04 | 19.6% | 19.86 | 4.12 | 412.2 | 29.1 | 93.0% | 69.7% | 64.8% | 7.1 | 5.07 | 50.67 | 4.22 |
| 50 | 4.15 | 0.86 | 12.92 | 42.5% | 20.03 | 6.68 | 357.2 | 29.1 | 94.9% | 70.6% | 67.0% | 8.5 | 4.15 | 59.67 | 3.45 |
| 60 | 3.38 | 0.78 | 10.59 | 72.8% | 20.19 | 9.21 | 333.5 | 28.2 | 94.5% | 68.8% | 65.0% | 10.3 | 3.38 | 67.08 | 2.82 |
| 70 | 2.73 | 0.78 | 9.75 | 86.5% | 20.24 | 10.10 | 313.9 | 27.2 | 94.0% | 68.7% | 64.6% | 11.1 | 2.73 | 73.44 | 2.27 |
| 80 | 2.21 | 0.78 | 9.25 | 95.8% | 20.28 | 10.64 | 296.4 | 26.5 | 93.8% | 69.1% | 64.8% | 11.7 | 2.21 | 78.55 | 1.84 |
| 90 | 1.82 | 0.78 | 8.47 | 112.4% | 20.33 | 11.47 | 274.6 | 25.8 | 93.3% | 69.3% | 64.6% | 12.6 | 1.82 | 82.26 | 1.52 |
| 100 | 1.49 | 0.85 | 7.31 | 140.7% | 20.40 | 12.67 | 262.1 | 24.7 | 91.7% | 67.6% | 62.0% | 14.3 | 1.49 | 85.53 | 1.24 |
| 110 | 1.26 | 0.89 | 6.59 | 162.6% | 20.45 | 13.41 | 241.1 | 24.0 | 90.5% | 67.6% | 61.2% | 15.5 | 1.26 | 87.73 | 1.05 |
| 120 | 1.05 | 1.02 | 5.81 | 187.6% | 20.49 | 14.17 | 227.6 | 23.1 | 88.1% | 66.4% | 58.5% | 16.9 | 1.05 | 89.81 | 0.87 |
| 130 | 0.82 | 1.21 | 5.04 | 214.3% | 20.53 | 14.88 | 222.8 | 22.7 | 84.6% | 63.9% | 54.1% | 18.3 | 0.82 | 92.01 | 0.68 |
| 140 | 0.59 | 1.14 | 5.06 | 216.8% | 20.53 | 14.90 | 213.8 | 22.1 | 85.4% | 65.1% | 55.6% | 18.5 | 0.59 | 94.26 | 0.49 |
| 150 | 0.42 | 1.18 | 4.69 | 234.6% | 20.55 | 15.27 | 204.4 | 21.2 | 84.1% | 64.5% | 54.3% | 19.5 | 0.42 | 95.90 | 0.35 |
| 160 | 0.24 | 1.23 | 4.34 | 252.7% | 20.57 | 15.62 | 197.7 | 21.0 | 82.5% | 63.7% | 52.6% | 20.5 | 0.24 | 97.66 | 0.20 |
| 170 | 0.09 | 1.26 | 4.05 | 269.9% | 20.59 | 15.91 | 195.2 | 20.4 | 81.3% | 62.4% | 50.7% | 21.5 | 0.09 | 99.12 | 0.08 |
| 180 | 0.00 | 1.24 | 3.92 | 280.7% | 20.60 | 16.06 | 200.9 | 20.8 | 81.1% | 60.8% | 49.3% | 22.1 | 0.00 | 100.00 | 0.00 |

| %HC | | | | | |
|---|---|---|---|---|---|
| 1.32 | Combustion Efficiency: | 90.45% | | Moisture of Wood (wet basis): | 16.72 |
| | Total Input (kJ): | 169,634 | 160,889 (Btu) | Initial Dry Weight $Wt_{do}$ (kg): | 8.56 |
| | Total Output (kJ): | 94,002 | 89,156 (Btu) | Moisture Content Dry | 20.08 |
| | Efficiency: | 55.41% | | | |
| | Total CO (g): | 1153.35 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Load Weight (kg): | **10.28** | | | | | |
| Fuel Heating | **HHV** | **LHV** | | **HHV** | **LHV** | |
| Value in kJ/kg - CV: | **19,810** | **18,329** | Btu/lb | **8522.5** | **7885.2** | |

| **69.78** | **170382** | **4.06** | **6.87** | **2.74** | **19810.00** | **16.72** | **79.11** | **20.98** | **2.12** | **7.01** | **0.13** | **0.21** | **34.36** | **75.65** | **5.74** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **% Dry** | | **Fuel Properties** | | | | **Mw** | **Mass Balance** | | | | | **kg Wood pe** | | | |
| **Comsumed** | **Total** | **Carbon** | **Hydrogen** | **Oxygen** | **Calorific** | **Moisture** | **(moles/100 mole dry flue gas)** | | | | | **00 mole df** | **Moles per kg** | | |
| **y** | **Input** | **/12= [a]** | **/1= [b]** | **/16= [c]** | **Value** | **Fuel Burnt** | **[h]** | **[u]** | **[w]** | **[j]** | **[k]** | **Nk** | **$CO_2$** | **$O_2$** | **CO** |
| 0.00 | 0 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 78.83 | 20.91 | 1.23 | 3.96 | 0.13 | 0.12 | 30.75 | 132.93 | 8.97 |
| 10.29 | 29021 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 78.91 | 20.93 | 0.96 | 3.13 | 0.09 | 0.10 | 31.53 | 180.29 | 8.35 |
| 23.93 | 23504 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 79.16 | 21.00 | 2.41 | 7.99 | 0.14 | 0.24 | 35.72 | 46.76 | 4.51 |
| 38.00 | 22681 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 79.44 | 21.07 | 3.57 | 11.95 | 0.16 | 0.36 | 37.16 | 17.52 | 3.21 |
| 50.67 | 18377 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 79.45 | 21.07 | 4.09 | 13.67 | 0.20 | 0.41 | 36.92 | 10.11 | 3.41 |
| 59.67 | 13923 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 79.54 | 21.10 | 3.42 | 11.52 | 0.11 | 0.34 | 37.95 | 19.62 | 2.53 |
| 67.08 | 11677 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 79.42 | 21.07 | 2.82 | 9.50 | 0.10 | 0.28 | 37.68 | 32.77 | 2.78 |
| 73.44 | 9731 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 79.37 | 21.05 | 2.62 | 8.79 | 0.10 | 0.26 | 37.44 | 38.80 | 3.00 |
| 78.55 | 7485 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 79.33 | 21.04 | 2.49 | 8.37 | 0.10 | 0.25 | 37.28 | 42.87 | 3.14 |
| 82.26 | 5913 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 79.28 | 21.03 | 2.30 | 7.71 | 0.10 | 0.23 | 36.99 | 50.09 | 3.41 |
| 85.53 | 4641 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 79.17 | 21.00 | 2.03 | 6.78 | 0.10 | 0.20 | 36.10 | 62.56 | 4.20 |
| 87.73 | 3630 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 79.11 | 20.98 | 1.87 | 6.20 | 0.11 | 0.19 | 35.44 | 72.13 | 4.79 |
| 89.81 | 3630 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 79.00 | 20.96 | 1.71 | 5.63 | 0.13 | 0.17 | 34.09 | 83.13 | 5.98 |
| 92.01 | 3780 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 78.87 | 20.92 | 1.58 | 5.11 | 0.15 | 0.16 | 32.13 | 94.87 | 7.71 |
| 94.26 | 3294 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 78.90 | 20.93 | 1.56 | 5.08 | 0.14 | 0.16 | 32.56 | 95.89 | 7.34 |
| 95.90 | 2882 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 78.86 | 20.92 | 1.48 | 4.80 | 0.15 | 0.15 | 31.81 | 103.58 | 8.00 |
| 97.66 | 2732 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 78.81 | 20.91 | 1.41 | 4.53 | 0.15 | 0.14 | 30.94 | 111.35 | 8.77 |
| 99.12 | 2732 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 78.78 | 20.90 | 1.35 | 4.31 | 0.16 | 0.13 | 30.23 | 118.74 | 9.40 |
| 100.00 | 749 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.72 | 78.78 | 20.90 | 1.31 | 4.19 | 0.15 | 0.13 | 30.10 | 123.32 | 9.52 |

Moisture Content $M_{Cwb}$: 16.72

Dry kg : 8.56

CA: 48.73

HY: 6.87

OX: 43.9

| | | | | | | | | | | | | | | | SUMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.71 | 435.95 | 33.09 | 11.15 | 554.35 | 10815.31 | 7868.72 | 7585.25 | 7515.15 | 11003.90 | 9055.84 | 298.19 | 7190.60 | 9940.07 | 31601.22 | 57585.90 |
| of Dry Wood | | | Moisture | Stack Temp | Heat Content Change - Ambient to Stack Temperature Flue Gas Constituent | | | | | | Room Temp | Energy Losses (kJ/kg Flue Gas Consti | | | |
| HC | $N_2$ | $H_2O$ | Present | K | $CO_2$ | $O_2$ | CO | $N_2$ | $CH_4$ | $H_2O$ | K | $CO_2$ | $O_2$ | CO | $N_2$ |
| 1.09 | 642.93 | 32.33 | 11.15 | 525.93 | 9441.39 | 6938.15 | 6705.75 | 6640.06 | 9454.86 | 8011.45 | 298.38 | 290.30 | 922.26 | 2598.39 | 4269.10 |
| 0.93 | 823.93 | 32.67 | 11.15 | 569.48 | 11379.93 | 8288.57 | 7992.28 | 7917.93 | 11558.52 | 9542.52 | 299.43 | 358.83 | 1494.38 | 2430.56 | 6523.80 |
| 0.58 | 330.34 | 33.36 | 11.15 | 675.37 | 16302.93 | 11628.04 | 11149.86 | 11059.37 | 17097.90 | 13292.53 | 302.47 | 582.40 | 543.68 | 1325.75 | 3653.40 |
| 0.44 | 223.65 | 33.64 | 11.15 | 711.37 | 18100.26 | 12824.55 | 12275.01 | 12180.11 | 19169.94 | 14626.77 | 302.21 | 672.66 | 224.69 | 947.68 | 2724.03 |
| 0.48 | 195.03 | 33.56 | 11.15 | 685.32 | 16800.77 | 11961.33 | 11463.79 | 11371.96 | 17667.74 | 13664.97 | 302.26 | 620.27 | 120.98 | 1004.71 | 2217.85 |
| 0.34 | 233.63 | 33.85 | 11.15 | 630.32 | 14129.19 | 10164.50 | 9769.03 | 9684.95 | 14627.92 | 11653.61 | 302.20 | 536.20 | 199.44 | 739.54 | 2262.71 |
| 0.35 | 282.62 | 33.82 | 11.15 | 606.65 | 13038.78 | 9424.49 | 9069.23 | 8988.75 | 13401.73 | 10822.48 | 301.33 | 491.36 | 308.85 | 810.66 | 2540.41 |
| 0.37 | 304.79 | 33.77 | 11.15 | 587.04 | 12156.81 | 8822.27 | 8498.74 | 8421.40 | 12417.97 | 10144.59 | 300.37 | 455.18 | 342.35 | 873.14 | 2566.72 |
| 0.39 | 319.73 | 33.74 | 11.15 | 569.59 | 11376.13 | 8285.24 | 7988.92 | 7914.63 | 11555.89 | 9538.47 | 299.66 | 424.10 | 355.21 | 914.72 | 2530.52 |
| 0.42 | 346.23 | 33.69 | 11.15 | 547.71 | 10402.94 | 7610.57 | 7347.05 | 7276.89 | 10492.63 | 8774.87 | 298.93 | 384.80 | 381.20 | 989.01 | 2519.50 |
| 0.51 | 391.03 | 33.50 | 11.15 | 535.21 | 9878.79 | 7246.81 | 7000.86 | 6932.95 | 9920.84 | 8362.99 | 297.84 | 356.65 | 453.34 | 1217.40 | 2710.98 |
| 0.58 | 425.48 | 33.36 | 11.15 | 514.26 | 8967.03 | 6606.76 | 6389.80 | 6326.28 | 8942.14 | 7635.36 | 297.17 | 317.83 | 476.55 | 1385.22 | 2691.72 |
| 0.74 | 463.52 | 33.05 | 11.15 | 500.71 | 8400.58 | 6207.66 | 6008.38 | 5947.69 | 8337.32 | 7181.05 | 296.29 | 286.37 | 516.07 | 1729.58 | 2756.89 |
| 0.97 | 502.74 | 32.58 | 11.15 | 495.98 | 8211.06 | 6074.08 | 5880.70 | 5820.96 | 8135.05 | 7028.98 | 295.82 | 263.80 | 576.23 | 2228.13 | 2926.45 |
| 0.92 | 507.72 | 32.69 | 11.15 | 486.93 | 7837.36 | 5809.16 | 5627.11 | 5569.33 | 7739.58 | 6726.78 | 295.22 | 255.20 | 557.02 | 2117.30 | 2827.67 |
| 1.00 | 534.84 | 32.52 | 11.15 | 477.59 | 7463.50 | 5543.71 | 5372.88 | 5317.10 | 7344.85 | 6423.80 | 294.37 | 237.41 | 574.23 | 2307.84 | 2843.80 |
| 1.10 | 561.92 | 32.32 | 11.15 | 470.87 | 7181.99 | 5342.34 | 5179.64 | 5125.46 | 7050.90 | 6193.38 | 294.12 | 222.24 | 594.86 | 2527.19 | 2880.11 |
| 1.18 | 588.00 | 32.16 | 11.15 | 468.37 | 7094.39 | 5280.51 | 5120.52 | 5066.79 | 6957.60 | 6122.95 | 293.58 | 214.45 | 627.03 | 2709.52 | 2979.27 |
| 1.19 | 604.94 | 32.14 | 11.15 | 474.04 | 7327.17 | 5446.99 | 5280.27 | 5225.22 | 7200.74 | 6313.44 | 293.90 | 220.56 | 671.71 | 2744.87 | 3160.97 |

| | | | AVERAGE | SUMS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 12221.69 | 33362.03 | 11237.24 | 8586.25 | 75632.02 | 16198.22 | 59433.8 | 94750.1 | 16198.2 | 1153.4 | 81.6 |
| of Dry Fuel) | | | Total | | | | | | | |
| tuent | | | Loss | Total | Chemical | Sensible an | Total | Chem | Grams Produced | |
| $CH_4$ | $H_2O$ Comb | $H_2O$ Fuel M | Rate | Loss | Loss 1 | Latent Loss | Output | Loss 2 | CO | HC |
| 984.06 | 1680.78 | 579.78 | 11324.68 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0.00 |
| 836.35 | 1748.09 | 596.86 | 13988.88 | 20493.11 | 4672 | 15820.73 | 8528 | 4672 | 342.62 | 21.74 |
| 527.82 | 1910.19 | 638.69 | 9181.92 | 10894.12 | 2128 | 8766.34 | 12610 | 2128 | 149.73 | 11.04 |
| 399.80 | 1971.35 | 653.57 | 7593.79 | 8694.21 | 1488 | 7206.23 | 13986 | 1488 | 102.89 | 8.05 |
| 436.76 | 1934.22 | 642.84 | 6977.63 | 6472.75 | 1293 | 5179.75 | 11904 | 1293 | 88.63 | 7.14 |
| 304.60 | 1882.79 | 620.41 | 6545.67 | 4600.41 | 713 | 3887.38 | 9322 | 713 | 49.71 | 3.79 |
| 317.94 | 1852.99 | 611.14 | 6933.36 | 4086.93 | 648 | 3439.29 | 7590 | 648 | 45.81 | 3.32 |
| 337.75 | 1827.64 | 603.58 | 7006.36 | 3441.64 | 580 | 2861.62 | 6289 | 580 | 41.20 | 2.94 |
| 351.00 | 1805.56 | 596.82 | 6977.92 | 2636.67 | 467 | 2169.59 | 4849 | 467 | 33.26 | 2.35 |
| 374.63 | 1776.98 | 588.30 | 7014.44 | 2093.87 | 398 | 1695.58 | 3820 | 398 | 28.47 | 1.99 |
| 460.21 | 1753.12 | 583.71 | 7535.41 | 1765.34 | 385 | 1380.39 | 2876 | 385 | 27.54 | 1.92 |
| 523.02 | 1721.48 | 575.59 | 7691.40 | 1409.54 | 343 | 1066.39 | 2221 | 343 | 24.56 | 1.71 |
| 663.65 | 1690.27 | 570.52 | 8213.35 | 1505.19 | 431 | 1074.32 | 2125 | 431 | 30.71 | 2.17 |
| 872.88 | 1661.47 | 568.83 | 9097.78 | 1736.03 | 582 | 1154.46 | 2044 | 582 | 41.21 | 2.97 |
| 821.65 | 1657.37 | 565.46 | 8801.66 | 1463.34 | 481 | 982.76 | 1830 | 481 | 34.15 | 2.43 |
| 897.47 | 1638.91 | 562.08 | 9061.74 | 1318.26 | 459 | 859.29 | 1564 | 459 | 32.60 | 2.33 |
| 986.21 | 1621.46 | 559.51 | 9391.57 | 1295.27 | 477 | 818.04 | 1437 | 477 | 33.87 | 2.43 |
| 1058.43 | 1611.11 | 558.72 | 9758.52 | 1345.88 | 512 | 833.98 | 1386 | 512 | 36.32 | 2.60 |
| 1067.47 | 1616.25 | 560.85 | 10042.67 | 379.47 | 142 | 237.64 | 369 | 142 | 10.07 | 0.72 |

# Intertek Testing Services NA Ltd

| | |
|---|---|
| **Manufacturer:** | SBI |
| **Model:** | NG1800 |
| **Date:** | 12/10/13 |
| **Run:** | 7 |
| **Control #:** | G101440749 |
| **Test Duration:** | 180 |
| **Output Category:** | 4 |

**Technicians:**

_____

_____

_____

**Test Results in Accordance with CSA B415.1-10**

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 55.4% | 59.9% |
| **Combustion Efficiency** | 90.5% | 90.5% |
| **Heat Transfer Efficiency** | 61% | 66.2% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 31,334 | 29,724 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 2.85 | 6.29 | **(lb/h)** |
| **Input (kJ/h)** | 56,545 | 53,639 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 8.56 | 18.87 | **dry lb** |
| **MC wet (%)** | 16.72 | | |
| **MC dry (%)** | 20.08 | | |
| **Particulate (g )** | 18.777 | | |
| **CO (g)** | 1,153 | | |
| **Test Duration (h)** | 3.00 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | 0.20 | 12.27 |
| **g/kg Dry Fuel** | 2.19 | 134.69 |
| **g/h** | 6.26 | 384.45 |
| **lb/MM Btu Output** | 0.46 | 28.52 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 12.38 |

**Version: 2.4** **15/04/2010**

**TEST FUEL DATA**
**EPA Method 5G-3**

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 10, 2013 |
| Test Run Number: | 7 |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

**PRE-BURN FUEL PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 8 | 0.753 | 24.9 | 22.5 | 24.3 |
| 2 | 8 | 0.795 | 24.3 | 23.0 | 23.1 |
| 3 | 8 | 0.837 | 20.4 | 20.8 | 20.6 |
| 4 | 8 | 0.807 | 22.0 | 21.9 | 22.1 |
| 5 | 8 | 0.873 | 22.1 | 21.6 | 22.7 |
| 6 | 8 | 0.901 | 22.0 | 21.2 | 21.7 |
| 7 | 8 | 0.781 | 21.0 | 21.0 | 21.7 |
| 8 | 8 | 0.786 | 22.5 | 21.0 | 23.0 |
| 9 | 8 | 0.846 | 21.9 | 25.0 | 23.8 |
| 10 | 8 | 0.860 | 20.2 | 20.0 | 20.2 |
| 11 | 8 | 0.939 | 23.8 | 23.0 | 24.2 |
| 12 | 8 | 0.831 | 23.2 | 22.4 | 22.7 |
| 13 | 8 | 0.828 | 24.5 | 21.9 | 23.8 |
| 14 | 17 | 1.816 | 21.7 | 20.9 | 21.7 |
| 15 | 17 | 1.724 | 22.3 | 20.5 | 22.0 |
| 16 | 17 | 1.833 | 21.7 | 21.1 | 21.9 |
| 17 | 17 | 1.996 | 19.9 | 19.1 | 20.6 |
| 18 | 17 | 2.206 | 21.4 | 23.2 | 23.8 |
| Total Weight | | **20.412** | Average, %db | | **22.1** |

| | | | |
|---|---|---|---|
| Allowable Fuel Load Range: | **4.53** | to | **5.67** |

**TEST FUEL LOAD PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 10:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. 2x4 | Weight, Lb. 4x4 | Moisture, %, Dry Basis | |
| 1 | 15 | 1.607 | | 19.3 | 19.4 | 19.5 |
| 2 | 15 | | 3.916 | 22.0 | 19.1 | 20.2 |
| 3 | 15 | 2.073 | | 19.3 | 19.2 | 19.0 |
| 4 | 15 | 1.551 | | 19.3 | 19.4 | 19.0 |
| 5 | 15 | | 3.453 | 20.0 | 20.1 | 20.1 |
| 6 | 15 | 1.964 | | 19.0 | 19.9 | 19.2 |
| 7 | 15 | 1.612 | | 19.5 | 19.2 | 19.5 |
| 8 | 15 | | 4.302 | 22.0 | 22.0 | 22.3 |
| 9 | 15 | 2.195 | | 21.4 | 21.2 | 22.1 |
| Totals | | 11.002 | 11.671 | | | |
| % of Weight | | 48.5 | 51.5 | | | |
| Total weight, wet, lb. | | **22.673** | | Average Moisture, dry | | **20.08** |
| Total weight, dry, kg | | 8.56 | | Average Moisture, wet | | 16.72 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 11, 2013 |
| Test Run Number: | 8 |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **3.03** | |
| Emission-Rate, g/hr: | **7.97** | |
| Adjusted Emission-Rate, g/hr : | **10.19** | |
| Duration of Test, Minutes | 160 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 1261.404 | 1229.146 |
| Dry Gas Meter Ending Reading, $ft^3$ | 1287.285 | 1253.622 |
| Barometric Pressure Correction Factor | 1.002 | 1.002 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 1.004 | 1.005 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **26.091** | **24.501** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **146.962** | |
| Total Tunnel Volume, scf | **23513.953** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 901.222 | 959.724 |
| Sample Particulate Mass, mg | 21.4 | 24.2 |
| Total Emissions, grams | 19.286 | 23.225 |
| Emission-Rate, g/hr | 7.23 | 8.71 |
| Adjusted Emission Rates, g/hr | **9.40** | **10.97** |
| Deviation, % | 7.70% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 82.05 | 86.73 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.0025@5 | 0.004@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 56.18 | |
| Maximum Ambient Temperture, ℉ | 84 | |
| Mimimum Ambient Temperature, ℉ | 72 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 21.37 | |
| Dry-Basis Fuel Load Moisture Content, % | 19.85 | |
| Wet-Basis Fuel Load Moisture Content, % | 16.56 | |
| Coal Bed Range, lb. | 4.30 | 5.30 |
| Actual Coal Bed, Lb. | 4.58 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | December 11, 2013 |
| Test Run No: | 8 |

# Temperature Data

| | |
|---|---|
| Firebox Temp Start | 523 |
| Firebox Temp End | 466.82 |
| Firebox Delta-T | **56.2** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **82.05** | **86.73** |

| Interval | 10 | Duration of Test, Min | **160** |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| **0** | **0** | 71.89 | 124 | 400.7 | 449.5 | 486.6 | 629.1 | 522.6 | 527.2 | | 66.83 | 65.25 | 65.535 | 65.17 |
| **1** | **10** | 73.52 | 190.1 | 581.6 | 487.1 | 500.1 | 552.2 | 490.5 | 505.9 | | 80.64 | 82.44 | 65.765 | 65.34 |
| **2** | **20** | 76.31 | 210.6 | 704.1 | 675.7 | 484.4 | 525.5 | 492.2 | 499.3 | | 81.85 | 85.64 | 65.71 | 65.215 |
| **3** | **30** | 81.22 | 215.7 | 704.2 | 759.9 | 464.8 | 542.5 | 517.6 | 515.1 | | 82.05 | 86.73 | 65.74 | 65.355 |
| **4** | **40** | 83.46 | 207.9 | 696.6 | 773.3 | 445.3 | 582.1 | 554.9 | 544 | | 78.77 | 84.19 | 65.725 | 65.235 |
| **5** | **50** | 83.98 | 192.1 | 639.9 | 733.4 | 431.8 | 643.6 | 580.8 | 577 | | 77.62 | 78.14 | 65.895 | 65.445 |
| **6** | **60** | 83.43 | 174.3 | 569.5 | 661 | 424 | 668.1 | 580.8 | 587.7 | | 74.31 | 73.71 | 65.975 | 65.495 |
| **7** | **70** | 81.41 | 158.8 | 518 | 583.2 | 427.4 | 664.3 | 566 | 587 | | 71.78 | 70.8 | 66.05 | 65.645 |
| **8** | **80** | 79.83 | 154 | 494.7 | 532.6 | 434 | 661.9 | 547.1 | 582.7 | | 70.61 | 70.76 | 66.025 | 65.48 |
| **9** | **90** | 77.48 | 144.4 | 448.1 | 491.9 | 446.8 | 661.5 | 530.7 | 566 | | 69.59 | 70.37 | 66.07 | 65.535 |
| **10** | **100** | 76.39 | 137.5 | 417 | 446.6 | 457.2 | 638.3 | 510.1 | 540.1 | | 68.43 | 69.06 | 66.08 | 65.495 |
| **11** | **110** | 74.56 | 132.8 | 393.9 | 412.5 | 464.6 | 613.6 | 489.5 | 518.3 | | 68.58 | 69.01 | 66.01 | 65.425 |
| **12** | **120** | 74.78 | 132.4 | 383.2 | 390.1 | 467.4 | 597.2 | 472.1 | 503.3 | | 71.21 | 70.93 | 65.97 | 65.41 |
| **13** | **130** | 74.36 | 130.8 | 374.2 | 373.7 | 468.2 | 586.5 | 458.2 | 491.8 | | 73.51 | 71.9 | 65.98 | 65.455 |
| **14** | **140** | 74.16 | 131 | 376 | 367.8 | 468.9 | 584.5 | 450 | 484.4 | | 76.7 | 72.65 | 66.15 | 65.585 |
| **15** | **150** | 73.58 | 130.3 | 374.5 | 363.4 | 468.5 | 586.3 | 445.8 | 478.3 | | 79.01 | 74.02 | 66.105 | 65.575 |
| **16** | **160** | 73.29 | 130 | 370.3 | 361 | 465.7 | 589.3 | 443.1 | 475 | | 79.13 | 74.86 | 66.095 | 65.635 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 11, 2013 |
| Test Run Number: | 8 |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 29.97 | 62 | Meter Box (A) | 1.002 |
| End | 30.00 | 64 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 160 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.0025@5 | 0.004@5 |

| Maximum Vacuum | | Average Gases, % | | |
|---|---|---|---|---|
| Train A | Train B | O2 | CO2 | CO |
| 0.00 | 0.00 | 11.695 | 7.814 | 0.968 |

| Time | Particulate Sampling Data | | | | | | | | | | | | Combustion Gasses, % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg | O2 | CO2 | CO |
| 0 | 0.018 | 0.00 | 0.00 | 0.080 | 21.37 | 21.37 | 1261.404 | 1229.146 | 100.04 | 100.06 | 0.00 | 0.00 | 20.170 | 0.110 | 0.260 |
| 10 | 0.018 | 0.00 | 0.00 | 0.010 | 18.51 | 2.86 | 1262.996 | 1230.622 | 99.98 | 98.00 | 0.00 | 0.00 | 8.990 | 11.580 | 0.670 |
| 20 | 0.018 | 0.00 | 0.00 | 0.011 | 15.16 | 3.35 | 1264.574 | 1232.143 | 100.66 | 102.59 | 0.00 | 0.00 | 4.310 | 15.360 | 1.530 |
| 30 | 0.015 | 0.00 | 0.00 | 0.011 | 11.41 | 3.75 | 1266.089 | 1233.568 | 104.78 | 104.19 | 0.00 | 0.00 | 3.380 | 15.660 | 2.300 |
| 40 | 0.015 | 0.00 | 0.00 | 0.011 | 8.39 | 3.02 | 1267.454 | 1234.912 | 93.86 | 97.72 | 0.00 | 0.00 | 4.110 | 14.050 | 1.180 |
| 50 | 0.018 | 0.00 | 0.00 | 0.010 | 6.23 | 2.16 | 1269.100 | 1236.480 | 103.50 | 104.25 | 0.00 | 0.00 | 7.830 | 11.790 | 0.640 |
| 60 | 0.018 | 0.00 | 0.00 | 0.095 | 4.86 | 1.37 | 1270.750 | 1238.075 | 102.31 | 104.58 | 0.00 | 0.00 | 10.430 | 9.190 | 0.640 |
| 70 | 0.018 | 0.00 | 0.00 | 0.090 | 3.94 | 0.92 | 1272.391 | 1239.671 | 100.49 | 103.33 | 0.00 | 0.00 | 11.740 | 8.210 | 0.620 |
| 80 | 0.018 | 0.00 | 0.00 | 0.088 | 3.22 | 0.72 | 1274.038 | 1241.048 | 100.47 | 88.83 | 0.00 | 0.00 | 11.940 | 7.970 | 0.600 |
| 90 | 0.018 | 0.00 | 0.00 | 0.080 | 2.72 | 0.50 | 1275.690 | 1242.586 | 99.98 | 98.43 | 0.00 | 0.00 | 13.940 | 5.500 | 0.940 |
| 100 | 0.018 | 0.00 | 0.00 | 0.078 | 2.27 | 0.45 | 1277.355 | 1244.133 | 100.18 | 98.44 | 0.00 | 0.00 | 14.160 | 5.130 | 1.010 |
| 110 | 0.018 | 0.00 | 0.00 | 0.075 | 1.81 | 0.46 | 1279.024 | 1245.624 | 100.04 | 94.52 | 0.00 | 0.00 | 14.530 | 4.720 | 1.070 |
| 120 | 0.018 | 0.00 | 0.00 | 0.075 | 1.40 | 0.41 | 1280.688 | 1247.275 | 99.72 | 104.63 | 0.00 | 0.00 | 14.770 | 4.530 | 1.040 |
| 130 | 0.018 | 0.00 | 0.00 | 0.075 | 1.04 | 0.36 | 1282.356 | 1248.823 | 99.82 | 97.96 | 0.00 | 0.00 | 14.610 | 4.750 | 0.970 |
| 140 | 0.018 | 0.00 | 0.00 | 0.073 | 0.63 | 0.41 | 1283.927 | 1250.412 | 94.00 | 100.55 | 0.00 | 0.00 | 14.540 | 4.670 | 1.040 |
| 150 | 0.018 | 0.00 | 0.00 | 0.073 | 0.26 | 0.37 | 1285.719 | 1252.011 | 107.17 | 101.12 | 0.00 | 0.00 | 14.610 | 4.870 | 0.970 |
| 160 | 0.018 | 0.00 | 0.00 | 0.073 | 0.00 | 0.26 | 1287.285 | 1253.622 | 93.63 | 101.84 | 0.00 | 0.00 | 14.760 | 4.740 | 0.970 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 11, 2013 |
| Test Run Number: | 8 |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0100 | 197 | 0.1000 |
| A2 | 0.0125 | 197 | 0.1118 |
| A3 | 0.0150 | 199 | 0.1225 |
| A4 | 0.0150 | 198 | 0.1225 |
| A Center | 0.0150 | 200 | 0.1225 |
| B1 | 0.0100 | 185 | 0.1000 |
| B2 | 0.0150 | 186 | 0.1225 |
| B3 | 0.0150 | 187 | 0.1225 |
| B4 | 0.0150 | 186 | 0.1225 |
| B Center | 0.0175 | 189 | 0.1323 |
| Averages | 0.014 | 192.46 | 0.1155 |

| | | |
|---|---|---|
| Tunnel Diameter | **8.000** | inches |
| Tunnel Static | | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9069 | factor |
| Baro. Pressure | 29.97 | |
| Pitot Factor | **0.99** | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 8.543 | Ft/ Sec |
| Initial Flow | **139.17** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.031792805 | | |
| VS (2) | 0.033856037 | STD Tunnel Flow: | 146.96 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 160 | | | | 618.6294118 | 26.079 | 24.490 | 8.55 | 100.04 | 100.06 |
| Time | Average Firebox Temp | Ending Average Firebox Temp | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 523.0 | | 0.018 | 584 | | | 8.385 | | |
| 10 | 507.2 | | 0.018 | 650.1 | 1.605 | 1.477 | 8.847 | 99.98 | 98.00 |
| 20 | 535.4 | | 0.018 | 670.6 | 1.591 | 1.523 | 8.985 | 100.66 | 102.59 |
| 30 | 560.0 | | 0.015 | 675.7 | 1.527 | 1.426 | 8.350 | 104.78 | 104.19 |
| 40 | 579.9 | | 0.015 | 667.9 | 1.376 | 1.345 | 8.302 | 93.86 | 97.72 |
| 50 | 593.3 | | 0.018 | 652.1 | 1.659 | 1.569 | 8.860 | 103.50 | 104.25 |
| 60 | 584.3 | | 0.018 | 634.3 | 1.663 | 1.596 | 8.739 | 102.31 | 104.58 |
| 70 | 565.6 | | 0.018 | 618.8 | 1.653 | 1.596 | 8.631 | 100.49 | 103.33 |
| 80 | 551.7 | | 0.018 | 614 | 1.659 | 1.378 | 8.598 | 100.47 | 88.83 |
| 90 | 539.4 | | 0.018 | 604.4 | 1.664 | 1.539 | 8.530 | 99.98 | 98.43 |
| 100 | 518.5 | | 0.018 | 597.5 | 1.677 | 1.548 | 8.481 | 100.18 | 98.44 |
| 110 | 499.7 | | 0.018 | 592.8 | 1.682 | 1.492 | 8.448 | 100.04 | 94.52 |
| 120 | 486.0 | | 0.018 | 592.4 | 1.677 | 1.652 | 8.445 | 99.72 | 104.63 |
| 130 | 475.7 | | 0.018 | 590.8 | 1.681 | 1.549 | 8.434 | 99.82 | 97.96 |
| 140 | 471.1 | | 0.018 | 591 | 1.582 | 1.590 | 8.435 | 94.00 | 100.55 |
| 150 | 468.5 | | 0.018 | 590.3 | 1.805 | 1.600 | 8.430 | 107.17 | 101.12 |
| 160 | 466.8 | 466.82 | 0.018 | 590 | 1.578 | 1.611 | 8.428 | 93.63 | 101.84 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| ample ID Number: | **101440749MTL-003** |
| Test Date: | **December 11, 2013** |
| est Run Number: | **8** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.3 | to | 5.3 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 526.5 |

| | |
|---|---|
| Final Coal Bed Wt, lb | 4.58 |

| Interval | 10 |
|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | | Catalyst Outlet | Flue Draft | Fuel Weight | Weight Loss |
| 0 | 0 | 72.91 | 225.3 | 381.1 | 461.3 | 546.1 | 650.3 | 502.6 | 509.7 | | | | 21.61 | **17.03** |
| 1 | 10 | 73.04 | 164.9 | 503.6 | 427.3 | 539.5 | 548.1 | 457.2 | 469.4 | | | | 19.15 | 2.46 |
| 2 | 20 | 74.43 | 180.6 | 567.7 | 536.3 | 518.4 | 503.2 | 451.1 | 451.3 | | | | 16.23 | 2.92 |
| 3 | 30 | 76.39 | 197.1 | 647.8 | 627.7 | 494.6 | 512 | 461.2 | 457.9 | | | | 13.40 | 2.83 |
| 4 | 40 | 79.66 | 188.4 | 678.8 | 709.4 | 474.5 | 550.5 | 489.6 | 485.6 | | | | 10.54 | 2.86 |
| 5 | 50 | 83.54 | 181 | 646.8 | 720 | 460.3 | 602.2 | 517.6 | 518.9 | | | | 8.30 | 2.24 |
| 6 | 60 | 82.7 | 167.4 | 598.2 | 674.5 | 452.8 | 644.5 | 542.8 | 547.1 | | | | 6.66 | 1.64 |
| 7 | 70 | 75.88 | 151.4 | 529.7 | 611.2 | 446.1 | 669.4 | 548 | 553.7 | | | | 5.58 | 1.08 |
| 8 | 80 | 72.43 | 138.9 | 477.2 | 542.5 | 449.1 | 666 | 545.8 | 544.4 | 549.56 | | | 5.00 | 0.58 |
| 9 | 90 | 70.72 | 130.7 | 421.4 | 479 | 473.8 | 653.5 | 532.8 | 534.8 | 534.78 | | | 4.66 | 0.34 |
| 10 | 100 | 71.74 | 125.9 | 407.1 | 458.4 | 481.9 | 636.8 | 525.9 | 529.5 | 526.5 | | | 4.58 | 0.08 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: December 11, 2013
Test Run Number: 8

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 37 | | 117.9 | |
| B - Rear Filter Catch | Filter | 38 | | 116.2 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 252.1 | 234.1 | 18 |
| Probe & Filter Holder | Probe | 19 | 140111.1 | 140107.7 | 3.4 |
| | | | Total Particulate, mg | | **21.4** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 39 | | 117.2 | |
| B - Rear Filter Catch | Filter | 40 | | 118.5 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 253.8 | 235.7 | 18.1 |
| Probe & Filter Holder | Probe | 20 | 139066.0 | 139059.9 | 6.1 |
| | | | Total Particulate, mg | | **24.2** |

**Manufacturer:** SBI
**Model:** NG1800
**Date:** 12/11/13
**Run:** 8
**Control #:** G101440749
**Test Duration:** 160 min

| | HHV | LHV |
|---|---|---|
| Eff | 65.05% | 70.31% |
| Comb Eff | 92.40% | 92.40% |
| HT Eff | 70.40% | 76.09% |
| Output | 39,104 | kJ/h |
| Burn Rate | 3.03 | kg/h |
| Grams CO | 852 | g |
| Input | 60,110 | kJ/h |
| MC wet | 16.56 | |

Ultimate $CO_2$
$CO_{2\text{-ult}}$ 19.64
$F_0$
1.061

| | | | |
|---|---|---|---|
| Overall Heating Efficiency: | 65.05% | | |
| Combustion Efficiency: | 92.40% | | |
| Heat Transfer Efficiency: | 70.40% | | |
| Heat Output: | 37,094 Btu/h | 39,104 | kJ/h |
| Heat Input: | 57,020 Btu/h | 60,110 | kJ/h |
| Burn Duration: | 2.67 h | | |
| Burn Rate: | 6.69 lb/h | 3.034 | kg/h |
| Stack Temp: | 502.9 Deg. F | 261.6 | Deg. C |

| Air Fuel Ratio (A/F) | |
|---|---|
| Dry Molecular Weight ($M_d$) | 29.73 |
| Dry Moles Exhaust Gas ($N_r$): | 420.74 |
| Air Fuel Ratio (A/F) | 12.00 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Averages | 0.97 | 7.81 | 4.48 | 20.36 | 12.06 | 258.25 | 25.15 | 88.2% | 38.9% | 43.6% | 32.37 | 2.75 | 71.59 | 2.30 |
| INPUT DATA | | | | Oxygen Calculation | | | Input Data | | Combust | Heat | Net | Air | Wet Wt | % Wet | Dry Wt. |
| Elapsed Time | Weight emaining (k | % CO [e] | % $CO_2$ [d] | Excess Air EA | Total $O_2$ | Calc. % $O_2$ [g] | Flue Gas (ºC) | Room Temp (ºC) | Eff % | Transfer % | Eff % | Fuel Ratio | Now Wt | Consumed x | Now $Wt_{dn}$ |
| 0 | 9.70 | 0.26 | 0.11 | 5208.9% | 20.92 | 20.68 | 204.8 | 22.2 | 57.3% | -433.6% | -248.3% | 313.8 | 9.70 | 0.00 | 8.09 |
| 10 | 8.40 | 0.67 | 11.58 | 60.4% | 20.13 | 8.22 | 305.3 | 23.1 | 95.6% | 71.9% | 68.7% | 9.6 | 8.40 | 13.40 | 7.01 |
| 20 | 6.88 | 1.53 | 15.36 | 16.3% | 19.82 | 3.70 | 373.4 | 24.6 | 92.5% | 71.9% | 66.4% | 6.9 | 6.88 | 29.07 | 5.74 |
| 30 | 5.18 | 2.30 | 15.66 | 9.4% | 19.75 | 2.94 | 373.4 | 27.3 | 89.4% | 72.1% | 64.4% | 6.4 | 5.18 | 46.61 | 4.32 |
| 40 | 3.81 | 1.18 | 14.05 | 29.0% | 19.93 | 5.29 | 369.2 | 28.6 | 93.6% | 71.1% | 66.5% | 7.7 | 3.81 | 60.74 | 3.18 |
| 50 | 2.83 | 0.64 | 11.79 | 58.0% | 20.12 | 8.01 | 337.7 | 28.9 | 95.8% | 70.4% | 67.5% | 9.5 | 2.83 | 70.85 | 2.36 |
| 60 | 2.21 | 0.64 | 9.19 | 99.8% | 20.29 | 10.78 | 298.6 | 28.6 | 94.8% | 69.0% | 65.5% | 11.9 | 2.21 | 77.26 | 1.84 |
| 70 | 1.79 | 0.62 | 8.21 | 122.5% | 20.36 | 11.84 | 270.0 | 27.5 | 94.5% | 69.3% | 65.5% | 13.3 | 1.79 | 81.57 | 1.49 |
| 80 | 1.46 | 0.60 | 7.97 | 129.2% | 20.37 | 12.10 | 257.1 | 26.6 | 94.5% | 69.8% | 66.0% | 13.7 | 1.46 | 84.93 | 1.22 |
| 90 | 1.23 | 0.94 | 5.50 | 205.0% | 20.51 | 14.54 | 231.2 | 25.3 | 88.5% | 65.1% | 57.6% | 18.0 | 1.23 | 87.27 | 1.03 |
| 100 | 1.03 | 1.01 | 5.13 | 219.9% | 20.53 | 14.90 | 213.9 | 24.7 | 87.0% | 65.7% | 57.1% | 18.8 | 1.03 | 89.38 | 0.86 |
| 110 | 0.82 | 1.07 | 4.72 | 239.3% | 20.56 | 15.30 | 201.1 | 23.6 | 85.4% | 65.5% | 55.9% | 19.8 | 0.82 | 91.53 | 0.69 |
| 120 | 0.64 | 1.04 | 4.53 | 252.7% | 20.57 | 15.52 | 195.1 | 23.8 | 85.3% | 65.4% | 55.8% | 20.6 | 0.64 | 93.45 | 0.53 |
| 130 | 0.47 | 0.97 | 4.75 | 243.4% | 20.56 | 15.33 | 190.1 | 23.5 | 86.6% | 67.1% | 58.1% | 20.1 | 0.47 | 95.13 | 0.39 |
| 140 | 0.29 | 1.04 | 4.67 | 244.0% | 20.56 | 15.37 | 191.1 | 23.4 | 85.6% | 66.6% | 57.0% | 20.1 | 0.29 | 97.05 | 0.24 |
| 150 | 0.12 | 0.97 | 4.87 | 236.4% | 20.55 | 15.20 | 190.3 | 23.1 | 86.9% | 67.5% | 58.6% | 19.7 | 0.12 | 98.78 | 0.10 |
| 160 | 0.00 | 0.97 | 4.74 | 244.0% | 20.56 | 15.34 | 187.9 | 22.9 | 86.6% | 67.2% | 58.2% | 20.2 | 0.00 | 100.00 | 0.00 |

| %HC | | | | | |
|---|---|---|---|---|---|
| 1.32 | Combustion Efficiency: | 92.40% | | Moisture of Wood (wet basis): | 16.56 |
| | Total Input (kJ): | 160,292 | 152,029 (Btu) | Initial Dry Weight $Wt_{do}$ (kg): | 8.09 |
| | Total Output (kJ): | 104,276 | 98,901 (Btu) | Moisture Content Dry | 19.85 |
| | Efficiency: | 65.05% | | | |
| | Total CO (g): | 852.24 | | | |

| | | | | | |
|---|---|---|---|---|---|
| Load Weight (kg): | **9.70** | | | | |
| Fuel Heating | **HHV** | **LHV** | | **HHV** | **LHV** |
| Value in kJ/kg - CV: | **19,810** | **18,329** | Btu/lb | **8522.5** | **7885.2** |

| **71.59** | **161267** | **4.06** | **6.87** | **2.74** | **19810.00** | **16.56** | **79.16** | **21.00** | **2.19** | **7.29** | **0.12** | **0.22** | **33.87** | **195.39** | **6.33** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **% Dry** | | **Fuel Properties** | | | | **Mw** | **Mass Balance** | | | | | **kg Wood pe** | | | |
| **Comsumed** | **Total** | **Carbon** | **Hydrogen** | **Oxygen** | **Calorific** | **Moisture** | **(moles/100 mole dry flue gas)** | | | | | **00 mole df** | **Moles per kg** | | |
| **y** | **Input** | **/12= [a]** | **/1= [b]** | **/16= [c]** | **Value** | **Fuel Burnt** | **[h]** | **[u]** | **[w]** | **[j]** | **[k]** | **Nk** | **$CO_2$** | **$O_2$** | **CO** |
| 0.00 | 0 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 78.95 | 20.94 | 0.09 | 0.31 | 0.00 | 0.01 | 11.98 | 2252.37 | 28.32 |
| 13.40 | 34034 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 79.53 | 21.10 | 3.04 | 10.26 | 0.08 | 0.30 | 38.32 | 27.19 | 2.22 |
| 29.07 | 26624 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 79.41 | 21.06 | 4.21 | 14.04 | 0.22 | 0.42 | 36.64 | 8.83 | 3.65 |
| 46.61 | 25387 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 79.10 | 20.98 | 4.50 | 14.81 | 0.33 | 0.45 | 34.94 | 6.57 | 5.13 |
| 60.74 | 19424 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 79.48 | 21.08 | 3.79 | 12.69 | 0.16 | 0.38 | 37.25 | 14.04 | 3.13 |
| 70.85 | 13237 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 79.56 | 21.10 | 3.08 | 10.42 | 0.08 | 0.31 | 38.46 | 26.13 | 2.09 |
| 77.26 | 8587 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 79.39 | 21.06 | 2.44 | 8.23 | 0.08 | 0.24 | 37.86 | 44.42 | 2.64 |
| 81.57 | 6150 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 79.33 | 21.04 | 2.19 | 7.39 | 0.07 | 0.22 | 37.64 | 54.27 | 2.84 |
| 84.93 | 4575 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 79.33 | 21.04 | 2.13 | 7.17 | 0.07 | 0.21 | 37.66 | 57.19 | 2.83 |
| 87.27 | 3562 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 79.02 | 20.96 | 1.61 | 5.32 | 0.11 | 0.16 | 34.25 | 90.58 | 5.85 |
| 89.38 | 3412 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 78.96 | 20.94 | 1.54 | 5.05 | 0.12 | 0.15 | 33.43 | 97.09 | 6.58 |
| 91.53 | 3262 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 78.91 | 20.93 | 1.46 | 4.75 | 0.13 | 0.15 | 32.53 | 105.47 | 7.37 |
| 93.45 | 2887 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 78.91 | 20.93 | 1.40 | 4.57 | 0.13 | 0.14 | 32.45 | 111.21 | 7.45 |
| 95.13 | 2887 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 78.95 | 20.94 | 1.44 | 4.70 | 0.12 | 0.14 | 33.21 | 107.17 | 6.78 |
| 97.05 | 2925 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 78.92 | 20.93 | 1.44 | 4.68 | 0.13 | 0.14 | 32.65 | 107.49 | 7.27 |
| 98.78 | 3337 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 78.96 | 20.94 | 1.47 | 4.81 | 0.12 | 0.15 | 33.37 | 104.13 | 6.65 |
| 100.00 | 975 | 4.06 | 6.87 | 2.74 | 19810.00 | 16.56 | 78.95 | 20.94 | 1.43 | 4.70 | 0.12 | 0.14 | 33.20 | 107.43 | 6.79 |

Moisture Content $M_{Cwb}$: 16.56

Dry kg : 8.09

CA: 48.73

HY: 6.87

OX: 43.9

| | | | | | | | | | | | | | | | SUMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.61 | 887.05 | 33.31 | 11.03 | 531.40 | 9758.85 | 7134.52 | 6886.26 | 6820.76 | 9853.62 | 8224.13 | 298.30 | 5757.14 | 18834.07 | 31105.83 | 85714.02 |
| | | | | Stack | Heat Content Change - Ambient to Stack Temperature | | | | | | Room | Energy Losses (kJ/kg | | | |
| of Dry Wood | | | Moisture | Temp | Flue Gas Constituent | | | | | | Temp | Flue Gas Consti | | | |
| HC | $N_2$ | $H_2O$ | Present | K | $CO_2$ | $O_2$ | CO | $N_2$ | $CH_4$ | $H_2O$ | K | $CO_2$ | $O_2$ | CO | $N_2$ |
| 0.50 | 8601.21 | 33.51 | 11.03 | 477.98 | 7444.40 | 5527.99 | 5357.27 | 5301.73 | 7329.40 | 6405.02 | 295.31 | 89.21 | 12451.11 | 8165.69 | 45601.33 |
| 0.28 | 263.16 | 33.96 | 11.03 | 578.48 | 11918.19 | 8670.71 | 8358.24 | 8281.02 | 12126.91 | 9978.66 | 296.22 | 456.66 | 235.72 | 645.90 | 2179.26 |
| 0.52 | 189.45 | 33.49 | 11.03 | 646.54 | 15078.27 | 10822.88 | 10395.52 | 10307.39 | 15663.90 | 12398.95 | 297.77 | 552.53 | 95.53 | 1070.90 | 1952.73 |
| 0.74 | 176.49 | 33.05 | 11.03 | 646.59 | 14976.71 | 10744.29 | 10318.57 | 10231.40 | 15570.86 | 12306.69 | 300.49 | 523.33 | 70.58 | 1505.30 | 1805.74 |
| 0.43 | 210.71 | 33.66 | 11.03 | 642.37 | 14725.45 | 10570.02 | 10152.75 | 10066.65 | 15296.52 | 12109.42 | 301.74 | 548.53 | 148.37 | 917.11 | 2121.16 |
| 0.26 | 259.55 | 34.00 | 11.03 | 610.87 | 13211.45 | 9540.22 | 9178.28 | 9097.32 | 13599.10 | 10951.86 | 302.03 | 508.14 | 249.27 | 610.01 | 2361.20 |
| 0.31 | 327.08 | 33.90 | 11.03 | 571.76 | 11397.13 | 8293.62 | 7995.24 | 7921.27 | 11592.37 | 9545.45 | 301.72 | 431.53 | 368.38 | 767.28 | 2590.90 |
| 0.33 | 363.74 | 33.87 | 11.03 | 543.15 | 10132.37 | 7416.91 | 7161.17 | 7092.56 | 10210.38 | 8553.21 | 300.60 | 381.41 | 402.53 | 824.82 | 2579.85 |
| 0.32 | 374.80 | 33.88 | 11.03 | 530.21 | 9582.10 | 7033.58 | 6795.98 | 6729.83 | 9613.22 | 8118.61 | 299.72 | 360.83 | 402.24 | 821.51 | 2522.31 |
| 0.71 | 492.06 | 33.11 | 11.03 | 504.32 | 8478.89 | 6258.19 | 6055.45 | 5994.67 | 8431.10 | 7236.72 | 298.42 | 290.41 | 566.85 | 1692.03 | 2949.76 |
| 0.80 | 514.52 | 32.92 | 11.03 | 487.04 | 7743.26 | 5736.22 | 5555.65 | 5498.78 | 7653.66 | 6641.10 | 297.81 | 258.84 | 556.92 | 1899.03 | 2829.23 |
| 0.91 | 543.86 | 32.71 | 11.03 | 474.21 | 7224.09 | 5366.95 | 5201.84 | 5147.78 | 7106.91 | 6219.39 | 296.79 | 235.02 | 566.07 | 2125.40 | 2799.68 |
| 0.91 | 565.32 | 32.71 | 11.03 | 468.26 | 6962.59 | 5178.94 | 5021.16 | 4968.65 | 6835.95 | 6003.87 | 296.92 | 225.97 | 575.93 | 2145.96 | 2808.88 |
| 0.82 | 552.06 | 32.89 | 11.03 | 463.26 | 6756.26 | 5030.94 | 4879.04 | 4827.73 | 6621.37 | 5834.36 | 296.68 | 224.40 | 539.18 | 1952.51 | 2665.21 |
| 0.89 | 551.80 | 32.75 | 11.03 | 464.26 | 6803.49 | 5065.17 | 4912.00 | 4860.39 | 6669.71 | 5873.70 | 296.57 | 222.16 | 544.46 | 2093.61 | 2681.97 |
| 0.80 | 540.98 | 32.92 | 11.03 | 463.43 | 6779.95 | 5048.86 | 4896.49 | 4844.98 | 6643.98 | 5855.25 | 296.25 | 226.22 | 525.76 | 1913.23 | 2621.02 |
| 0.82 | 553.01 | 32.89 | 11.03 | 461.09 | 6685.89 | 4981.41 | 4831.71 | 4780.75 | 6546.12 | 5778.00 | 296.09 | 221.98 | 535.17 | 1955.55 | 2643.79 |

| | | | AVERAGE | SUMS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 9299.73 | 29563.97 | 9783.16 | 11179.88 | 56016.28 | 12178.48 | 43837.8 | 105251.0 | 12178.5 | 852.2 | 64.1 |
| of Dry Fuel) | | | Total | | | | | | | |
| tuent | | | Loss | Total | Chemical | Sensible an | Total | Chem | Grams Produced | |
| $CH_4$ | $H_2O$ Comb | $H_2O$ Fuel M | Rate | Loss | Loss 1 | Latent Loss | Output | Loss 2 | CO | HC |
| 453.23 | 1688.17 | 555.42 | 69004.16 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0.00 |
| 252.11 | 1832.27 | 594.83 | 6196.74 | 10646.09 | 1505 | 9140.95 | 23388 | 1505 | 106.64 | 7.68 |
| 469.10 | 1887.59 | 621.51 | 6649.89 | 8937.28 | 2008 | 6929.46 | 17687 | 2008 | 137.36 | 11.14 |
| 668.00 | 1859.77 | 620.49 | 7053.21 | 9038.75 | 2703 | 6336.24 | 16348 | 2703 | 184.15 | 15.12 |
| 392.47 | 1887.36 | 618.32 | 6633.32 | 6504.19 | 1246 | 5257.75 | 12920 | 1246 | 85.89 | 6.80 |
| 237.06 | 1867.20 | 605.56 | 6438.44 | 4302.18 | 551 | 3751.35 | 8935 | 551 | 39.06 | 2.80 |
| 282.16 | 1813.97 | 590.05 | 6844.26 | 2966.84 | 444 | 2522.65 | 5620 | 444 | 32.00 | 2.17 |
| 294.47 | 1778.85 | 579.11 | 6841.03 | 2123.72 | 340 | 1783.61 | 4026 | 340 | 24.71 | 1.62 |
| 289.03 | 1764.74 | 574.32 | 6734.97 | 1555.35 | 251 | 1304.05 | 3020 | 251 | 18.33 | 1.19 |
| 635.82 | 1695.29 | 564.59 | 8394.76 | 1509.61 | 411 | 1098.44 | 2053 | 411 | 29.47 | 2.04 |
| 721.07 | 1665.90 | 558.03 | 8489.02 | 1462.28 | 444 | 1018.31 | 1950 | 444 | 31.74 | 2.21 |
| 812.32 | 1641.76 | 553.38 | 8733.62 | 1438.29 | 476 | 961.87 | 1824 | 476 | 34.01 | 2.39 |
| 813.74 | 1634.52 | 551.00 | 8756.00 | 1276.23 | 425 | 851.20 | 1611 | 425 | 30.41 | 2.12 |
| 732.00 | 1638.04 | 549.13 | 8300.47 | 1209.84 | 386 | 824.17 | 1678 | 386 | 27.68 | 1.90 |
| 795.55 | 1632.27 | 549.56 | 8519.58 | 1257.90 | 420 | 837.47 | 1667 | 420 | 30.06 | 2.10 |
| 718.51 | 1640.23 | 549.36 | 8194.33 | 1380.50 | 437 | 943.51 | 1957 | 437 | 31.35 | 2.16 |
| 733.09 | 1636.06 | 548.51 | 8274.13 | 407.22 | 130 | 276.77 | 568 | 130 | 9.36 | 0.64 |

# Intertek Testing Services NA Ltd

| | |
|---|---|
| **Manufacturer:** | SBI |
| **Model:** | NG1800 |
| **Date:** | 12/11/13 |
| **Run:** | 8 |
| **Control #:** | G101440749 |
| **Test Duration:** | 160 |
| **Output Category:** | 4 |

**Technicians:**

_____

_____

_____

**Test Results in Accordance with CSA B415.1-10**

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 65.1% | 70.3% |
| **Combustion Efficiency** | 92.4% | 92.4% |
| **Heat Transfer Efficiency** | 70% | 76.1% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 39,104 | 37,094 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 3.03 | 6.69 | **(lb/h)** |
| **Input (kJ/h)** | 60,110 | 57,020 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 8.09 | 17.83 | **dry lb** |
| **MC wet (%)** | 16.56 | | |
| **MC dry (%)** | 19.85 | | |
| **Particulate (g )** | 21.2555 | | |
| **CO (g)** | 852 | | |
| **Test Duration (h)** | 2.67 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | 0.20 | 8.17 |
| **g/kg Dry Fuel** | 2.63 | 105.33 |
| **g/h** | 7.97 | 319.59 |
| **lb/MM Btu Output** | 0.47 | 18.99 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 12.00 |

**Version: 2.4** **15/04/2010**

**TEST FUEL DATA**
**EPA Method 5G-3**

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | December 11, 2013 |
| Test Run Number: | 8 |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

**PRE-BURN FUEL PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:30 | Temp.,℉: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 8 | 0.795 | 21.7 | 21.0 | 21.7 |
| 2 | 8 | 0.789 | 19.9 | 20.3 | 19.8 |
| 3 | 8 | 0.831 | 19.9 | 19.5 | 20.0 |
| 4 | 8 | 0.796 | 20.5 | 21.5 | 20.2 |
| 5 | 8 | 0.900 | 23.8 | 21.3 | 22.6 |
| 6 | 8 | 0.781 | 23.0 | 21.9 | 22.1 |
| 7 | 8 | 0.785 | 22.0 | 21.5 | 22.0 |
| 8 | 8 | 0.795 | 24.5 | 21.7 | 23.0 |
| 9 | 8 | 0.908 | 19.5 | 20.9 | 20.0 |
| 10 | 8 | 0.776 | 20.1 | 20.5 | 20.3 |
| 11 | 8 | 0.883 | 21.7 | 21.1 | 21.9 |
| 12 | 8 | 1.037 | 22.8 | 22.4 | 19.5 |
| 13 | 8 | 0.822 | 22.5 | 23.0 | 23.0 |
| 14 | 17 | 1.831 | 21.3 | 19.3 | 23.3 |
| 15 | 17 | 2.018 | 22.8 | 21.0 | 22.5 |
| 16 | 17 | 1.889 | 22.7 | 21.9 | 23.0 |
| 17 | 17 | 1.947 | 20.6 | 22.4 | 18.9 |
| 18 | 17 | 1.819 | 22.1 | 20.1 | 22.1 |
| Total Weight | | 20.402 | Average, %db | | 21.5 |

| | | | |
|---|---|---|---|
| Allowable Fuel Load Range: | 4.27 | to | 5.34 |

**TEST FUEL LOAD PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 10:30 | Temp.,℉: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. 2x4 | Weight, Lb. 4x4 | Moisture, %, Dry Basis | |
| 1 | 15 | 1.544 | | 19.0 | 19.2 | 19.0 |
| 2 | 15 | | 3.660 | 22.3 | 18.9 | 20.9 |
| 3 | 15 | 2.050 | | 19.2 | 20.4 | 20.4 |
| 4 | 15 | 1.571 | | 19.2 | 18.7 | 19.2 |
| 5 | 15 | | 3.515 | 20.9 | 20.2 | 19.9 |
| 6 | 15 | 1.760 | | 19.0 | 19.2 | 18.7 |
| 7 | 15 | 1.575 | | 19.0 | 19.8 | 19.9 |
| 8 | 15 | | 3.601 | 22.1 | 18.6 | 20.8 |
| 9 | 15 | 2.097 | | 19.7 | 21.6 | 20.2 |
| Totals | | 10.597 | 10.776 | | | |
| % of Weight | | 49.6 | 50.4 | | | |
| Total weight, wet, lb. | | 21.373 | | Average Moisture, dry | | 19.85 |
| Total weight, dry, kg | | 8.09 | | Average Moisture, wet | | 16.56 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 4, 2014 |
| Test Run Number: | 9 |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **2.19** | |
| Emission-Rate, g/hr: | **1.80** | |
| Adjusted Emission-Rate, g/hr : | **2.96** | |
| Duration of Test, Minutes | 220 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 1287.304 | 1253.65 |
| Dry Gas Meter Ending Reading, $ft^3$ | 1322.658 | 1287.007 |
| Barometric Pressure Correction Factor | 1.017 | 1.017 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 1.009 | 1.010 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **36.342** | **34.045** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **150.600** | |
| Total Tunnel Volume, scf | **33131.911** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 911.669 | 973.188 |
| Sample Particulate Mass, mg | 6.8 | 7.2 |
| Total Emissions, grams | 6.199 | 7.007 |
| Emission-Rate, g/hr | 1.69 | 1.91 |
| Adjusted Emission Rates, g/hr | **2.81** | **3.12** |
| Deviation, % | 5.08% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 87.77 | 82.34 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.002@5 | 0.004@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 106.66 | |
| Maximum Ambient Temperture, ℉ | 76 | |
| Mimimum Ambient Temperature, ℉ | 66 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 21.42 | |
| Dry-Basis Fuel Load Moisture Content, % | 21.15 | |
| Wet-Basis Fuel Load Moisture Content, % | 17.46 | |
| Coal Bed Range, lb. | 4.30 | 5.30 |
| Actual Coal Bed, Lb. | 4.64 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | February 4, 2014 |
| Test Run No: | 9 |

# Temperature Data

| | |
|---|---|
| Firebox Temp Start | 471.3 |
| Firebox Temp End | 364.64 |
| Firebox Delta-T | **106.7** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **87.77** | **82.34** |

| Interval | 10 | Duration of Test, Min | 220 |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| 0 | 0 | 71.07 | 112.3 | 401.9 | 407.6 | 416.5 | 556.6 | 482.3 | 493.5 | | 65.93 | 65.63 | 62.39 | 62.25 |
| 1 | 10 | 75.61 | 134.9 | 505.1 | 367.4 | 412 | 476.6 | 450.1 | 453.3 | | 78.59 | 71.68 | 62.63 | 62.43 |
| 2 | 20 | 68.93 | 163.1 | 673.5 | 505.7 | 395.9 | 461.7 | 424.4 | 437 | | 87.77 | 80.1 | 62.71 | 62.55 |
| 3 | 30 | 70.89 | 172.8 | 715 | 606.6 | 378.4 | 493.9 | 443.8 | 463.5 | | 81.53 | 82.34 | 62.82 | 62.84 |
| 4 | 40 | 75.49 | 164.3 | 687.6 | 625.7 | 363.4 | 538.9 | 476.2 | 502.5 | | 86.36 | 80.6 | 62.98 | 62.95 |
| 5 | 50 | 76.19 | 151.8 | 614.5 | 578 | 351.8 | 585.3 | 508.2 | 530.6 | | 84.25 | 77.24 | 63.1 | 62.87 |
| 6 | 60 | 75.11 | 142.9 | 579 | 537.5 | 341.4 | 610.7 | 524.8 | 552.1 | | 82.61 | 74.8 | 63.25 | 62.99 |
| 7 | 70 | 74.14 | 136.4 | 549.9 | 503.3 | 331.5 | 623.4 | 527.8 | 565.3 | | 82.19 | 73.07 | 63.35 | 62.93 |
| 8 | 80 | 72.69 | 129.9 | 514.4 | 474.3 | 323.3 | 635.9 | 526.3 | 568.1 | | 81.9 | 72.94 | 63.4 | 62.95 |
| 9 | 90 | 70.66 | 122.1 | 473.8 | 440.8 | 316 | 647 | 524 | 555.4 | | 81.27 | 72.94 | 63.53 | 63.13 |
| 10 | 100 | 69.91 | 115.9 | 443.6 | 405.8 | 310.8 | 631.7 | 517.4 | 539.6 | | 80 | 72.01 | 63.53 | 62.7 |
| 11 | 110 | 68.91 | 110.8 | 415.7 | 378.8 | 307.1 | 618.6 | 502.4 | 523.5 | | 78.55 | 71.69 | 63.56 | 62.72 |
| 12 | 120 | 68.52 | 107.2 | 393 | 353.9 | 303.9 | 602.5 | 486.3 | 504.7 | | 77.16 | 70.87 | 63.49 | 62.69 |
| 13 | 130 | 69.1 | 105.1 | 379.1 | 335.5 | 301.4 | 599 | 472.9 | 490.9 | | 76.14 | 70.15 | 63.47 | 62.89 |
| 14 | 140 | 66.13 | 102.2 | 366.2 | 322.2 | 297.9 | 594.1 | 461.3 | 478.1 | | 75.44 | 69.88 | 63.44 | 62.82 |
| 15 | 150 | 67.74 | 100.3 | 351.7 | 309.9 | 295.4 | 584 | 451.4 | 466.2 | | 74.73 | 69.71 | 63.43 | 62.88 |
| 16 | 160 | 66.59 | 98.05 | 341.4 | 297.6 | 291.1 | 573.4 | 440 | 453.2 | | 73.86 | 69.45 | 63.47 | 62.91 |
| 17 | 170 | 66.26 | 96.46 | 332.5 | 288.9 | 288.2 | 563.1 | 428.7 | 442.1 | | 73.21 | 69.07 | 63.43 | 62.93 |
| 18 | 180 | 71.7 | 97.65 | 331.1 | 283.3 | 286 | 556.1 | 418.8 | 432.6 | | 73.06 | 68.87 | 63.46 | 63.09 |
| 19 | 190 | 67.12 | 95.8 | 329.6 | 279.7 | 283.4 | 553.6 | 411.7 | 428.2 | | 72.97 | 68.98 | 63.49 | 63.01 |
| 20 | 200 | 72.35 | 96.06 | 322.1 | 277 | 281.4 | 544.7 | 406.3 | 424.2 | | 72.91 | 68.74 | 63.47 | 62.87 |
| 21 | 210 | 66.18 | 92.26 | 304.5 | 268.9 | 278.7 | 521.1 | 400.7 | 415.8 | | 72.51 | 68.26 | 63.47 | 62.77 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 | 220 | 70.41 | 91.4 | 290.9 | 259.3 | 276.6 | 492.6 | 393.6 | 401.1 | | 71.73 | 68.07 | 63.42 | 62.77 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 4, 2014 |
| Test Run Number: | 9 |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 30.42 | 59 | Meter Box (A) | 1.002 |
| End | 30.42 | 56 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 220 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.002@5 | 0.004@5 |

| Maximum Vacuum | | Average Gases, % | | |
|---|---|---|---|---|
| Train A | Train B | O2 | CO2 | CO |
| 0.00 | 0.00 | 12.872 | 6.779 | 1.027 |

| Time | Particulate Sampling Data | | | | | | | | | | | | Combustion Gasses, % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg | O2 | CO2 | CO |
| 0 | 0.015 | 0.00 | 0.00 | 0.073 | 21.42 | 21.42 | 1287.304 | 1253.650 | 99.94 | 99.94 | 0.00 | 0.00 | 17.540 | 0.730 | 0.830 |
| 10 | 0.015 | 0.00 | 0.00 | 0.088 | 19.94 | 1.48 | 1288.900 | 1255.083 | 100.77 | 95.85 | 0.00 | 0.00 | 10.050 | 10.480 | 0.710 |
| 20 | 0.015 | 0.00 | 0.00 | 0.100 | 16.93 | 3.01 | 1290.457 | 1256.555 | 100.59 | 100.74 | 0.00 | 0.00 | 4.880 | 16.050 | 0.840 |
| 30 | 0.015 | 0.00 | 0.00 | 0.103 | 13.61 | 3.32 | 1292.068 | 1258.008 | 104.87 | 100.15 | 0.00 | 0.00 | 3.870 | 16.080 | 1.260 |
| 40 | 0.015 | 0.00 | 0.00 | 0.100 | 10.87 | 2.74 | 1293.558 | 1259.400 | 96.31 | 95.28 | 0.00 | 0.00 | 6.290 | 14.300 | 0.530 |
| 50 | 0.015 | 0.00 | 0.00 | 0.095 | 8.93 | 1.94 | 1295.124 | 1260.910 | 100.18 | 102.33 | 0.00 | 0.00 | 8.820 | 11.810 | 0.520 |
| 60 | 0.015 | 0.00 | 0.00 | 0.093 | 7.34 | 1.59 | 1296.697 | 1262.480 | 99.86 | 105.60 | 0.00 | 0.00 | 10.230 | 10.240 | 0.540 |
| 70 | 0.015 | 0.00 | 0.00 | 0.090 | 6.02 | 1.32 | 1298.270 | 1264.031 | 99.31 | 103.77 | 0.00 | 0.00 | 10.890 | 9.410 | 0.550 |
| 80 | 0.015 | 0.00 | 0.00 | 0.085 | 5.02 | 1.00 | 1299.871 | 1265.563 | 100.51 | 101.93 | 0.00 | 0.00 | 11.950 | 8.460 | 0.590 |
| 90 | 0.015 | 0.00 | 0.00 | 0.080 | 4.27 | 0.75 | 1301.510 | 1267.079 | 102.19 | 100.17 | 0.00 | 0.00 | 12.790 | 7.170 | 0.690 |
| 100 | 0.015 | 0.00 | 0.00 | 0.775 | 3.70 | 0.57 | 1303.120 | 1268.518 | 99.84 | 94.65 | 0.00 | 0.00 | 13.150 | 6.710 | 0.820 |
| 110 | 0.015 | 0.00 | 0.00 | 0.075 | 3.23 | 0.47 | 1304.746 | 1270.090 | 100.38 | 102.93 | 0.00 | 0.00 | 14.100 | 5.290 | 1.110 |
| 120 | 0.015 | 0.00 | 0.00 | 0.073 | 2.86 | 0.37 | 1306.367 | 1271.588 | 99.77 | 97.78 | 0.00 | 0.00 | 14.300 | 5.010 | 1.240 |
| 130 | 0.015 | 0.00 | 0.00 | 0.070 | 2.47 | 0.39 | 1307.992 | 1273.070 | 99.84 | 96.52 | 0.00 | 0.00 | 14.440 | 4.740 | 1.310 |
| 140 | 0.015 | 0.00 | 0.00 | 0.070 | 2.13 | 0.34 | 1309.625 | 1274.625 | 100.08 | 101.03 | 0.00 | 0.00 | 14.940 | 4.100 | 1.410 |
| 150 | 0.015 | 0.00 | 0.00 | 0.068 | 1.80 | 0.33 | 1311.253 | 1276.212 | 99.60 | 102.92 | 0.00 | 0.00 | 15.380 | 3.610 | 1.420 |
| 160 | 0.015 | 0.00 | 0.00 | 0.065 | 1.48 | 0.32 | 1312.876 | 1277.777 | 99.09 | 101.29 | 0.00 | 0.00 | 15.630 | 3.420 | 1.410 |
| 170 | 0.015 | 0.00 | 0.00 | 0.065 | 1.20 | 0.28 | 1314.510 | 1279.310 | 99.63 | 99.07 | 0.00 | 0.00 | 15.770 | 3.240 | 1.470 |
| 180 | 0.015 | 0.00 | 0.00 | 0.065 | 0.87 | 0.33 | 1316.140 | 1280.850 | 99.48 | 99.60 | 0.00 | 0.00 | 15.430 | 3.740 | 1.320 |
| 190 | 0.015 | 0.00 | 0.00 | 0.055 | 0.58 | 0.29 | 1317.763 | 1282.394 | 98.89 | 99.71 | 0.00 | 0.00 | 15.690 | 3.510 | 1.320 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **200** | **0.015** | **0.00** | **0.00** | **0.055** | **0.31** | **0.27** | 1319.399 | 1283.929 | **99.72** | **99.18** | **0.00** | **0.00** | **16.010** | **3.200** | **1.300** |
| **210** | **0.015** | **0.00** | **0.00** | **0.060** | **0.07** | **0.24** | 1321.031 | 1285.431 | **99.10** | **96.73** | **0.00** | **0.00** | **16.920** | **2.280** | **1.260** |
| **220** | **0.015** | **0.00** | **0.00** | **0.060** | **0.00** | **0.07** | 1322.658 | 1287.007 | **98.75** | **101.42** | **0.00** | **0.00** | **16.980** | **2.330** | **1.180** |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 4, 2014 |
| Test Run Number: | 9 |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0125 | 146 | 0.1118 |
| A2 | 0.0125 | 142 | 0.1118 |
| A3 | 0.0150 | 145 | 0.1225 |
| A4 | 0.0150 | 145 | 0.1225 |
| A Center | 0.0150 | 145 | 0.1225 |
| B1 | 0.0150 | 142 | 0.1225 |
| B2 | 0.0100 | 141 | 0.1000 |
| B3 | 0.0150 | 142 | 0.1225 |
| B4 | 0.0150 | 142 | 0.1225 |
| B Center | 0.0150 | 143 | 0.1225 |
| Averages | 0.014 | 143.22 | 0.1170 |

| | | |
|---|---|---|
| Tunnel Diameter | **8.000** | inches |
| Tunnel Static | **-0.095** | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9553 | factor |
| Baro. Pressure | 30.42 | |
| Pitot Factor | **0.99** | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 8.252 | Ft/ Sec |
| Initial Flow | **147.59** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.023056231 | | |
| VS (2) | 0.024611302 | STD Tunnel Flow: | 150.60 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 220 | | | | 579.1165217 | 36.324 | 34.029 | 8.08 | 99.94 | 99.94 |
| Time | Average Firebox Temp | Ending Average Firebox Temp | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 471.3 | | 0.015 | 572.3 | | | 8.038 | | |
| 10 | 431.9 | | 0.015 | 594.9 | 1.642 | 1.463 | 8.195 | 100.77 | 95.85 |
| 20 | 444.9 | | 0.015 | 623.1 | 1.602 | 1.503 | 8.387 | 100.59 | 100.74 |
| 30 | 477.2 | | 0.015 | 632.8 | 1.657 | 1.482 | 8.452 | 104.87 | 100.15 |
| 40 | 501.3 | | 0.015 | 624.3 | 1.532 | 1.420 | 8.395 | 96.31 | 95.28 |
| 50 | 510.8 | | 0.015 | 611.8 | 1.610 | 1.540 | 8.310 | 100.18 | 102.33 |
| 60 | 513.3 | | 0.015 | 602.9 | 1.616 | 1.601 | 8.250 | 99.86 | 105.60 |
| 70 | 510.3 | | 0.015 | 596.4 | 1.616 | 1.582 | 8.205 | 99.31 | 103.77 |
| 80 | 505.6 | | 0.015 | 589.9 | 1.645 | 1.563 | 8.160 | 100.51 | 101.93 |
| 90 | 496.6 | | 0.015 | 582.1 | 1.683 | 1.546 | 8.106 | 102.19 | 100.17 |
| 100 | 481.1 | | 0.015 | 575.9 | 1.654 | 1.468 | 8.063 | 99.84 | 94.65 |
| 110 | 466.1 | | 0.015 | 570.8 | 1.670 | 1.604 | 8.027 | 100.38 | 102.93 |
| 120 | 450.3 | | 0.015 | 567.2 | 1.665 | 1.529 | 8.002 | 99.77 | 97.78 |
| 130 | 439.9 | | 0.015 | 565.1 | 1.669 | 1.512 | 7.987 | 99.84 | 96.52 |
| 140 | 430.7 | | 0.015 | 562.2 | 1.677 | 1.586 | 7.966 | 100.08 | 101.03 |
| 150 | 421.4 | | 0.015 | 560.3 | 1.672 | 1.619 | 7.953 | 99.60 | 102.92 |
| 160 | 411.1 | | 0.015 | 558.05 | 1.667 | 1.596 | 7.937 | 99.09 | 101.29 |
| 170 | 402.2 | | 0.015 | 556.46 | 1.678 | 1.564 | 7.926 | 99.63 | 99.07 |
| 180 | 395.4 | | 0.015 | 557.65 | 1.674 | 1.570 | 7.934 | 99.48 | 99.60 |
| 190 | 391.3 | | 0.015 | 555.8 | 1.667 | 1.575 | 7.921 | 98.89 | 99.71 |
| 200 | 386.7 | | 0.015 | 556.06 | 1.681 | 1.566 | 7.923 | 99.72 | 99.18 |
| 210 | 377.0 | | 0.015 | 552.26 | 1.676 | 1.533 | 7.896 | 99.10 | 96.73 |
| 220 | 364.6 | 364.64 | 0.015 | 551.4 | 1.671 | 1.608 | 7.890 | 98.75 | 101.42 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| ample ID Number: | **101440749MTL-003** |
| Test Date: | **February 4, 2014** |
| Test Run Number: | **9** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.3 | to | 5.3 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 475.58 |

| | |
|---|---|
| Final Coal Bed Wt, lb | 4.64 |

| | |
|---|---|
| Interval | 10 |

| Time | | Temperature Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Flue Draft | Fuel Weight | Weight Loss |
| 0 | 0 | 66.47 | 174.1 | 394.9 | 282.2 | 436.3 | 427.5 | 352.4 | 370.3 | | | 20.90 | **16.26** |
| 1 | 10 | 66.67 | 126.2 | 496.8 | 322 | 449.9 | 456.1 | 342.1 | 364.1 | | | 18.71 | 2.19 |
| 2 | 20 | 66.2 | 137.3 | 557.5 | 418.3 | 457.9 | 464.3 | 350.4 | 376.2 | | | 16.00 | 2.71 |
| 3 | 30 | 66.86 | 141 | 582.2 | 459.2 | 454.5 | 449.2 | 363.6 | 388.4 | | | 13.67 | 2.33 |
| 4 | 40 | 68.29 | 147.5 | 599.5 | 488.2 | 444.7 | 466.2 | 388.5 | 404.2 | | | 11.41 | 2.26 |
| 5 | 50 | 67.67 | 149.8 | 619 | 505.6 | 430.2 | 496.9 | 433.6 | 432.8 | | | 9.07 | 2.34 |
| 6 | 60 | 67.99 | 143.2 | 588.2 | 509.7 | 420 | 532.9 | 470 | 461.2 | | | 7.33 | 1.74 |
| 7 | 70 | 68 | 136.8 | 555.7 | 486.7 | 414.8 | 560.6 | 490.1 | 486.3 | | | 5.92 | 1.41 |
| 8 | 80 | 67.41 | 125.3 | 496.2 | 455.3 | 411.8 | 570.7 | 493.6 | 499.4 | | | 5.03 | 0.89 |
| 9 | 90 | 70.26 | 113.9 | 411.1 | 416.1 | 416.1 | 564.2 | 484.9 | 496.6 | | | 4.64 | 0.39 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: February 4, 2014
Test Run Number: 9

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 49 | | 119.7 | |
| B - Rear Filter Catch | Filter | 50 | | 119.1 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 244.4 | 238.8 | 5.6 |
| Probe & Filter Holder | Probe | 17 | 139746.7 | 139745.5 | 1.2 |
| | | | Total Particulate, mg | | **6.8** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 51 | | 117.2 | |
| B - Rear Filter Catch | Filter | 52 | | 119.6 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 242.8 | 236.8 | 6 |
| Probe & Filter Holder | Probe | 18 | 147884.8 | 147883.6 | 1.2 |
| | | | Total Particulate, mg | | **7.2** |

**Manufacturer:** SBI
**Model:** NG1800
**Date:** 02/04/14
**Run:** 9
**Control #:** G101440749
**Test Duration:** 220 min

| | HHV | LHV |
|---|---|---|
| Eff | 65.27% | 70.55% |
| Comb Eff | 92.78% | 92.78% |
| HT Eff | 70.35% | 76.04% |
| Output | 28,286 | kJ/h |
| Burn Rate | 2.19 | kg/h |
| Grams CO | 811 | g |
| Input | 43,334 | kJ/h |
| MC wet | 17.46 | |

Ultimate $CO_2$
$CO_{2\text{-ult}}$ 19.64
$F_0$
1.061

| | | |
|---|---|---|
| Overall Heating Efficiency: | 65.27% | |
| Combustion Efficiency: | 92.78% | |
| Heat Transfer Efficiency: | 70.35% | |

| Air Fuel Ratio (A/F) | |
|---|---|
| Dry Molecular Weight ($M_d$) | 29.61 |
| Dry Moles Exhaust Gas ($N_r$): | 465.70 |
| Air Fuel Ratio (A/F) | 13.28 |

| | | | | |
|---|---|---|---|---|
| Heat Output: | 26,832 | Btu/h | 28,286 | kJ/h |
| Heat Input: | 41,107 | Btu/h | 43,334 | kJ/h |
| Burn Duration: | 3.67 | h | | |
| Burn Rate: | 4.82 | lb/h | 2.187 | kg/h |
| Stack Temp: | 450.6 | Deg. F | 232.6 | Deg. C |

| | INPUT DATA | | | Oxygen Calculation | | | Input Data | | Combust | Heat | Net | Air | Wet Wt | % Wet | Dry Wt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Weight emaining (k | % CO [e] | % $CO_2$ [d] | Excess Air EA | Total $O_2$ | Calc. % $O_2$ [g] | Flue Gas (ºC) | Room Temp (ºC) | Eff % | Transfer % | Eff % | Fuel Ratio | Now Wt | Consumed x | Now $Wt_{dn}$ |
| Averages | 1.03 | 6.78 | 2.45 | 20.42 | 13.13 | 231.40 | 21.39 | 85.0% | 62.2% | 54.2% | 19.97 | 2.66 | 72.58 | 2.20 | |
| 0 | 9.72 | 0.83 | 0.73 | 1159.2% | 20.84 | 19.69 | 205.5 | 21.7 | 60.7% | -28.6% | -17.4% | 71.1 | 9.72 | 0.00 | 8.02 |
| 10 | 9.05 | 0.71 | 10.48 | 75.5% | 20.20 | 9.37 | 262.8 | 24.2 | 94.9% | 73.2% | 69.5% | 10.5 | 9.05 | 6.90 | 7.47 |
| 20 | 7.68 | 0.84 | 16.05 | 16.3% | 19.82 | 3.35 | 356.4 | 20.5 | 95.9% | 73.1% | 70.0% | 7.0 | 7.68 | 20.95 | 6.34 |
| 30 | 6.18 | 1.26 | 16.08 | 13.3% | 19.80 | 3.09 | 379.4 | 21.6 | 93.9% | 71.9% | 67.5% | 6.8 | 6.18 | 36.45 | 5.10 |
| 40 | 4.93 | 0.53 | 14.30 | 32.5% | 19.96 | 5.40 | 364.2 | 24.2 | 97.1% | 71.3% | 69.2% | 8.0 | 4.93 | 49.25 | 4.07 |
| 50 | 4.05 | 0.52 | 11.81 | 59.3% | 20.13 | 8.06 | 323.6 | 24.6 | 96.6% | 70.9% | 68.5% | 9.6 | 4.05 | 58.30 | 3.34 |
| 60 | 3.33 | 0.54 | 10.24 | 82.2% | 20.23 | 9.72 | 303.9 | 24.0 | 96.0% | 70.0% | 67.2% | 10.9 | 3.33 | 65.73 | 2.75 |
| 70 | 2.73 | 0.55 | 9.41 | 97.2% | 20.28 | 10.60 | 287.7 | 23.4 | 95.6% | 69.7% | 66.7% | 11.8 | 2.73 | 71.89 | 2.25 |
| 80 | 2.28 | 0.59 | 8.46 | 117.0% | 20.34 | 11.59 | 268.0 | 22.6 | 94.9% | 69.4% | 65.9% | 13.0 | 2.28 | 76.56 | 1.88 |
| 90 | 1.94 | 0.69 | 7.17 | 149.9% | 20.42 | 12.91 | 245.4 | 21.5 | 93.1% | 68.4% | 63.6% | 14.9 | 1.94 | 80.06 | 1.60 |
| 100 | 1.68 | 0.82 | 6.71 | 160.9% | 20.44 | 13.32 | 228.7 | 21.1 | 91.4% | 68.7% | 62.8% | 15.5 | 1.68 | 82.72 | 1.39 |
| 110 | 1.47 | 1.11 | 5.29 | 206.9% | 20.52 | 14.67 | 213.2 | 20.5 | 86.2% | 65.7% | 56.7% | 18.0 | 1.47 | 84.92 | 1.21 |
| 120 | 1.30 | 1.24 | 5.01 | 214.3% | 20.53 | 14.90 | 200.6 | 20.3 | 84.2% | 66.1% | 55.7% | 18.3 | 1.30 | 86.65 | 1.07 |
| 130 | 1.12 | 1.31 | 4.74 | 224.7% | 20.54 | 15.15 | 192.8 | 20.6 | 82.8% | 66.0% | 54.7% | 18.9 | 1.12 | 88.47 | 0.93 |
| 140 | 0.97 | 1.41 | 4.10 | 256.5% | 20.58 | 15.77 | 185.7 | 19.0 | 79.7% | 63.8% | 50.8% | 20.6 | 0.97 | 90.05 | 0.80 |
| 150 | 0.82 | 1.42 | 3.61 | 290.5% | 20.61 | 16.29 | 177.6 | 19.9 | 77.7% | 62.3% | 48.4% | 22.5 | 0.82 | 91.60 | 0.67 |
| 160 | 0.67 | 1.41 | 3.42 | 306.7% | 20.62 | 16.50 | 171.9 | 19.2 | 77.0% | 61.9% | 47.7% | 23.4 | 0.67 | 93.09 | 0.55 |
| 170 | 0.54 | 1.47 | 3.24 | 317.0% | 20.63 | 16.65 | 166.9 | 19.0 | 75.5% | 61.5% | 46.4% | 23.9 | 0.54 | 94.40 | 0.45 |
| 180 | 0.39 | 1.32 | 3.74 | 288.2% | 20.61 | 16.21 | 166.2 | 22.1 | 79.4% | 65.2% | 51.8% | 22.4 | 0.39 | 95.94 | 0.33 |
| 190 | 0.26 | 1.32 | 3.51 | 306.7% | 20.62 | 16.45 | 165.3 | 19.5 | 78.5% | 63.6% | 49.9% | 23.5 | 0.26 | 97.29 | 0.22 |
| 200 | 0.14 | 1.30 | 3.20 | 336.5% | 20.64 | 16.79 | 161.2 | 22.4 | 77.4% | 62.8% | 48.6% | 25.1 | 0.14 | 98.55 | 0.12 |
| 210 | 0.03 | 1.26 | 2.28 | 454.9% | 20.71 | 17.80 | 151.4 | 19.0 | 72.4% | 55.6% | 40.2% | 31.7 | 0.03 | 99.67 | 0.03 |
| 220 | 0.00 | 1.18 | 2.33 | 459.6% | 20.71 | 17.79 | 143.8 | 21.3 | 74.0% | 58.4% | 43.2% | 32.1 | 0.00 | 100.00 | 0.00 |

| %HC | | | | | |
|---|---|---|---|---|---|
| 1.32 | Combustion Efficiency: | 92.78% | | Moisture of Wood (wet basis): | 17.46 |
| | Total Input (kJ): | 158,890 | 150,699 (Btu) | Initial Dry Weight $Wt_{do}$ (kg): | 8.02 |
| | Total Output (kJ): | 103,714 | 98,367 (Btu) | Moisture Content Dry | 21.15 |
| | Efficiency: | 65.27% | | | |
| | Total CO (g): | 810.59 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Load Weight (kg): | **9.72** | | | | | |
| Fuel Heating | **HHV** | **LHV** | | | **HHV** | **LHV** |
| Value in kJ/kg - CV: | **19,810** | **18,329** | | Btu/lb | **8522.5** | **7885.2** |

| **72.58** | **159149** | **4.06** | **6.87** | **2.74** | **19810.00** | **17.46** | **79.06** | **20.97** | **1.95** | **6.45** | **0.13** | **0.19** | **32.31** | **106.52** | **7.57** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **% Dry** | | **Fuel Properties** | | | | **Mw** | **Mass Balance** | | | | | **kg Wood pe** | | | |
| **Comsumed** | **Total** | **Carbon** | **Hydrogen** | **Oxygen** | **Calorific** | **Moisture** | **(moles/100 mole dry flue gas)** | | | | | **00 mole df** | **Moles per kg** | | |
| **y** | **Input** | **/12= [a]** | **/1= [b]** | **/16= [c]** | **Value** | **Fuel Burnt** | **[h]** | **[u]** | **[w]** | **[j]** | **[k]** | **Nk** | **$CO_2$** | **$O_2$** | **CO** |
| 0.00 | 0 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.75 | 20.89 | 0.41 | 1.22 | 0.09 | 0.04 | 18.06 | 487.28 | 20.54 |
| 6.90 | 22123 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 79.44 | 21.07 | 2.78 | 9.36 | 0.09 | 0.28 | 37.92 | 33.89 | 2.57 |
| 20.95 | 23481 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 79.76 | 21.16 | 4.19 | 14.15 | 0.12 | 0.42 | 38.52 | 8.05 | 2.02 |
| 36.45 | 22479 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 79.57 | 21.11 | 4.31 | 14.46 | 0.18 | 0.43 | 37.46 | 7.19 | 2.94 |
| 49.25 | 17360 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 79.77 | 21.16 | 3.67 | 12.47 | 0.07 | 0.37 | 39.17 | 14.78 | 1.45 |
| 58.30 | 13094 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 79.61 | 21.12 | 3.05 | 10.36 | 0.06 | 0.30 | 38.89 | 26.53 | 1.71 |
| 65.73 | 10794 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 79.50 | 21.09 | 2.67 | 9.05 | 0.06 | 0.27 | 38.54 | 36.58 | 2.03 |
| 71.89 | 8606 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 79.44 | 21.07 | 2.47 | 8.35 | 0.06 | 0.25 | 38.32 | 43.15 | 2.24 |
| 76.56 | 6492 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 79.36 | 21.05 | 2.25 | 7.58 | 0.07 | 0.22 | 37.87 | 51.87 | 2.64 |
| 80.06 | 4896 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 79.23 | 21.02 | 1.96 | 6.56 | 0.08 | 0.19 | 36.86 | 66.34 | 3.55 |
| 82.72 | 3858 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 79.15 | 20.99 | 1.88 | 6.26 | 0.10 | 0.19 | 35.90 | 71.28 | 4.39 |
| 84.92 | 3116 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.93 | 20.94 | 1.61 | 5.25 | 0.14 | 0.16 | 33.02 | 91.59 | 6.93 |
| 86.65 | 2819 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.85 | 20.92 | 1.58 | 5.11 | 0.16 | 0.16 | 31.91 | 94.90 | 7.90 |
| 88.47 | 2708 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.80 | 20.90 | 1.53 | 4.93 | 0.17 | 0.15 | 31.12 | 99.43 | 8.60 |
| 90.05 | 2485 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.72 | 20.88 | 1.40 | 4.45 | 0.18 | 0.14 | 29.41 | 113.12 | 10.11 |
| 91.60 | 2411 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.68 | 20.87 | 1.28 | 4.05 | 0.18 | 0.13 | 28.27 | 127.57 | 11.12 |
| 93.09 | 2226 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.67 | 20.87 | 1.23 | 3.88 | 0.18 | 0.12 | 27.87 | 134.41 | 11.49 |
| 94.40 | 2263 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.64 | 20.86 | 1.21 | 3.77 | 0.19 | 0.12 | 27.00 | 138.78 | 12.25 |
| 95.94 | 2300 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.73 | 20.88 | 1.29 | 4.09 | 0.17 | 0.13 | 29.21 | 126.55 | 10.31 |
| 97.29 | 2077 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.72 | 20.88 | 1.23 | 3.89 | 0.17 | 0.12 | 28.67 | 134.39 | 10.78 |
| 98.55 | 1892 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.71 | 20.88 | 1.15 | 3.62 | 0.16 | 0.11 | 28.01 | 146.99 | 11.38 |
| 99.67 | 1410 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.66 | 20.87 | 0.91 | 2.82 | 0.16 | 0.09 | 25.18 | 196.56 | 13.92 |
| 100.00 | 260 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.46 | 78.70 | 20.88 | 0.90 | 2.80 | 0.14 | 0.09 | 26.03 | 198.71 | 13.18 |

Moisture Content $M_{Cwb}$: 17.46

Dry kg : 8.02

CA: 48.73

HY: 6.87

OX: 43.9

| | | | | | | | | | | | | | | | SUMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.93 | 547.25 | 32.66 | 11.75 | 504.55 | 8711.64 | 6402.81 | 6188.58 | 6127.90 | 8722.03 | 7393.65 | 294.54 | 6805.00 | 12716.48 | 50130.41 | 67068.12 |
| | | | | Stack | Heat Content Change - Ambient to Stack Temperature | | | | | | Room | Energy Losses (kJ/kg | | | |
| of Dry Wood | | | Moisture | Temp | Flue Gas Constituent | | | | | | Temp | Flue Gas Consti | | | |
| HC | $N_2$ | $H_2O$ | Present | K | $CO_2$ | $O_2$ | CO | $N_2$ | $CH_4$ | $H_2O$ | K | $CO_2$ | $O_2$ | CO | $N_2$ |
| 2.21 | 1948.63 | 30.10 | 11.75 | 478.65 | 7490.70 | 5562.13 | 5390.29 | 5334.43 | 7375.52 | 6444.47 | 294.86 | 135.31 | 2710.33 | 5921.82 | 10394.85 |
| 0.32 | 287.48 | 33.88 | 11.75 | 535.98 | 9931.65 | 7285.13 | 7037.77 | 6969.53 | 9974.93 | 8407.05 | 297.38 | 376.64 | 246.91 | 745.15 | 2003.58 |
| 0.28 | 191.39 | 33.96 | 11.75 | 629.54 | 14417.81 | 10390.69 | 9991.18 | 9904.18 | 14886.11 | 11920.15 | 293.67 | 555.31 | 83.65 | 590.59 | 1895.57 |
| 0.42 | 185.38 | 33.69 | 11.75 | 652.59 | 15486.04 | 11109.14 | 10668.82 | 10578.71 | 16101.60 | 12724.37 | 294.76 | 580.12 | 79.84 | 862.00 | 1961.10 |
| 0.19 | 218.53 | 34.15 | 11.75 | 637.37 | 14654.22 | 10537.84 | 10126.72 | 10039.80 | 15181.05 | 12079.94 | 297.31 | 574.05 | 155.76 | 425.57 | 2193.99 |
| 0.21 | 262.19 | 34.11 | 11.75 | 596.76 | 12712.99 | 9213.20 | 8872.09 | 8792.05 | 13013.92 | 10589.22 | 297.70 | 494.45 | 244.42 | 499.81 | 2305.16 |
| 0.24 | 299.24 | 34.05 | 11.75 | 577.04 | 11817.62 | 8598.50 | 8288.88 | 8212.24 | 12022.50 | 9895.92 | 297.10 | 455.48 | 314.52 | 592.03 | 2457.41 |
| 0.26 | 323.48 | 34.01 | 11.75 | 560.87 | 11093.87 | 8098.61 | 7813.78 | 7740.10 | 11227.71 | 9330.89 | 296.56 | 425.07 | 349.46 | 651.26 | 2503.74 |
| 0.30 | 355.25 | 33.92 | 11.75 | 541.15 | 10226.85 | 7496.33 | 7240.45 | 7170.53 | 10283.10 | 8648.73 | 295.76 | 387.29 | 388.83 | 766.52 | 2547.36 |
| 0.41 | 407.28 | 33.70 | 11.75 | 518.59 | 9256.93 | 6817.88 | 6593.36 | 6527.95 | 9236.66 | 7878.40 | 294.63 | 341.17 | 452.30 | 1027.09 | 2658.71 |
| 0.52 | 423.46 | 33.47 | 11.75 | 501.82 | 8528.94 | 6303.76 | 6101.71 | 6040.01 | 8461.96 | 7292.70 | 294.21 | 306.19 | 449.34 | 1268.32 | 2557.70 |
| 0.86 | 492.68 | 32.80 | 11.75 | 486.32 | 7870.13 | 5836.07 | 5653.82 | 5595.63 | 7766.21 | 6758.92 | 293.66 | 259.88 | 534.51 | 1999.97 | 2756.84 |
| 1.00 | 502.31 | 32.53 | 11.75 | 473.71 | 7330.29 | 5450.21 | 5283.62 | 5228.48 | 7201.84 | 6317.51 | 293.44 | 233.94 | 517.22 | 2277.10 | 2626.30 |
| 1.09 | 517.36 | 32.34 | 11.75 | 465.98 | 6984.70 | 5201.26 | 5044.27 | 4991.21 | 6844.77 | 6031.96 | 293.76 | 217.35 | 517.17 | 2477.19 | 2582.24 |
| 1.29 | 564.61 | 31.94 | 11.75 | 458.82 | 6739.65 | 5028.04 | 4878.57 | 4826.77 | 6584.37 | 5834.55 | 292.11 | 198.19 | 568.76 | 2911.29 | 2725.23 |
| 1.42 | 616.26 | 31.69 | 11.75 | 450.76 | 6361.43 | 4753.01 | 4613.49 | 4564.13 | 6199.24 | 5518.09 | 293.01 | 179.87 | 606.35 | 3198.72 | 2812.70 |
| 1.46 | 641.02 | 31.61 | 11.75 | 445.04 | 6142.37 | 4595.48 | 4462.11 | 4414.05 | 5972.29 | 5337.51 | 292.37 | 171.16 | 617.67 | 3302.41 | 2829.50 |
| 1.56 | 655.30 | 31.40 | 11.75 | 440.09 | 5939.82 | 4448.76 | 4320.84 | 4274.05 | 5764.80 | 5168.90 | 292.18 | 160.38 | 617.41 | 3519.60 | 2800.78 |
| 1.30 | 614.83 | 31.92 | 11.75 | 439.32 | 5791.91 | 4335.92 | 4210.73 | 4165.25 | 5625.76 | 5037.03 | 295.21 | 169.16 | 548.72 | 2960.45 | 2560.93 |
| 1.36 | 643.06 | 31.81 | 11.75 | 438.48 | 5853.54 | 4385.19 | 4259.35 | 4213.18 | 5678.76 | 5095.43 | 292.66 | 167.84 | 589.33 | 3097.50 | 2709.34 |
| 1.42 | 688.95 | 31.68 | 11.75 | 434.32 | 5567.11 | 4171.72 | 4052.29 | 4008.30 | 5398.45 | 4847.81 | 295.57 | 155.94 | 613.22 | 3266.40 | 2761.53 |
| 1.71 | 868.86 | 31.10 | 11.75 | 424.54 | 5286.97 | 3972.93 | 3861.94 | 3819.44 | 5102.43 | 4620.96 | 292.14 | 133.14 | 780.93 | 3992.14 | 3318.54 |
| 1.60 | 879.19 | 31.32 | 11.75 | 416.98 | 4882.18 | 3672.83 | 3571.22 | 3531.71 | 4702.83 | 4273.43 | 294.49 | 127.08 | 729.84 | 3777.46 | 3105.03 |

| | | | AVERAGE | SUMS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 19222.65 | 38639.62 | 13883.09 | 9063.71 | 55176.07 | 11471.19 | 43704.9 | 103973.4 | 11471.2 | 810.6 | 58.9 |
| of Dry Fuel) | | | Total | | | | | | | |
| tuent | | | Loss | Total | Chemical | Sensible an | Total | Chem | Grams Produced | |
| $CH_4$ | $H_2O$ Comb | $H_2O$ Fuel M | Rate | Loss | Loss 1 | Latent Loss | Output | Loss 2 | CO | HC |
| 1983.45 | 1517.59 | 592.46 | 23255.80 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0.00 |
| 288.03 | 1774.64 | 615.52 | 6050.48 | 6756.94 | 1130 | 5626.88 | 15366 | 1130 | 80.34 | 5.72 |
| 254.21 | 1898.04 | 656.81 | 5934.19 | 7033.77 | 973 | 6061.26 | 16447 | 973 | 66.90 | 5.33 |
| 377.29 | 1910.00 | 666.26 | 6436.61 | 7303.86 | 1363 | 5940.74 | 15175 | 1363 | 93.26 | 7.56 |
| 170.07 | 1913.90 | 658.69 | 6092.02 | 5338.63 | 507 | 4832.04 | 12022 | 507 | 35.62 | 2.63 |
| 186.90 | 1860.91 | 641.17 | 6232.83 | 4119.86 | 442 | 3677.77 | 8974 | 442 | 31.69 | 2.19 |
| 214.20 | 1833.98 | 633.02 | 6500.65 | 3542.19 | 429 | 3113.61 | 7252 | 429 | 31.01 | 2.07 |
| 231.68 | 1812.65 | 626.38 | 6600.24 | 2867.28 | 375 | 2492.57 | 5739 | 375 | 27.24 | 1.79 |
| 271.51 | 1784.77 | 618.36 | 6764.63 | 2216.69 | 333 | 1883.82 | 4275 | 333 | 24.23 | 1.58 |
| 369.00 | 1747.36 | 609.31 | 7204.93 | 1780.85 | 338 | 1442.49 | 3116 | 338 | 24.55 | 1.62 |
| 471.63 | 1715.88 | 602.43 | 7371.48 | 1435.53 | 333 | 1102.77 | 2422 | 333 | 23.92 | 1.64 |
| 774.59 | 1663.74 | 596.15 | 8585.69 | 1350.45 | 429 | 921.25 | 1765 | 429 | 30.52 | 2.17 |
| 896.24 | 1635.57 | 590.97 | 8777.34 | 1249.11 | 445 | 804.47 | 1570 | 445 | 31.48 | 2.27 |
| 981.03 | 1616.79 | 587.61 | 8979.39 | 1227.42 | 466 | 761.66 | 1480 | 466 | 32.92 | 2.39 |
| 1158.76 | 1590.64 | 585.29 | 9738.16 | 1221.73 | 503 | 718.37 | 1264 | 503 | 35.53 | 2.59 |
| 1269.21 | 1568.28 | 581.57 | 10216.69 | 1243.50 | 536 | 707.01 | 1168 | 536 | 37.90 | 2.76 |
| 1306.92 | 1558.37 | 579.45 | 10365.48 | 1164.56 | 511 | 653.44 | 1061 | 511 | 36.14 | 2.62 |
| 1399.77 | 1542.82 | 577.47 | 10618.23 | 1212.84 | 555 | 658.02 | 1050 | 555 | 39.18 | 2.86 |
| 1163.58 | 1564.50 | 575.92 | 9543.26 | 1107.93 | 473 | 635.03 | 1192 | 473 | 33.51 | 2.41 |
| 1214.43 | 1560.81 | 576.60 | 9915.85 | 1039.78 | 447 | 593.25 | 1038 | 447 | 31.66 | 2.27 |
| 1273.71 | 1546.42 | 573.69 | 10190.91 | 973.21 | 428 | 544.78 | 919 | 428 | 30.43 | 2.17 |
| 1533.05 | 1511.04 | 571.03 | 11839.88 | 842.47 | 389 | 453.77 | 567 | 389 | 27.73 | 1.95 |
| 1433.39 | 1510.90 | 566.94 | 11250.65 | 147.47 | 68 | 79.88 | 112 | 68 | 4.84 | 0.34 |

# Intertek Testing Services NA Ltd

| | |
|---|---|
| **Manufacturer:** | SBI |
| **Model:** | NG1800 |
| **Date:** | 02/04/14 |
| **Run:** | 9 |
| **Control #:** | G101440749 |
| **Test Duration:** | 220 |
| **Output Category:** | 4 |

**Technicians:**

_____

_____

_____

**Test Results in Accordance with CSA B415.1-10**

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 65.3% | 70.5% |
| **Combustion Efficiency** | 92.8% | 92.8% |
| **Heat Transfer Efficiency** | 70% | 76.0% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 28,286 | 26,832 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 2.19 | 4.82 | **(lb/h)** |
| **Input (kJ/h)** | 43,334 | 41,107 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 8.02 | 17.68 | **dry lb** |
| **MC wet (%)** | 17.46 | | |
| **MC dry (%)** | 21.15 | | |
| **Particulate (g )** | 6.603 | | |
| **CO (g)** | 811 | | |
| **Test Duration (h)** | 3.67 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | 0.06 | 7.82 |
| **g/kg Dry Fuel** | 0.82 | 101.06 |
| **g/h** | 1.80 | 221.07 |
| **lb/MM Btu Output** | 0.15 | 18.16 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 13.28 |

**Version: 2.4** **15/04/2010**

Intertek

# TEST FUEL DATA
## EPA Method 5G-3

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 4, 2014 |
| Test Run Number: | 9 |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

**PRE-BURN FUEL PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 16 | 1.745 | 19.0 | 19.8 | 18.9 |
| 2 | 16 | 1.675 | 19.9 | 19.9 | 19.7 |
| 3 | 16 | 1.628 | 20.3 | 19.9 | 19.7 |
| 4 | 16 | 1.603 | 19.4 | 19.7 | 19.3 |
| 5 | 16 | 1.819 | 22.0 | 20.3 | 22.1 |
| 6 | 16 | 1.897 | 22.1 | 21.3 | 22.2 |
| 7 | 16 | 1.829 | 21.7 | 20.2 | 21.7 |
| 8 | 16 | 1.921 | 21.7 | 20.6 | 21.7 |
| 9 | 17 | 1.665 | 20.4 | 20.5 | 20.6 |
| 10 | 17 | 1.68 | 19.9 | 19.9 | 20.3 |
| 11 | 17 | 1.67 | 20.0 | 20.0 | 20.6 |
| 12 | 17 | 1.76 | 20.3 | 20.3 | 21.0 |
| Total Weight | | 20.880 | Average, %db | | 20.5 |

| Allowable Fuel Load Range: | 4.28 | to | 5.35 |
|---|---|---|---|

**TEST FUEL LOAD PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 10:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. 2x4 | Weight, Lb. 4x4 | Moisture, %, Dry Basis | |
| 1 | 15 | 1.560 | | 21.1 | 19.9 | 20.2 |
| 2 | 15 | 1.561 | | 19.0 | 19.9 | 21.0 |
| 3 | 15 | 1.584 | | 21.5 | 20.5 | 21.5 |
| 4 | 15 | 2.034 | | 21.9 | 21.1 | 22.0 |
| 5 | 15 | 1.776 | | 21.6 | 20.0 | 20.9 |
| 6 | 15 | 2.054 | | 21.9 | 21.4 | 22.1 |
| 7 | 15 | | 3.902 | 21.4 | 21.7 | 21.9 |
| 8 | 15 | | 3.179 | 21.0 | 20.9 | 21.0 |
| 9 | 15 | | 3.767 | 21.7 | 21.9 | 21.9 |
| Totals | | 10.569 | 10.848 | | | |
| % of Weight | | 49.3 | 50.7 | | | |
| Total weight, wet, lb. | | 21.417 | | Average Moisture, dry | | 21.15 |
| Total weight, dry, kg | | 8.02 | | Average Moisture, wet | | 17.45 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 5, 2014 |
| Test Run Number: | 10 |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **0.95** | |
| Emission-Rate, g/hr: | **3.85** | |
| Adjusted Emission-Rate, g/hr : | **5.57** | |
| Duration of Test, Minutes | 510 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 1322.678 | 1287.035 |
| Dry Gas Meter Ending Reading, $ft^3$ | 1406.257 | 1367.17 |
| Barometric Pressure Correction Factor | 1.004 | 1.004 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 1.009 | 1.010 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **84.825** | **80.740** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **146.558** | |
| Total Tunnel Volume, scf | **74744.395** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 881.164 | 925.744 |
| Sample Particulate Mass, mg | 36.9 | 35.6 |
| Total Emissions, grams | 32.515 | 32.956 |
| Emission-Rate, g/hr | 3.83 | 3.88 |
| Adjusted Emission Rates, g/hr | **5.54** | **5.60** |
| Deviation, % | 0.56% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 72.77 | 68.93 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0,002@5 | 0,003@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 101.18 | |
| Maximum Ambient Temperture, ℉ | 86 | |
| Mimimum Ambient Temperature, ℉ | 75 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 21.61 | |
| Dry-Basis Fuel Load Moisture Content, % | 21.02 | |
| Wet-Basis Fuel Load Moisture Content, % | 17.37 | |
| Coal Bed Range, lb. | 4.40 | 5.40 |
| Actual Coal Bed, Lb. | 5.3 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | February 5, 2014 |
| Test Run No: | 10 |

# Temperature Data

| | |
|---|---|
| Firebox Temp Start | 415.56 |
| Firebox Temp End | 314.38 |
| Firebox Delta-T | **101.2** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **72.77** | **68.93** |

| Interval | 10 | Duration of Test, Min | **510** |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| 0 | 0 | 80.82 | 101.2 | 287.3 | 345.4 | 421.9 | 475.4 | 412.6 | 422.5 | | 67.64 | 66.21 | 61.99 | 61.79 |
| 1 | 10 | 74.81 | 91.2 | 266.2 | 317.4 | 413.4 | 420.2 | 385.6 | 398.6 | | 70.52 | 66.73 | 62.42 | 61.98 |
| 2 | 20 | 82.19 | 89.11 | 235.7 | 293 | 402.8 | 369.6 | 348.5 | 363.4 | | 70.55 | 67 | 62.58 | 62.15 |
| 3 | 30 | 84.77 | 91.21 | 263.7 | 306.2 | 386.6 | 338.1 | 320.3 | 335.8 | | 70.93 | 67.28 | 62.68 | 62.26 |
| 4 | 40 | 86.11 | 92.85 | 282.3 | 322.5 | 370.8 | 319.6 | 304.8 | 318.7 | | 71.35 | 67.82 | 62.84 | 62.4 |
| 5 | 50 | 78.7 | 92.84 | 297.4 | 338.5 | 353.7 | 310.2 | 291.7 | 313.4 | | 71.71 | 68.1 | 62.9 | 62.46 |
| 6 | 60 | 82.77 | 92.9 | 291.4 | 350.6 | 338.1 | 310.7 | 287 | 312.9 | | 71.74 | 68.02 | 62.86 | 62.49 |
| 7 | 70 | 85.15 | 94.04 | 302.8 | 350.2 | 326 | 311.9 | 295.7 | 318.5 | | 71.9 | 68.05 | 62.91 | 62.55 |
| 8 | 80 | 83.31 | 95.7 | 325.3 | 364.6 | 312.8 | 325.3 | 307.3 | 330.2 | | 72.1 | 68.26 | 63 | 62.58 |
| 9 | 90 | 80.92 | 96.75 | 342.7 | 400.2 | 301.2 | 346.1 | 324.8 | 343.8 | | 72.6 | 68.69 | 63.1 | 62.7 |
| 10 | 100 | 85.73 | 96.75 | 325.1 | 411.3 | 290.4 | 364.7 | 341.1 | 354.5 | | 72.77 | 68.93 | 63.24 | 62.82 |
| 11 | 110 | 84.41 | 96.06 | 321.4 | 404.4 | 280.8 | 366.3 | 346.8 | 359.8 | | 72.62 | 68.8 | 63.19 | 62.76 |
| 12 | 120 | 81.63 | 94.33 | 314.5 | 398.2 | 273 | 366.2 | 349.1 | 363.4 | | 72.48 | 68.73 | 63.13 | 62.73 |
| 13 | 130 | 82.15 | 93.82 | 306.7 | 387.9 | 266.9 | 366.5 | 353.4 | 365.9 | | 72.31 | 68.66 | 63.16 | 62.74 |
| 14 | 140 | 85.14 | 94.47 | 303.2 | 380 | 261.4 | 368.1 | 356.4 | 367.2 | | 72.12 | 68.51 | 63.14 | 62.76 |
| 15 | 150 | 84.24 | 94.25 | 311.3 | 379.2 | 256.7 | 374.2 | 361.4 | 370.5 | | 72.22 | 68.41 | 63.09 | 62.67 |
| 16 | 160 | 80.55 | 93.97 | 317.2 | 389.3 | 252.6 | 383.9 | 366.8 | 377.8 | | 72.26 | 68.3 | 63.22 | 62.75 |
| 17 | 170 | 81.78 | 94.18 | 317.2 | 393.2 | 249.5 | 394.3 | 373.8 | 387.2 | | 72.41 | 68.17 | 63.13 | 62.68 |
| 18 | 180 | 85.96 | 94.73 | 309.1 | 391.2 | 247.7 | 406.3 | 381.6 | 396.5 | | 72.52 | 68.22 | 63.38 | 62.84 |
| 19 | 190 | 84.65 | 93.26 | 304.3 | 385.5 | 246 | 418.6 | 386.4 | 406 | | 72.27 | 68.25 | 63.31 | 62.83 |
| 20 | 200 | 81.97 | 91.81 | 293.6 | 380.8 | 244.7 | 429 | 389.1 | 413.4 | | 72.02 | 68.21 | 63.49 | 62.97 |
| 21 | 210 | 79.86 | 89.35 | 266.4 | 359.7 | 244.5 | 428 | 386.6 | 409.2 | | 71.63 | 68.06 | 63.34 | 62.93 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 | 220 | 85.39 | 89.54 | 251.2 | 335.4 | 245 | 420.6 | 380.2 | 402.1 | | 70.99 | 67.84 | 63.26 | 62.9 |
| 23 | 230 | 83.59 | 87.54 | 241.3 | 318 | 245.9 | 413.5 | 373.5 | 396.3 | | 70.68 | 67.57 | 63.12 | 62.75 |
| 24 | 240 | 78.7 | 85.69 | 236 | 304.7 | 247.1 | 409.3 | 369.2 | 392.1 | | 70.34 | 67.4 | 63.2 | 62.81 |
| 25 | 250 | 84.77 | 86.77 | 229.7 | 295.7 | 249.7 | 410 | 368.7 | 388.2 | | 70.18 | 67.27 | 63.24 | 62.85 |
| 26 | 260 | 80.34 | 84.75 | 227.3 | 289.5 | 252.3 | 410.3 | 366.9 | 384.5 | | 70.16 | 67.13 | 63.31 | 62.97 |
| 27 | 270 | 80.74 | 84.54 | 222.6 | 283.7 | 254.3 | 411.2 | 364.1 | 380.9 | | 69.9 | 66.81 | 63.32 | 62.95 |
| 28 | 280 | 77.72 | 83.86 | 222.7 | 281.1 | 257.1 | 404 | 358.6 | 377.3 | | 69.85 | 66.81 | 63.44 | 63.08 |
| 29 | 290 | 78.66 | 84.11 | 221 | 279.5 | 261.9 | 401.6 | 353.7 | 376 | | 69.89 | 67.01 | 63.5 | 63.12 |
| 30 | 300 | 83.19 | 85 | 219.9 | 278 | 267.1 | 403.5 | 350.8 | 376.6 | | 69.83 | 67.1 | 63.47 | 63.12 |
| 31 | 310 | 85.21 | 85.52 | 218 | 277 | 272.4 | 405.4 | 349.5 | 378.2 | | 69.88 | 67.19 | 63.45 | 63.07 |
| 32 | 320 | 82.56 | 84.76 | 216.2 | 274.8 | 276.5 | 405.9 | 347.7 | 375.5 | | 70.05 | 67.29 | 63.46 | 63.09 |
| 33 | 330 | 83.79 | 85.04 | 213.2 | 271.4 | 278.2 | 406.7 | 344 | 370.5 | | 69.97 | 67.29 | 63.54 | 63.15 |
| 34 | 340 | 85.39 | 85.3 | 212 | 268.7 | 280.6 | 409 | 343.7 | 367.3 | | 70.19 | 67.37 | 63.55 | 63.23 |
| 35 | 350 | 85.9 | 85.21 | 211.3 | 267.8 | 283.3 | 413.3 | 344.2 | 365.4 | | 70.16 | 67.33 | 63.56 | 63.2 |
| 36 | 360 | 83.18 | 84.23 | 210.7 | 266.3 | 284.4 | 419.7 | 343.2 | 362.1 | | 69.75 | 67.14 | 63.46 | 63.12 |
| 37 | 370 | 85.12 | 85.02 | 210 | 265.4 | 286.6 | 426.4 | 345.3 | 362.3 | | 69.96 | 67.14 | 63.43 | 63.07 |
| 38 | 380 | 85.93 | 85.24 | 210.6 | 265.9 | 289.1 | 435 | 346.5 | 363.4 | | 69.91 | 67.25 | 63.39 | 63.05 |
| 39 | 390 | 83.19 | 84.33 | 210.9 | 265.7 | 289.3 | 444.2 | 345.1 | 363.2 | | 69.84 | 67.02 | 63.4 | 63.05 |
| 40 | 400 | 85 | 84.87 | 211.1 | 266.1 | 290.1 | 449.9 | 347.1 | 365.8 | | 69.91 | 66.86 | 63.38 | 63.01 |
| 41 | 410 | 85.45 | 85.11 | 212 | 267.4 | 291.6 | 452.9 | 348.6 | 368 | | 69.89 | 66.8 | 63.3 | 62.91 |
| 42 | 420 | 83.54 | 84.41 | 211.3 | 266.5 | 291.9 | 447.1 | 347.6 | 367.6 | | 69.79 | 66.73 | 63.31 | 62.94 |
| 43 | 430 | 85.06 | 85.06 | 208.5 | 263.8 | 293.6 | 429 | 346.6 | 366.5 | | 69.88 | 66.83 | 63.31 | 62.92 |
| 44 | 440 | 83.35 | 84.39 | 205.7 | 261.4 | 296.7 | 416.9 | 342.6 | 362.9 | | 69.89 | 66.89 | 63.26 | 62.88 |
| 45 | 450 | 83.13 | 83.79 | 202.5 | 257.3 | 298.8 | 405.4 | 336.1 | 356.6 | | 69.54 | 66.74 | 63.29 | 62.92 |
| 46 | 460 | 84.39 | 84.16 | 200 | 254.5 | 300.9 | 396.8 | 331.6 | 351.7 | | 69.5 | 66.72 | 63.2 | 62.89 |
| 47 | 470 | 84.66 | 84 | 198.6 | 252 | 302.8 | 390.5 | 327.3 | 347.4 | | 69.49 | 66.84 | 63.25 | 62.9 |
| 48 | 480 | 84.93 | 83.97 | 197.6 | 249.6 | 303.8 | 384.9 | 322.6 | 344.5 | | 69.54 | 66.85 | 63.25 | 62.88 |
| 49 | 490 | 85.04 | 83.85 | 196.6 | 247.2 | 304.8 | 380.7 | 318.8 | 343.3 | | 69.61 | 66.84 | 63.25 | 62.88 |
| 50 | 500 | 84.78 | 83.56 | 195.5 | 245.7 | 305.3 | 377.4 | 315.6 | 341.1 | | 69.64 | 66.76 | 63.27 | 62.9 |
| 51 | 510 | 84.88 | 83.73 | 194 | 243.2 | 304.4 | 374.2 | 311.9 | 338.2 | | 69.5 | 66.83 | 63.3 | 62.96 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 5, 2014 |
| Test Run Number: | 10 |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 30.06 | 69 | Meter Box (A) | 1.002 |
| End | 30.00 | 66 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 510 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.002@5 | 0.003@5 |

| Maximum Vacuum | | Average Gases, % | | |
|---|---|---|---|---|
| Train A | Train B | O2 | CO2 | CO |
| 0.00 | 0.00 | 14.380 | 5.036 | 1.306 |

| Time | Particulate Sampling Data | | | | | | | | | | | | Combustion Gasses, % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg | O2 | CO2 | CO |
| 0 | 0.015 | 0.00 | 0.00 | 0.055 | 21.61 | 21.61 | 1322.678 | 1287.035 | 99.97 | 99.97 | 0.00 | 0.00 | 19,21 | 0.680 | 0.560 |
| 10 | 0.015 | 0.00 | 0.00 | 0.058 | 20.77 | 0.84 | 1324.312 | 1288.566 | 100.09 | 97.82 | 0.00 | 0.00 | 16,79 | 2.430 | 0.730 |
| 20 | 0.015 | 0.00 | 0.00 | 0.058 | 20.25 | 0.52 | 1325.938 | 1290.115 | 99.38 | 98.75 | 0.00 | 0.00 | 14,54 | 5.220 | 0.840 |
| 30 | 0.015 | 0.00 | 0.00 | 0.058 | 19.41 | 0.84 | 1327.541 | 1291.639 | 98.14 | 97.32 | 0.00 | 0.00 | 15,93 | 4.670 | 0.930 |
| 40 | 0.015 | 0.00 | 0.00 | 0.060 | 18.51 | 0.90 | 1329.165 | 1293.178 | 99.54 | 98.40 | 0.00 | 0.00 | 15,02 | 5.190 | 0.960 |
| 50 | 0.015 | 0.00 | 0.00 | 0.063 | 17.64 | 0.87 | 1330.780 | 1294.730 | 98.98 | 99.22 | 0.00 | 0.00 | 14,07 | 5.800 | 1.100 |
| 60 | 0.015 | 0.00 | 0.00 | 0.063 | 16.68 | 0.96 | 1332.398 | 1296.307 | 99.18 | 100.81 | 0.00 | 0.00 | 14,32 | 5.520 | 1.210 |
| 70 | 0.015 | 0.00 | 0.00 | 0.060 | 15.77 | 0.91 | 1334.010 | 1297.905 | 98.90 | 102.25 | 0.00 | 0.00 | 12,96 | 7.000 | 1.130 |
| 80 | 0.015 | 0.00 | 0.00 | 0.065 | 14.76 | 1.01 | 1335.620 | 1299.499 | 98.91 | 102.14 | 0.00 | 0.00 | 12,02 | 8.760 | 0.720 |
| 90 | 0.015 | 0.00 | 0.00 | 0.068 | 13.72 | 1.04 | 1337.225 | 1301.081 | 98.68 | 101.44 | 0.00 | 0.00 | 12,35 | 8.240 | 0.740 |
| 100 | 0.015 | 0.00 | 0.00 | 0.065 | 12.88 | 0.84 | 1338.834 | 1302.682 | 98.90 | 102.64 | 0.00 | 0.00 | 13,38 | 7.130 | 0.760 |
| 110 | 0.015 | 0.00 | 0.00 | 0.065 | 12.12 | 0.76 | 1340.431 | 1304.261 | 98.11 | 101.18 | 0.00 | 0.00 | 13,21 | 7.220 | 0.730 |
| 120 | 0.015 | 0.00 | 0.00 | 0.063 | 11.40 | 0.72 | 1342.061 | 1305.849 | 99.99 | 101.60 | 0.00 | 0.00 | 13,46 | 6.620 | 0.910 |
| 130 | 0.015 | 0.00 | 0.00 | 0.060 | 10.72 | 0.68 | 1343.685 | 1307.446 | 99.57 | 102.13 | 0.00 | 0.00 | 13,63 | 6.510 | 0.940 |
| 140 | 0.015 | 0.00 | 0.00 | 0.060 | 9.97 | 0.75 | 1345.309 | 1309.032 | 99.63 | 101.48 | 0.00 | 0.00 | 13,23 | 7.100 | 0.900 |
| 150 | 0.015 | 0.00 | 0.00 | 0.063 | 9.21 | 0.76 | 1346.939 | 1310.614 | 99.99 | 101.22 | 0.00 | 0.00 | 12,50 | 8.160 | 0.750 |
| 160 | 0.015 | 0.00 | 0.00 | 0.065 | 8.47 | 0.74 | 1348.561 | 1312.070 | 99.45 | 93.12 | 0.00 | 0.00 | 12,55 | 8.020 | 0.790 |
| 170 | 0.015 | 0.00 | 0.00 | 0.065 | 7.69 | 0.78 | 1350.188 | 1313.522 | 99.79 | 92.90 | 0.00 | 0.00 | 12,52 | 7.870 | 0.930 |
| 180 | 0.015 | 0.00 | 0.00 | 0.060 | 6.92 | 0.77 | 1351.811 | 1315.053 | 99.55 | 97.97 | 0.00 | 0.00 | 12,53 | 7.570 | 1.000 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 190 | 0.015 | 0.00 | 0.00 | 0.060 | 6.31 | 0.61 | 1353.435 | 1316.633 | 99.49 | 100.97 | 0.00 | 0.00 | 12,55 | 7.580 | 0.920 |
| 200 | 0.015 | 0.00 | 0.00 | 0.060 | 5.86 | 0.45 | 1355.061 | 1318.227 | 99.45 | 101.71 | 0.00 | 0.00 | 14,03 | 4.960 | 1.420 |
| 210 | 0.015 | 0.00 | 0.00 | 0.055 | 5.54 | 0.32 | 1356.683 | 1319.813 | 99.01 | 100.98 | 0.00 | 0.00 | 14,33 | 4.510 | 1.590 |
| 220 | 0.015 | 0.00 | 0.00 | 0.053 | 5.23 | 0.31 | 1358.312 | 1321.412 | 99.47 | 101.83 | 0.00 | 0.00 | 14,23 | 4.450 | 1.690 |
| 230 | 0.015 | 0.00 | 0.00 | 0.050 | 5.01 | 0.22 | 1359.946 | 1323.013 | 99.62 | 101.80 | 0.00 | 0.00 | 14,18 | 4.500 | 1.710 |
| 240 | 0.015 | 0.00 | 0.00 | 0.050 | 4.77 | 0.24 | 1361.570 | 1324.604 | 98.83 | 100.98 | 0.00 | 0.00 | 14,06 | 4.620 | 1.680 |
| 250 | 0.015 | 0.00 | 0.00 | 0.050 | 4.53 | 0.24 | 1363.195 | 1326.210 | 98.98 | 102.03 | 0.00 | 0.00 | 14,17 | 4.490 | 1.700 |
| 260 | 0.015 | 0.00 | 0.00 | 0.050 | 4.33 | 0.20 | 1364.830 | 1327.703 | 99.39 | 94.65 | 0.00 | 0.00 | 14,25 | 4.430 | 1.740 |
| 270 | 0.015 | 0.00 | 0.00 | 0.050 | 4.07 | 0.26 | 1366.395 | 1329.223 | 95.12 | 96.35 | 0.00 | 0.00 | 14,24 | 4.730 | 1.460 |
| 280 | 0.015 | 0.00 | 0.00 | 0.050 | 3.87 | 0.20 | 1368.123 | 1330.956 | 104.93 | 109.75 | 0.00 | 0.00 | 14,19 | 4.690 | 1.450 |
| 290 | 0.015 | 0.00 | 0.00 | 0.050 | 3.65 | 0.22 | 1369.785 | 1332.548 | 100.94 | 100.84 | 0.00 | 0.00 | 13,99 | 5.010 | 1.420 |
| 300 | 0.015 | 0.00 | 0.00 | 0.045 | 3.44 | 0.21 | 1371.442 | 1334.128 | 100.72 | 100.16 | 0.00 | 0.00 | 14,07 | 4.830 | 1.430 |
| 310 | 0.015 | 0.00 | 0.00 | 0.045 | 3.25 | 0.19 | 1373.096 | 1335.706 | 100.59 | 100.09 | 0.00 | 0.00 | 14,53 | 4.420 | 1.610 |
| 320 | 0.015 | 0.00 | 0.00 | 0.045 | 3.10 | 0.15 | 1374.755 | 1337.286 | 100.82 | 100.14 | 0.00 | 0.00 | 14,58 | 4.250 | 1.620 |
| 330 | 0.015 | 0.00 | 0.00 | 0.045 | 2.92 | 0.18 | 1376.411 | 1338.865 | 100.65 | 100.10 | 0.00 | 0.00 | 14,63 | 4.340 | 1.570 |
| 340 | 0.015 | 0.00 | 0.00 | 0.045 | 2.72 | 0.20 | 1378.075 | 1340.465 | 101.16 | 101.44 | 0.00 | 0.00 | 14,50 | 4.540 | 1.510 |
| 350 | 0.015 | 0.00 | 0.00 | 0.045 | 2.56 | 0.16 | 1379.727 | 1342.031 | 100.42 | 99.28 | 0.00 | 0.00 | 14,44 | 4.540 | 1.550 |
| 360 | 0.015 | 0.00 | 0.00 | 0.045 | 2.35 | 0.21 | 1381.385 | 1343.605 | 100.71 | 99.71 | 0.00 | 0.00 | 14,47 | 4.490 | 1.590 |
| 370 | 0.015 | 0.00 | 0.00 | 0.045 | 2.17 | 0.18 | 1383.042 | 1345.196 | 100.73 | 100.87 | 0.00 | 0.00 | 14,50 | 4.510 | 1.580 |
| 380 | 0.015 | 0.00 | 0.00 | 0.045 | 1.99 | 0.18 | 1384.696 | 1346.826 | 100.58 | 103.37 | 0.00 | 0.00 | 14,35 | 4.690 | 1.580 |
| 390 | 0.015 | 0.00 | 0.00 | 0.045 | 1.77 | 0.22 | 1386.352 | 1348.452 | 100.61 | 103.03 | 0.00 | 0.00 | 14,30 | 4.760 | 1.550 |
| 400 | 0.015 | 0.00 | 0.00 | 0.045 | 1.58 | 0.19 | 1388.010 | 1349.987 | 100.79 | 97.32 | 0.00 | 0.00 | 14,38 | 4.720 | 1.550 |
| 410 | 0.015 | 0.00 | 0.00 | 0.045 | 1.41 | 0.17 | 1389.666 | 1351.496 | 100.70 | 95.71 | 0.00 | 0.00 | 14,35 | 4.710 | 1.530 |
| 420 | 0.015 | 0.00 | 0.00 | 0.045 | 1.19 | 0.22 | 1391.323 | 1353.053 | 100.70 | 98.68 | 0.00 | 0.00 | 15,22 | 3.740 | 1.540 |
| 430 | 0.015 | 0.00 | 0.00 | 0.045 | 1.05 | 0.14 | 1392.982 | 1354.620 | 100.88 | 99.38 | 0.00 | 0.00 | 15,33 | 3.580 | 1.610 |
| 440 | 0.015 | 0.00 | 0.00 | 0.045 | 0.94 | 0.11 | 1394.643 | 1356.189 | 100.95 | 99.45 | 0.00 | 0.00 | 15,48 | 3.390 | 1.660 |
| 450 | 0.015 | 0.00 | 0.00 | 0.043 | 0.77 | 0.17 | 1396.305 | 1357.759 | 100.95 | 99.45 | 0.00 | 0.00 | 15,62 | 3.400 | 1.510 |
| 460 | 0.015 | 0.00 | 0.00 | 0.043 | 0.63 | 0.14 | 1397.961 | 1359.327 | 100.64 | 99.37 | 0.00 | 0.00 | 15,62 | 3.360 | 1.540 |
| 470 | 0.015 | 0.00 | 0.00 | 0.043 | 0.47 | 0.16 | 1399.620 | 1360.893 | 100.79 | 99.22 | 0.00 | 0.00 | 15,63 | 3.330 | 1.560 |
| 480 | 0.015 | 0.00 | 0.00 | 0.043 | 0.35 | 0.12 | 1401.281 | 1362.459 | 100.91 | 99.23 | 0.00 | 0.00 | 15,67 | 3.290 | 1.590 |
| 490 | 0.015 | 0.00 | 0.00 | 0.040 | 0.23 | 0.12 | 1402.940 | 1364.025 | 100.78 | 99.21 | 0.00 | 0.00 | 15,72 | 3.270 | 1.560 |
| 500 | 0.015 | 0.00 | 0.00 | 0.040 | 0.10 | 0.13 | 1404.593 | 1365.574 | 100.38 | 98.11 | 0.00 | 0.00 | 15,85 | 3.080 | 1.640 |
| 510 | 0.015 | 0.00 | 0.00 | 0.040 | 0.00 | 0.10 | 1406.257 | 1367.170 | 101.06 | 101.09 | 0.00 | 0.00 | 15,94 | 2.960 | 1.630 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 5, 2014 |
| Test Run Number: | 10 |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0100 | 90 | 0.1000 |
| A2 | 0.0125 | 90 | 0.1118 |
| A3 | 0.0150 | 90 | 0.1225 |
| A4 | 0.0125 | 90 | 0.1118 |
| A Center | 0.0150 | 90 | 0.1225 |
| B1 | 0.0100 | 90 | 0.1000 |
| B2 | 0.0125 | 90 | 0.1118 |
| B3 | 0.0150 | 90 | 0.1225 |
| B4 | 0.0125 | 90 | 0.1118 |
| B Center | 0.0150 | 90 | 0.1225 |
| Averages | 0.013 | 90 | 0.1115 |

| | | |
|---|---|---|
| Tunnel Diameter | 8.000 | inches |
| Tunnel Static | -0.088 | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9106 | factor |
| Baro. Pressure | 30.06 | |
| Pitot Factor | 0.99 | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 7.555 | Ft/ Sec |
| Initial Flow | **146.46** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.009737527 | | |
| VS (2) | 0.010230109 | STD Tunnel Flow: | 146.56 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 510 | | | | 548.6948077 | 84.787 | 80.704 | 7.55 | 99.97 | 99.97 |
| Time | Average Firebox Temp | Ending Average Firebox Temp | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 415.6 | | 0.015 | 561.2 | | | 7.636 | | |
| 10 | 387.0 | | 0.015 | 551.2 | 1.660 | 1.544 | 7.567 | 100.09 | 97.82 |
| 20 | 355.5 | | 0.015 | 549.11 | 1.652 | 1.562 | 7.553 | 99.38 | 98.75 |
| 30 | 337.4 | | 0.015 | 551.21 | 1.628 | 1.537 | 7.568 | 98.14 | 97.32 |
| 40 | 327.3 | | 0.015 | 552.85 | 1.649 | 1.551 | 7.579 | 99.54 | 98.40 |
| 50 | 321.5 | | 0.015 | 552.84 | 1.639 | 1.564 | 7.579 | 98.98 | 99.22 |
| 60 | 319.9 | | 0.015 | 552.9 | 1.643 | 1.589 | 7.579 | 99.18 | 100.81 |
| 70 | 320.5 | | 0.015 | 554.04 | 1.636 | 1.610 | 7.587 | 98.90 | 102.25 |
| 80 | 328.0 | | 0.015 | 555.7 | 1.634 | 1.606 | 7.598 | 98.91 | 102.14 |
| 90 | 343.2 | | 0.015 | 556.75 | 1.629 | 1.594 | 7.605 | 98.68 | 101.44 |
| 100 | 352.4 | | 0.015 | 556.75 | 1.632 | 1.612 | 7.605 | 98.90 | 102.64 |
| 110 | 351.6 | | 0.015 | 556.06 | 1.620 | 1.590 | 7.601 | 98.11 | 101.18 |
| 120 | 350.0 | | 0.015 | 554.33 | 1.654 | 1.600 | 7.589 | 99.99 | 101.60 |
| 130 | 348.1 | | 0.015 | 553.82 | 1.648 | 1.609 | 7.585 | 99.57 | 102.13 |
| 140 | 346.6 | | 0.015 | 554.47 | 1.648 | 1.598 | 7.590 | 99.63 | 101.48 |
| 150 | 348.4 | | 0.015 | 554.25 | 1.654 | 1.594 | 7.588 | 99.99 | 101.22 |
| 160 | 354.1 | | 0.015 | 553.97 | 1.645 | 1.467 | 7.586 | 99.45 | 93.12 |
| 170 | 359.6 | | 0.015 | 554.18 | 1.651 | 1.463 | 7.588 | 99.79 | 92.90 |
| 180 | 364.7 | | 0.015 | 554.73 | 1.646 | 1.542 | 7.592 | 99.55 | 97.97 |
| 190 | 368.5 | | 0.015 | 553.26 | 1.647 | 1.591 | 7.582 | 99.49 | 100.97 |
| 200 | 371.4 | | 0.015 | 551.81 | 1.649 | 1.605 | 7.572 | 99.45 | 101.71 |
| 210 | 365.6 | | 0.015 | 549.35 | 1.645 | 1.597 | 7.555 | 99.01 | 100.98 |
| 220 | 356.7 | | 0.015 | 549.54 | 1.652 | 1.610 | 7.556 | 99.47 | 101.83 |
| 230 | 349.4 | | 0.015 | 547.54 | 1.658 | 1.613 | 7.542 | 99.62 | 101.80 |
| 240 | 344.5 | | 0.015 | 545.69 | 1.648 | 1.602 | 7.530 | 98.83 | 100.98 |
| 250 | 342.5 | | 0.015 | 546.77 | 1.648 | 1.617 | 7.537 | 98.98 | 102.03 |
| 260 | 340.7 | | 0.015 | 544.75 | 1.658 | 1.503 | 7.523 | 99.39 | 94.65 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 270 | 338.8 | | 0.015 | 544.54 | 1.587 | 1.530 | 7.522 | 95.12 | 96.35 |
| 280 | 335.6 | | 0.015 | 543.86 | 1.752 | 1.744 | 7.517 | 104.93 | 109.75 |
| 290 | 334.5 | | 0.015 | 544.11 | 1.685 | 1.602 | 7.519 | 100.94 | 100.84 |
| 300 | 335.2 | | 0.015 | 545 | 1.680 | 1.590 | 7.525 | 100.72 | 100.16 |
| 310 | 336.5 | | 0.015 | 545.52 | 1.677 | 1.589 | 7.528 | 100.59 | 100.09 |
| 320 | 336.1 | | 0.015 | 544.76 | 1.682 | 1.590 | 7.523 | 100.82 | 100.14 |
| 330 | 334.2 | | 0.015 | 545.04 | 1.679 | 1.589 | 7.525 | 100.65 | 100.10 |
| 340 | 333.9 | | 0.015 | 545.3 | 1.687 | 1.610 | 7.527 | 101.16 | 101.44 |
| 350 | 334.8 | | 0.015 | 545.21 | 1.675 | 1.576 | 7.526 | 100.42 | 99.28 |
| 360 | 335.1 | | 0.015 | 544.23 | 1.681 | 1.584 | 7.519 | 100.71 | 99.71 |
| 370 | 337.2 | | 0.015 | 545.02 | 1.680 | 1.602 | 7.525 | 100.73 | 100.87 |
| 380 | 340.0 | | 0.015 | 545.24 | 1.677 | 1.641 | 7.526 | 100.58 | 103.37 |
| 390 | 341.5 | | 0.015 | 544.33 | 1.679 | 1.637 | 7.520 | 100.61 | 103.03 |
| 400 | 343.8 | | 0.015 | 544.87 | 1.681 | 1.545 | 7.524 | 100.79 | 97.32 |
| 410 | 345.7 | | 0.015 | 545.11 | 1.680 | 1.520 | 7.526 | 100.70 | 95.71 |
| 420 | 344.1 | | 0.015 | 544.41 | 1.681 | 1.568 | 7.521 | 100.70 | 98.68 |
| 430 | 339.9 | | 0.015 | 545.06 | 1.683 | 1.578 | 7.525 | 100.88 | 99.38 |
| 440 | 336.1 | | 0.015 | 544.39 | 1.685 | 1.580 | 7.521 | 100.95 | 99.45 |
| 450 | 330.8 | | 0.015 | 543.79 | 1.686 | 1.581 | 7.516 | 100.95 | 99.45 |
| 460 | 327.1 | | 0.015 | 544.16 | 1.680 | 1.579 | 7.519 | 100.64 | 99.37 |
| 470 | 324.0 | | 0.015 | 544 | 1.683 | 1.577 | 7.518 | 100.79 | 99.22 |
| 480 | 321.1 | | 0.015 | 543.97 | 1.685 | 1.577 | 7.518 | 100.91 | 99.23 |
| 490 | 319.0 | | 0.015 | 543.85 | 1.683 | 1.577 | 7.517 | 100.78 | 99.21 |
| 500 | 317.0 | | 0.015 | 543.56 | 1.677 | 1.560 | 7.515 | 100.38 | 98.11 |
| 510 | 314.4 | 314.38 | 0.015 | 543.73 | 1.688 | 1.607 | 7.516 | 101.06 | 101.09 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| ample ID Number: | **101440749MTL-003** |
| Test Date: | **February 5, 2014** |
| est Run Number: | **10** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.4 | to | 5.4 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 415.14 |

| | |
|---|---|
| Final Coal Bed Wt, lb | 5.3 |

| Interval | 10 |
|---|---|

| Time | | Temperature Data | | | | | | | | | Flue Draft | Fuel Weight | Weight Loss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | | | |
| 0 | 0 | 72.41 | 145.3 | 609.8 | 532.6 | 515.1 | 587.9 | 476.1 | 496.9 | | | 9.25 | 3.95 |
| 1 | 10 | 73.33 | 104.3 | 413.4 | 515 | 518.2 | 594.3 | 485.8 | 520.4 | | | 8.16 | 1.09 |
| 2 | 20 | 72.92 | 96.07 | 347.6 | 448.7 | 495.6 | 578.4 | 480.2 | 505.5 | | | 7.62 | 0.54 |
| 3 | 30 | 73.9 | 93.45 | 320.8 | 399.6 | 471.3 | 565.9 | 469.9 | 482.4 | | | 7.03 | 0.59 |
| 4 | 40 | 79.41 | 92.25 | 300 | 375.1 | 451.3 | 552.5 | 462.1 | 468.3 | | | 6.61 | 0.42 |
| 5 | 50 | 82.23 | 98.19 | 327.6 | 363.2 | 440.2 | 529.5 | 447.8 | 457.9 | | | 6.01 | 0.60 |
| 6 | 60 | 82.13 | 90.59 | 287.6 | 364.3 | 431.5 | 505.6 | 436.6 | 447.7 | | | 5.72 | 0.29 |
| 7 | 70 | 83.55 | 89.48 | 269.1 | 343 | 424.1 | 484.4 | 423 | 433.5 | | | 5.45 | 0.27 |
| 8 | 80 | 80.48 | 90.46 | 264.3 | 334 | 420.8 | 477.7 | 416.1 | 427.1 | | | 5.30 | 0.15 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: February 5, 2014
Test Run Number: 10

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 53 | | 118.4 | |
| B - Rear Filter Catch | Filter | 54 | | 117.4 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 269.1 | 235.8 | 33.3 |
| Probe & Filter Holder | Probe | 19 | 140111.3 | 140107.7 | 3.6 |
| | | | Total Particulate, mg | | **36.9** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 55 | | 120 | |
| B - Rear Filter Catch | Filter | 56 | | 118.5 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 271.3 | 238.5 | 32.8 |
| Probe & Filter Holder | Probe | 20 | 139063.1 | 139060.3 | 2.8 |
| | | | Total Particulate, mg | | **35.6** |

**Manufacturer:** SBI
**Model:** NG1800
**Date:** 02/05/14
**Run:** 10
**Control #:** G101440749
**Test Duration:** 510 min

| | HHV | LHV |
|---|---|---|
| Eff | 66.24% | 71.59% |
| Comb Eff | 86.65% | 86.65% |
| HT Eff | 76.44% | 82.62% |
| Output | 12,507 | kJ/h |
| Burn Rate | 0.95 | kg/h |
| Grams CO | 1,521 | g |
| Input | 18,881 | kJ/h |
| MC wet | 17.37 | |

Ultimate $CO_2$
$CO_{2\text{-ult}}$ 19.64
$F_0$
1.060

| | | |
|---|---|---|
| Overall Heating Efficiency: | 66.24% | |
| Combustion Efficiency: | 86.65% | |
| Heat Transfer Efficiency: | 76.44% | |

| Air Fuel Ratio (A/F) | |
|---|---|
| Dry Molecular Weight ($M_d$) | 29.40 |
| Dry Moles Exhaust Gas ($N_r$): | 554.66 |
| Air Fuel Ratio (A/F) | 15.80 |

| | | | | |
|---|---|---|---|---|
| Heat Output: | 11,864 | Btu/h | 12,507 | kJ/h |
| Heat Input: | 17,911 | Btu/h | 18,881 | kJ/h |
| Burn Duration: | 8.50 | h | | |
| Burn Rate: | 2.10 | lb/h | 0.953 | kg/h |
| Stack Temp: | 249.3 | Deg. F | 120.7 | Deg. C |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Averages | 1.31 | 5.04 | 2.43 | 20.52 | 14.83 | 121.14 | 28.43 | 82.3% | 75.6% | 62.4% | 19.89 | 3.11 | 68.26 | 2.58 |
| INPUT DATA | | | | Oxygen Calculation | | | Input Data | | Combust | Heat | Net | Air | Wet Wt | % Wet | Dry Wt. |
| Elapsed Time | Weight emaining (k | % CO [e] | % $CO_2$ [d] | Excess Air EA | Total $O_2$ | Calc. % $O_2$ [g] | Flue Gas (ºC) | Room Temp (ºC) | Eff % | Transfer % | Eff % | Fuel Ratio | Now Wt | Consumed x | Now $Wt_{dn}$ |
| 0 | 9.80 | 0.56 | 0.68 | 1484.1% | 20.86 | 19.90 | 141.8 | 27.1 | 67.6% | 5.5% | 3.7% | 91.1 | 9.80 | 0.00 | 8.10 |
| 10 | 9.42 | 0.73 | 2.43 | 521.6% | 20.73 | 17.94 | 130.1 | 23.8 | 82.5% | 63.0% | 52.0% | 36.3 | 9.42 | 3.88 | 7.79 |
| 20 | 9.19 | 0.84 | 5.22 | 224.1% | 20.54 | 14.90 | 113.2 | 27.9 | 89.1% | 78.6% | 70.1% | 19.1 | 9.19 | 6.29 | 7.59 |
| 30 | 8.81 | 0.93 | 4.67 | 250.8% | 20.57 | 15.44 | 128.7 | 29.3 | 86.9% | 75.5% | 65.7% | 20.6 | 8.81 | 10.18 | 7.28 |
| 40 | 8.40 | 0.96 | 5.19 | 219.4% | 20.53 | 14.86 | 139.1 | 30.1 | 87.7% | 75.6% | 66.3% | 18.8 | 8.40 | 14.34 | 6.94 |
| 50 | 8.00 | 1.10 | 5.80 | 184.7% | 20.48 | 14.13 | 147.4 | 25.9 | 87.3% | 75.5% | 65.9% | 16.7 | 8.00 | 18.37 | 6.61 |
| 60 | 7.57 | 1.21 | 5.52 | 191.9% | 20.50 | 14.37 | 144.1 | 28.2 | 85.7% | 75.4% | 64.6% | 17.1 | 7.57 | 22.81 | 6.25 |
| 70 | 7.16 | 1.13 | 7.00 | 141.6% | 20.40 | 12.84 | 150.4 | 29.5 | 88.8% | 77.6% | 69.0% | 14.2 | 7.16 | 27.02 | 5.91 |
| 80 | 6.70 | 0.72 | 8.76 | 107.2% | 20.31 | 11.19 | 162.9 | 28.5 | 93.9% | 78.8% | 74.1% | 12.3 | 6.70 | 31.70 | 5.53 |
| 90 | 6.23 | 0.74 | 8.24 | 118.7% | 20.35 | 11.74 | 172.6 | 27.2 | 93.4% | 77.3% | 72.3% | 13.0 | 6.23 | 36.51 | 5.14 |
| 100 | 5.84 | 0.76 | 7.13 | 149.0% | 20.42 | 12.91 | 162.8 | 29.9 | 92.4% | 76.9% | 71.0% | 14.8 | 5.84 | 40.40 | 4.83 |
| 110 | 5.50 | 0.73 | 7.22 | 147.1% | 20.42 | 12.83 | 160.8 | 29.1 | 92.7% | 77.1% | 71.5% | 14.7 | 5.50 | 43.91 | 4.54 |
| 120 | 5.17 | 0.91 | 6.62 | 160.9% | 20.44 | 13.37 | 156.9 | 27.6 | 90.4% | 76.3% | 69.0% | 15.4 | 5.17 | 47.24 | 4.27 |
| 130 | 4.86 | 0.94 | 6.51 | 163.7% | 20.45 | 13.47 | 152.6 | 27.9 | 90.0% | 76.6% | 68.9% | 15.6 | 4.86 | 50.39 | 4.02 |
| 140 | 4.52 | 0.90 | 7.10 | 145.5% | 20.41 | 12.86 | 150.7 | 29.5 | 91.0% | 77.9% | 70.9% | 14.5 | 4.52 | 53.86 | 3.74 |
| 150 | 4.18 | 0.75 | 8.16 | 120.5% | 20.35 | 11.82 | 155.2 | 29.0 | 93.3% | 78.8% | 73.6% | 13.1 | 4.18 | 57.38 | 3.45 |
| 160 | 3.84 | 0.79 | 8.02 | 123.0% | 20.36 | 11.94 | 158.4 | 27.0 | 92.9% | 78.2% | 72.6% | 13.3 | 3.84 | 60.80 | 3.18 |
| 170 | 3.49 | 0.93 | 7.87 | 123.2% | 20.36 | 12.02 | 158.4 | 27.7 | 91.5% | 78.0% | 71.4% | 13.2 | 3.49 | 64.41 | 2.88 |
| 180 | 3.14 | 1.00 | 7.57 | 129.2% | 20.37 | 12.30 | 153.9 | 30.0 | 90.6% | 78.2% | 70.9% | 13.6 | 3.14 | 67.98 | 2.59 |
| 190 | 2.86 | 0.92 | 7.58 | 131.1% | 20.38 | 12.34 | 151.3 | 29.3 | 91.3% | 78.4% | 71.6% | 13.7 | 2.86 | 70.80 | 2.37 |
| 200 | 2.66 | 1.42 | 4.96 | 207.9% | 20.52 | 14.85 | 145.3 | 27.8 | 82.3% | 73.7% | 60.7% | 17.9 | 2.66 | 72.88 | 2.20 |
| 210 | 2.51 | 1.59 | 4.51 | 222.0% | 20.54 | 15.23 | 130.2 | 26.6 | 79.3% | 74.2% | 58.8% | 18.6 | 2.51 | 74.36 | 2.08 |
| 220 | 2.37 | 1.69 | 4.45 | 219.9% | 20.53 | 15.24 | 121.8 | 29.7 | 78.1% | 75.5% | 59.0% | 18.4 | 2.37 | 75.80 | 1.96 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 230 | 2.27 | 1.71 | 4.50 | 216.3% | 20.53 | 15.17 | 116.3 | 28.7 | 78.1% | 76.2% | 59.5% | 18.2 | 2.27 | 76.82 | 1.88 |
| 240 | 2.16 | 1.68 | 4.62 | 211.8% | 20.52 | 15.06 | 113.3 | 25.9 | 78.8% | 76.6% | 60.3% | 18.0 | 2.16 | 77.93 | 1.79 |
| 250 | 2.06 | 1.70 | 4.49 | 217.3% | 20.53 | 15.19 | 109.8 | 29.3 | 78.2% | 77.1% | 60.3% | 18.3 | 2.06 | 79.04 | 1.70 |
| 260 | 1.96 | 1.74 | 4.43 | 218.4% | 20.53 | 15.23 | 108.5 | 26.9 | 77.6% | 76.8% | 59.6% | 18.3 | 1.96 | 79.96 | 1.62 |
| 270 | 1.85 | 1.46 | 4.73 | 217.3% | 20.53 | 15.07 | 105.9 | 27.1 | 81.2% | 78.1% | 63.4% | 18.4 | 1.85 | 81.17 | 1.53 |
| 280 | 1.76 | 1.45 | 4.69 | 219.9% | 20.53 | 15.12 | 105.9 | 25.4 | 81.2% | 77.8% | 63.2% | 18.5 | 1.76 | 82.09 | 1.45 |
| 290 | 1.66 | 1.42 | 5.01 | 205.5% | 20.52 | 14.80 | 105.0 | 25.9 | 82.4% | 78.6% | 64.8% | 17.7 | 1.66 | 83.11 | 1.37 |
| 300 | 1.56 | 1.43 | 4.83 | 213.8% | 20.53 | 14.98 | 104.4 | 28.4 | 81.8% | 78.6% | 64.3% | 18.2 | 1.56 | 84.08 | 1.29 |
| 310 | 1.47 | 1.61 | 4.42 | 225.8% | 20.54 | 15.32 | 103.3 | 29.6 | 78.8% | 77.9% | 61.4% | 18.8 | 1.47 | 84.96 | 1.22 |
| 320 | 1.41 | 1.62 | 4.25 | 234.6% | 20.55 | 15.49 | 102.3 | 28.1 | 78.1% | 77.5% | 60.5% | 19.3 | 1.41 | 85.65 | 1.16 |
| 330 | 1.32 | 1.57 | 4.34 | 232.4% | 20.55 | 15.42 | 100.7 | 28.8 | 78.9% | 78.0% | 61.6% | 19.2 | 1.32 | 86.49 | 1.09 |
| 340 | 1.23 | 1.51 | 4.54 | 224.7% | 20.54 | 15.25 | 100.0 | 29.7 | 80.2% | 78.7% | 63.1% | 18.8 | 1.23 | 87.41 | 1.02 |
| 350 | 1.16 | 1.55 | 4.54 | 222.5% | 20.54 | 15.22 | 99.6 | 29.9 | 79.8% | 78.8% | 62.8% | 18.6 | 1.16 | 88.15 | 0.96 |
| 360 | 1.07 | 1.59 | 4.49 | 223.1% | 20.54 | 15.25 | 99.3 | 28.4 | 79.2% | 78.5% | 62.2% | 18.6 | 1.07 | 89.12 | 0.88 |
| 370 | 0.98 | 1.58 | 4.51 | 222.5% | 20.54 | 15.24 | 98.9 | 29.5 | 79.4% | 78.7% | 62.5% | 18.6 | 0.98 | 89.96 | 0.81 |
| 380 | 0.90 | 1.58 | 4.69 | 213.3% | 20.53 | 15.05 | 99.2 | 30.0 | 79.9% | 79.1% | 63.2% | 18.1 | 0.90 | 90.79 | 0.75 |
| 390 | 0.80 | 1.55 | 4.76 | 211.3% | 20.52 | 14.99 | 99.4 | 28.4 | 80.4% | 79.1% | 63.6% | 18.0 | 0.80 | 91.81 | 0.66 |
| 400 | 0.72 | 1.55 | 4.72 | 213.3% | 20.53 | 15.03 | 99.5 | 29.4 | 80.3% | 79.1% | 63.5% | 18.1 | 0.72 | 92.69 | 0.59 |
| 410 | 0.64 | 1.53 | 4.71 | 214.8% | 20.53 | 15.05 | 100.0 | 29.7 | 80.5% | 79.0% | 63.6% | 18.2 | 0.64 | 93.47 | 0.53 |
| 420 | 0.54 | 1.54 | 3.74 | 272.0% | 20.59 | 16.08 | 99.6 | 28.6 | 77.0% | 76.6% | 59.0% | 21.4 | 0.54 | 94.49 | 0.45 |
| 430 | 0.48 | 1.61 | 3.58 | 278.5% | 20.60 | 16.21 | 98.1 | 29.5 | 75.5% | 76.5% | 57.8% | 21.7 | 0.48 | 95.14 | 0.39 |
| 440 | 0.43 | 1.66 | 3.39 | 289.0% | 20.61 | 16.39 | 96.5 | 28.5 | 74.1% | 75.9% | 56.3% | 22.2 | 0.43 | 95.65 | 0.40 |
| 450 | 0.35 | 1.51 | 3.40 | 300.1% | 20.62 | 16.46 | 94.7 | 28.4 | 75.8% | 76.4% | 57.9% | 22.9 | 0.35 | 96.44 | 0.33 |
| 460 | 0.29 | 1.54 | 3.36 | 300.9% | 20.62 | 16.49 | 93.3 | 29.1 | 75.3% | 76.6% | 57.6% | 23.0 | 0.29 | 97.08 | 0.27 |
| 470 | 0.21 | 1.56 | 3.33 | 301.7% | 20.62 | 16.51 | 92.6 | 29.3 | 74.9% | 76.6% | 57.4% | 23.0 | 0.21 | 97.82 | 0.20 |
| 480 | 0.16 | 1.59 | 3.29 | 302.5% | 20.62 | 16.53 | 92.0 | 29.4 | 74.4% | 76.6% | 56.9% | 23.0 | 0.16 | 98.38 | 0.15 |
| 490 | 0.10 | 1.56 | 3.27 | 306.7% | 20.62 | 16.57 | 91.4 | 29.5 | 74.6% | 76.6% | 57.2% | 23.3 | 0.10 | 98.94 | 0.10 |
| 500 | 0.05 | 1.64 | 3.08 | 316.2% | 20.63 | 16.73 | 90.8 | 29.3 | 72.7% | 76.0% | 55.3% | 23.7 | 0.05 | 99.54 | 0.04 |
| 510 | 0.00 | 1.63 | 2.96 | 328.0% | 20.64 | 16.86 | 90.0 | 29.4 | 72.2% | 75.7% | 54.6% | 24.4 | 0.00 | 100.00 | 0.00 |

| %HC | | | | | |
|---|---|---|---|---|---|
| 1.32 | Combustion Efficiency: | 86.65% | | Moisture of Wood (wet basis): | 17.37 |
| | Total Input (kJ): | 160,489 | 152,216 (Btu) | Initial Dry Weight $Wt_{do}$ (kg): | 8.10 |
| | Total Output (kJ): | 106,309 | 100,829 (Btu) | Moisture Content Dry | 21.02 |
| | Efficiency: | 66.24% | | | |
| | Total CO (g): | 1520.51 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Load Weight (kg): | **9.80** | | | | | |
| Fuel Heating | **HHV** | **LHV** | | | **HHV** | **LHV** |
| Value in kJ/kg - CV: | **19,810** | **18,329** | | Btu/lb | **8522.5** | **7885.2** |

| **68.21** | **160917** | **4.06** | **6.87** | **2.74** | **19810.00** | **17.37** | **78.83** | **20.91** | **1.60** | **5.17** | **0.17** | **0.16** | **30.83** | **106.96** | **8.86** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **% Dry** | | **Fuel Properties** | | | | **Mw** | **Mass Balance** | | | | | **kg Wood pe** | | | |
| **Comsumed** | **Total** | **Carbon** | **Hydrogen** | **Oxygen** | **Calorific** | **Moisture** | **(moles/100 mole dry flue gas)** | | | | | **00 mole df** | **Moles per kg** | | |
| **y** | **Input** | **/12= [a]** | **/1= [b]** | **/16= [c]** | **Value** | **Fuel Burnt** | **[h]** | **[u]** | **[w]** | **[j]** | **[k]** | **Nk** | **$CO_2$** | **$O_2$** | **CO** |
| 0.00 | 0 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.86 | 20.92 | 0.32 | 0.99 | 0.05 | 0.03 | 21.52 | 629.71 | 17.72 |
| 3.88 | 8162 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.90 | 20.93 | 0.80 | 2.58 | 0.08 | 0.08 | 30.63 | 226.10 | 9.20 |
| 6.29 | 5050 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.04 | 20.97 | 1.52 | 5.01 | 0.10 | 0.15 | 34.59 | 98.74 | 5.57 |
| 10.18 | 6461 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.96 | 20.95 | 1.41 | 4.61 | 0.11 | 0.14 | 33.37 | 110.31 | 6.65 |
| 14.34 | 6573 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.99 | 20.95 | 1.54 | 5.07 | 0.12 | 0.15 | 33.80 | 96.81 | 6.25 |
| 18.37 | 6796 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.97 | 20.95 | 1.73 | 5.68 | 0.14 | 0.17 | 33.64 | 81.97 | 6.38 |
| 22.81 | 6944 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.90 | 20.93 | 1.70 | 5.52 | 0.15 | 0.17 | 32.73 | 85.21 | 7.17 |
| 27.02 | 7130 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.03 | 20.96 | 2.04 | 6.71 | 0.14 | 0.20 | 34.53 | 63.33 | 5.57 |
| 31.70 | 7613 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.33 | 21.04 | 2.36 | 7.92 | 0.09 | 0.23 | 37.37 | 47.75 | 3.07 |
| 36.51 | 6981 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.28 | 21.03 | 2.23 | 7.49 | 0.09 | 0.22 | 37.08 | 52.82 | 3.33 |
| 40.40 | 5942 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.20 | 21.01 | 1.97 | 6.57 | 0.09 | 0.20 | 36.47 | 66.02 | 3.89 |
| 43.91 | 5496 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.22 | 21.01 | 1.98 | 6.63 | 0.09 | 0.20 | 36.67 | 65.16 | 3.71 |
| 47.24 | 5199 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.10 | 20.98 | 1.88 | 6.24 | 0.11 | 0.19 | 35.36 | 71.40 | 4.86 |
| 50.39 | 5310 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.08 | 20.98 | 1.86 | 6.17 | 0.12 | 0.19 | 35.12 | 72.66 | 5.07 |
| 53.86 | 5607 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.14 | 20.99 | 2.00 | 6.64 | 0.11 | 0.20 | 35.73 | 64.72 | 4.53 |
| 57.38 | 5570 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.27 | 21.03 | 2.22 | 7.43 | 0.09 | 0.22 | 37.00 | 53.58 | 3.40 |
| 60.80 | 5644 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.25 | 21.02 | 2.19 | 7.34 | 0.10 | 0.22 | 36.75 | 54.73 | 3.62 |
| 64.41 | 5756 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.18 | 21.00 | 2.20 | 7.31 | 0.12 | 0.22 | 36.02 | 55.04 | 4.26 |
| 67.98 | 5125 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.13 | 20.99 | 2.14 | 7.10 | 0.13 | 0.21 | 35.53 | 57.75 | 4.69 |
| 70.80 | 3936 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 79.16 | 21.00 | 2.12 | 7.06 | 0.11 | 0.21 | 35.91 | 58.46 | 4.36 |
| 72.88 | 2859 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.77 | 20.89 | 1.62 | 5.19 | 0.18 | 0.16 | 30.84 | 92.34 | 8.83 |
| 74.36 | 2339 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.67 | 20.87 | 1.55 | 4.92 | 0.21 | 0.15 | 29.18 | 98.56 | 10.29 |
| 75.80 | 1968 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.62 | 20.85 | 1.57 | 4.94 | 0.22 | 0.16 | 28.55 | 97.76 | 10.84 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.82 | 1708 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.62 | 20.85 | 1.58 | 4.99 | 0.22 | 0.16 | 28.54 | 96.25 | 10.85 |
| 77.93 | 1782 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.64 | 20.86 | 1.61 | 5.07 | 0.22 | 0.16 | 28.92 | 94.28 | 10.52 |
| 79.04 | 1634 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.62 | 20.85 | 1.58 | 4.98 | 0.22 | 0.16 | 28.57 | 96.67 | 10.82 |
| 79.96 | 1708 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.60 | 20.85 | 1.58 | 4.95 | 0.23 | 0.16 | 28.25 | 97.15 | 11.10 |
| 81.17 | 1708 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.74 | 20.89 | 1.57 | 5.02 | 0.19 | 0.16 | 30.26 | 96.43 | 9.34 |
| 82.09 | 1560 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.74 | 20.89 | 1.56 | 4.98 | 0.19 | 0.16 | 30.25 | 97.53 | 9.35 |
| 83.11 | 1597 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.77 | 20.90 | 1.63 | 5.23 | 0.18 | 0.16 | 30.92 | 91.31 | 8.76 |
| 84.08 | 1485 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.76 | 20.89 | 1.59 | 5.08 | 0.18 | 0.16 | 30.59 | 94.88 | 9.06 |
| 84.96 | 1263 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.65 | 20.86 | 1.54 | 4.86 | 0.21 | 0.15 | 28.91 | 100.18 | 10.53 |
| 85.65 | 1225 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.64 | 20.86 | 1.50 | 4.72 | 0.21 | 0.15 | 28.52 | 103.97 | 10.87 |
| 86.49 | 1411 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.67 | 20.87 | 1.51 | 4.76 | 0.20 | 0.15 | 28.97 | 102.96 | 10.48 |
| 87.41 | 1337 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.70 | 20.88 | 1.54 | 4.89 | 0.20 | 0.15 | 29.67 | 99.62 | 9.87 |
| 88.15 | 1374 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.69 | 20.87 | 1.55 | 4.92 | 0.20 | 0.15 | 29.45 | 98.75 | 10.05 |
| 89.12 | 1448 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.67 | 20.87 | 1.55 | 4.90 | 0.21 | 0.15 | 29.15 | 99.02 | 10.32 |
| 89.96 | 1337 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.67 | 20.87 | 1.55 | 4.91 | 0.21 | 0.15 | 29.24 | 98.78 | 10.24 |
| 90.79 | 1485 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.68 | 20.87 | 1.59 | 5.07 | 0.21 | 0.16 | 29.56 | 94.82 | 9.96 |
| 91.81 | 1523 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.70 | 20.88 | 1.60 | 5.10 | 0.20 | 0.16 | 29.83 | 93.94 | 9.71 |
| 92.69 | 1337 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.70 | 20.88 | 1.59 | 5.07 | 0.20 | 0.16 | 29.77 | 94.79 | 9.77 |
| 93.47 | 1448 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.71 | 20.88 | 1.59 | 5.05 | 0.20 | 0.16 | 29.85 | 95.41 | 9.70 |
| 94.49 | 1337 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.64 | 20.86 | 1.35 | 4.24 | 0.20 | 0.13 | 27.86 | 119.80 | 11.47 |
| 95.14 | 408 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.60 | 20.85 | 1.33 | 4.15 | 0.21 | 0.13 | 27.06 | 122.56 | 12.17 |
| 95.00 | 612 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.56 | 20.84 | 1.30 | 4.02 | 0.22 | 0.13 | 26.28 | 127.01 | 12.87 |
| 95.90 | 1320 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.63 | 20.86 | 1.26 | 3.93 | 0.19 | 0.13 | 27.19 | 131.63 | 12.08 |
| 96.65 | 1279 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.61 | 20.85 | 1.26 | 3.92 | 0.20 | 0.12 | 26.90 | 131.98 | 12.33 |
| 97.50 | 1195 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.60 | 20.85 | 1.25 | 3.90 | 0.20 | 0.12 | 26.70 | 132.33 | 12.51 |
| 98.14 | 1025 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.59 | 20.85 | 1.25 | 3.89 | 0.21 | 0.12 | 26.40 | 132.69 | 12.76 |
| 98.77 | 1068 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.60 | 20.85 | 1.24 | 3.85 | 0.20 | 0.12 | 26.53 | 134.43 | 12.66 |
| 99.47 | 1411 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.55 | 20.84 | 1.21 | 3.75 | 0.21 | 0.12 | 25.49 | 138.42 | 13.57 |
| 100.00 | 428 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.37 | 78.55 | 20.84 | 1.18 | 3.64 | 0.21 | 0.12 | 25.17 | 143.36 | 13.86 |

Moisture Content $M_{Cwb}$: 17.37

Dry kg : 8.10

CA: 48.73

HY: 6.87

OX: 43.9

| | | | | | | | | | | | | | | | SUMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.12 | 545.05 | 32.28 | 11.68 | 394.29 | 3683.60 | 2776.21 | 2700.65 | 2670.51 | 3537.19 | 3232.07 | 301.58 | 6075.34 | 14991.15 | 131549.52 | 74376.11 |
| | | | | Stack | Heat Content Change - Ambient to Stack Temperature | | | | | | Room | Energy Losses (kJ/kg | | | |
| of Dry Wood | | | Moisture | Temp | Flue Gas Constituent | | | | | | Temp | Flue Gas Consti | | | |
| HC | $N_2$ | $H_2O$ | Present | K | $CO_2$ | $O_2$ | CO | $N_2$ | $CH_4$ | $H_2O$ | K | $CO_2$ | $O_2$ | CO | $N_2$ |
| 1.57 | 2495.73 | 31.38 | 11.68 | 414.98 | 4578.26 | 3441.41 | 3345.52 | 3308.65 | 4416.17 | 4003.13 | 300.27 | 98.52 | 2167.10 | 5073.92 | 8257.50 |
| 0.98 | 994.65 | 32.57 | 11.68 | 403.26 | 4220.45 | 3182.70 | 3096.54 | 3061.88 | 4048.58 | 3706.01 | 296.93 | 129.28 | 719.62 | 2632.69 | 3045.51 |
| 0.65 | 523.80 | 33.22 | 11.68 | 386.32 | 3369.25 | 2547.85 | 2480.60 | 2452.47 | 3216.61 | 2969.39 | 301.03 | 116.55 | 251.58 | 1589.15 | 1284.61 |
| 0.79 | 564.33 | 32.94 | 11.68 | 401.87 | 3951.66 | 2977.35 | 2896.10 | 2863.82 | 3796.55 | 3465.91 | 302.47 | 131.89 | 328.43 | 1900.12 | 1616.14 |
| 0.76 | 514.46 | 33.01 | 11.68 | 412.21 | 4350.35 | 3269.98 | 3178.84 | 3143.81 | 4196.58 | 3803.68 | 303.21 | 147.06 | 316.58 | 1789.36 | 1617.36 |
| 0.80 | 457.94 | 32.93 | 11.68 | 420.59 | 4857.02 | 3647.50 | 3545.02 | 3506.13 | 4692.61 | 4241.58 | 299.09 | 163.37 | 298.98 | 1827.86 | 1605.58 |
| 0.91 | 467.81 | 32.71 | 11.68 | 417.26 | 4631.58 | 3479.00 | 3381.44 | 3344.31 | 4473.06 | 4045.92 | 301.36 | 151.59 | 296.43 | 2054.55 | 1564.51 |
| 0.71 | 389.83 | 33.10 | 11.68 | 423.59 | 4845.25 | 3633.57 | 3530.23 | 3491.76 | 4692.37 | 4223.48 | 302.68 | 167.30 | 230.10 | 1597.02 | 1361.19 |
| 0.37 | 338.40 | 33.78 | 11.68 | 436.09 | 5409.47 | 4046.86 | 3929.34 | 3887.03 | 5260.32 | 4700.20 | 301.66 | 202.15 | 193.25 | 881.28 | 1315.38 |
| 0.40 | 356.79 | 33.72 | 11.68 | 445.76 | 5869.44 | 4383.27 | 4254.08 | 4208.68 | 5724.47 | 5088.04 | 300.33 | 217.65 | 231.52 | 956.58 | 1501.62 |
| 0.46 | 405.06 | 33.60 | 11.68 | 435.98 | 5353.28 | 4003.79 | 3887.26 | 3845.46 | 5207.96 | 4649.78 | 303.00 | 195.21 | 264.33 | 1115.07 | 1557.64 |
| 0.44 | 402.35 | 33.65 | 11.68 | 433.93 | 5294.73 | 3962.32 | 3847.58 | 3806.09 | 5145.90 | 4602.50 | 302.27 | 194.15 | 258.19 | 1063.48 | 1531.36 |
| 0.59 | 422.50 | 33.34 | 11.68 | 430.09 | 5192.59 | 3890.31 | 3778.74 | 3737.76 | 5036.96 | 4520.50 | 300.72 | 183.60 | 277.77 | 1393.84 | 1579.19 |
| 0.62 | 426.62 | 33.28 | 11.68 | 425.76 | 4999.76 | 3749.05 | 3642.32 | 3602.65 | 4842.87 | 4357.56 | 301.01 | 175.59 | 272.39 | 1453.52 | 1536.96 |
| 0.56 | 398.23 | 33.41 | 11.68 | 423.82 | 4854.75 | 3640.54 | 3536.95 | 3498.42 | 4701.94 | 4231.51 | 302.67 | 173.45 | 235.62 | 1297.65 | 1393.17 |
| 0.41 | 359.47 | 33.70 | 11.68 | 428.32 | 5062.44 | 3793.06 | 3684.35 | 3644.38 | 4910.13 | 4407.60 | 302.17 | 187.32 | 203.25 | 974.96 | 1310.04 |
| 0.44 | 363.16 | 33.64 | 11.68 | 431.59 | 5278.60 | 3953.99 | 3840.41 | 3798.80 | 5122.04 | 4594.22 | 300.12 | 194.00 | 216.41 | 1038.41 | 1379.56 |
| 0.53 | 362.41 | 33.46 | 11.68 | 431.59 | 5252.46 | 3933.84 | 3820.70 | 3779.33 | 5097.92 | 4570.59 | 300.81 | 189.21 | 216.51 | 1220.94 | 1369.68 |
| 0.59 | 371.36 | 33.34 | 11.68 | 427.09 | 4974.56 | 3727.43 | 3620.65 | 3581.36 | 4824.44 | 4331.41 | 303.13 | 176.74 | 215.25 | 1345.15 | 1329.96 |
| 0.54 | 375.05 | 33.44 | 11.68 | 424.43 | 4890.75 | 3667.27 | 3562.86 | 3524.06 | 4737.38 | 4262.49 | 302.40 | 175.64 | 214.38 | 1249.03 | 1321.69 |
| 1.14 | 489.84 | 32.25 | 11.68 | 418.48 | 4699.51 | 3529.43 | 3430.32 | 3392.68 | 4539.94 | 4104.36 | 300.91 | 144.95 | 325.89 | 2529.18 | 1661.86 |
| 1.34 | 509.04 | 31.84 | 11.68 | 403.37 | 4117.88 | 3103.40 | 3018.91 | 2985.22 | 3954.45 | 3612.96 | 299.74 | 120.17 | 305.88 | 2942.61 | 1519.58 |
| 1.42 | 504.37 | 31.68 | 11.68 | 394.93 | 3653.09 | 2756.30 | 2682.04 | 2651.95 | 3501.14 | 3210.04 | 302.81 | 104.29 | 269.47 | 3097.20 | 1337.55 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.43 | 498.61 | 31.67 | 11.68 | 389.43 | 3466.38 | 2619.09 | 2549.42 | 2520.63 | 3314.16 | 3051.60 | 301.81 | 98.93 | 252.08 | 3096.85 | 1256.81 |
| 1.38 | 492.18 | 31.76 | 11.68 | 386.48 | 3450.19 | 2610.05 | 2541.41 | 2512.54 | 3291.69 | 3042.26 | 299.09 | 99.77 | 246.09 | 3002.40 | 1236.62 |
| 1.42 | 500.30 | 31.68 | 11.68 | 382.98 | 3178.72 | 2404.75 | 2341.53 | 2314.93 | 3032.55 | 2802.99 | 302.47 | 90.82 | 232.47 | 3086.81 | 1158.16 |
| 1.46 | 501.28 | 31.60 | 11.68 | 381.65 | 3218.75 | 2437.04 | 2373.46 | 2346.39 | 3066.35 | 2841.37 | 300.01 | 90.94 | 236.76 | 3166.82 | 1176.20 |
| 1.21 | 503.80 | 32.11 | 11.68 | 379.04 | 3104.32 | 2351.62 | 2290.56 | 2264.38 | 2954.67 | 2742.23 | 300.23 | 93.95 | 226.77 | 2665.01 | 1140.79 |
| 1.21 | 507.91 | 32.11 | 11.68 | 379.09 | 3170.70 | 2402.75 | 2340.57 | 2313.78 | 3015.99 | 2802.16 | 298.55 | 95.92 | 234.34 | 2668.78 | 1175.20 |
| 1.13 | 486.15 | 32.26 | 11.68 | 378.15 | 3112.48 | 2358.85 | 2297.86 | 2271.54 | 2960.14 | 2751.04 | 299.07 | 96.23 | 215.38 | 2500.10 | 1104.30 |
| 1.17 | 498.78 | 32.19 | 11.68 | 377.54 | 2991.47 | 2266.20 | 2207.38 | 2182.14 | 2847.11 | 2642.64 | 301.59 | 91.51 | 215.02 | 2582.85 | 1088.41 |
| 1.37 | 514.42 | 31.78 | 11.68 | 376.48 | 2905.76 | 2201.24 | 2144.10 | 2119.59 | 2765.61 | 2566.88 | 302.71 | 84.00 | 220.52 | 3002.51 | 1090.36 |
| 1.42 | 527.75 | 31.69 | 11.68 | 375.48 | 2921.70 | 2214.51 | 2157.31 | 2132.59 | 2778.17 | 2582.79 | 301.24 | 83.33 | 230.25 | 3100.20 | 1125.48 |
| 1.36 | 525.11 | 31.80 | 11.68 | 373.82 | 2828.20 | 2144.10 | 2088.83 | 2064.87 | 2688.25 | 2500.84 | 301.92 | 81.93 | 220.76 | 2987.67 | 1084.27 |
| 1.28 | 514.30 | 31.97 | 11.68 | 373.15 | 2767.23 | 2097.77 | 2043.67 | 2020.24 | 2630.53 | 2446.77 | 302.81 | 82.10 | 208.99 | 2812.53 | 1039.01 |
| 1.31 | 510.44 | 31.91 | 11.68 | 372.76 | 2740.68 | 2077.69 | 2024.12 | 2000.91 | 2605.18 | 2423.37 | 303.09 | 80.72 | 205.17 | 2865.79 | 1021.34 |
| 1.35 | 510.65 | 31.83 | 11.68 | 372.43 | 2785.12 | 2112.23 | 2057.98 | 2034.33 | 2645.57 | 2463.96 | 301.58 | 81.18 | 209.14 | 2942.07 | 1038.83 |
| 1.33 | 509.99 | 31.85 | 11.68 | 372.04 | 2728.15 | 2068.72 | 2015.50 | 1992.36 | 2592.13 | 2413.09 | 302.66 | 79.76 | 204.35 | 2919.15 | 1016.09 |
| 1.30 | 495.87 | 31.92 | 11.68 | 372.37 | 2724.35 | 2065.48 | 2012.27 | 1989.18 | 2589.29 | 2409.19 | 303.11 | 80.52 | 195.85 | 2837.84 | 986.37 |
| 1.26 | 493.26 | 31.99 | 11.68 | 372.54 | 2789.39 | 2115.42 | 2061.07 | 2037.39 | 2649.74 | 2467.66 | 301.59 | 83.22 | 198.72 | 2769.16 | 1004.95 |
| 1.27 | 496.29 | 31.98 | 11.68 | 372.65 | 2755.36 | 2089.10 | 2035.30 | 2011.94 | 2618.53 | 2436.77 | 302.59 | 82.01 | 198.02 | 2786.05 | 998.52 |
| 1.26 | 498.88 | 32.00 | 11.68 | 373.15 | 2765.96 | 2096.79 | 2042.71 | 2019.29 | 2629.35 | 2445.62 | 302.84 | 82.58 | 200.06 | 2764.25 | 1007.39 |
| 1.48 | 585.81 | 31.56 | 11.68 | 372.76 | 2790.91 | 2116.38 | 2061.96 | 2038.28 | 2651.61 | 2468.71 | 301.78 | 77.76 | 253.53 | 3270.17 | 1194.04 |
| 1.58 | 594.18 | 31.37 | 11.68 | 371.21 | 2695.83 | 2044.60 | 1992.10 | 1969.20 | 2560.58 | 2385.10 | 302.63 | 72.96 | 250.59 | 3468.64 | 1170.07 |
| 1.67 | 608.92 | 31.18 | 11.68 | 369.65 | 2669.56 | 2025.77 | 1974.03 | 1951.29 | 2533.20 | 2363.55 | 301.68 | 70.14 | 257.29 | 3666.45 | 1188.19 |
| 1.55 | 628.78 | 31.43 | 11.68 | 367.87 | 2602.71 | 1975.87 | 1925.60 | 1903.37 | 2467.97 | 2305.62 | 301.56 | 70.76 | 260.09 | 3440.42 | 1196.80 |
| 1.58 | 629.35 | 31.35 | 11.68 | 366.48 | 2520.09 | 1913.43 | 1864.82 | 1843.28 | 2389.00 | 2232.87 | 302.26 | 67.79 | 252.54 | 3511.92 | 1160.07 |
| 1.61 | 630.15 | 31.30 | 11.68 | 365.71 | 2483.11 | 1885.61 | 1837.77 | 1816.53 | 2353.37 | 2200.51 | 302.41 | 66.29 | 249.53 | 3562.17 | 1144.68 |
| 1.65 | 630.72 | 31.23 | 11.68 | 365.15 | 2455.06 | 1864.48 | 1817.22 | 1796.20 | 2326.43 | 2175.91 | 302.56 | 64.83 | 247.39 | 3634.45 | 1132.91 |
| 1.63 | 637.64 | 31.27 | 11.68 | 364.59 | 2430.43 | 1845.97 | 1799.23 | 1778.41 | 2302.65 | 2154.38 | 302.62 | 64.48 | 248.16 | 3604.23 | 1133.99 |
| 1.76 | 650.00 | 31.01 | 11.68 | 363.98 | 2411.46 | 1831.87 | 1785.55 | 1764.88 | 2284.02 | 2138.03 | 302.47 | 61.46 | 253.57 | 3864.62 | 1147.17 |
| 1.79 | 667.80 | 30.94 | 11.68 | 363.15 | 2375.93 | 1805.18 | 1759.61 | 1739.23 | 2249.69 | 2107.00 | 302.53 | 59.79 | 258.78 | 3946.06 | 1161.45 |

| | | | AVERAGE | SUMS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 52015.95 | 79272.97 | 28664.76 | 7441.27 | 54153.31 | 21393.82 | 32759.5 | 106763.5 | 21420.2 | 1520.5 | 108.3 |
| of Dry Fuel) | | | Total | | | | | | | |
| tuent | | | Loss | Total | Chemical | Sensible an | Total | Chem | Grams Produced | |
| $CH_4$ | $H_2O$ Comb | $H_2O$ Fuel M | Rate | Loss | Loss 1 | Latent Loss | Output | Loss 2 | CO | HC |
| 1404.68 | 1505.47 | 560.25 | 19067.44 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0.00 |
| 874.21 | 1552.65 | 556.78 | 9510.74 | 3918.67 | 1432 | 2487.11 | 4244 | 1432 | 106.16 | 6.44 |
| 583.00 | 1559.17 | 548.18 | 5932.24 | 1512.36 | 550 | 962.65 | 3538 | 550 | 39.74 | 2.66 |
| 707.43 | 1562.50 | 553.98 | 6800.49 | 2218.12 | 843 | 1374.87 | 4243 | 843 | 60.70 | 4.13 |
| 675.86 | 1577.03 | 557.92 | 6681.17 | 2216.78 | 810 | 1406.48 | 4356 | 810 | 58.09 | 4.01 |
| 714.09 | 1587.41 | 563.03 | 6760.32 | 2319.07 | 863 | 1456.12 | 4477 | 863 | 61.27 | 4.38 |
| 812.96 | 1570.34 | 560.75 | 7011.13 | 2457.68 | 995 | 1462.43 | 4487 | 995 | 70.42 | 5.10 |
| 635.88 | 1595.24 | 562.82 | 6149.56 | 2213.30 | 795 | 1417.94 | 4917 | 795 | 56.17 | 4.09 |
| 332.11 | 1644.09 | 568.39 | 5136.66 | 1973.93 | 461 | 1513.03 | 5639 | 461 | 33.05 | 2.28 |
| 358.76 | 1654.29 | 572.92 | 5493.33 | 1935.93 | 458 | 1478.19 | 5045 | 458 | 32.86 | 2.26 |
| 412.20 | 1633.68 | 567.80 | 5745.93 | 1723.36 | 453 | 1270.54 | 4218 | 453 | 32.64 | 2.21 |
| 390.00 | 1634.50 | 567.25 | 5638.93 | 1564.43 | 399 | 1165.76 | 3932 | 399 | 28.80 | 1.93 |
| 531.41 | 1616.41 | 566.29 | 6148.51 | 1613.59 | 500 | 1113.94 | 3585 | 500 | 35.72 | 2.49 |
| 556.95 | 1608.21 | 564.39 | 6168.01 | 1653.40 | 533 | 1120.23 | 3657 | 533 | 38.06 | 2.67 |
| 497.57 | 1610.41 | 562.92 | 5770.78 | 1633.46 | 503 | 1130.58 | 3974 | 503 | 35.89 | 2.52 |
| 366.56 | 1630.46 | 564.97 | 5237.57 | 1472.71 | 373 | 1099.59 | 4098 | 373 | 26.78 | 1.84 |
| 393.62 | 1633.83 | 567.15 | 5422.98 | 1545.17 | 403 | 1141.75 | 4099 | 403 | 28.88 | 2.00 |
| 476.25 | 1624.07 | 566.88 | 5663.54 | 1645.57 | 488 | 1157.96 | 4110 | 488 | 34.63 | 2.47 |
| 529.13 | 1610.34 | 564.08 | 5770.66 | 1492.80 | 480 | 1013.08 | 3632 | 480 | 33.99 | 2.45 |
| 484.42 | 1612.86 | 563.28 | 5621.30 | 1116.96 | 341 | 776.12 | 2819 | 341 | 24.25 | 1.72 |
| 1018.71 | 1550.14 | 561.43 | 7792.17 | 1124.72 | 507 | 617.74 | 1735 | 507 | 35.69 | 2.63 |
| 1199.14 | 1515.02 | 555.69 | 8158.10 | 963.44 | 485 | 478.61 | 1376 | 485 | 34.02 | 2.53 |
| 1271.75 | 1494.46 | 550.99 | 8125.71 | 807.30 | 431 | 376.62 | 1161 | 431 | 30.16 | 2.26 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1274.17 | 1489.16 | 549.14 | 8017.13 | 691.31 | 374 | 317.19 | 1017 | 374 | 26.19 | 1.97 |
| 1233.91 | 1493.10 | 549.03 | 7860.91 | 707.31 | 378 | 328.95 | 1075 | 378 | 26.49 | 1.99 |
| 1269.60 | 1481.73 | 546.23 | 7865.82 | 648.77 | 357 | 291.90 | 985 | 357 | 24.98 | 1.88 |
| 1305.31 | 1479.20 | 546.68 | 8001.91 | 690.00 | 383 | 307.03 | 1018 | 383 | 26.79 | 2.02 |
| 1077.60 | 1499.87 | 545.52 | 7249.51 | 625.12 | 321 | 304.55 | 1083 | 321 | 22.55 | 1.66 |
| 1077.60 | 1501.80 | 546.22 | 7299.87 | 574.73 | 293 | 281.78 | 985 | 293 | 20.62 | 1.52 |
| 1009.68 | 1507.26 | 545.63 | 6978.59 | 562.51 | 281 | 281.50 | 1034 | 281 | 19.78 | 1.46 |
| 1042.56 | 1500.32 | 544.36 | 7065.02 | 529.75 | 270 | 259.66 | 956 | 270 | 19.01 | 1.40 |
| 1226.67 | 1478.68 | 543.48 | 7646.22 | 487.33 | 268 | 219.47 | 775 | 268 | 18.79 | 1.40 |
| 1265.77 | 1475.11 | 543.66 | 7823.81 | 483.98 | 268 | 215.60 | 741 | 268 | 18.83 | 1.40 |
| 1216.06 | 1477.68 | 542.71 | 7611.08 | 542.16 | 298 | 244.54 | 869 | 298 | 20.90 | 1.55 |
| 1141.03 | 1483.75 | 542.07 | 7309.48 | 493.27 | 265 | 228.06 | 844 | 265 | 18.64 | 1.38 |
| 1166.66 | 1480.33 | 541.80 | 7361.81 | 510.60 | 278 | 232.57 | 863 | 278 | 19.53 | 1.45 |
| 1201.00 | 1478.06 | 542.27 | 7492.55 | 547.76 | 301 | 246.69 | 900 | 301 | 21.13 | 1.57 |
| 1191.00 | 1477.48 | 541.68 | 7429.50 | 501.37 | 276 | 225.63 | 835 | 276 | 19.35 | 1.44 |
| 1159.58 | 1480.62 | 541.64 | 7282.40 | 546.05 | 298 | 248.07 | 939 | 298 | 20.90 | 1.56 |
| 1129.34 | 1485.64 | 542.32 | 7213.35 | 554.39 | 298 | 256.56 | 968 | 298 | 20.91 | 1.56 |
| 1135.91 | 1483.96 | 541.96 | 7226.43 | 487.67 | 263 | 224.57 | 849 | 263 | 18.47 | 1.37 |
| 1125.04 | 1485.38 | 542.06 | 7206.75 | 526.87 | 283 | 244.22 | 921 | 283 | 19.85 | 1.47 |
| 1320.94 | 1465.74 | 542.33 | 8124.52 | 548.27 | 308 | 240.31 | 789 | 308 | 21.68 | 1.60 |
| 1407.82 | 1454.06 | 541.35 | 8365.49 | 172.39 | 100 | 72.48 | 236 | 100 | 7.02 | 0.52 |
| 1491.82 | 1444.66 | 541.10 | 8659.66 | 267.50 | 158.42 | 109.07 | 344 | 158 | 11.13 | 0.83 |
| 1382.13 | 1454.22 | 540.43 | 8344.84 | 556.08 | 319.56 | 236.52 | 764 | 320 | 22.53 | 1.65 |
| 1414.49 | 1448.57 | 539.58 | 8394.96 | 541.95 | 316.30 | 225.64 | 737 | 316 | 22.28 | 1.64 |
| 1437.04 | 1445.22 | 539.20 | 8444.12 | 509.20 | 299.85 | 209.35 | 685 | 300 | 21.12 | 1.55 |
| 1469.62 | 1441.07 | 538.91 | 8529.18 | 441.24 | 262.65 | 178.59 | 584 | 263 | 18.48 | 1.36 |
| 1453.38 | 1442.07 | 538.66 | 8484.98 | 457.59 | 271.32 | 186.27 | 611 | 260 | 19.11 | 1.41 |
| 1566.65 | 1429.86 | 538.47 | 8861.79 | 631.34 | 384.93 | 246.41 | 780 | 303 | 27.07 | 2.00 |
| 1596.87 | 1425.77 | 538.11 | 8986.82 | 194.07 | 119.08 | 74.98 | 234 | 238 | 8.38 | 0.62 |

# Intertek Testing Services NA Ltd

| | |
|---|---|
| **Manufacturer:** | SBI |
| **Model:** | NG1800 |
| **Date:** | 02/05/14 |
| **Run:** | 10 |
| **Control #:** | G101440749 |
| **Test Duration:** | 510 |
| **Output Category:** | 2 |

**Technicians:**

_____

_____

_____

**Test Results in Accordance with CSA B415.1-10**

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 66.2% | 71.6% |
| **Combustion Efficiency** | 86.7% | 86.7% |
| **Heat Transfer Efficiency** | 76% | 82.6% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 12,507 | 11,864 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 0.95 | 2.10 | **(lb/h)** |
| **Input (kJ/h)** | 18,881 | 17,911 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 8.10 | 17.86 | **dry lb** |
| **MC wet (%)** | 17.37 | | |
| **MC dry (%)** | 21.02 | | |
| **Particulate (g )** | 32.7355 | | |
| **CO (g)** | 1,521 | | |
| **Test Duration (h)** | 8.50 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | 0.31 | 14.30 |
| **g/kg Dry Fuel** | 4.04 | 187.68 |
| **g/h** | 3.85 | 178.88 |
| **lb/MM Btu Output** | 0.72 | 33.24 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 15.80 |

**Version: 2.4** **15/04/2010**

Intertek

# TEST FUEL DATA
## EPA Method 5G-3

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 5, 2014 |
| Test Run Number: | 10 |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

**PRE-BURN FUEL PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 16 | 1.663 | 19.5 | 20.5 | 19.9 |
| 2 | 16 | 1.598 | 21.9 | 22.3 | 22.2 |
| 3 | 16 | 1.712 | 21.4 | 21.1 | 21.4 |
| 4 | 16 | 1.282 | 21.4 | 20.6 | 21.9 |
| 5 | 16 | 1.710 | 21.2 | 20.3 | 21.7 |
| 6 | 16 | 1.652 | 20.0 | 19.0 | 19.2 |
| 7 | 16 | 1.754 | 20.6 | 21.6 | 20.5 |
| 8 | 16 | 1.647 | 20.2 | 19.0 | 19.5 |
| 9 | 17 | 1.920 | 20.6 | 20.5 | 21.0 |
| 10 | 17 | 1.98 | 20.5 | 19.9 | 20.6 |
| 11 | 17 | 2.09 | 21.0 | 20.4 | 21.0 |
| 12 | 17 | 2.06 | 22.0 | 21.9 | 22.5 |
| Total Weight | | 21.073 | Average, %db | | 20.8 |

| Allowable Fuel Load Range: | 4.32 | to | 5.40 |
|---|---|---|---|

**TEST FUEL LOAD PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 10:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. 2x4 | Weight, Lb. 4x4 | Moisture, %, Dry Basis | |
| 1 | 15 | 1.401 | | 19.3 | 20.5 | 20.5 |
| 2 | 15 | 1.554 | | 19.9 | 21.1 | 19.9 |
| 3 | 15 | 1.368 | | 20.0 | 20.2 | 20.9 |
| 4 | 15 | | 3.989 | 21.9 | 22.0 | 22.2 |
| 5 | 15 | | 3.594 | 20.1 | 22.1 | 19.1 |
| 6 | 15 | | 3.956 | 21.5 | 22.0 | 22.3 |
| 7 | 15 | 2.088 | | 22.3 | 21.2 | 22.2 |
| 8 | 15 | 1.589 | | 21.0 | 19.7 | 19.9 |
| 9 | 15 | 2.070 | | 22.1 | 21.5 | 22.2 |
| , | | 10.070 | 11.539 | | | |
| % of Weight | | 46.6 | 53.4 | | | |
| Total weight, wet, lb. | | 21.609 | | Average Moisture, dry | | 21.02 |
| Total weight, dry, kg | | 8.10 | | Average Moisture, wet | | 17.37 |

Date: _____ Engineer Signature: _____

## Results

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 6, 2014 |
| Test Run Number: | 11 |

| | | |
|---|---|---|
| Dry Burn-Rate, kg/hr: | **2.01** | |
| Emission-Rate, g/hr: | **1.83** | |
| Adjusted Emission-Rate, g/hr : | **3.01** | |
| Duration of Test, Minutes | 250 | |
| **Dry Gas Meter Standardization** | Train A | Train B |
| Dry Gas Meter Beginning Reading, $ft^3$ | 1406.28 | 1367.198 |
| Dry Gas Meter Ending Reading, $ft^3$ | 1447.543 | 1407.105 |
| Barometric Pressure Correction Factor | 1.010 | 1.010 |
| Dry Gas Meter Calibration Factors (γ factors) | 1.002 | 0.994 |
| Dry Gas Meter Temperature Factors | 1.009 | 1.010 |
| Dry Gas Meter Delta-H Correction Factors | 1.000 | 1.000 |
| Dry Gas Meter STD Volume Sampled, $ft^3$ | **42.134** | **40.456** |
| **Dillution Tunnel Flow / Volume** | | |
| Standardized Tunnel Flow, dscfm | **144.039** | |
| Total Tunnel Volume, scf | **36009.709** | |
| **Emission Caclulations** | Train A | Train B |
| Sample Ratios (Total Tunnel Volume / Total Sample Volume) | 854.651 | 890.091 |
| Sample Particulate Mass, mg | 8.8 | 8.7 |
| Total Emissions, grams | 7.521 | 7.744 |
| Emission-Rate, g/hr | 1.81 | 1.86 |
| Adjusted Emission Rates, g/hr | **2.97** | **3.04** |
| Deviation, % | 1.21% | |
| **Operating Parameters** | Train A | Train B |
| Max Filter Temperature, ℉ | 85.59 | 79.83 |
| Post-Test Leak Check, cfm @ in. Hg vac. | 0.002@5 | 0.003@5 |
| Average Firebox Surface Temperture delta-T, ℉ | 70.9 | |
| Maximum Ambient Temperture, ℉ | 84 | |
| Mimimum Ambient Temperature, ℉ | 66 | |
| **Fuel Properties** | | |
| Wet Fuel Load Weight, lb. | 22.28 | |
| Dry-Basis Fuel Load Moisture Content, % | 20.72 | |
| Wet-Basis Fuel Load Moisture Content, % | 17.16 | |
| Coal Bed Range, lb. | 4.50 | 5.50 |
| Actual Coal Bed, Lb. | 5.04 | |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID No: | 101440749MTL-003 |
| Test Date: | February 6, 2014 |
| Test Run No: | 11 |

## Temperature Data

| | |
|---|---|
| Firebox Temp Start | 450.9 |
| Firebox Temp End | 380 |
| Firebox Delta-T | **70.9** |

| Max Filter Temps | |
|---|---|
| Train A | Train B |
| **85.59** | **79.83** |

| Interval | 10 | Duration of Test, Min | 250 |
|---|---|---|---|

| Time | | Temperature Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dillution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Train A Filter | Train B Filter | Train A DGM | Train B DGM |
| 0 | 0 | 76.44 | 111.3 | 372.7 | 412.5 | 378.4 | 531.5 | 457.8 | 474.3 | | 66.89 | 67.8 | 62.53 | 62.25 |
| 1 | 10 | 83.82 | 120.7 | 435.3 | 384.8 | 384.4 | 461.8 | 434.8 | 447.2 | | 77.11 | 70.74 | 62.93 | 62.47 |
| 2 | 20 | 73.58 | 143.9 | 618.9 | 519.8 | 378.1 | 442 | 412.1 | 429.6 | | 85.3 | 77.49 | 63.04 | 62.5 |
| 3 | 30 | 72.47 | 153.2 | 665.5 | 619.4 | 365.8 | 459.4 | 421.9 | 449.1 | | 79.46 | 79.83 | 63.11 | 62.62 |
| 4 | 40 | 73.96 | 149.2 | 648.6 | 639.1 | 354.4 | 492.1 | 444.7 | 478.3 | | 85.59 | 79.09 | 63.03 | 62.6 |
| 5 | 50 | 74.49 | 139.5 | 584.4 | 610.2 | 344.8 | 527.6 | 468.9 | 505.7 | | 83.64 | 75.8 | 63.14 | 62.63 |
| 6 | 60 | 73.26 | 131.6 | 545.4 | 564.8 | 335.8 | 551.7 | 483.5 | 523 | | 83.95 | 73.31 | 63.09 | 62.61 |
| 7 | 70 | 71.9 | 125.6 | 508.8 | 529.2 | 327.6 | 560.9 | 490.5 | 534.2 | | 83.74 | 72.86 | 63.22 | 62.73 |
| 8 | 80 | 71.15 | 120 | 479.9 | 498.8 | 320.5 | 565.8 | 490.5 | 546.3 | | 82.57 | 73.01 | 63.2 | 62.76 |
| 9 | 90 | 69.24 | 115.7 | 464.1 | 470.4 | 314.7 | 569.9 | 487.4 | 552.6 | | 81.15 | 72.74 | 63.26 | 62.85 |
| 10 | 100 | 69.09 | 110.9 | 434.5 | 448.3 | 310.5 | 566.2 | 487.1 | 538.7 | | 79.87 | 72.01 | 63.28 | 62.83 |
| 11 | 110 | 69.18 | 107.6 | 411.6 | 425.5 | 309.5 | 556 | 487.6 | 514.1 | | 78.8 | 71.32 | 63.31 | 62.86 |
| 12 | 120 | 68.65 | 103.4 | 383 | 399.1 | 308.9 | 537.8 | 478.7 | 491.5 | | 77.5 | 70.76 | 63.36 | 62.88 |
| 13 | 130 | 67.32 | 99.52 | 356.7 | 370.8 | 307 | 520 | 463.4 | 469.7 | | 76.21 | 70.09 | 63.44 | 62.98 |
| 14 | 140 | 67.37 | 97.11 | 343.6 | 348.9 | 304.9 | 512.1 | 448.2 | 452.1 | | 75.14 | 69.68 | 63.38 | 62.95 |
| 15 | 150 | 69.14 | 95.98 | 333.4 | 336.5 | 301.9 | 513.7 | 439.1 | 441.1 | | 74.46 | 69.36 | 63.35 | 62.91 |
| 16 | 160 | 66.81 | 94.16 | 324.7 | 324 | 297.6 | 512.9 | 431.6 | 432.8 | | 73.84 | 68.74 | 63.26 | 62.84 |
| 17 | 170 | 71.04 | 94.44 | 319.5 | 317.4 | 295.4 | 527.3 | 425.7 | 427.5 | | 73.55 | 68.59 | 63.22 | 62.82 |
| 18 | 180 | 67.58 | 93.25 | 319.1 | 314.2 | 292.2 | 546.9 | 423 | 425.8 | | 73.19 | 68.5 | 63.24 | 62.81 |
| 19 | 190 | 71.24 | 93.61 | 315.6 | 312.9 | 290.5 | 553.7 | 425.1 | 428.1 | | 73.25 | 68.53 | 63.14 | 62.82 |
| 20 | 200 | 67.41 | 93.49 | 313 | 308.7 | 288 | 549 | 424.9 | 427.2 | | 73.21 | 68.44 | 63.07 | 62.72 |
| 21 | 210 | 70.38 | 93.95 | 312 | 307.7 | 287.5 | 548.1 | 424.9 | 429.4 | | 73.36 | 68.46 | 63.09 | 62.74 |
| 22 | 220 | 67.19 | 92.85 | 310.6 | 306 | 285.6 | 548.5 | 424.2 | 429.3 | | 73.21 | 68.35 | 63.02 | 62.69 |
| 23 | 230 | 69.4 | 93.03 | 305.9 | 304.1 | 285.3 | 543.3 | 419.7 | 428 | | 73.02 | 68.3 | 62.99 | 62.62 |
| 24 | 240 | 66.43 | 91.49 | 298.2 | 298.3 | 283.6 | 530.5 | 409 | 420.6 | | 72.75 | 68.25 | 63.03 | 62.69 |
| 25 | 250 | 68.82 | 91.04 | 288.6 | 291.9 | 283.5 | 514.2 | 398.9 | 411.5 | | 72.51 | 68.14 | 63 | 62.67 |

# Gas Particulate Sampling Data

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 6, 2014 |
| Test Run Number: | 11 |

| Barometer, In. Hg | | RH, % | Sample Box Correction (γ) Factors | |
|---|---|---|---|---|
| Start | 30.24 | 46 | Meter Box (A) | 1.002 |
| End | 30.18 | 45 | Meter Box (B) | 0.994 |
| Duration of Test, Min | | 250 | | |

| Leak Check, cfm @ in Hg | |
|---|---|
| Train A | Train B |
| 0.002@5 | 0.003@5 |

| Maximum Vacuum | | Average Gases, % | | |
|---|---|---|---|---|
| Train A | Train B | O2 | CO2 | CO |
| 0.00 | 0.00 | 12.72 | 6.975 | 6.975 |

| Time | Particulate Sampling Data | | | | | | | | | | | | Combustion Gasses, % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tunnel Delta-P | Train A Delta-H | Train B Delta-H | Flue Draft | Fuel Weight | Weight Loss | Train A Volume | Train B Volume | Train A Proportional Rate | Train B Proportional Rate | Train A Vacuum, In. Hg | Train B Vacuum, In. Hg | O2 | CO2 | CO |
| 0 | 0.015 | 0.00 | 0.00 | 0.065 | 22.28 | 22.28 | 1406.280 | 1367.198 | 99.94 | 99.94 | 0.00 | 0.00 | 17.820 | 0.720 | 0.540 |
| 10 | 0.015 | 0.00 | 0.00 | 0.085 | 20.74 | 1.54 | 1407.921 | 1368.694 | 100.40 | 94.64 | 0.00 | 0.00 | 10.600 | 10.980 | 0.810 |
| 20 | 0.015 | 0.00 | 0.00 | 0.098 | 18.06 | 2.68 | 1409.535 | 1370.224 | 100.68 | 98.70 | 0.00 | 0.00 | 5.330 | 15.180 | 0.930 |
| 30 | 0.015 | 0.00 | 0.00 | 0.100 | 15.06 | 3.00 | 1411.164 | 1371.801 | 102.38 | 102.49 | 0.00 | 0.00 | 3.990 | 15.830 | 1.720 |
| 40 | 0.015 | 0.00 | 0.00 | 0.098 | 12.34 | 2.72 | 1412.755 | 1373.372 | 99.68 | 101.77 | 0.00 | 0.00 | 5.840 | 14.140 | 1.000 |
| 50 | 0.015 | 0.00 | 0.00 | 0.093 | 10.33 | 2.01 | 1414.345 | 1374.915 | 98.80 | 99.15 | 0.00 | 0.00 | 9.040 | 11.470 | 0.640 |
| 60 | 0.015 | 0.00 | 0.00 | 0.090 | 8.76 | 1.57 | 1415.975 | 1376.479 | 100.62 | 99.84 | 0.00 | 0.00 | 9.950 | 10.560 | 0.610 |
| 70 | 0.015 | 0.00 | 0.00 | 0.085 | 7.45 | 1.31 | 1417.607 | 1378.095 | 100.21 | 102.61 | 0.00 | 0.00 | 10.710 | 9.710 | 0.610 |
| 80 | 0.015 | 0.00 | 0.00 | 0.083 | 6.35 | 1.10 | 1419.210 | 1379.710 | 97.96 | 102.05 | 0.00 | 0.00 | 11.510 | 9.030 | 0.620 |
| 90 | 0.015 | 0.00 | 0.00 | 0.080 | 5.41 | 0.94 | 1420.861 | 1381.330 | 100.51 | 101.97 | 0.00 | 0.00 | 11.440 | 8.870 | 0.640 |
| 100 | 0.015 | 0.00 | 0.00 | 0.078 | 4.66 | 0.75 | 1422.494 | 1382.941 | 98.99 | 100.98 | 0.00 | 0.00 | 12.250 | 7.880 | 0.790 |
| 110 | 0.015 | 0.00 | 0.00 | 0.075 | 4.07 | 0.59 | 1424.152 | 1384.545 | 100.21 | 100.25 | 0.00 | 0.00 | 13.290 | 6.520 | 0.950 |
| 120 | 0.015 | 0.00 | 0.00 | 0.070 | 3.60 | 0.47 | 1425.812 | 1386.137 | 99.95 | 99.12 | 0.00 | 0.00 | 14.210 | 5.180 | 1.200 |
| 130 | 0.015 | 0.00 | 0.00 | 0.070 | 3.27 | 0.33 | 1427.479 | 1387.735 | 100.01 | 99.14 | 0.00 | 0.00 | 14.610 | 4.620 | 1.320 |
| 140 | 0.015 | 0.00 | 0.00 | 0.065 | 2.94 | 0.33 | 1429.150 | 1389.367 | 100.05 | 101.03 | 0.00 | 0.00 | 14.520 | 4.760 | 1.230 |
| 150 | 0.015 | 0.00 | 0.00 | 0.065 | 2.64 | 0.30 | 1430.825 | 1390.999 | 100.19 | 100.94 | 0.00 | 0.00 | 14.830 | 4.360 | 1.390 |
| 160 | 0.015 | 0.00 | 0.00 | 0.065 | 2.32 | 0.32 | 1432.488 | 1392.531 | 99.33 | 94.61 | 0.00 | 0.00 | 14.780 | 4.390 | 1.370 |
| 170 | 0.015 | 0.00 | 0.00 | 0.065 | 2.00 | 0.32 | 1434.159 | 1394.099 | 99.84 | 96.86 | 0.00 | 0.00 | 14.570 | 4.670 | 1.350 |
| 180 | 0.015 | 0.00 | 0.00 | 0.065 | 1.69 | 0.31 | 1435.833 | 1395.723 | 99.91 | 100.22 | 0.00 | 0.00 | 14.410 | 4.780 | 1.340 |
| 190 | 0.015 | 0.00 | 0.00 | 0.063 | 1.40 | 0.29 | 1437.502 | 1397.356 | 99.66 | 100.80 | 0.00 | 0.00 | 14.610 | 4.560 | 1.440 |
| 200 | 0.015 | 0.00 | 0.00 | 0.063 | 1.07 | 0.33 | 1439.175 | 1398.979 | 99.90 | 100.19 | 0.00 | 0.00 | 14.770 | 4.450 | 1.330 |
| 210 | 0.015 | 0.00 | 0.00 | 0.063 | 0.81 | 0.26 | 1440.849 | 1400.599 | 100.00 | 100.05 | 0.00 | 0.00 | 14.640 | 4.700 | 1.200 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 220 | 0.015 | 0.00 | 0.00 | 0.063 | 0.53 | 0.28 | 1442.522 | 1402.221 | 99.85 | 100.08 | 0.00 | 0.00 | 15.260 | 4.070 | 1.240 |
| 230 | 0.015 | 0.00 | 0.00 | 0.060 | 0.29 | 0.24 | 1444.195 | 1403.825 | 99.87 | 99.00 | 0.00 | 0.00 | 15.480 | 3.700 | 1.250 |
| 240 | 0.015 | 0.00 | 0.00 | 0.060 | 0.05 | 0.24 | 1445.869 | 1405.457 | 99.79 | 100.57 | 0.00 | 0.00 | 15.860 | 3.440 | 1.210 |
| 250 | 0.015 | 0.00 | 0.00 | 0.060 | 0.00 | 0.05 | 1447.543 | 1407.105 | 99.75 | 101.52 | 0.00 | 0.00 | 16.390 | 2.770 | 1.370 |

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 6, 2014 |
| Test Run Number: | 11 |

| | Dilution Tunnel | | |
|---|---|---|---|
| | Delta P In. H2O | Temp,℉ | Square Root |
| A1 | 0.0100 | 125 | 0.1000 |
| A2 | 0.0125 | 126 | 0.1118 |
| A3 | 0.0125 | 126 | 0.1118 |
| A4 | 0.0150 | 125 | 0.1225 |
| A Center | 0.0150 | 126 | 0.1225 |
| B1 | 0.0150 | 127 | 0.1225 |
| B2 | 0.0150 | 127 | 0.1225 |
| B3 | 0.0100 | 127 | 0.1000 |
| B4 | 0.0100 | 126 | 0.1000 |
| B Center | 0.0150 | 131 | 0.1225 |
| Averages | 0.013 | 126.66 | 0.1114 |

| | | |
|---|---|---|
| Tunnel Diameter | 8.000 | inches |
| Tunnel Static | -0.095 | in. H2O |
| Tunnel Area | 0.34907 | Ft2 |
| Pitot Correction | 0.9094 | factor |
| Baro. Pressure | 30.24 | |
| Pitot Factor | 0.99 | ( 0.99 for standard, 0.84 or Cal. For S-Type ) |
| Initial Velocity | 7.770 | Ft/ Sec |
| Initial Flow | **142.05** | Ft3/min |

| | | | |
|---|---|---|---|
| VS (1) | 0.019152053 | | |
| VS (2) | 0.019946069 | STD Tunnel Flow: | 144.04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 250 | | | | 569.8661538 | 42.115 | 40.438 | 7.66 | 99.94 | 99.94 |
| Time | Average Firebox Temp | Ending Average Firebox Temp | Tunnel Delta-P | Tunnel Temp, R | STD Sample $Ft^3$ (1) | STD Sample $Ft^3$ (2) | Tunnel Velocity | Proportional Rate (1) | Proportional Rate (2) |
| 0 | 450.9 | | 0.015 | 571.3 | | | 7.672 | | |
| 10 | 422.6 | | 0.015 | 580.7 | 1.676 | 1.517 | 7.734 | 100.40 | 94.64 |
| 20 | 436.3 | | 0.015 | 603.9 | 1.648 | 1.551 | 7.887 | 100.68 | 98.70 |
| 30 | 463.1 | | 0.015 | 613.2 | 1.663 | 1.598 | 7.948 | 102.38 | 102.49 |
| 40 | 481.7 | | 0.015 | 609.2 | 1.624 | 1.592 | 7.922 | 99.68 | 101.77 |
| 50 | 491.4 | | 0.015 | 599.5 | 1.623 | 1.564 | 7.859 | 98.80 | 99.15 |
| 60 | 491.8 | | 0.015 | 591.6 | 1.664 | 1.585 | 7.807 | 100.62 | 99.84 |
| 70 | 488.5 | | 0.015 | 585.6 | 1.666 | 1.638 | 7.767 | 100.21 | 102.61 |
| 80 | 484.4 | | 0.015 | 580 | 1.636 | 1.636 | 7.730 | 97.96 | 102.05 |
| 90 | 479.0 | | 0.015 | 575.7 | 1.685 | 1.641 | 7.701 | 100.51 | 101.97 |
| 100 | 470.2 | | 0.015 | 570.9 | 1.666 | 1.632 | 7.669 | 98.99 | 100.98 |
| 110 | 458.5 | | 0.015 | 567.6 | 1.692 | 1.625 | 7.647 | 100.21 | 100.25 |
| 120 | 443.2 | | 0.015 | 563.4 | 1.694 | 1.613 | 7.618 | 99.95 | 99.12 |
| 130 | 426.2 | | 0.015 | 559.52 | 1.701 | 1.619 | 7.592 | 100.01 | 99.14 |
| 140 | 413.2 | | 0.015 | 557.11 | 1.705 | 1.653 | 7.576 | 100.05 | 101.03 |
| 150 | 406.5 | | 0.015 | 555.98 | 1.709 | 1.653 | 7.568 | 100.19 | 100.94 |
| 160 | 399.8 | | 0.015 | 554.16 | 1.697 | 1.552 | 7.556 | 99.33 | 94.61 |
| 170 | 398.7 | | 0.015 | 554.44 | 1.705 | 1.589 | 7.557 | 99.84 | 96.86 |
| 180 | 400.4 | | 0.015 | 553.25 | 1.708 | 1.645 | 7.549 | 99.91 | 100.22 |
| 190 | 402.1 | | 0.015 | 553.61 | 1.704 | 1.655 | 7.552 | 99.66 | 100.80 |
| 200 | 399.6 | | 0.015 | 553.49 | 1.708 | 1.645 | 7.551 | 99.90 | 100.19 |
| 210 | 399.5 | | 0.015 | 553.95 | 1.709 | 1.642 | 7.554 | 100.00 | 100.05 |
| 220 | 398.7 | | 0.015 | 552.85 | 1.708 | 1.644 | 7.547 | 99.85 | 100.08 |
| 230 | 396.1 | | 0.015 | 553.03 | 1.708 | 1.626 | 7.548 | 99.87 | 99.00 |
| 240 | 388.4 | | 0.015 | 551.49 | 1.709 | 1.654 | 7.537 | 99.79 | 100.57 |
| 250 | 380.0 | 380 | 0.015 | 551.04 | 1.709 | 1.670 | 7.534 | 99.75 | 101.52 |

| | |
|---|---|
| Project Number: | **G101440749** |
| Manufacturer: | **Stove Builder International, inc** |
| Model: | **NG1800** |
| Sample ID Number: | **101440749MTL-003** |
| Test Date: | **February 6, 2014** |
| Test Run Number: | **11** |

# EPA Method 28
# Pre Burn Data

| | | | |
|---|---|---|---|
| Coal Bed Range | 4.5 | to | 5.5 |

| | |
|---|---|
| Average Firebox Temp, ℉ | 455.88 |

| | |
|---|---|
| Final Coal Bed Wt, lb | 5.04 |

| Interval | 10 |
|---|---|

| Time | | Temperature Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interval | Duration | Room | Dilution Tunnel | Flue Gas | Firebox Top | Firebox Bottom | Firebox Back | Firebox Left | Firebox Right | Catalyst Outlet | Flue Draft | Fuel Weight | Weight Loss |
| 0 | 0 | 65.97 | 148.1 | 590.4 | 478.8 | 430.6 | 535.5 | 360.3 | 344.2 | | | 14.97 | 9.93 |
| 1 | 10 | 69.65 | 130.5 | 516.7 | 518.8 | 435.6 | 507.4 | 406.4 | 374.8 | | | 12.98 | 1.99 |
| 2 | 20 | 66.25 | 133.7 | 557.1 | 524.7 | 423.8 | 496.5 | 417.7 | 399 | | | 10.96 | 2.02 |
| 3 | 30 | 67.55 | 133.2 | 556.7 | 553.9 | 406 | 514.3 | 434.4 | 434.4 | | | 9.01 | 1.95 |
| 4 | 40 | 68.21 | 126 | 528.9 | 545.9 | 388.7 | 528.7 | 449 | 465.3 | | | 7.54 | 1.47 |
| 5 | 50 | 70.48 | 137.9 | 555.2 | 545 | 378.5 | 550.9 | 465.1 | 488.7 | | | 5.99 | 1.55 |
| 6 | 60 | 80.55 | 116.1 | 447.3 | 506.7 | 375.2 | 554 | 470.6 | 502.1 | | | 5.40 | 0.59 |
| 7 | 70 | 77.29 | 108.5 | 393.1 | 434.3 | 375 | 537.5 | 460.7 | 487.1 | | | 5.12 | 0.28 |
| 8 | 80 | 76.85 | 121.8 | 395.2 | 426.2 | 376.9 | 535.8 | 459 | 481.5 | | | 5.04 | 0.08 |

Project Number: G101440749
Manufacturer: Stove Builder International, inc
Model: NG1800
Sample ID Number: 101440749MTL-003
Test Date: February 6, 2014
Test Run Number: 11

Intertek Equipment No.'s SBI-206

| Sample Train - 1 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 57 | | 117.6 | |
| B - Rear Filter Catch | Filter | 58 | | 119.7 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 244.7 | 237.3 | 7.4 |
| Probe & Filter Holder | Probe | 21 | 136036.2 | 136034.8 | 1.4 |
| | | | Total Particulate, mg | | **8.8** |

| Sample Train - 2 | | | | | |
|---|---|---|---|---|---|
| Sample Component | Component | ID Number | Weights | | |
| | | | Final, mg | Tare, mg | Particulate, mg |
| A - Front Filter Catch | Filter | 59 | | 118.3 | |
| B - Rear Filter Catch | Filter | 60 | | 117.7 | |
| C - Seal Set | O-Ring | | | | |
| Total, A+B+C-Tares | | | 243.5 | 236 | 7.5 |
| Probe & Filter Holder | Probe | 26 | 139796.8 | 139795.6 | 1.2 |
| | | | Total Particulate, mg | | **8.7** |

| | |
|---|---|
| **Manufacturer:** | SBI |
| **Model:** | NG1800 |
| **Date:** | 02/06/14 |
| **Run:** | 11 |
| **Control #:** | G101440749 |
| **Test Duration:** | 250 min |

| | HHV | LHV |
|---|---|---|
| **Eff** | 66.77% | 72.16% |
| **Comb Eff** | 92.17% | 92.17% |
| **HT Eff** | 72.44% | 78.30% |
| **Output** | 26,581 | kJ/h |
| **Burn Rate** | 2.01 | kg/h |
| **Grams CO** | 914 | g |
| **Input** | 39,811 | kJ/h |
| **MC wet** | 17.16 | |

| | |
|---|---|
| Overall Heating Efficiency: | 66.77% |
| Combustion Efficiency: | 92.17% |
| Heat Transfer Efficiency: | 72.44% |

| Air Fuel Ratio (A/F) | |
|---|---|
| Dry Molecular Weight ($M_d$) | 29.63 |
| Dry Moles Exhaust Gas ($N_r$): | 453.31 |
| Air Fuel Ratio (A/F) | 12.92 |

| | | | |
|---|---|---|---|
| Heat Output: | 25,215 Btu/h | 26,581 kJ/h | |
| Heat Input: | 37,765 Btu/h | 39,811 kJ/h | |
| Burn Duration: | 4.17 h | | |
| Burn Rate: | 4.43 lb/h | 2.010 kg/h | |
| Stack Temp: | 412.8 Deg. F | 211.6 Deg. C | |

Ultimate $CO_2$

$CO_{2\text{-ult}}$ 19.64

$F_0$

1.061

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Averages** | **1.08** | **6.97** | **2.26** | **20.41** | **12.89** | **210.72** | **21.48** | **86.3%** | **66.5%** | **58.1%** | **19.01** | **2.76** | **72.70** | **2.29** |
| **INPUT DATA** | | | | **Oxygen Calculation** | | | **Input Data** | | **Combust** | **Heat** | **Net** | **Air** | **Wet Wt** | **% Wet** | **Dry Wt.** |
| **Elapsed Time** | **Weight emaining (k** | **% CO [e]** | **% $CO_2$ [d]** | **Excess Air EA** | **Total $O_2$** | **Calc. % $O_2$ [g]** | **Flue Gas (ºC)** | **Room Temp (ºC)** | **Eff %** | **Transfer %** | **Eff %** | **Fuel Ratio** | **Now Wt** | **Consumed x** | **Now $Wt_{dn}$** |
| 0 | 10.11 | 0.54 | 0.72 | 1459.0% | 20.86 | 19.87 | 189.3 | 24.7 | 69.3% | -25.3% | -17.6% | 89.9 | 10.11 | 0.00 | 8.37 |
| 10 | 9.41 | 0.81 | 10.98 | 66.6% | 20.16 | 8.78 | 224.1 | 28.8 | 94.4% | 76.7% | 72.5% | 9.9 | 9.41 | 6.90 | 7.80 |
| 20 | 8.19 | 0.93 | 15.18 | 21.9% | 19.88 | 4.23 | 326.1 | 23.1 | 95.2% | 74.1% | 70.6% | 7.3 | 8.19 | 18.93 | 6.79 |
| 30 | 6.83 | 1.72 | 15.83 | 11.9% | 19.78 | 3.09 | 351.9 | 22.5 | 91.8% | 73.1% | 67.1% | 6.6 | 6.83 | 32.40 | 5.66 |
| 40 | 5.60 | 1.00 | 14.14 | 29.7% | 19.94 | 5.30 | 342.6 | 23.3 | 94.5% | 72.3% | 68.3% | 7.8 | 5.60 | 44.61 | 4.64 |
| 50 | 4.69 | 0.64 | 11.47 | 62.2% | 20.14 | 8.35 | 306.9 | 23.6 | 95.7% | 71.6% | 68.5% | 9.7 | 4.69 | 53.63 | 3.88 |
| 60 | 3.97 | 0.61 | 10.56 | 75.9% | 20.20 | 9.34 | 285.2 | 22.9 | 95.6% | 71.8% | 68.6% | 10.5 | 3.97 | 60.68 | 3.29 |
| 70 | 3.38 | 0.61 | 9.71 | 90.3% | 20.26 | 10.24 | 264.9 | 22.2 | 95.3% | 71.9% | 68.5% | 11.4 | 3.38 | 66.56 | 2.80 |
| 80 | 2.88 | 0.62 | 9.03 | 103.6% | 20.30 | 10.96 | 248.8 | 21.8 | 94.9% | 72.0% | 68.4% | 12.2 | 2.88 | 71.50 | 2.39 |
| 90 | 2.45 | 0.64 | 8.87 | 106.6% | 20.31 | 11.12 | 240.1 | 20.7 | 94.7% | 72.4% | 68.5% | 12.3 | 2.45 | 75.72 | 2.03 |
| 100 | 2.11 | 0.79 | 7.88 | 126.6% | 20.37 | 12.09 | 223.6 | 20.6 | 92.7% | 71.9% | 66.7% | 13.5 | 2.11 | 79.08 | 1.75 |
| 110 | 1.85 | 0.95 | 6.52 | 163.0% | 20.45 | 13.45 | 210.9 | 20.7 | 89.9% | 70.0% | 62.9% | 15.5 | 1.85 | 81.73 | 1.53 |
| 120 | 1.63 | 1.20 | 5.18 | 207.9% | 20.52 | 14.74 | 195.0 | 20.4 | 85.0% | 67.6% | 57.4% | 18.0 | 1.63 | 83.84 | 1.35 |
| 130 | 1.48 | 1.32 | 4.62 | 230.7% | 20.55 | 15.27 | 180.4 | 19.6 | 82.4% | 67.1% | 55.3% | 19.2 | 1.48 | 85.32 | 1.23 |
| 140 | 1.33 | 1.23 | 4.76 | 227.9% | 20.54 | 15.17 | 173.1 | 19.7 | 83.7% | 68.7% | 57.5% | 19.1 | 1.33 | 86.80 | 1.11 |
| 150 | 1.20 | 1.39 | 4.36 | 241.6% | 20.56 | 15.51 | 167.4 | 20.6 | 80.8% | 67.9% | 54.9% | 19.8 | 1.20 | 88.15 | 0.99 |
| 160 | 1.05 | 1.37 | 4.39 | 241.0% | 20.56 | 15.48 | 162.6 | 19.3 | 81.1% | 68.5% | 55.6% | 19.8 | 1.05 | 89.59 | 0.87 |
| 170 | 0.91 | 1.35 | 4.67 | 226.3% | 20.54 | 15.20 | 159.7 | 21.7 | 82.2% | 70.3% | 57.8% | 18.9 | 0.91 | 91.02 | 0.75 |
| 180 | 0.77 | 1.34 | 4.78 | 221.0% | 20.54 | 15.09 | 159.5 | 19.8 | 82.6% | 70.5% | 58.2% | 18.7 | 0.77 | 92.41 | 0.64 |
| 190 | 0.64 | 1.44 | 4.56 | 227.4% | 20.54 | 15.26 | 157.6 | 21.8 | 80.9% | 70.2% | 56.8% | 19.0 | 0.64 | 93.72 | 0.53 |
| 200 | 0.49 | 1.33 | 4.45 | 239.8% | 20.56 | 15.44 | 156.1 | 19.7 | 81.8% | 69.7% | 57.0% | 19.7 | 0.49 | 95.20 | 0.40 |
| 210 | 0.37 | 1.20 | 4.70 | 232.9% | 20.55 | 15.25 | 155.6 | 21.3 | 83.9% | 71.0% | 59.5% | 19.4 | 0.37 | 96.36 | 0.30 |
| 220 | 0.24 | 1.24 | 4.07 | 269.9% | 20.59 | 15.90 | 154.8 | 19.6 | 81.6% | 68.4% | 55.8% | 21.5 | 0.24 | 97.62 | 0.20 |
| 230 | 0.13 | 1.25 | 3.70 | 296.8% | 20.61 | 16.29 | 152.2 | 20.8 | 80.1% | 67.1% | 53.8% | 23.0 | 0.13 | 98.70 | 0.11 |
| 240 | 0.02 | 1.21 | 3.44 | 322.4% | 20.63 | 16.59 | 147.9 | 19.1 | 79.6% | 66.2% | 52.7% | 24.4 | 0.02 | 99.78 | 0.02 |
| 250 | 0.00 | 1.37 | 2.77 | 374.5% | 20.67 | 17.21 | 142.6 | 20.5 | 74.2% | 62.8% | 46.6% | 27.2 | 0.00 | 100.00 | 0.00 |

| | | | | | |
|---|---|---|---|---|---|
| %HC | Combustion Efficiency: | 92.17% | | Moisture of Wood (wet basis): | 17.16 |
| 1.32 | Total Input (kJ): | 165,878 | 157,327 (Btu) | Initial Dry Weight $Wt_{do}$ (kg): | 8.37 |
| | Total Output (kJ): | 110,754 | 105,045 (Btu) | Moisture Content Dry | 20.71 |
| | Efficiency: | 66.77% | | | |
| | Total CO (g): | 914.07 | | | |

| | | | | | |
|---|---|---|---|---|---|
| Load Weight (kg): | **10.11** | | | | |
| Fuel Heating | **HHV** | **LHV** | | **HHV** | **LHV** |
| Value in kJ/kg - CV: | **19,810** | **18,329** | Btu/lb | **8522.5** | **7885.2** |

| **72.70** | **166064** | **4.06** | **6.87** | **2.74** | **19810.00** | **17.16** | **79.05** | **20.97** | **2.02** | **6.66** | **0.14** | **0.20** | **33.05** | **99.04** | **6.91** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **% Dry** | | **Fuel Properties** | | | | **Mw** | **Mass Balance** | | | | | **kg Wood pe** | | | |
| **Comsumed** | **Total** | **Carbon** | **Hydrogen** | **Oxygen** | **Calorific** | **Moisture** | **(moles/100 mole dry flue gas)** | | | | | **00 mole df** | **Moles per kg** | | |
| **y** | **Input** | **/12= [a]** | **/1= [b]** | **/16= [c]** | **Value** | **Fuel Burnt** | **[h]** | **[u]** | **[w]** | **[j]** | **[k]** | **Nk** | **$CO_2$** | **$O_2$** | **CO** |
| 0.00 | 0 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.87 | 20.92 | 0.32 | 1.01 | 0.05 | 0.03 | 22.49 | 620.48 | 16.87 |
| 6.90 | 21429 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 79.43 | 21.07 | 2.93 | 9.85 | 0.10 | 0.29 | 37.68 | 30.12 | 2.78 |
| 18.93 | 21146 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 79.66 | 21.13 | 4.00 | 13.48 | 0.13 | 0.40 | 38.15 | 10.63 | 2.34 |
| 32.40 | 21295 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 79.36 | 21.05 | 4.38 | 14.56 | 0.25 | 0.44 | 36.30 | 7.09 | 3.94 |
| 44.61 | 17609 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 79.56 | 21.10 | 3.76 | 12.65 | 0.14 | 0.37 | 37.77 | 14.16 | 2.67 |
| 53.63 | 13328 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 79.54 | 21.10 | 3.00 | 10.15 | 0.08 | 0.30 | 38.40 | 27.96 | 2.14 |
| 60.68 | 10722 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 79.49 | 21.09 | 2.77 | 9.36 | 0.07 | 0.28 | 38.33 | 33.89 | 2.21 |
| 66.56 | 8972 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 79.44 | 21.07 | 2.56 | 8.65 | 0.07 | 0.25 | 38.13 | 40.23 | 2.40 |
| 71.50 | 7595 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 79.39 | 21.06 | 2.39 | 8.08 | 0.07 | 0.24 | 37.90 | 46.02 | 2.60 |
| 75.72 | 6292 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 79.37 | 21.05 | 2.36 | 7.96 | 0.08 | 0.23 | 37.77 | 47.36 | 2.72 |
| 79.08 | 4989 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 79.24 | 21.02 | 2.16 | 7.22 | 0.10 | 0.21 | 36.69 | 56.30 | 3.68 |
| 81.73 | 3946 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 79.08 | 20.98 | 1.87 | 6.18 | 0.12 | 0.19 | 35.07 | 72.36 | 5.11 |
| 83.84 | 2978 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.88 | 20.92 | 1.61 | 5.22 | 0.15 | 0.16 | 32.37 | 92.10 | 7.50 |
| 85.32 | 2457 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.79 | 20.90 | 1.50 | 4.83 | 0.17 | 0.15 | 30.87 | 102.02 | 8.82 |
| 86.80 | 2345 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.84 | 20.91 | 1.51 | 4.89 | 0.15 | 0.15 | 31.61 | 100.75 | 8.17 |
| 88.15 | 2308 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.74 | 20.89 | 1.46 | 4.66 | 0.18 | 0.15 | 30.02 | 106.76 | 9.57 |
| 89.59 | 2383 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.76 | 20.89 | 1.46 | 4.67 | 0.17 | 0.15 | 30.19 | 106.49 | 9.42 |
| 91.02 | 2345 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.78 | 20.90 | 1.52 | 4.89 | 0.17 | 0.15 | 30.78 | 100.16 | 8.90 |
| 92.41 | 2234 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.79 | 20.90 | 1.55 | 4.98 | 0.17 | 0.15 | 31.01 | 97.87 | 8.69 |
| 93.72 | 2308 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.74 | 20.88 | 1.52 | 4.86 | 0.19 | 0.15 | 30.09 | 100.71 | 9.50 |
| 95.20 | 2197 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.78 | 20.90 | 1.46 | 4.69 | 0.17 | 0.15 | 30.53 | 105.95 | 9.12 |
| 96.36 | 2010 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.85 | 20.92 | 1.49 | 4.82 | 0.15 | 0.15 | 31.70 | 102.87 | 8.09 |
| 97.62 | 1936 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.79 | 20.90 | 1.35 | 4.31 | 0.16 | 0.13 | 30.39 | 118.73 | 9.26 |
| 98.70 | 1787 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.76 | 20.89 | 1.26 | 4.01 | 0.16 | 0.13 | 29.57 | 130.19 | 9.99 |
| 99.78 | 1266 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.76 | 20.89 | 1.18 | 3.76 | 0.15 | 0.12 | 29.25 | 141.05 | 10.29 |
| 100.00 | 186 | 4.06 | 6.87 | 2.74 | 19810.00 | 17.16 | 78.65 | 20.86 | 1.06 | 3.30 | 0.17 | 0.11 | 26.22 | 162.91 | 12.97 |

Moisture Content $M_{Cwb}$: 17.16

Dry kg : 8.37

CA: 48.73

HY: 6.87

OX: 43.9

| | | | | | | | | | | | | | | | SUMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.85 | 520.92 | 32.83 | 11.51 | 483.87 | 7786.05 | 5749.64 | 5564.08 | 5508.09 | 7735.96 | 6649.73 | 294.63 | 6932.55 | 12384.34 | 51724.64 | 66341.86 |
| | | | | Stack | Heat Content Change - Ambient to Stack Temperature | | | | | | Room | Energy Losses (kJ/kg | | | |
| of Dry Wood | | | Moisture | Temp | Flue Gas Constituent | | | | | | Temp | Flue Gas Consti | | | |
| HC | $N_2$ | $H_2O$ | Present | K | $CO_2$ | $O_2$ | CO | $N_2$ | $CH_4$ | $H_2O$ | K | $CO_2$ | $O_2$ | CO | $N_2$ |
| 1.46 | 2463.36 | 31.60 | 11.51 | 462.43 | 6676.36 | 4971.11 | 4820.93 | 4770.25 | 6543.80 | 5764.85 | 297.84 | 150.13 | 3084.47 | 4853.20 | 11750.86 |
| 0.36 | 272.56 | 33.81 | 11.51 | 497.21 | 8030.85 | 5931.84 | 5740.76 | 5682.91 | 7976.07 | 6861.00 | 301.94 | 302.57 | 178.64 | 802.51 | 1548.96 |
| 0.32 | 200.20 | 33.88 | 11.51 | 599.21 | 12882.91 | 9334.53 | 8988.47 | 8907.47 | 13191.82 | 10727.97 | 296.25 | 491.50 | 99.27 | 682.46 | 1783.31 |
| 0.56 | 182.00 | 33.40 | 11.51 | 625.09 | 14130.77 | 10188.68 | 9798.19 | 9712.60 | 14579.11 | 11690.29 | 295.63 | 513.01 | 72.23 | 1154.95 | 1767.69 |
| 0.37 | 212.54 | 33.79 | 11.51 | 615.71 | 13652.94 | 9860.42 | 9486.69 | 9402.94 | 14050.48 | 11319.99 | 296.46 | 515.73 | 139.62 | 781.35 | 1998.50 |
| 0.27 | 266.30 | 33.99 | 11.51 | 580.04 | 11969.72 | 8704.61 | 8390.01 | 8312.68 | 12187.20 | 10016.29 | 296.76 | 459.66 | 243.36 | 624.36 | 2213.70 |
| 0.27 | 288.54 | 33.99 | 11.51 | 558.37 | 10998.09 | 8033.46 | 7752.13 | 7678.77 | 11120.33 | 9257.66 | 296.07 | 421.56 | 272.27 | 643.75 | 2215.61 |
| 0.28 | 311.96 | 33.95 | 11.51 | 538.04 | 10102.99 | 7410.82 | 7159.19 | 7089.77 | 10146.99 | 8552.09 | 295.32 | 385.25 | 298.12 | 695.07 | 2211.70 |
| 0.31 | 333.24 | 33.91 | 11.51 | 521.98 | 9397.80 | 6916.50 | 6687.44 | 6621.37 | 9388.47 | 7990.41 | 294.90 | 356.22 | 318.28 | 753.90 | 2206.49 |
| 0.32 | 337.93 | 33.88 | 11.51 | 513.21 | 9047.15 | 6671.75 | 6454.15 | 6389.68 | 9009.00 | 7712.73 | 293.84 | 341.68 | 315.94 | 788.74 | 2159.26 |
| 0.45 | 368.92 | 33.63 | 11.51 | 496.76 | 8323.73 | 6159.05 | 5963.38 | 5902.71 | 8243.14 | 7127.93 | 293.76 | 305.39 | 346.77 | 1062.83 | 2177.65 |
| 0.63 | 425.39 | 33.27 | 11.51 | 484.04 | 7765.09 | 5760.70 | 5581.44 | 5523.87 | 7657.01 | 6672.60 | 293.81 | 272.35 | 416.86 | 1474.73 | 2349.80 |
| 0.94 | 492.92 | 32.63 | 11.51 | 468.15 | 7087.56 | 5275.75 | 5115.99 | 5062.28 | 6950.19 | 6117.55 | 293.51 | 229.42 | 485.90 | 2160.41 | 2495.28 |
| 1.12 | 526.49 | 32.28 | 11.51 | 453.54 | 6488.79 | 4845.57 | 4702.69 | 4652.52 | 6329.02 | 5624.58 | 292.77 | 200.31 | 494.34 | 2537.53 | 2449.49 |
| 1.03 | 523.63 | 32.47 | 11.51 | 446.26 | 6177.79 | 4620.37 | 4485.88 | 4437.65 | 6010.26 | 5365.82 | 292.80 | 195.31 | 465.51 | 2348.49 | 2323.70 |
| 1.22 | 542.16 | 32.08 | 11.51 | 440.59 | 5900.12 | 4417.06 | 4289.56 | 4243.22 | 5730.56 | 5131.34 | 293.78 | 177.11 | 471.54 | 2749.36 | 2300.51 |
| 1.20 | 541.59 | 32.12 | 11.51 | 435.76 | 5745.16 | 4306.64 | 4183.71 | 4138.21 | 5567.85 | 5005.15 | 292.49 | 173.44 | 458.59 | 2705.56 | 2241.19 |
| 1.14 | 519.24 | 32.25 | 11.51 | 432.87 | 5534.01 | 4148.83 | 4030.52 | 3986.67 | 5362.17 | 4821.92 | 294.84 | 170.33 | 415.56 | 2553.81 | 2070.03 |
| 1.11 | 511.17 | 32.30 | 11.51 | 432.65 | 5597.82 | 4198.57 | 4079.32 | 4034.84 | 5419.82 | 4880.45 | 292.92 | 173.59 | 410.91 | 2495.54 | 2062.47 |
| 1.22 | 519.52 | 32.08 | 11.51 | 430.71 | 5438.64 | 4079.11 | 3963.23 | 3920.01 | 5265.87 | 4741.55 | 294.95 | 163.64 | 410.82 | 2726.50 | 2036.53 |
| 1.16 | 540.44 | 32.20 | 11.51 | 429.26 | 5458.95 | 4097.45 | 3981.81 | 3938.23 | 5278.73 | 4764.03 | 292.82 | 166.65 | 434.11 | 2618.43 | 2128.36 |
| 1.01 | 531.87 | 32.49 | 11.51 | 428.71 | 5372.83 | 4031.87 | 3917.85 | 3875.03 | 5197.51 | 4687.44 | 294.47 | 170.34 | 414.76 | 2322.40 | 2061.02 |
| 1.16 | 588.39 | 32.21 | 11.51 | 427.93 | 5407.64 | 4060.19 | 3945.91 | 3902.67 | 5226.36 | 4721.18 | 292.70 | 164.36 | 482.08 | 2657.05 | 2296.28 |
| 1.25 | 629.54 | 32.03 | 11.51 | 425.32 | 5251.49 | 3944.11 | 3833.39 | 3791.31 | 5072.90 | 4586.63 | 293.93 | 155.31 | 513.49 | 2865.76 | 2386.80 |
| 1.27 | 669.72 | 31.98 | 11.51 | 421.04 | 5135.39 | 3861.79 | 3754.58 | 3713.12 | 4950.07 | 4492.73 | 292.28 | 150.21 | 544.70 | 2950.28 | 2486.76 |
| 1.63 | 744.39 | 31.27 | 11.51 | 415.71 | 4862.63 | 3659.81 | 3558.98 | 3519.52 | 4680.30 | 4258.91 | 293.61 | 127.49 | 596.20 | 3715.66 | 2619.90 |

| | | | AVERAGE | SUMS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 19780.80 | 43243.44 | 15145.82 | 8290.52 | 55124.01 | 12994.30 | 42129.7 | 110940.3 | 12994.3 | 914.1 | 67.5 |
| of Dry Fuel) | | | Total | | | | | | | |
| tuent | | | Loss | Total | Chemical | Sensible an | Total | Chem | Grams Produced | |
| $CH_4$ | $H_2O$ Comb | $H_2O$ Fuel M | Rate | Loss | Loss 1 | Latent Loss | Output | Loss 2 | CO | HC |
| 1309.32 | 1571.70 | 572.35 | 23292.03 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0.00 |
| 320.36 | 1718.52 | 584.96 | 5456.53 | 5902.49 | 1194 | 4708.19 | 15527 | 1194 | 84.18 | 6.17 |
| 292.32 | 1852.88 | 629.46 | 5831.21 | 6224.52 | 1014 | 5210.97 | 14922 | 1014 | 69.86 | 5.53 |
| 509.90 | 1858.77 | 640.54 | 6517.08 | 7005.64 | 1739 | 5266.37 | 14289 | 1739 | 118.73 | 9.69 |
| 331.51 | 1868.18 | 636.28 | 6271.16 | 5574.52 | 962 | 4612.40 | 12035 | 962 | 66.49 | 5.21 |
| 241.26 | 1834.85 | 621.27 | 6238.46 | 4197.19 | 568 | 3629.10 | 9131 | 568 | 40.37 | 2.88 |
| 241.74 | 1808.97 | 612.54 | 6216.45 | 3364.60 | 468 | 2896.24 | 7357 | 468 | 33.55 | 2.32 |
| 256.11 | 1783.28 | 604.42 | 6233.97 | 2823.45 | 422 | 2401.72 | 6149 | 422 | 30.38 | 2.06 |
| 274.66 | 1762.04 | 597.96 | 6269.56 | 2403.62 | 387 | 2017.06 | 5191 | 387 | 27.94 | 1.87 |
| 288.66 | 1751.01 | 594.76 | 6240.05 | 1981.86 | 336 | 1646.18 | 4310 | 336 | 24.23 | 1.63 |
| 400.31 | 1718.46 | 588.03 | 6599.44 | 1661.92 | 362 | 1299.91 | 3327 | 362 | 25.94 | 1.80 |
| 564.29 | 1684.62 | 582.79 | 7345.44 | 1463.26 | 400 | 1063.72 | 2483 | 400 | 28.50 | 2.00 |
| 847.66 | 1634.47 | 576.41 | 8429.54 | 1267.34 | 445 | 821.84 | 1711 | 445 | 31.57 | 2.27 |
| 1005.47 | 1600.85 | 570.73 | 8858.73 | 1098.79 | 433 | 665.36 | 1358 | 433 | 30.63 | 2.23 |
| 921.91 | 1601.66 | 567.76 | 8424.34 | 997.41 | 382 | 615.28 | 1348 | 382 | 27.08 | 1.95 |
| 1095.92 | 1574.94 | 565.06 | 8934.46 | 1041.02 | 442 | 598.58 | 1267 | 442 | 31.22 | 2.28 |
| 1076.66 | 1572.98 | 563.61 | 8792.03 | 1057.47 | 449 | 608.11 | 1325 | 449 | 31.73 | 2.31 |
| 1017.16 | 1573.55 | 561.50 | 8361.95 | 990.03 | 418 | 572.20 | 1355 | 418 | 29.50 | 2.15 |
| 993.84 | 1577.99 | 562.17 | 8276.50 | 933.25 | 389 | 544.47 | 1301 | 389 | 27.45 | 2.00 |
| 1095.08 | 1562.47 | 560.57 | 8555.62 | 996.88 | 440 | 556.73 | 1311 | 440 | 31.00 | 2.28 |
| 1038.33 | 1569.37 | 560.83 | 8516.09 | 944.26 | 401 | 543.51 | 1252 | 401 | 28.33 | 2.06 |
| 908.26 | 1581.03 | 559.95 | 8017.77 | 813.67 | 324 | 489.56 | 1197 | 324 | 23.00 | 1.65 |
| 1037.56 | 1568.07 | 560.34 | 8765.72 | 856.62 | 357 | 499.73 | 1079 | 357 | 25.34 | 1.81 |
| 1116.31 | 1555.17 | 558.79 | 9151.63 | 825.54 | 355 | 470.36 | 961 | 355 | 25.24 | 1.80 |
| 1139.34 | 1549.66 | 557.71 | 9378.67 | 599.26 | 258 | 340.82 | 667 | 258 | 18.41 | 1.30 |
| 1456.85 | 1507.92 | 555.02 | 10579.03 | 99.41 | 48 | 51.31 | 87 | 48 | 3.41 | 0.24 |

# Intertek Testing Services NA Ltd

| | |
|---|---|
| **Manufacturer:** | SBI |
| **Model:** | NG1800 |
| **Date:** | 02/06/14 |
| **Run:** | 11 |
| **Control #:** | G101440749 |
| **Test Duration:** | 250 |
| **Output Category:** | 4 |

**Technicians:**

_____

_____

_____

**Test Results in Accordance with CSA B415.1-10**

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 66.8% | 72.2% |
| **Combustion Efficiency** | 92.2% | 92.2% |
| **Heat Transfer Efficiency** | 72% | 78.3% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 26,581 | 25,215 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 2.01 | 4.43 | **(lb/h)** |
| **Input (kJ/h)** | 39,811 | 37,765 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 8.37 | 18.46 | **dry lb** |
| **MC wet (%)** | 17.16 | | |
| **MC dry (%)** | 20.71 | | |
| **Particulate (g )** | 7.6325 | | |
| **CO (g)** | 914 | | |
| **Test Duration (h)** | 4.17 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | 0.07 | 8.25 |
| **g/kg Dry Fuel** | 0.91 | 109.16 |
| **g/h** | 1.83 | 219.38 |
| **lb/MM Btu Output** | 0.16 | 19.18 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 12.92 |

**Version: 2.4** **15/04/2010**

Intertek

# TEST FUEL DATA
## EPA Method 5G-3

| | |
|---|---|
| Project Number: | G101440749 |
| Manufacturer: | Stove Builder International, inc |
| Model: | NG1800 |
| Sample ID Number: | 101440749MTL-003 |
| Test Date: | February 6, 2014 |
| Test Run Number: | 11 |

| Calibration Reference ID | SBI-153 | |
|---|---|---|
| Set meter to Species 1 | | |
| Set Temperature to 70F | 12% | 12.0 |
| Set pin setting to 444 | 22% | 22.0 |

**PRE-BURN FUEL PROPERTIES**

| Eq. ID No.: | SBI-214 | Time: | 9:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. | Moisture, %, Dry Basis | | |
| 1 | 16 | 1.827 | 20.6 | 19.2 | 21.0 |
| 2 | 16 | 1.858 | 20.9 | 19.0 | 21.1 |
| 3 | 16 | 1.939 | 21.4 | 19.7 | 21.7 |
| 4 | 16 | 1.513 | 19.7 | 20.4 | 19.8 |
| 5 | 16 | 1.564 | 19.5 | 19.8 | 20.2 |
| 6 | 16 | 1.544 | 22.5 | 22.0 | 21.9 |
| 7 | 16 | 1.472 | 21.0 | 21.5 | 21.2 |
| 8 | 16 | 1.912 | 22.3 | 22.3 | 22.3 |
| 9 | 17 | 1.983 | 21.1 | 20.2 | 22.2 |
| 10 | 17 | 1.907 | 21.7 | 19.4 | 21.1 |
| 11 | 17 | 1.939 | 21.7 | 20.1 | 21.7 |
| 12 | 17 | 1.947 | 20.5 | 19.3 | 21.2 |
| Total Weight | | 21.405 | Average, %db | | 20.9 |

| Allowable Fuel Load Range: | 4.46 | to | 5.57 |
|---|---|---|---|

**TEST FUEL LOAD PROPERTIES**

| Eq. ID No.: | SBI-214 | | Time: | 10:30 | Temp.,°F: | 70 |
|---|---|---|---|---|---|---|
| Piece No. | Length, In. | Weight, Lb. 2x4 | Weight, Lb. 4x4 | Moisture, %, Dry Basis | | |
| 1 | 15 | 1.550 | | 19.8 | 19.1 | 20.2 |
| 2 | 15 | 1.554 | | 19.5 | 19.1 | 20.0 |
| 3 | 15 | 1.463 | | 19.5 | 18.9 | 19.3 |
| 4 | 15 | | 3.950 | 22.3 | 22.7 | 21.9 |
| 5 | 15 | | 3.720 | 20.0 | 22.1 | 20.0 |
| 6 | 15 | | 4.005 | 21.0 | 21.9 | 22.2 |
| 7 | 15 | 2.174 | | 21.9 | 21.7 | 22.1 |
| 8 | 15 | 1.641 | | 19.7 | 18.9 | 19.5 |
| 9 | 15 | 2.221 | | 22.0 | 21.9 | 22.2 |
| , | | 10.603 | 11.675 | | | |
| % of Weight | | 47.6 | 52.4 | | | |
| Total weight, wet, lb. | | 22.278 | | Average Moisture, dry | | 20.72 |
| Total weight, dry, kg | | 8.37 | | Average Moisture, wet | | 17.16 |

Date: _____ Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 25/11/2013 Engineer: Claude Pelland Run #: 1A Sample Train #: A

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 1 | Tare: | 0,1186 | Preliminary Wt: | 0,1534 | |
| Rear Filter # | 2 | Tare: | 0,1190 | Preliminary Wt: | 0,1210 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 25/11/2013 21:00 | | Preliminary Wt: | 0,2744 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 26/11/2013 | 22:00 | 1,9 | 71,4 | 0,1529<br>0,1208 | 0,1 =<br>0,1000 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Probe #: | 17 | Tare: | 139,7454 | Preliminary Wt: | 139,7487 | |
| Date/Time in dessicator: | | 25/11/2013 21:00 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 26/11/2013 | 22:00 | 1,9 | 71,4 | 139,7478 | 200 =<br>200,0000 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 25/11/2013 Engineer: Claude Pelland Run #: 1A Sample Train #: B

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 3 | Tare: | 0,1190 | Preliminary Wt: | 0,1478 | |
| Rear Filter # | 4 | Tare: | 0,1183 | Preliminary Wt: | 0,1199 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 25/11/2013 21:00 | | Preliminary Wt: | 0,2677 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 26/11/2013 | 22:00 | 1,9 | 71,4 | 0,1473<br>0,1197 | 0,1=<br>0,1000 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Probe #: | 18 | Tare: | 147,8809 | Preliminary Wt: | 147,8841 | |
| Date/Time in dessicator: | | 25/11/2013 21:00 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 26/11/2013 | 22:00 | 1,9 | 71,4 | 147,8836 | 200=<br>200,0000 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 26/11/2013 Engineer: Claude Pelland Run #: 2A Sample Train #: A

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 5 | Tare: | 0,1181 | Preliminary Wt: | 0,1675 | |
| Rear Filter # | 6 | Tare: | 0,1189 | Preliminary Wt: | 0,1225 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 26/11/2013 22:00 | | Preliminary Wt: | 0,2900 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Probe #: | 19 | Tare: | 140,1085 | Preliminary Wt: | 140,1130 | |
| Date/Time in dessicator: | | 26/11/2013 22:00 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

## DILUTION TUNNEL WORKSHEET - METHOD 5G3

Client: SBI  Model: NG1800

Project #: G100968870  Sample ID #: _____

Date: 26/11/2013  Engineer: Claude Pelland  Run #: 2A  Sample Train #: B

Balance Equipment #: SBI-206  Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 7 | Tare: | 0,1190 | Preliminary Wt: | 0,1670 | |
| Rear Filter # | 8 | Tare: | 0,1183 | Preliminary Wt: | 0,1214 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 26/11/2013 22:00 | | Preliminary Wt: | 0,2884 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Probe #: | 20 | Tare: | 139,0590 | Preliminary Wt: | 139,0641 | |
| Date/Time in dessicator: | | 26/11/2013 22:00 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 02/12/2013 Engineer: Claude Pelland Run #: 1 Sample Train #: A

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 9 | Tare: | 0,1200 | Preliminary Wt: | 0,1681 | |
| Rear Filter # | 10 | Tare: | 0,1193 | Preliminary Wt: | 0,1227 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 02/12/2013 21:00 | | Preliminary Wt: | 0,2908 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 05/12/2013 | 8:00 | 2,5 | 68,8 | 0,1668<br>0,1223 | 0,1 =<br>0,1000 | |
| 06/12/2013 | 11:00 | 2,7 | 69,1 | 0,1674<br>0,1223 | 0,1 =<br>0,1000 | |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 0,1665<br>0,1224 | 0,1 =<br>0,1000 | |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1664<br>0,1224 | 0,1 =<br>0,1000 | |
| Probe #: | 21 | Tare: | 136,0377 | Preliminary Wt: | 136,0406 | |
| Date/Time in dessicator: | | 02/12/2013 21:00 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 06/12/2013 | 10:30 | 2,7 | 69,1 | 136,0397 | 200 =<br>199,9998 | |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 136,0394 | 200 =<br>199,9998 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 02/12/2013 Engineer: Claude Pelland Run #: 1 Sample Train #: B

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 11 | Tare: | 0,1186 | Preliminary Wt: | 0,1601 | |
| Rear Filter # | 12 | Tare: | 0,1189 | Preliminary Wt: | 0,1216 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 02/12/2013 21:00 | | Preliminary Wt: | 0,2817 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 05/12/2013 | 8:00 | 2,5 | 68,8 | 0,1590<br>0,1213 | 0,1=<br>0,1000 | |
| 06/12/2013 | 11:00 | 2,7 | 69,1 | 0,1592<br>0,1214 | 0,1=<br>0,1000 | |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 0,1584<br>0,1213 | 0,1=<br>0,1000 | |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1582<br>0,1213 | 0,1=<br>0,1000 | |
| Probe #: | 22 | Tare: | 139,5700 | Preliminary Wt: | 139,5740 | |
| Date/Time in dessicator: | | 02/12/2012 21:00 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 06/12/2013 | 10:30 | 2,7 | 69,1 | 139,5729 | 200=<br>199,9998 | |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 139,5728 | 200=<br>199,9998 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 03/12/2013 Engineer: Claude Pelland Run #: 2 Sample Train #: A

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | |
|---|---|---|---|---|---|
| Front Filter # | 13 | Tare: | 0,1194 | Preliminary Wt: | 0,1480 |
| Rear Filter # | 14 | Tare: | 0,1193 | Preliminary Wt: | 0,1257 |
| Seal Set # | | Tare: | | Preliminary Wt: | |
| Date/Time in dessicator: | | 03/12/2013 22:00 | | Preliminary Wt: | 0,2737 |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 05/12/2013 | 8:00 | 2,5 | 68,8 | 0,1472<br>0,1256 | 0,1 =<br>0,1000 | |
| 06/12/2013 | 11:00 | 2,7 | 69,1 | 0,1476<br>0,1255 | 0,1 =<br>0,1000 | |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 0,1469<br>0,1253 | 0,1 =<br>0,1000 | |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1470<br>0,1253 | 0,1 =<br>0,1000 | |

| | | | | | |
|---|---|---|---|---|---|
| Probe #: | 25 | Tare: | 136,8103 | Preliminary Wt: | 136,8134 |
| Date/Time in dessicator: | | 03/12/2013 21:30 | | | |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 06/12/2013 | 10:30 | 2,7 | 69,1 | 136,8134 | 200 =<br>199,9998 | |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 136,8130 | 200 =<br>199,9998 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

## DILUTION TUNNEL WORKSHEET - METHOD 5G3

Client: SBI Model: NG1800
Project #: G100968870 Sample ID #: _____
Date: 03/12/2013 Engineer: Claude Pelland Run #: 2 Sample Train #: B
Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | |
|---|---|---|---|---|---|
| Front Filter # | 15 | Tare: | 0,1187 | Preliminary Wt: | 0,1530 |
| Rear Filter # | 16 | Tare: | 0,1189 | Preliminary Wt: | 0,1217 |
| Seal Set # | | Tare: | | Preliminary Wt: | |
| Date/Time in dessicator: | | 03/12/2013 22:00 | | Preliminary Wt: | 0,2747 |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 05/12/2013 | 8:00 | 2,5 | 68,8 | 0,1524<br>0,1215 | 0,1=<br>0,1000 | |
| 06/12/2013 | 11:00 | 2,7 | 69,1 | 0,1520<br>0,1214 | 0,1=<br>0,1000 | |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 0,1514<br>0,1211 | 0,1=<br>0,1000 | |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1512<br>0,1212 | 0,1=<br>0,1000 | |

| | | | | | |
|---|---|---|---|---|---|
| Probe #: | 26 | Tare: | 139,8018 | Preliminary Wt: | 139,8052 |
| Date/Time in dessicator: | | 03/12/2013 21:30 | | | |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 06/12/2013 | 10:30 | 2,7 | 69,1 | 139,8047 | 200=<br>199,9998 | |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 139,8043 | 200=<br>199,9998 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 04/12/2013 Engineer: Claude Pelland Run #: 3 Sample Train #: A

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | |
|---|---|---|---|---|---|
| Front Filter # | 17 | Tare: | 0,1190 | Preliminary Wt: | 0,1377 |
| Rear Filter # | 18 | Tare: | 0,1191 | Preliminary Wt: | 0,1208 |
| Seal Set # | | Tare: | | Preliminary Wt: | |
| Date/Time in dessicator: | | 04/12/2013 19:00 | | Preliminary Wt: | 0,2585 |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 06/12/2013 | 11:00 | 2,7 | 69,1 | 0,1375<br>0,1207 | 0,1 =<br>0,1000 | |
| 09/12/2013 | 8:00 | 2,1 | 69,0 | 0,1372<br>0,1207 | 0,1 =<br>0,1000 | |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1372<br>0,1207 | 0,1 =<br>0,1000 | |
| | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Probe #: | 27 | Tare: | 136,8891 | Preliminary Wt: | 136,8901 |
| Date/Time in dessicator: | | 04/12/2013 19:00 | | | |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 136,8902 | 200 =<br>199,9998 | |
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 136,8900 | 200 =<br>199,9996 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 04/12/2013 Engineer: Claude Pelland Run #: 3 Sample Train #: B

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 19 | Tare: | 0,1194 | Preliminary Wt: | 0,1368 | |
| Rear Filter # | 20 | Tare: | 0,1191 | Preliminary Wt: | 0,1207 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 04/12/2013 | 19:00 | Preliminary Wt: | 0,2575 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 06/12/2013 | 11:00 | 2,7 | 69,1 | 0,1365<br>0,1205 | 0,1 =<br>0,1000 | |
| 09/12/2013 | 8:00 | 2,1 | 69,0 | 0,1359<br>0,1205 | 0,1 =<br>0,1000 | |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1359<br>0,1206 | 0,1 =<br>0,1000 | |
| | | | | | | |
| Probe #: | 28 | Tare: | 136,2155 | Preliminary Wt: | 136,2166 | |
| Date/Time in dessicator: | | 04/12/2013 | 19:00 | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 136,2168 | 200 =<br>199,9998 | |
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 136,2169 | 200 =<br>199,9996 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 05/12/2013 Engineer: Claude Pelland Run #: 4 Sample Train #: A

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | |
|---|---|---|---|---|---|
| Front Filter # | 21 | Tare: | 0,1190 | Preliminary Wt: | 0,1439 |
| Rear Filter # | 22 | Tare: | 0,1189 | Preliminary Wt: | 0,1212 |
| Seal Set # | | Tare: | | Preliminary Wt: | |
| Date/Time in dessicator: | | 05/12/2013 20:00 | | Preliminary Wt: | 0,2651 |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 09/12/2013 | 8:00 | 2,1 | 69,0 | 0,1434<br>0,1211 | 0,1=<br>0,1000 | |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1433<br>0,1212 | 0,1 =<br>0,1000 | |
| | | | | | | |
| | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Probe #: | 31 | Tare: | 137,0951 | Preliminary Wt: | 137,0969 |
| Date/Time in dessicator: | | 05/12/2013 19:30 | | | |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 137,0966 | 200=<br>199,9998 | |
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 137,0967 | 200=<br>199,9996 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 05/12/2013 Engineer: Claude Pelland Run #: 4 Sample Train #: B

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 23 | Tare: | 0,1187 | Preliminary Wt: | 0,1427 | |
| Rear Filter # | 24 | Tare: | 0,1182 | Preliminary Wt: | 0,1202 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 05/12/2013 20:00 | | Preliminary Wt: | 0,2629 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 09/12/2013 | 8:00 | 2,1 | 69,0 | 0,1421<br>0,1201 | 0,1=<br>0,1000 | |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1421<br>0,1201 | 0,1=<br>0,1000 | |
| | | | | | | |
| | | | | | | |
| Probe #: | 32 | Tare: | 136,0071 | Preliminary Wt: | 136,0093 | |
| Date/Time in dessicator: | | 05/12/2013 19:30 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 136,0089 | 200=<br>199,9998 | |
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 136,0090 | 200=<br>199,9996 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 06/12/2013 Engineer: Claude Pelland Run #: 5 Sample Train #: A

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 25 | Tare: | 0,1181 | Preliminary Wt: | 0,1333 | |
| Rear Filter # | 26 | Tare: | 0,1171 | Preliminary Wt: | 0,1189 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 06/12/2013 | 17:30 | Preliminary Wt: | 0,2522 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 09/12/2013 | 8:00 | 2,1 | 69,0 | 0,1329<br>0,1188 | 0,1=<br>0,1000 | |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1328<br>0,1189 | 0,1=<br>0,1000 | |
| | | | | | | |
| | | | | | | |
| Probe #: | 33 | Tare: | 135,9899 | Preliminary Wt: | 135,9905 | |
| Date/Time in dessicator: | | 06/12/2013 | 17:30 | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 135,9909 | 200=<br>199,9998 | |
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 135,9906 | 200=<br>199,9996 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 06/12/2013 Engineer: Claude Pelland Run #: 5 Sample Train #: 13

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 27 | Tare: | 0,1182 | Preliminary Wt: | 0,1321 | |
| Rear Filter # | 28 | Tare: | 0,1152 | Preliminary Wt: | 0,1165 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 06/12/2013 17:30 | | Preliminary Wt: | 0,2486 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 09/12/2013 | 8:00 | 2,1 | 69,0 | 0,1317<br>0,1164 | 0,1=<br>0,1000 | |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1317<br>0,1165 | 0,1=<br>0,1000 | |
| | | | | | | |
| | | | | | | |
| Probe #: | 34 | Tare: | 108,4120 | Preliminary Wt: | 108,4138 | |
| Date/Time in dessicator: | | 06/12/2013 17:30 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 09/12/2013 | 9:00 | 2,1 | 69,0 | 108,4136 | 200=<br>199,9998 | |
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 108,4135 | 200=<br>199,9996 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 09/12/2013 Engineer: Claude Pelland Run #: 6 Sample Train #: A

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | |
|---|---|---|---|---|---|
| Front Filter # | 29 | Tare: | 0,1186 | Preliminary Wt: | 0,1291 |
| Rear Filter # | 30 | Tare: | 0,1179 | Preliminary Wt: | 0,1192 |
| Seal Set # | | Tare: | | Preliminary Wt: | |
| Date/Time in dessicator: | | 09/12/2013 15:30 | | Preliminary Wt: | 0,2483 |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1287<br>0,1190 | 0,1=<br>0,1000 | |
| 09/01/2014 | 8:00 | 1,4 | 70,4 | 0,1287<br>0,1190 | 0,1=<br>0,1000 | |
| | | | | | | |
| | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Probe #: | 35 | Tare: | 107,8399 | Preliminary Wt: | 107,8426 |
| Date/Time in dessicator: | | 09/12/2013 15:30 | | | |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 107,8419 | 200=<br>199,9996 | |
| 09/01/2014 | 8:30 | 1,4 | 70,4 | 107,8421 | 200=<br>199,9997 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI  Model: NG1800

Project #: G100968870  Sample ID #: _____

Date: 09/12/2013  Engineer: Claude Pelland  Run #: 6  Sample Train #: B

Balance Equipment #: SBI-206  Thermo/Hygrometer Equipment #: SBI-213

| | | | | | |
|---|---|---|---|---|---|
| Front Filter # | 31 | Tare: | 0,1183 | Preliminary Wt: | 0,1272 |
| Rear Filter # | 32 | Tare: | 0,1181 | Preliminary Wt: | 0,1198 |
| Seal Set # | | Tare: | | Preliminary Wt: | |
| Date/Time in dessicator: | | 09/12/2013 | 15:30 | Preliminary Wt: | 0,2470 |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1268<br>0,1195 | 0,1 =<br>0,1000 | |
| 09/01/2014 | 8:00 | 1,4 | 70,4 | 0,1267<br>0,1195 | 0,1 =<br>0,1000 | |
| | | | | | | |
| | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Probe #: | 36 | Tare: | 108,4995 | Preliminary Wt: | 108,5032 |
| Date/Time in dessicator: | | 09/12/2013 | 15:30 | | |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 108,5025 | 200 =<br>199,9996 | |
| 09/01/2014 | 8:30 | 1,4 | 70,4 | 108,5023 | 200 =<br>199,9997 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 10/12/2013 Engineer: Claude Pelland Run #: 7 Sample Train #: A

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 33 | Tare: | 0,1170 | Preliminary Wt: | 0,1340 | |
| Rear Filter # | 34 | Tare: | 0,1171 | Preliminary Wt: | 0,1187 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 10/12/2013 15:00 | | Preliminary Wt: | 0,2527 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1334<br>0,1186 | 0,1=<br>0,1000 | |
| 09/01/2014 | 8:00 | 1,4 | 70,4 | 0,1333<br>0,1186 | 0,1=<br>0,1000 | |
| | | | | | | |
| | | | | | | |
| Probe #: | 17 | Tare: | 139,7458 | Preliminary Wt: | 139,7505 | |
| Date/Time in dessicator: | | 10/12/2013 15:30 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 139,7498 | 200=<br>199,9996 | |
| 09/01/2014 | 8:30 | 1,4 | 70,4 | 139,7497 | 200=<br>199,9997 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

## DILUTION TUNNEL WORKSHEET - METHOD 5G3

Client: SBI  Model: NG1800
Project #: G100968870  Sample ID #: _____
Date: 10/12/2013  Engineer: Claude Pelland  Run #: 7  Sample Train #: 13
Balance Equipment #: SBI-206  Thermo/Hygrometer Equipment #: SBI-213

| | | | | | |
|---|---|---|---|---|---|
| Front Filter # | 35 | Tare: | 0,1152 | Preliminary Wt: | 0,1299 |
| Rear Filter # | 36 | Tare: | 0,1171 | Preliminary Wt: | 0,1183 |
| Seal Set # | | Tare: | | Preliminary Wt: | |
| Date/Time in dessicator: | | 10/12/2013 15:00 | | Preliminary Wt: | 0,2482 |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1295<br>0,1181 | 0,1 =<br>0,1000 | |
| 09/01/2014 | 8:00 | 1,4 | 70,4 | 0,1295<br>0,1181 | 0,1 =<br>0,1000 | |
| | | | | | | |
| | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Probe #: | 18 | Tare: | 147,8821 | Preliminary Wt: | 147,8878 |
| Date/Time in dessicator: | | 10/12/2013 15:30 | | | |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 147,8872 | 200 =<br>199,9996 | |
| 09/01/2014 | 8:30 | 1,4 | 70,4 | 147,8873 | 200 =<br>199,9997 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI Model: NG1800

Project #: G100968870 Sample ID #: _____

Date: 11/12/2013 Engineer: Claude Pelland Run #: 8 Sample Train #: A

Balance Equipment #: SBI-206 Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 37 | Tare: | 0,1179 | Preliminary Wt: | 0,1352 | |
| Rear Filter # | 38 | Tare: | 0,1162 | Preliminary Wt: | 0,1171 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 11/12/2013 | 14:30 | Preliminary Wt: | 0,2523 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1344<br>0,1178 | 0,1 =<br>0,1000 | |
| 09/01/2014 | 8:00 | 1,4 | 70,4 | 0,1344<br>0,1177 | 0,1 =<br>0,1000 | |
| | | | | | | |
| | | | | | | |
| Probe #: | 19 | Tare: | 140,1077 | Preliminary Wt: | 140,1126 | |
| Date/Time in dessicator: | | 11/12/2013 | 15:00 | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 140,1113 | 200 =<br>199,9996 | |
| 09/01/2014 | 8:30 | 1,4 | 70,4 | 140,1111 | 200 =<br>199,9997 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

## DILUTION TUNNEL WORKSHEET - METHOD 5G3

Client: SBI  Model: NG1800
Project #: G100968870  Sample ID #: _____
Date: 11/12/2013  Engineer: Claude Pelland  Run #: 8  Sample Train #: B
Balance Equipment #: SBI-206  Thermo/Hygrometer Equipment #: SBI-213

| | | | | | |
|---|---|---|---|---|---|
| Front Filter # | 39 | Tare: | 0,1172 | Preliminary Wt: | 0,1339 |
| Rear Filter # | 40 | Tare: | 0,1185 | Preliminary Wt: | 0,1205 |
| Seal Set # | | Tare: | | Preliminary Wt: | |
| Date/Time in dessicator: | | 11/12/2013 14:30 | | Preliminary Wt: | 0,2544 |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 08/01/2014 | 8:00 | 1,1 | 70,2 | 0,1334<br>0,1203 | 0,1 =<br>0,1000 | |
| 09/01/2014 | 8:00 | 1,4 | 70,4 | 0,1335<br>0,1203 | 0,1 =<br>0,1000 | |
| | | | | | | |
| | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Probe #: | 20 | Tare: | 139,0599 | Preliminary Wt: | 139,0672 |
| Date/Time in dessicator: | | 11/12/2013 15:00 | | | |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 08/01/2014 | 8:30 | 1,1 | 70,2 | 139,0663 | 200 =<br>199,9996 | |
| 09/01/2014 | 8:30 | 1,4 | 70,4 | 139,0660 | 200 =<br>199,9997 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

## DILUTION TUNNEL WORKSHEET - METHOD 5G3

Client: SBI  Model: NG1800
Project #: G100968870  Sample ID #: _____
Date: 04/02/2014  Engineer: Claude Pelland  Run #: 9  Sample Train #: A
Balance Equipment #: SBI-206  Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 49 | Tare: | 0,1197 | Preliminary Wt: | 0,1256 | |
| Rear Filter # | 50 | Tare: | 0,1191 | Preliminary Wt: | 0,1194 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 04/02/2014 16:30 | | Preliminary Wt: | 0,2450 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 06/02/2014 | 8:00 | 2,6 | 68,7 | 0,1254<br>0,1192 | 0,1 =<br>0,1000 | |
| 12/02/2014 | 13:30 | 1,5 | 69,2 | 0,1253<br>0,1192 | 0,1 =<br>0,1000 | |
| 13/02/2014 | 9:30 | 2,7 | 68,5 | 0,1252<br>0,1192 | 0,1 =<br>0,1000 | |
| | | | | | | |
| Probe #: | 17 | Tare: | 139,7455 | Preliminary Wt: | 139,7472 | |
| Date/Time in dessicator: | | 04/02/2014 17:00 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 05/02/2014 | 21:00 | 3,2 | 69,3 | 139,7475 | 200 =<br>199,9997 | |
| 12/02/2014 | 13:00 | 1,5 | 69,2 | 139,7464 | 200g =<br>199,9997 | |
| 13/02/2014 | 9:00 | 2,7 | 68,5 | 139,7467 | 200 =<br>199,9998 | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

## DILUTION TUNNEL WORKSHEET - METHOD 5G3

Client: SBI  Model: NG1800
Project #: G100968870  Sample ID #: _____
Date: 04/02/2014  Engineer: Claude Pelland  Run #: 9  Sample Train #: B
Balance Equipment #: SBI-206  Thermo/Hygrometer Equipment #: SBI-213

| | | | | | |
|---|---|---|---|---|---|
| Front Filter # | 51 | Tare: | 0,1172 | Preliminary Wt: | 0,1230 |
| Rear Filter # | 52 | Tare: | 0,1196 | Preliminary Wt: | 0,1201 |
| Seal Set # | | Tare: | | Preliminary Wt: | |
| Date/Time in dessicator: | | 04/02/2014 16:30 | | Preliminary Wt: | 0,2431 |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 06/02/2014 | 8:00 | 2,6 | 68,7 | 0,1228<br>0,1199 | 0,1 =<br>0,1000 | |
| 12/02/2014 | 13:30 | 1,5 | 69,2 | 0,1228<br>0,1199 | 0,1 =<br>0,1000 | |
| 13/02/2014 | 9:30 | 2,7 | 68,5 | 0,1229<br>0,1199 | 0,1 =<br>0,1000 | |
| | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Probe #: | 18 | Tare: | 147,8836 | Preliminary Wt: | 147,8851 |
| Date/Time in dessicator: | | 04/02/2014 17:00 | | | |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 05/02/2014 | 21:00 | 3,2 | 69,3 | 147,8856 | 200 =<br>199,9997 | |
| 12/02/2014 | 13:00 | 1,5 | 69,2 | 147,8846 | 200 =<br>199,9997 | |
| 13/02/2014 | 9:00 | 2,7 | 68,5 | 147,8848 | 200 =<br>199,9998 | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

**DILUTION TUNNEL WORKSHEET - METHOD 5G3**

Client: SBI  Model: NG1800

Project #: G100968870  Sample ID #: _____

Date: 05/02/2014  Engineer: Claude Pelland  Run #: 10  Sample Train #: A

Balance Equipment #: SBI-206  Thermo/Hygrometer Equipment #: SBI-213

| | | | | | |
|---|---|---|---|---|---|
| Front Filter # | 53 | Tare: | 0,1184 | Preliminary Wt: | 0,1507 |
| Rear Filter # | 54 | Tare: | 0,1174 | Preliminary Wt: | 0,1195 |
| Seal Set # | | Tare: | | Preliminary Wt: | |
| Date/Time in dessicator: | | 05/02/2014 21:00 | | Preliminary Wt: | 0,2702 |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 12/02/2014 | 13:30 | 1,5 | 69,2 | 0,1498<br>0,1194 | 0,1=<br>0,1000 | |
| 13/02/2014 | 9:30 | 2,7 | 68,5 | 0,1497<br>0,1194 | 0,1=<br>0,1000 | |
| | | | | | | |
| | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Probe #: | 19 | Tare: | 140,1077 | Preliminary Wt: | 140,1118 |
| Date/Time in dessicator: | | 05/02/2014 21:00 | | | |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 12/02/2014 | 13:00 | 1,5 | 69,2 | 140,1108 | 200=<br>199,9997 | |
| 13/02/2014 | 9:00 | 2,7 | 68,5 | 140,1113 | 200=<br>199,9998 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

## DILUTION TUNNEL WORKSHEET - METHOD 5G3

Client: SBI  Model: NG1800

Project #: G100968870  Sample ID #: _____

Date: 05/02/2014  Engineer: Claude Pelland  Run #: 10  Sample Train #: 13

Balance Equipment #: SBI-206  Thermo/Hygrometer Equipment #: SBI-213

| | | | | | |
|---|---|---|---|---|---|
| Front Filter # | 55 | Tare: | 0,1200 | Preliminary Wt: | 0,1513 |
| Rear Filter # | 56 | Tare: | 0,1185 | Preliminary Wt: | 0,1211 |
| Seal Set # | | Tare: | | Preliminary Wt: | |
| Date/Time in dessicator: | | 05/02/2014 21:00 | | Preliminary Wt: | 0,2724 |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 12/02/2014 | 13:30 | 1,5 | 69,2 | 0,1504<br>0,1210 | 0,1=<br>0,1000 | |
| 13/02/2014 | 9:30 | 2,7 | 68,5 | 0,1503<br>0,1210 | 0,1=<br>0,1000 | |
| | | | | | | |
| | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Probe #: | 20 | Tare: | 139,0603 | Preliminary Wt: | 139,0639 |
| Date/Time in dessicator: | | 05/02/2014 21:00 | | | |

| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
|---|---|---|---|---|---|---|
| 12/02/2014 | 13:00 | 1,5 | 69,2 | 139,0626 | 200=<br>199,9997 | |
| 13/02/2014 | 9:00 | 2,7 | 68,5 | 139,0631 | 200=<br>199,9998 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

## DILUTION TUNNEL WORKSHEET - METHOD 5G3

Client: SBI  Model: NG1800

Project #: G100968870  Sample ID #: _____

Date: 06/02/2014  Engineer: Claude Pelland  Run #: 11  Sample Train #: A

Balance Equipment #: SBI-206  Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 57 | Tare: | 0,1176 | Preliminary Wt: | 0,1250 | |
| Rear Filter # | 58 | Tare: | 0,1197 | Preliminary Wt: | 0,1198 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 06/02/2014 16:00 | | Preliminary Wt: | 0,2448 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 12/02/2014 | 13:30 | 1,5 | 69,2 | 0,1250<br>0,1198 | 0,1=<br>0,1000 | |
| 13/02/2014 | 9:30 | 2,7 | 68,5 | 0,1250<br>0,1197 | 0,1=<br>0,1000 | |
| | | | | | | |
| | | | | | | |
| Probe #: | 21 | Tare: | 136,0348 | Preliminary Wt: | 136,0367 | |
| Date/Time in dessicator: | | 06/02/2014 16:00 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 12/02/2014 | 13:00 | 1,5 | 69,2 | 136,0359 | 200=<br>199,9997 | |
| 13/02/2014 | 9:00 | 2,7 | 68,5 | 136,0362 | 200=<br>199,9998 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____

Intertek

## DILUTION TUNNEL WORKSHEET - METHOD 5G3

Client: SBI  Model: NG1800
Project #: G100968870  Sample ID #: _____
Date: 06/02/2014  Engineer: Claude Pelland  Run #: 11  Sample Train #: B
Balance Equipment #: SBI-206  Thermo/Hygrometer Equipment #: SBI-213

| | | | | | | |
|---|---|---|---|---|---|---|
| Front Filter # | 59 | Tare: | 0,1183 | Preliminary Wt: | 0,1255 | |
| Rear Filter # | 60 | Tare: | 0,1177 | Preliminary Wt: | 0,1182 | |
| Seal Set # | | Tare: | | Preliminary Wt: | | |
| Date/Time in dessicator: | | 06/02/2014 16:00 | | Preliminary Wt: | 0,2437 | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 12/02/2014 | 13:30 | 1,5 | 69,2 | 0,1254<br>0,1181 | 0,1=<br>0,1000 | |
| 13/02/2014 | 9:30 | 2,7 | 68,5 | 0,1255<br>0,1180 | 0,1=<br>0,1000 | |
| | | | | | | |
| | | | | | | |
| Probe #: | 22 | Tare: | 139,5683 | Preliminary Wt: | 139,7977 | |
| Date/Time in dessicator: | | 06/02/2014 16:00 | | | | |
| Date | Time | R/H % | Temp. (F) | Weight (grams) | Audit (grams) | Initials |
| 12/02/2014 | 13:00 | 1,5 | 69,2 | 139,7967 | 200=<br>199,9997 | |
| 13/02/2014 | 9:00 | 2,7 | 68,5 | 139,7968 | 200=<br>199,9998 | |
| | | | | | | |
| | | | | | | |

Date: _____

Engineer Signature: _____