



Evaluation of Device FS-1001.2 to the ASHRAE 103-1993 Standard

Prepared for:

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Technical Report Number

30014730 REV 1

Test Protocol

ASHRAE 103-1993

June 18, 2010

Prepared by:

A handwritten signature in black ink that reads "Judd Smith".

Judd Smith, Technical Manager

Reviewed by:

A handwritten signature in black ink that reads "Rick Nelson".

Rick Nelson, Senior Project Technician



Program Description

Evaluate Green Energy devices on two furnaces using ASHRAE 103-1993 for the test set-up and parameters. Four tests were conducted:

1. 90% efficient furnace without the device
2. 90% efficient furnace with the device

Executive Summary

Test Condition	Test Results
90% efficient furnace without the device	89.55%
90% efficient furnace with the device	90.97%

The conditions observed during testing are contained in this report.



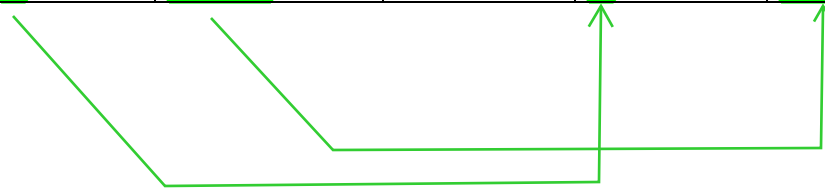
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Samples:				
Manufacturer	Listed AFUE	Model/SKU	Quantity	Description
Luxair	90%	G9T10014UPC13A	1	UPFLOW FURNACE

As Received State	
Standard Referenced: Visual Inspection (Include Photograph) Examine each sample for any shipping damage to packaging or product, and check for missing parts and/or accessories.	
Manufacturer	
Luxair	Unit is used and was supplied by a local HVAC Company
Comments: unit was in good working order.	

Combustion Results						
Standard Referenced: Visual Inspection (Include Photograph) Examine each sample for any shipping damage to packaging or product, and check for missing parts and/or accessories.						
Manufacturer	Without Device			With Device		
Luxair	CO ₂ , %	CO, PPM	Steady State Condensate	CO ₂ , %	CO,PPM	Steady State Condensate
	6.6	8	1.39 lbs	7.3	0	2.00 lbs



Test Results 90% without device

AFUE Report

Project Name GREEN ENERGY 90% Test Date 03/20/2006
Product Description without magnets

Unit Characteristics

Type of Unit: Condensing Furnace
Installation: Indoors
Type of Fuel: Natural Gas
Control Mode: Single Stage Control
Option: No Optional Tracer Gas Test
System Number: 10

Input Values

TYPE 2	INST 1	NSYS 10	FUEL 3	CTRL 1	OPTEST 0	IPURGE 0
QP	PE	BE	LJ	DP	TP	
0.	0.118	0.140	0.000	0.00000	0.000	
QIN	XCO2S	XCO2F	TSSSX	TFSS	TRA	
100000.	0.00	6.60	0.0	129.0	79.0	
TFON1	TFON2	TFOF3	TFOF4	TFOF5		
115.0	120.0	115.2	101.0	79.0		
MCSS	QCSS	MC	QC			
1.390	51514.	0.466	18531.			

Rise Temperature 50°F

-----Calculated Values-----

REFTRM	REFTOA	PHI	CP	CS'			
70.00	42.00	0.70	0.24	1.220			
A	B	CJ	K	HHVA	LLA		
0.0919	10.9600	0.00	0.00	20120.	9.55		
A/F	CIID	DF	TON	TOFF			
14.450	0.900	0.400	3.870	13.300			
T1	T2	T3	T4	ALPHA			
0.50	2.50	1.50	9.00	0.700			
RTS	RTF	S/F	LSSS	EFFYSS			
0.00	1.75	1.00	1.67	91.5668			
QOUT	KSON	KSOFF	KION	KIOFF			
92000.00	0.031400	2.127679	0.000000	0.000000			
TSSS	TAON	TAOFF	RON	ROFF	CS		
129.0	4.526	15.059	0.854	0.883	1.740		
SISO	SISI	SISOX	SISIX	SIFO	SIFI	SIFOX	SIFIX
0.000	0.000	0.000	0.000	39.822	0.000	39.991	0.000
D0	DS	CTON	CTOFF	THFO	THFOX		
1.000	0.000	0.700	0.816	19.045	15.635		
F3	F4	F5	F6	F7	F8		
0.0000000	0.0000000	0.1355931	0.0080904	0.0000000	0.0000000		
LGSS	LCSS	LG	LC				
2.842	0.053	2.648	0.049				
LSON	LSOFF	LION	LIOFF	EFFYHS	AFUE		
2.506	0.991	0.000	0.000	89.550648	89.550650		

Combustion Efficiency 89.55%

Test Results 90% with device

AFUE Report

Project Name: GREN ENERGY 90% W MA
Product Description: with magnets
Test Date: 03/20/2006

Unit Characteristics

Type of Unit: Condensing Furnace
Installation: Indoors
Type of Fuel: Natural Gas
Control Mode: Single Stage Control
Option: No Optional Tracer Gas Test
System Number: 10

Input Values

TYPE 2	INST 1	NSYS 10	FUEL 3	CTRL 1	OPTEST 0	IPURGE 0
QP	PE	BE	LJ	DP	TP	
0.	0.118	0.140	0.000	0.00000	0.000	
QIN	XCO2S	XCO2F	TSSSX	TFSS	TRA	
100000.	0.00	7.30	0.0	125.5	73.0	
TFON1	TFON2	TFOF3	TFOF4	TFOF5		
110.4	115.5	111.0	96.5	73.0		
MCSS	QCSS	MC	QC			
2.000	51514.	0.710	20040.			

Rise Temperature 52.5°F

-----Calculated Values-----

REFTRM	REFTOA	PHI	CP	CS'			
70.00	42.00	0.70	0.24	1.220			
A	B	CJ	K	HHVA	LLA		
0.0919	10.9600	0.00	0.00	20120.	9.55		
A/F	CIID	DF	TON	TOFF			
14.450	0.900	0.400	3.870	13.300			
T1	T2	T3	T4	ALPHA			
0.50	2.50	1.50	9.00	0.700			
RTS	RTF	S/F	LSSS	EFFYSS			
0.00	1.59	1.00	1.60	92.8603			
QOUT	KSON	KSOFF	KION	KIOFF			
93000.00	0.028656	1.917489	0.000000	0.000000			
TSSS	TAON	TAOFF	RON	ROFF	CS		
125.5	4.853	15.605	0.797	0.852	1.590		
SISO	SISI	SISOX	SISIX	SIFO	SIFI	SIFOX	SIFIX
0.000	0.000	0.000	0.000	41.354	0.000	41.833	0.000
D0	DS	CTON	CTOFF	THFO	THFOX		
1.000	0.000	0.694	0.810	18.477	16.738		
F3	F4	F5	F6	F7	F8		
0.0000000	0.0000000	0.1441907	0.0081316	0.0000000	0.0000000		
LGSS	LCSS	LG	LC				
4.089	0.069	3.731	0.063				
LSON	LSOFF	LION	LIOFF	EFFYHS	AFUE		
2.194	0.950	0.000	0.000	90.973096	90.973100		

Combustion Efficiency 90.97%

June 18, 2010

SUMMARY

Equipment List:		
Description	Barcode #	Instrument Range
CO/CO2 Analyzer		0-1000 CO/0 20% CO2
Compact Daq temperature Module		Varies

Revisions:		
Rev #	Date	Description
REV 1	6/18/2010	Added Combustion, separated the 80% furnace data out.