

## EMS Heat Loss/Heat Gain Calculation

**Company:** Green Engineering Solutions, Inc.  
**Preparer:** Misty Miller CER #1493  
**Phone:** 904-400-0624

**Customer:** Perry Residence  
**Address:** 249 SW Sedgefield LN Fort White, FL 32038  
**Phone:**  
**Date:** 9/14/2022

This HVAC load calculation has been performed using sound engineering principles as prescribed by Manual J seventh and eighth abridged editions and ASHRAE Fundamentals. Duct sizing has been performed as prescribed by Manual D.

### 1. Design Conditions

<b>Total conditioned area (sq.ft.)</b>	2244		
	<b>Indoor</b>	<b>Outdoor</b>	<b>Temp. Diff.</b>
<b>Winter</b>	70	34	36
<b>Summer</b>	73	95	22

**Front of home is facing:**  
South

**2. How would you describe the summer humidity in your area?** Moderately Humid 40 Grains difference

**3. How tight is the house?** Average-over 1500 Sq. Ft.  
Winter air change / hr: 0.7 Summer air change / hr: 0.35

**4. Fireplace evaluation :** Number: 1 Tightness: Average 20

**5. Number of occupants:** 4

### 6. Overhang characteristics (optional)

	<b>East</b>	<b>West</b>	<b>S/SE/SW</b>
<b>Distance of overhang from top of window (Ft.)</b>			
<b>Length of overhang</b>			



## 7. Solar gain through glass

Facing	Total area - Sq.Ft.	Type of glass	HTM	Linear ft.	Unshaded	Shaded	BTUH
N/Shaded	144	Trpl or low-E	20	Below OH		144	
NE/NW		-- Select --			0		0
South	110	Trpl or low-E	33		110	0	3630
SE/SW		-- Select --			0	0	0
East	8	Trpl or low-E	65.0		8	0	520
West	8	Trpl or low-E	65.0		8	0	520
Skylight		-- Select --					0
Total North and Shaded						144	2880
Total Solar Gain							7550
Adjust for tinted or reflective window coating?				No	1		7550

## 8. Ducts/Pipes

Location:	Radial or spider in attic				
Attic Temp.	Insulation		Leakage		Area
130	R-6	1	sealed	1	2244
Duct gain:	0.231	Duct loss:	0.115		

## 9. Load Calculation

Elements of Load	Insulation / R-value	Area/lin.ft.	U-value	Heat Loss	Heat Gain
Gross Wall		2001.7	Glass solar gain		7550
Glass 1	Trpl or low-E	270	0.42	4082	
Glass 2	-- Select --			0	
Skylight	-- Select --	0		0	
Doors	Insulated or Storm	23.33	0.4	336	205
Net walls	R-19	1708	0.06	3690	2255
Ceilings	R-30	2244	0.033	2666	3332
Floors	-- Select --			0	0
Open floors	-- Select --			0	0
Slab floors	No Insulation	200.16	0.8	5765	0
Volume of your building or zone (cu. Ft.)		25383		12519	3583
	People				1200
	Appliances				4100
	Sub Total			29058	22226
	Duct Loss/Gain			3343	5129
	Sensible Load			32401	27355
	Latent Load				4947
	TOTAL BTUH			32401	32303

Summary		
	BTUH	Tons
Total heating load	32401	
Total cooling load	32303	2.7

## Room by Room

Total Heat Loss	32401	System CFM (cooling)	1400
Total Heat Gain	27355	System CFM (heating)	1400

Room name	Great Room	Kitchen/Dining	Laundry/Hall	Bedroom 2	Bathroom 2	Bedroom 3	Master Bath/Closet	Master Bedroom
Gross wall	320.8	257.5	105.8	264.2	55.8	317.5	340	340
North windows		69	20	15				40
NE/NW windows								
South windows	80					15	15	
SE/SW windows								
East windows								8
West windows					8			
Skylight								
Doors	23.33							
Net walls	217	188	86	249	48	302	325	292
Ceiling	561	420	189	174	71	251	289	289
Floor-crawl								
Floor-open								
Floor-slab	32.08	25.75	10.58	26.42	5.58	31.75	34	34
Infiltration	103	69	20	15	8	15	15	48
People				1		1		2
Appliances	1200	900	500	500		500		500
Heat loss	8938	6284	2086	2646	904	3047	3224	5272
Sensible Heat Gain	7911	4917	1893	2302	968	2770	1891	4703
Cooling CFM	405	252	97	118	50	142	97	241
Heating CFM	386	272	90	114	39	132	139	228

## Air Ducts Sizing

Total measured length of ducts 65  
 Total equivalent length of fittings 33  
 Available static pressure for duct .34  
 Friction rate .05

Use cooling CFM  
 Flex ducts used

	CFM	No. outlets	Outlet CFM	Duct diam.	Air vel.
<b>Supply trunk / branch</b>					
First section off AHU	1400			19.9	646
1st reduction / branch	1000			17.6	595
2nd reduction / branch	600			14.5	526
3rd reduction / branch	400			12.4	476
4th reduction / branch	200			9.5	402
5th reduction / branch	100			7.3	340
<b>Return trunk / branch</b>					
First section off AHU	1400			19.9	646
1st reduction / branch	1000			17.6	595
2nd reduction / branch	600			14.5	526
3rd reduction / branch	400			12.4	476
4th reduction / branch	200			9.5	402
5th reduction / branch	100			7.3	340
<b>Room runs</b>					
Great Room	405	4	101.2	7.4	341
Kitchen/Dining	252	3	84	6.9	325.9
Laundry/Hall	97	1	97	7.3	337.5
Bedroom 2	118	1	118	7.8	354
Bathroom 2	50	1	50	5.6	287.3
Bedroom 3	142	1	142	8.4	370.3
Master Bath/Closet	97	1	97	7.3	337.5
Master Bedroom	241	2	120.5	7.9	355.8



## Equipment selection as per Manual S

	BTUH	Nom.Tons
Total heat loss	32401	
Total heat gain	34303	2.9
Sensible heat gain	27355	
Latent heat gain	6948	
Sensible/total ratio	0.8	
Target cooling TD	21	

Design temp.	Outdoor	Indoor
Winter	34	70
Summer	95	73
ID design RH	50%, 63F WB	
Altitude		

Predominantly Cool climate

### Manufacturer's Equipment Specification

Equipment	Manufacturer	Model No.	BTUH output	Clg. capacity @ OD design temp.		
Furnace				Total	Sensible	Latent
Boiler						
Heat pump / AC	Amana	ASZ14042		39000	29640	9360
Evaporator						
Air handler	Amana	ARUF43C14				
TOTAL CAPACITY with altitude correction			0	39000	29640	9360
Selected equipment size			OK	OK	OK	OK
			Heating CFM	Cooling CFM (rec.)	Ext. static pressure of blower	
			1400	1283	.5	

### Available static pressure for duct

Blower ext. static press.	.5
coil pressure drop	
filter pressure drop	.1
register pressure drop	.03
grille pressure drop	.03
other	
Available SP for duct	0.34

### Supplemental heat needed for heat pump

HP capacity @ 47F	40000
HP capacity @ 17F	24000
HP capacity @ ODDT	33067
BTUH supplemental heat	-666
KW supplemental heat	-0



# 2020 - AIR BARRIER AND INSULATION INSPECTION COMPONENT CRITERIA

**TABLE 402.4.1.1**  
**AIR BARRIER AND INSULATION INSPECTION COMPONENT CRITERIA <sup>a</sup>**

Project Name: Perry Residence Street: 249 SW Sedgefield LN City, State, Zip: Fort White, FL, 32038 Owner: Natalie and Darrell Perry Design Location: FL, Jacksonville			Builder Name: Permit Office: Columbia County Permit Number: Jurisdiction: 221000	CHECK
COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA		
General requirements	A continuous air barrier shall be installed in the building envelope. The exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed.	Air-permeable insulation shall not be used as a sealing material.		
Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed. Access openings, drop down stairs or knee wall doors to unconditioned attic spaces shall be sealed.	The insulation in any dropped ceiling/soffit shall be aligned with the air barrier.		
Walls	The junction of the foundation and sill plate shall be sealed. The junction of the top plate and the top of exterior walls shall be sealed. Knee walls shall be sealed.	Cavities within corners and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance of R-3 per inch minimum. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.		
Windows, skylights and doors	The space between window/door jambs and framing, and skylights and framing shall be sealed.			
Rim joists	Rim joists shall include the air barrier.	Rim joists shall be insulated.		
Floors (including above-garage and cantilevered floors)	The air barrier shall be installed at any exposed edge of insulation.	Floor framing cavity insulation shall be installed to maintain permanent contact with the underside of subfloor decking, or floor framing cavity insulation shall be permitted to be in contact with the top side of sheathing, or continuous insulation installed on the underside of floor framing and extends from the bottom to the top of all perimeter floor framing members.		
Crawl space walls	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.	Where provided instead of floor insulation, insulation shall be permanently attached to the crawlspace walls.		
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.			
Narrow cavities		Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity spaces.		
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.			
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be sealed to the finished surface.	Recessed light fixtures installed in the building thermal envelope shall be air tight and IC rated.		
Plumbing and wiring		Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind piping and wiring.		
Shower/tub on exterior wall	The air barrier installed at exterior walls adjacent to showers and tubs shall separate them from the showers and tubs.	Exterior walls adjacent to showers and tubs shall be insulated.		
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical or communication boxes or air-sealed boxes shall be installed.			
HVAC register boots	HVAC supply and return register boots that penetrate building thermal envelope shall be sealed to the sub-floor, wall covering or			
Concealed sprinklers	When required to be sealed, concealed fire sprinklers shall only be sealed in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.			

a. In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.



# Envelope Leakage Test Report (Blower Door Test)

## Residential Prescriptive, Performance or ERI Method Compliance

### 2020 Florida Building Code, Energy Conservation, 7th Edition

Jurisdiction: 221000	Permit #:
<b>Job Information</b>	
Builder:	Community: Lot: NA
Address: 249 SW Sedgefield LN	
City: Fort White	State: FL Zip: 32038
<b>Air Leakage Test Results</b> <i>Passing results must meet either the Performance, Prescriptive, or ERI Method</i>	
<input type="radio"/> <b>PRESCRIPTIVE METHOD</b> -The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 7 air changes per hour at a pressure of 0.2 inch w.g. (50 Pascals) in Climate Zones 1 and 2.	
<input type="radio"/> <b>PERFORMANCE or ERI METHOD</b> -The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding the selected ACH(50) value, as shown on Form R405-2020 (Performance) or R406-2020 (ERI), section labeled as infiltration, sub-section ACH50. ACH(50) specified on Form R405-2020-Energy Calc (Performance) or R406-2020 (ERI): <span style="border: 1px solid black; padding: 2px;">5.149</span>	
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 60%;"> <math display="block">\frac{\text{CFM}(50)}{\text{Building Volume}} \times 60 \div \frac{25383}{\text{ACH}(50)} = \text{ACH}(50)</math> <div style="border: 1px solid black; width: 40px; height: 20px; margin: 5px auto; display: flex; align-items: center; justify-content: center;"> <b>PASS</b> </div> <input type="checkbox"/> When ACH(50) is less than 3, Mechanical Ventilation installation must be verified by building department.         </div> <div style="width: 35%;"> <b>Method for calculating building volume:</b>  <input type="radio"/> Retrieved from architectural plans  <input checked="" type="radio"/> Code software calculated  <input type="radio"/> Field measured and calculated         </div> </div>	
<p><b>R402.4.1.2 Testing.</b> Testing shall be conducted in accordance with ANSI/RESNET/ICC 380 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Testing shall be conducted by either individuals as defined in Section 553.993(5) or (7), <i>Florida Statutes</i>, or individuals licensed as set forth in Section 489.105(3)(f), (g), or (i) or an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the <i>building thermal envelope</i>.</p> <p>During testing:</p> <ol style="list-style-type: none"> <li>Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures.</li> <li>Dampers including exhaust, intake, makeup air, back draft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures.</li> <li>Interior doors, if installed at the time of the test, shall be open.</li> <li>Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed.</li> <li>Heating and cooling systems, if installed at the time of the test, shall be turned off.</li> <li>Supply and return registers, if installed at the time of the test, shall be fully open.</li> </ol>	
<b>Testing Company</b>	
Company Name: _____ Phone: _____ I hereby verify that the above Air Leakage results are in accordance with the 2020 7th Edition Florida Building Code Energy Conservation requirements according to the compliance method selected above.	
Signature of Tester: _____ Date of Test: _____	
Printed Name of Tester: _____	
License/Certification #: _____ Issuing Authority: _____	

# ENERGY PERFORMANCE LEVEL (EPL) DISPLAY CARD

ESTIMATED ENERGY PERFORMANCE INDEX\* = 98

The lower the EnergyPerformance Index, the more efficient the home.

249 SW Sedgefield LN, Fort White, FL, 32038

1. New construction or existing	New (From Plans)	10. Wall Type and Insulation	Insulation	Area
2. Single family or multiple family	Detached	a. Frame - Wood, Exterior	R=19.0	2001.70 ft <sup>2</sup>
3. Number of units, if multiple family	1	b. N/A	R=	ft <sup>2</sup>
4. Number of Bedrooms	3	c. N/A	R=	ft <sup>2</sup>
5. Is this a worst case?	No	d. N/A	R=	ft <sup>2</sup>
6. Conditioned floor area (ft <sup>2</sup> )	2244	11. Ceiling Type and insulation level	Insulation	Area
7. Windows**	Description	a. Under Attic (Vented)	R=30.0	2244.00 ft <sup>2</sup>
a. U-Factor:	DbI, U=0.35	b. N/A	R=	ft <sup>2</sup>
SHGC:	SHGC=0.27	c. N/A	R=	ft <sup>2</sup>
b. U-Factor:	N/A	12. Ducts, location & insulation level	R	ft <sup>2</sup>
SHGC:		a. Sup: Attic, Ret: Attic, AH: Laundry Room and Hall	6	448.8
c. U-Factor:	N/A	13. Cooling systems	kBtu/hr	Efficiency
SHGC:		a. Central Unit	39.0	SEER:14.00
d. U-Factor:	N/A	14. Heating systems	kBtu/hr	Efficiency
SHGC:		a. Electric Heat Pump	39.0	HSPF:8.20
Area Weighted Average Overhang Depth:	2.370 ft.	15. Hot water systems	Cap: 50 gallons	
Area Weighted Average SHGC:	0.270	a. Electric	EF: 0.95	
8. Skylights	Description	b. Conservation features		
a. U-Factor(AVG):	N/A	None		
SHGC(AVG):	N/A	Credits (Performance method)		CF
9. Floor Types	Insulation	Area		
a. Slab-On-Grade Edge Insulation	R=0.0	2244.00 ft <sup>2</sup>		
b. N/A	R=	ft <sup>2</sup>		
c. N/A	R=	ft <sup>2</sup>		

I certify that this home has complied with the Florida Energy Efficiency Code for Building Construction through the above energy saving features which will be installed (or exceeded) in this home before final inspection. Otherwise, a new EPL Display Card will be completed based on installed Code compliant features.

Builder Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Address of New Home: \_\_\_\_\_ City/FL Zip: \_\_\_\_\_



\*Note: This is not a Building Energy Rating. If your Index is below 70, your home may qualify for energy efficient mortgage (EEM) incentives if you obtain a Florida Energy Rating. For information about the Florida Building Code, Energy Conservation, contact the Florida Building Commission's support staff.

\*\*Label required by Section R303.1.3 of the Florida Building Code, Energy Conservation, if not DEFAULT.