

Florida Building Code, Energy Conservation, 7th Edition (2020)

Mandatory Requirements for Residential Performance, Prescriptive and ERI Methods

ADDRESS: 2388 SE UNION PARK DR
Port St Lucie , FL ,

Permit Number:

MANDATORY REQUIREMENTS - See individual code sections for full details.

SECTION R401 GENERAL

☒ **R401.3 Energy Performance Level (EPL) display card (Mandatory).** The building official shall require that an energy performance level (EPL) display card be completed and certified by the builder to be accurate and correct before final approval of the building for occupancy. Florida law (Section 553.9085, Florida Statutes) requires the EPL display card to be included as an addendum to each sales contract for both presold and nonpresold residential buildings. The EPL display card contains information indicating the energy performance level and efficiencies of components installed in a dwelling unit. The building official shall verify that the EPL display card completed and signed by the builder accurately reflects the plans and specifications submitted to demonstrate code compliance for the building. A copy of the EPL display card can be found in Appendix RD.

SECTION R402 BUILDING THERMAL ENVELOPE

☐ **R402.4 Air leakage (Mandatory).** The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Sections R402.4.1 through R402.4.5.

Exception: Dwelling units of R-2 Occupancies and multiple attached single family dwellings shall be permitted to comply with Section C402.5.

☐ **R402.4.1 Building thermal envelope** The building thermal envelope shall comply with Sections R402.4.1.1 and R402.4.1.2. The sealing methods between dissimilar materials shall allow for differential expansion and contraction.

☐ **R402.4.1.1 Installation.** The components of the building thermal envelope as listed in Table R402.4.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria listed in Table R402.4.1.1, as applicable to the method of construction. Where required by the code official, an approved third party shall inspect all components and verify compliance.

☐ **R402.4.1.2 Testing.** The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding seven air changes per hour in Climate Zones 1 and 2, and three air changes per hour in Climate Zones 3 through 8. 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), Florida Statutes, 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 building thermal envelope.

Exception: Testing is not required for additions, alterations, renovations, or repairs, of the building thermal envelope of existing buildings in which the new construction is less than 85 percent of the building thermal envelope.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures.
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures.
3. Interior doors, if installed at the time of the test, shall be open.
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed.
5. Heating and cooling systems, if installed at the time of the test, shall be turned off.
6. Supply and return registers, if installed at the time of the test, shall be fully open.

☐ **R402.4.2 Fireplaces.** New wood-burning fireplaces shall have tight-fitting flue dampers or doors, and outdoor combustion air. Where using tight-fitting doors on factory-built fireplaces listed and labeled in accordance with UL 127, the doors shall be tested and listed for the fireplace. Where using tight-fitting doors on masonry fireplaces, the doors shall be listed and labeled in accordance with UL 907.

☐ **R402.4.3 Fenestration air leakage.** Windows, skylights and sliding glass doors shall have an air infiltration rate of no more than 0.3 cfm per square foot (1.5 L/s/m²), and swinging doors no more than 0.5 cfm per square foot (2.6 L/s/m²), when tested according to NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440 by an accredited, independent laboratory and listed and labeled by the manufacturer.

Exception: Site-built windows, skylights and doors.

MANDATORY REQUIREMENTS - (Continued)

- ☐ **R402.4.4 Rooms containing fuel-burning appliances.** In Climate Zones 3 through 8, where open combustion air ducts provide combustion air to open combustion fuel burning appliances, the appliances and combustion air opening shall be located outside the building thermal envelope or enclosed in a room, isolated from inside the thermal envelope. Such rooms shall be sealed and insulated in accordance with the envelope requirements of Table R402.1.2, where the walls, floors and ceilings shall meet not less than the basement wall R-value requirement. The door into the room shall be fully gasketed and any water lines and ducts in the room insulated in accordance with Section R403. The combustion air duct shall be insulated where it passes through conditioned space to a minimum of R-8.

Exceptions:

1. Direct vent appliances with both intake and exhaust pipes installed continuous to the outside.
2. Fireplaces and stoves complying with Section R402.4.2 and Section R1006 of the Florida Building Code, Residential.

- ☐ **R402.4.5 Recessed lighting.** Recessed luminaires installed in the building thermal envelope shall be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed luminaires shall be IC-rated and labeled as having an air leakage rate not more than 2.0 cfm (0.944 L/s) when tested in accordance with ASTM E283 at a 1.57 psf (75 Pa) pressure differential. All recessed luminaires shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.

SECTION R403 SYSTEMS

R403.1 Controls.

- ☐ **R403.1.1 Thermostat provision (Mandatory).** At least one thermostat shall be provided for each separate heating and cooling system.

- ☐ **R403.1.3 Heat pump supplementary heat (Mandatory).** Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.

- ☐ **R403.3.2 Sealing (Mandatory)** All ducts, air handlers, filter boxes and building cavities that form the primary air containment passageways for air distribution systems shall be considered ducts or plenum chambers, shall be constructed and sealed in accordance with Section C403.2.9.2 of the Commercial Provisions of this code and shall be shown to meet duct tightness criteria below.

Duct tightness shall be verified by testing in accordance with ANSI/RESNET/ICC 380 by either individuals as defined in Section 553.993(5) or (7), Florida Statutes, or individuals licensed as set forth in Section 489.105(3)(f), (g) or (i), Florida Statutes, to be "substantially leak free" in accordance with Section R403.3.3.

- ☐ **R403.3.2.1 Sealed air handler.** Air handlers shall have a manufacturer's designation for an air leakage of no more than 2 percent of the design airflow rate when tested in accordance with ASHRAE 193.

- ☐ **R403.3.3 Duct testing (Mandatory).** Ducts shall be pressure tested to determine air leakage by one of the following methods:

1. Rough-in test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure if installed at the time of the test. All registers shall be taped or otherwise sealed during the test.
2. Postconstruction test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. Registers shall be taped or otherwise sealed during the test.

Exceptions:

1. A duct air leakage test shall not be required where the ducts and air handlers are located entirely within the building thermal envelope.
2. *Duct testing is not mandatory for buildings complying by Section 405 of this code. Duct leakage testing is required for Section R405 compliance where credit is taken for leakage, and a duct air leakage Q_n to the outside of less than 0.080 (where Q_n = duct leakage to the outside in cfm per 100 square feet of conditioned floor area tested at 25 Pascals) is indicated in the compliance report for the proposed design.*

A written report of the results of the test shall be signed by the party conducting the test and provided to the code official.

- ☐ **R403.3.5 Building cavities (Mandatory).** Building framing cavities shall not be used as ducts or plenums.

- ☐ **R403.4 Mechanical system piping insulation (Mandatory).** Mechanical system piping capable of carrying fluids above 105°F (41°C) or below 55°F (13°C) shall be insulated to a minimum of R-3.

- ☐ **R403.4.1 Protection of piping insulation.** Piping insulation exposed to weather shall be protected from damage, including that caused by sunlight, moisture, equipment maintenance and wind, and shall provide shielding from solar radiation that can cause degradation of the material. Adhesive tape shall not be permitted.

- ☐ **R403.5.1 Heated water circulation and temperature maintenance systems (Mandatory).** If heated water circulation systems are installed, they shall be in accordance with Section R403.5.1.1. Heat trace temperature maintenance systems shall be in accordance with Section R403.5.1.2. Automatic controls, temperature sensors and pumps shall be accessible. Manual controls shall be readily accessible.

- ☐ **R403.5.1.1 Circulation systems.** Heated water circulation systems shall be provided with a circulation pump. The system return pipe shall be a dedicated return pipe or a cold water supply pipe. Gravity and thermosiphon circulation systems shall be prohibited. Controls for circulating hot water system pumps shall start the pump based on the identification of a demand for hot water within the occupancy. The controls shall automatically turn off the pump when the water in the circulation loop is at the desired temperature and when there is no demand for hot water.

- ☐ **R403.5.1.2 Heat trace systems.** Electric heat trace systems shall comply with IEEE 515.1 or UL 515. Controls for such systems shall automatically adjust the energy input to the heat tracing to maintain the desired water temperature in the piping in accordance with the times when heated water is used in the occupancy.

MANDATORY REQUIREMENTS - (Continued)

- ☐ **R403.5.5 Heat traps (Mandatory).** Storage water heaters not equipped with integral heat traps and having vertical pipe risers shall have heat traps installed on both the inlets and outlets. External heat traps shall consist of either a commercially available heat trap or a downward and upward bend of at least 3 ½ inches (89 mm) in the hot water distribution line and cold water line located as close as possible to the storage tank.
- R403.5.6 Water heater efficiencies (Mandatory).**
- ☐ **R403.5.6.1.1 Automatic controls.** Service water-heating systems shall be equipped with automatic temperature controls capable of adjustment from the lowest to the highest acceptable temperature settings for the intended use. The minimum temperature setting range shall be from 100°F to 140°F (38°C to 60°C).
- ☐ **R403.5.6.1.2 Shut down.** A separate switch or a clearly marked circuit breaker shall be provided to permit the power supplied to electric service systems to be turned off. A separate valve shall be provided to permit the energy supplied to the main burner(s) of combustion types of service water-heating systems to be turned off.
- ☐ **R403.5.6.2 Water-heating equipment.** Water-heating equipment installed in residential units shall meet the minimum efficiencies of Table C404.2 in Chapter 4 of the Florida Building Code, Energy Conservation, Commercial Provisions, for the type of equipment installed. Equipment used to provide heating functions as part of a combination system shall satisfy all stated requirements for the appropriate water-heating category. Solar water heaters shall meet the criteria of Section R403.5.6.2.1.
- ☐ **R403.5.6.2.1 Solar water-heating systems.** Solar systems for domestic hot water production are rated by the annual solar energy factor of the system. The solar energy factor of a system shall be determined from the Florida Solar Energy Center Directory of Certified Solar Systems. Solar collectors shall be tested in accordance with ISO Standard 9806, Test Methods for Solar Collectors, and SRCC Standard TM-1, Solar Domestic Hot Water System and Component Test Protocol. Collectors in installed solar water-heating systems should meet the following criteria:
1. Be installed with a tilt angle between 10 degrees and 40 degrees of the horizontal; and
 2. Be installed at an orientation within 45 degrees of true south.
- ☐ **R403.6 Mechanical ventilation (Mandatory).** The building shall be provided with ventilation that meets the requirements of the Florida Building Code, Residential, or Florida Building Code, Mechanical, as applicable, or with other approved means of ventilation including: Natural, Infiltration or Mechanical means. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.
- ☐ **R403.6.1 Whole-house mechanical ventilation system fan efficacy.** When installed to function as a whole-house mechanical ventilation system, fans shall meet the efficacy requirements of Table R403.6.1.
- Exception:** Where an air handler that is integral to tested and listed HVAC equipment is used to provide whole-house mechanical ventilation, the air handler shall be powered by an electronically commutated motor.
- ☐ **R403.6.2 Ventilation air.** Residential buildings designed to be operated at a positive indoor pressure or for mechanical ventilation shall meet the following criteria:
1. The design air change per hour minimums for residential buildings in ASHRAE 62.2, Ventilation for Acceptable Indoor Air Quality, shall be the maximum rates allowed for residential applications.
 2. No ventilation or air-conditioning system make-up air shall be provided to conditioned space from attics, crawlspaces, attached enclosed garages or outdoor spaces adjacent to swimming pools or spas.
 3. If ventilation air is drawn from enclosed space(s), then the walls of the space(s) from which air is drawn shall be insulated to a minimum of R-11 and the ceiling shall be insulated to a minimum of R-19, space permitting, or R-10 otherwise.

R403.7 Heating and cooling equipment.

- ☐ **R403.7.1 Equipment sizing (Mandatory).** Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on the equipment loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies, based on building loads for the directional orientation of the building. The manufacturer and model number of the outdoor and indoor units (if split system) shall be submitted along with the sensible and total cooling capacities at the design conditions described in Section R302.1. This Code does not allow designer safety factors, provisions for future expansion or other factors that affect equipment sizing. System sizing calculations shall not include loads created by local intermittent mechanical ventilation such as standard kitchen and bathroom exhaust systems. New or replacement heating and cooling equipment shall have an efficiency rating equal to or greater than the minimum required by federal law for the geographic location where the equipment is installed.

**TABLE R403.6.1
WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM FAN EFFICACY**

FAN LOCATION	AIRFLOW RATE MINIMUM (CFM)	MINIMUM EFFICACY ^a (CFM/WATT)	AIRFLOW RATE MAXIMUM (CFM)
HRV or ERV	Any	1.2 cfm/watt	Any
Range hoods	Any	2.8 cfm/watt	Any
In-line fan	Any	2.8 cfm/watt	Any
Bathroom, utility room	10	1.4 cfm/watt	<90
Bathroom, utility room	90	2.8 cfm/watt	Any

For SI: 1 cfm = 28.3 L/min.

a. When tested in accordance with HVI Standard 916

MANDATORY REQUIREMENTS - (Continued)

- ☐ **R403.7.1.1 Cooling equipment capacity.** Cooling only equipment shall be selected so that its total capacity is not less than the calculated total load but not more than 1.15 times greater than the total load calculated according to the procedure selected in Section R403.7, or the closest available size provided by the manufacturer's product lines. The corresponding latent capacity of the equipment shall not be less than the calculated latent load.

The published value for AHRI total capacity is a nominal, rating-test value and shall not be used for equipment sizing. Manufacturer's expanded performance data shall be used to select cooling-only equipment. This selection shall be based on the outdoor design dry-bulb temperature for the load calculation (or entering water temperature for water-source equipment), the blower CFM provided by the expanded performance data, the design value for entering wet-bulb temperature and the design value for entering dry-bulb temperature.

Design values for entering wet-bulb and dry-bulb temperatures shall be for the indoor dry bulb and relative humidity used for the load calculation and shall be adjusted for return side gains if the return duct(s) is installed in an unconditioned space.

Exceptions:

1. Attached single- and multiple-family residential equipment sizing may be selected so that its cooling capacity is less than the calculated total sensible load but not less than 80 percent of that load.
2. When signed and sealed by a Florida-registered engineer, in attached single- and multiple-family units, the capacity of equipment may be sized in accordance with good design practice.

R403.7.1.2 Heating equipment capacity.

- ☐ **R403.7.1.2.1 Heat pumps.** Heat pump sizing shall be based on the cooling requirements as calculated according to Section R403.7.1.1, and the heat pump total cooling capacity shall not be more than 1.15 times greater than the design cooling load even if the design heating load is 1.15 times greater than the design cooling load.

- ☐ **R403.7.1.2.2 Electric resistance furnaces.** Electric resistance furnaces shall be sized within 4 kW of the design requirements calculated according to the procedure selected in Section R403.7.1.

- ☐ **R403.7.1.2.3 Fossil fuel heating equipment.** The capacity of fossil fuel heating equipment with natural draft atmospheric burners shall not be less than the design load calculated in accordance with Section R403.7.1.

- ☐ **R403.7.1.3 Extra capacity required for special occasions.** Residences requiring excess cooling or heating equipment capacity on an intermittent basis, such as anticipated additional loads caused by major entertainment events, shall have equipment sized or controlled to prevent continuous space cooling or heating within that space by one or more of the following options:

1. A separate cooling or heating system is utilized to provide cooling or heating to the major entertainment areas.
2. A variable capacity system sized for optimum performance during base load periods is utilized.

- ☐ **R403.8 Systems serving multiple dwelling units (Mandatory).** Systems serving multiple dwelling units shall comply with Sections C403 and C404 of the Florida Building Code, Energy Conservation—Commercial Provisions in lieu of Section R403.

- ☐ **R403.9 Snow melt and ice system controls (Mandatory)** Snow- and ice-melting systems, supplied through energy service to the building, shall include automatic controls capable of shutting off the system when the pavement temperature is above 50°F (10°C), and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F (4.8°C).

- ☐ **R403.10 Pools and permanent spa energy consumption (Mandatory).** The energy consumption of pools and permanent spas shall be in accordance with Sections R403.10.1 through R403.10.5.

- ☐ **R403.10.1 Heaters.** The electric power to heaters shall be controlled by a readily accessible on-off switch that is an integral part of the heater mounted on the exterior of the heater, or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. Gas-fired heaters shall not be equipped with continuously burning ignition pilots.

- ☐ **R403.10.2 Time switches.** Time switches or other control methods that can automatically turn off and on according to a preset schedule shall be installed for heaters and pump motors. Heaters and pump motors that have built-in time switches shall be in compliance with this section.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. Pumps that operate solar- and waste-heat-recovery pool heating systems.
3. Where pumps are powered exclusively from on-site renewable generation.

- ☐ **R403.10.3 Covers.** Outdoor heated swimming pools and outdoor permanent spas shall be equipped with a vapor-retardant cover on or at the water surface or a liquid cover or other means proven to reduce heat loss.
- Exception:** Where more than 70 percent of the energy for heating, computed over an operation season, is from site-recovered energy, such as from a heat pump or solar energy source, covers or other vapor-retardant means shall not be required.
- ☐ **R403.10.4 Gas- and oil-fired pool and spa heaters.** All gas- and oil-fired pool and spa heaters shall have a minimum thermal efficiency of 82 percent for heaters manufactured on or after April 16, 2013, when tested in accordance with ANSI Z 21.56. Pool heaters fired by natural or LP gas shall not have continuously burning pilot lights.
- ☐ **R403.10.5 Heat pump pool heaters.** Heat pump pool heaters shall have a minimum COP of 4.0 when tested in accordance with AHRI 1160, Table 2, Standard Rating Conditions-Low Air Temperature. A test report from an independent laboratory is required to verify procedure compliance. Geothermal swimming pool heat pumps are not required to meet this standard.
- ☐ **R403.11 Portable spas (Mandatory).** The energy consumption of electric-powered portable spas shall be controlled by the requirements of APSP-14.
- ☐ **R403.13 Dehumidifiers (Mandatory)** If installed, a dehumidifier shall conform to the following requirements:
1. The minimum rated efficiency of the dehumidifier shall be greater than 1.7 liters/ kWh if the total dehumidifier capacity for the house is less than 75 pints/day and greater than 2.38 liters/kWh if the total dehumidifier capacity for the house is greater than or equal to 75 pints/day.
 2. The dehumidifier shall be controlled by a sensor that is installed in a location where it is exposed to mixed house air.
 3. Any dehumidifier unit located in unconditioned space that treats air from conditioned space shall be insulated to a minimum of R-2.
 4. Condensate disposal shall be in accordance with Section M1411.3.1 of the Florida Building Code, Residential.
- ☐ **R403.13.1 Ducted dehumidifiers.** Ducted dehumidifiers shall, in addition to conforming to the requirements of Section R403.13, conform to the following requirements:
1. If a ducted dehumidifier is configured with return and supply ducts both connected into the supply side of the cooling system, a backdraft damper shall be installed in the supply air duct between the dehumidifier inlet and outlet duct.
 2. If a ducted dehumidifier is configured with only its supply duct connected into the supply side of the central heating and cooling system, a backdraft damper shall be installed in the dehumidifier supply duct between the dehumidifier and central supply duct.
 3. A ducted dehumidifier shall not be ducted to or from a central ducted cooling system on the return duct side upstream from the central cooling evaporator coil.
 4. Ductwork associated with a dehumidifier located in unconditioned space shall be insulated to a minimum of R-6.

SECTION R404

ELECTRICAL POWER AND LIGHTING SYSTEMS

- ☐ **R404.1 Lighting equipment (Mandatory).** Not less than 90 percent of the lamps in permanently installed luminaires shall have an efficacy of at least 45 lumens-per-watt or shall utilize lamps with an efficacy of not less than 65 lumens-per-watt.

R404.1.1 Lighting equipment (Mandatory). Fuel gas lighting systems shall not have continuously burning pilot lights.

2020 - AIR BARRIER AND INSULATION INSPECTION COMPONENT CRITERIA

TABLE 402.4.1.1
AIR BARRIER AND INSULATION INSPECTION COMPONENT CRITERIA^a

Project Name: East Lake Lot-12-Stetson+Sales Center Street: City, State, Zip: Port St Lucie , FL , Owner: K Hovnanian Homes Design Location: FL, VERO_BEACH_MUNICIPAL_ARPT			Builder Name: K Hovnanian Homes Permit Office: St. Lucie County Permit Number: Jurisdiction:	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 or 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:	Permit #:
Job Information	
Builder: K Hovnanian Homes	Community: Lot: 12
Address:	
City: Port St Lucie	State: FL Zip:
Air Leakage Test Results <i>Passing results must meet either the Performance, Prescriptive, or ERI Method</i>	
<input type="radio"/> PRESCRIPTIVE METHOD -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"/> PERFORMANCE or ERI METHOD -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): 6.000	
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 60%;"> $\frac{\text{CFM}(50)}{\text{Building Volume}} \times 60 \div 7.964636E25 = \text{ACH}(50)$ <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 10px;"></div> <div style="font-size: 24px; font-weight: bold; margin-right: 10px;">PASS</div> </div> <div style="margin-top: 10px;"> <input type="checkbox"/> When ACH(50) is less than 3, Mechanical Ventilation installation must be verified by building department. </div> </div> <div style="width: 35%;"> <p>Method for calculating building volume:</p> <input type="radio"/> Retrieved from architectural plans <input checked="" type="radio"/> Code software calculated <input type="radio"/> Field measured and calculated </div> </div>	
<p>R402.4.1.2 Testing. 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 <i>code official</i>. 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"> 1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures. 2. Dampers including exhaust, intake, makeup air, back draft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures. 3. Interior doors, if installed at the time of the test, shall be open. 4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed. 5. Heating and cooling systems, if installed at the time of the test, shall be turned off. 6. Supply and return registers, if installed at the time of the test, shall be fully open. 	
Testing Company	
<p>Company Name: _____ Phone: _____</p> <p>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.</p> <p>Signature of Tester: _____ Date of Test: _____</p> <p>Printed Name of Tester: _____</p> <p>License/Certification #: _____ Issuing Authority: _____</p>	

*East Lake-Lot-12 Stetson Model w/Sales Center
HVAC Load Calculations*

for

K Hovnanian Homes

Boca Raton, FL 33428



Prepared By:

Oscar L Calleja
Engineered Air LLC
2520 N Andrews Ave. Ext.
Pompano Beach, FL 33064
954-974-7277
Friday, June 10, 2022

Rhvac is an ACCA approved Manual J, D and S computer program.
Calculations are performed per ACCA Manual J 8th Edition, Version 2.50, and ACCA Manual D.



Project Report

General Project Information

Project Title: East Lake-Lot-12 Stetson Model w/Sales Center
Designed By: Oscar Calleja
Project Date: Wednesday, June 08, 2022
Client Name: K Hovnanian Homes
Client City: Boca Raton, FL 33428
Company Name: Engineered Air LLC
Company Representative: Oscar L Calleja
Company Address: 2520 N Andrews Ave. Ext.
Company City: Pompano Beach, FL 33064
Company Phone: 954-974-7277
Company Fax: 954-973-1883

Design Data

Reference City: West Palm Beach, Florida
Building Orientation: Front door faces West
Daily Temperature Range: Medium
Latitude: 26 Degrees
Elevation: 15 ft.
Altitude Factor: 0.999

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	45	42.23	n/a	n/a	70	n/a
Summer:	91	78	56%	50%	75	59

Check Figures

Total Building Supply CFM:	1,682	CFM Per Square ft.:	0.827
Square ft. of Room Area:	2,033	Square ft. Per Ton:	499
Volume (ft ³):	18,409		

Building Loads

Total Heating Required Including Ventilation Air:	30,657 Btuh	30.657 MBH
Total Sensible Gain:	39,263 Btuh	80 %
Total Latent Gain:	9,625 Btuh	20 %
Total Cooling Required Including Ventilation Air:	48,888 Btuh	4.07 Tons (Based On Sensible + Latent)

Notes

Rhvac is an ACCA approved Manual J, D and S computer program.
Calculations are performed per ACCA Manual J 8th Edition, Version 2.50, and ACCA Manual D.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



Load Preview Report

Scope	Has AED	Net Ton	ft ² /Ton	Area	Sens Gain	Lat Gain	Net Gain	Sens Loss	Min Htg CFM	Min Clg CFM	Sys Htg CFM	Sys Clg CFM	Sys Act CFM	Duct Size
Building		4.07	499	2,033	39,263	9,625	48,888	30,657	1,232	1,682	1,232	1,682	1,682	
System 1	No	2.43	663	1,612	24,357	4,795	29,152	21,890	933	1,068	933	1,068	1,068	12x16
Ventilation					880	2,019	2,899	1,374			50	50	50	
Supply Duct Latent						485	485							
Return Duct					0	90	90	0						
Zone 1 - Clg.: 39%, Htg.: 47%				626	9,665	600	10,265	9,700	441	440	441	440	440	8x12
1-Foyer-Great Room				250	4,332	0	4,332	4,172	190	197	190	197	197	2-6
2-Dining Area				200	3,009	0	3,009	4,146	189	137	189	137	137	2-5
3-Kitchen				176	2,324	600	2,924	1,382	63	106	63	106	106	1-6
Zone 2 - Clg.: 61%, Htg.: 53%				986	15,190	1,600	16,790	10,816	492	691	492	691	691	10x14
7-Owner's Suite				196	4,626	400	5,026	2,219	101	210	101	210	210	2-6
8-Owner's WICs				84	1,741	0	1,741	1,663	76	79	76	79	79	1-5
9-Owner's Bath				116	1,009	0	1,009	1,003	46	46	46	46	46	1-4
10-Loft & Stairs				146	1,727	0	1,727	1,555	71	79	71	79	79	1-5
11-Bedroom 2				154	1,927	200	2,127	1,145	52	88	52	88	88	1-5
12-Bedroom 3 & Hall Bath				230	3,162	800	3,962	2,331	106	144	106	144	144	2-5
13-Laundry Room				60	998	200	1,198	899	41	45	41	45	45	1-4
System 2	No	1.64	256	422	14,906	4,831	19,736	8,768	299	614	299	614	614	9x14
Ventilation					1,407	3,231	4,638	2,199			80	80	80	
Zone 1 - Clg.: 73%, Htg.: 79%				195	10,454	800	11,254	5,179	236	475	236	475	475	9x11
4-DISPLAY AREA				195	10,454	800	11,254	5,179	236	475	236	475	475	5-6
Zone 2 - Clg.: 12%, Htg.: 11%				112	1,677	400	2,077	695	32	76	32	76	76	4x4
6-Office #2				112	1,677	400	2,077	695	32	76	32	76	76	1-5
Zone 3 - Clg.: 15%, Htg.: 11%				115	2,177	400	2,577	695	32	99	32	99	99	4x4
5-Office #1				115	2,177	400	2,577	695	32	99	32	99	99	1-6
Sum of room airflows may be greater than system airflow because system has multiple zones.														



System 1 House Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
K Hov Low E SH: Glazing-K Hov Loe E SH, U-value 1.04, SHGC 0.29	88	2,287	0	3,703	3,703
CGI-SLGL-SPLe: Glazing-CGI-SLGLD-SingPane Low-e, ground reflectance = 0.23, U-value 1.03, SHGC 0.27	48	1,236	0	1,065	1,065
K Hov Low E SH: Glazing-Glazing-K Hov Low E Glass, U-value 1.07, SHGC 0.3	19.5	522	0	457	457
7A-4: Glazing-Glass or plastic block, smooth or wide ribs or flutes, no screen, enamel coating, ground reflectance = 0.23, U-value 0.6, SHGC 0.27	12	180	0	184	184
CGI-SH-SPLe: Glazing-CGI-SH-SinglePane Lowe, U-value 1.03, SHGC 0.29	48.5	1,248	0	1,802	1,802
11J: Door-Metal - Fiberglass Core, U-value 0.6	45.4	616	0	581	581
13A-4ocs: Wall-Block, board insulation only, R-4 board insulation, open core, siding finish, U-value 0.143	1902	6,798	0	4,433	4,433
12B-0bw: Part-Frame, R-11 insulation in 2 x 4 stud cavity, no board insulation, brick finish, wood studs, U-value 0.097	148.3	288	0	216	216
16B-30: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-30 insulation, U-value 0.032	985.6	788	0	1,607	1,607
22A-pl: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, light dry soil, U-value 0.989	121	2,991	0	0	0
20P-19-c: Floor-Over open crawl space or garage, Passive, R-19 blanket insulation, carpet covering, U-value 0.05	400	501	0	221	221
Subtotals for structure:		17,455	0	14,269	14,269
People:	4		800	800	1,600
Equipment:			1,400	4,200	5,600
Lighting:	100			341	341
Ductwork:		1,799	575	3,471	4,047
Infiltration: Winter CFM: 46, Summer CFM: 0		1,261	0	0	0
Ventilation: Winter CFM: 50, Summer CFM: 50		1,374	2,019	880	2,899
AED Excursion:		0	0	397	397
System 1 House Load Totals:		21,890	4,795	24,357	29,152

Check Figures

Supply CFM:	1,068	CFM Per Square ft.:	0.663
Square ft. of Room Area:	1,612	Square ft. Per Ton:	663
Volume (ft³):	14,541		

System Loads

Total Heating Required Including Ventilation Air:	21,890 Btuh	21.890 MBH
Total Sensible Gain:	24,357 Btuh	84 %
Total Latent Gain:	4,795 Btuh	16 %
Total Cooling Required Including Ventilation Air:	29,152 Btuh	2.43 Tons (Based On Sensible + Latent)

Notes

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Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



System 2 Sales Ctr-Mini-Split Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
CGI-SLGL-Gray: Glazing-CGI-SLGL Doors-Low-e, U-value 1.03, SHGC 0.29	128	3,296	0	5,682	5,682
13A-4ocs: Wall-Block, board insulation only, R-4 board insulation, open core, siding finish, U-value 0.143	507.6	1,814	0	1,184	1,184
22A-pl: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, light dry soil, U-value 0.989	59	1,459	0	0	0
Subtotals for structure:		6,569	0	6,866	6,866
People:	8		1,600	1,600	3,200
Equipment:			0	4,000	4,000
Lighting:	300			1,023	1,023
Ductwork:		0	0	0	0
Infiltration: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Ventilation: Winter CFM: 80, Summer CFM: 80		2,199	3,231	1,407	4,638
AED Excursion:		0	0	9	9
System 2 Sales Ctr-Mini-Split Load Totals:		8,768	4,831	14,906	19,736

Check Figures

Supply CFM:	614	CFM Per Square ft.:	1.455
Square ft. of Room Area:	422	Square ft. Per Ton:	256
Volume (ft³):	3,868		

System Loads

Total Heating Required Including Ventilation Air:	8,768 Btuh	8.768 MBH
Total Sensible Gain:	14,906 Btuh	76 %
Total Latent Gain:	4,831 Btuh	24 %
Total Cooling Required Including Ventilation Air:	19,736 Btuh	1.64 Tons (Based On Sensible + Latent)

Notes

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All computed results are estimates as building use and weather may vary.

Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



Equipment Data - System 1 - House

Cooling

System Type:	Air Source Heat Pump
Outdoor Model:	GSZ160361B*
Indoor Model:	ASPT37B14A*
Tradename:	GSZ16
Outdoor Manufacturer:	GOODMAN
Description:	Air Source Heat Pump
AHRI Reference No.:	201667795
Nominal Capacity:	33,600
Adjusted Capacity:	33600
Adjusted Sensible Capacity:	25200
Adjusted Latent Capacity:	8400
Efficiency:	15 SEER

Heating

System Type:	Air Source Heat Pump
Model:	GSZ160361B*
Tradename:	GSZ16
Manufacturer:	GOODMAN
Description:	Air Source Heat Pump
Capacity:	34,600
Efficiency:	8.5 HSPF

This system's equipment was selected in accordance with ACCA Manual S.

Manual S equipment sizing data: SODB: 91F, SOWB: 78F, WODB: 45F, SIDB: 75F, SIRH: 50%, WIDB: 70F, Sen. gain: 24,357 Btuh, Lat. gain: 4,795 Btuh, Sen. loss: 21,890 Btuh, Entering clg. coil DB: 75.8F, Entering clg. coil WB: 63.4F, Entering htg. coil DB: 68.7F, Clg. coil TD: 20F, Htg. coil TD: 20F, Req. clg. airflow: 1068 CFM, Req. htg. airflow: 933 CFM



Equipment Data - System 2 - Sales Ctr-Mini-Split

Cooling

System Type:	Air Source Heat Pump
Outdoor Model:	3MXS24RMVJUA
Indoor Model:	(2)-CTXS07 + (1) FTXS12
Tradename:	MULTIZONE VAR SPEED
Outdoor Manufacturer:	DAIKIN
Indoor Manufacturer:	DAIKIN
Description:	Air Source Heat Pump
Comment:	INVERTER VARIABLE SPEED
AHRI Reference No.:	205663351
Nominal Capacity:	24,000
Adjusted Capacity:	24000
Adjusted Sensible Capacity:	18000
Adjusted Latent Capacity:	6000
Efficiency:	18 SEER

Heating

System Type:	Air Source Heat Pump
Model:	GSZ160361B*
Tradename:	GSZ16
Manufacturer:	GOODMAN
Description:	Air Source Heat Pump
Capacity:	34,600
Efficiency:	8.5 HSPF

This system's equipment was selected in accordance with ACCA Manual S.

Manual S equipment sizing data: SODB: 91F, SOWB: 78F, WODB: 45F, SIDB: 75F, SIRH: 50%, WIDB: 70F, Sen. gain: 14,906 Btuh, Lat. gain: 4,831 Btuh, Sen. loss: 8,768 Btuh, Entering clg. coil DB: 77.1F, Entering clg. coil WB: 64.9F, Entering htg. coil DB: 63.3F, Clg. coil TD: 20F, Htg. coil TD: 20F, Req. clg. airflow: 614 CFM, Req. htg. airflow: 299 CFM



Manual S Performance Data - System 1 - House

Loads and Design Conditions

Cooling:

Outdoor Dry Bulb:	0	Sensible Gain:	24,357
Outdoor Wet Bulb:	78	Latent Gain:	4,795
Indoor Dry Bulb:	75	Total Gain:	29,152
Indoor RH:	50	Load SHR:	0.84
Supply Airflow:	0	Entering Dry Bulb:	0
		Entering Wet Bulb:	0

Heating:

Outdoor Dry Bulb:	45	Sensible Loss:	21,890
Indoor Dry Bulb:	70	Entering Dry Bulb:	68.7
Indoor RH:	40	Supply Airflow:	55,981

Equipment Performance Data at System Design Conditions

This system's equipment was selected in accordance with ACCA Manual S.

Cooling:

Model Type: Air Source Heat Pump, Outdoor Model: GSZ160361B*, Indoor Model: ASPT37B14A*
, AHRI Reference Number: 201667795 Nominal Capacity: 33,600, Manufacturer: GOODMAN

Interpolation Results:

		<u>Load</u>	<u>Percent of Load</u>
Sensible Capacity:	25,200	24,357	103%
Latent Capacity:	8,400	4,795	175%
Total Capacity:	33,600	29,152	115%

Heating:

Model Type: Air Source Heat Pump, Model: GSZ160361B*, Nominal Capacity: 34,600, Manufacturer: GOODMAN

Results:

		<u>Load</u>	<u>Percent of Load</u>
Heating Capacity:	34,600	21,890	158%



Manual S Performance Data - System 2 - Sales Ctr-Mini-Split

Loads and Design Conditions

Cooling:

Outdoor Dry Bulb:	0	Sensible Gain:	14,906
Outdoor Wet Bulb:	78	Latent Gain:	4,831
Indoor Dry Bulb:	75	Total Gain:	19,736
Indoor RH:	50	Load SHR:	0.76
Supply Airflow:	0	Entering Dry Bulb:	0
		Entering Wet Bulb:	0

Heating:

Outdoor Dry Bulb:	45	Sensible Loss:	8,768
Indoor Dry Bulb:	70	Entering Dry Bulb:	63.3
Indoor RH:	40	Supply Airflow:	17,925

Equipment Performance Data at System Design Conditions

This system's equipment was selected in accordance with ACCA Manual S.

Cooling:

Model Type: Air Source Heat Pump, Outdoor Model: 3MXS24RMVJUA, Indoor Model: (2)-CTXS07 + (1) FTXS12
, AHRI Reference Number: 205663351 Nominal Capacity: 24,000, Manufacturer: DAIKIN

Interpolation Results:

		<u>Load</u>	<u>Percent of Load</u>
Sensible Capacity:	18,000	14,906	121%
Latent Capacity:	6,000	4,831	124%
Total Capacity:	24,000	19,736	122%

Heating:

Model Type: Air Source Heat Pump, Model: GSZ160361B*, Nominal Capacity: 34,600, Manufacturer: GOODMAN

Results:

		<u>Load</u>	<u>Percent of Load</u>
Heating Capacity:	34,600	8,768	395%