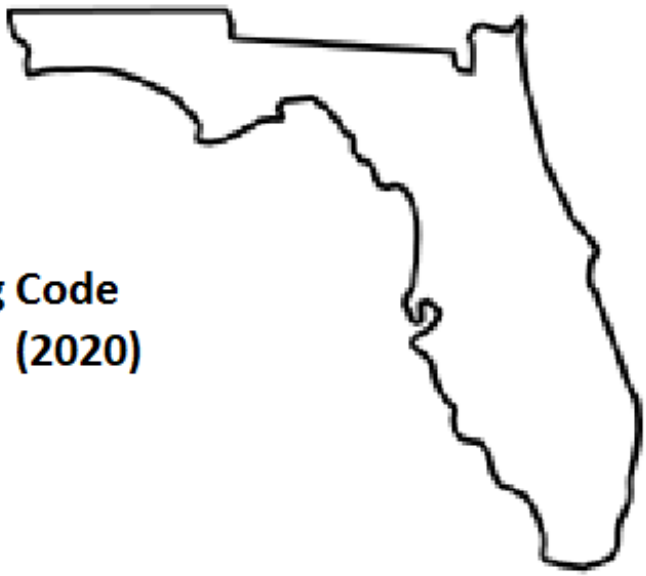
RIGHT - ENERGY® Florida 2020

Compliance Supplement Instruction Guide



Florida Building Code
Seventh Edition (2020)

MiTek WRIGHTSOFT

Right-Suite® Universal
Right-Energy® Florida 2020
Compliance Supplement

Approval for Compliance

Right-Energy Florida 2020 is a module within MiTek Wrightsoft's Right-Suite Universal (RSU) software program that supports demonstration of compliance with the Florida Energy Code Energy Conservation, Seventh Edition (2020) ("Code"). The Code applies to residential buildings and the buildings' sites and associated systems and equipment.

Note also that Right-Energy® Florida 2020 is approved only for *residential, new construction, single-family* compliance. RSU includes non-residential loads and duct design methods. However, the Florida Building Commission specifies distinct procedures for building types other than those listed above and these are not yet supported in Right-Energy® Florida 2020.

Right-Suite® Universal with the Right-Energy® Florida 2020 module may be used to show compliance with the Florida Energy Code only when the following reference documents are readily available to the program user:

- Florida Energy Code
- Energy Simulation Tool Approval: Technical Assistance Manual (TAM 2017-1.0)

Overview

The Florida Energy Code Energy Conservation, Seventh Edition (2020) (Code) allows compliance using a Prescriptive, Simulated Performance or Energy Rating Index (ERI) method. The Prescriptive method is found in the Code (see Related Publications). The Performance method and ERI method provide additional flexibility. The current release of Right-Energy® Florida 2020 supports both the Performance method and ERI method for residential, new construction, single-family buildings only.

The Performance and ERI methods use building modeling software to demonstrate compliance by comparing the calculated energy use of the project building (called the Proposed Design) to that of a building with the same geometry but with reference energy performance characteristics (the Standard Reference Design). The Code (see Related Publications) explains how the Proposed and Standard Reference Designs are determined. If you have questions about how the software models a building feature, refer to the Code.

This manual is a guide to the use of Right-Energy® Florida 2020. The manual assumes working knowledge of RSU operation. In addition, knowledge of the Code is helpful. The Code is extensive and complex. Right-Energy® Florida 2020 will help you efficiently prepare compliance documents, but as the submittal author, you are responsible for their content.

Obtaining and Installing Right-Energy® Florida 2020

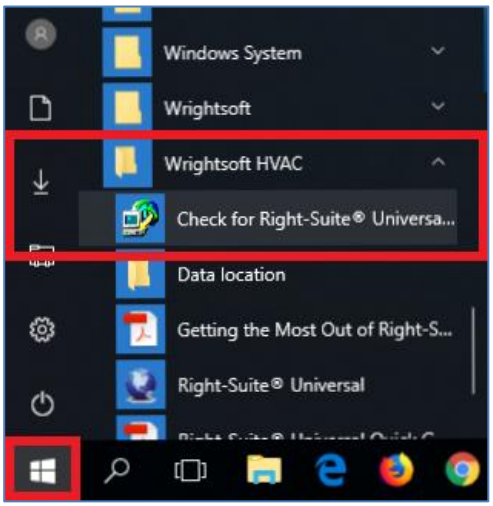
Right-Energy® Florida 2020 is a licensed feature of Right-Suite Universal 2021, meaning you must either add that feature to your existing license or order it if you are a new user. See www.wrightsoft.com for information on ordering and downloading the program. Note that the R405 and R406 versions of Right-Energy Florida are separate licensed features of Right-Suite Universal 2021. Be sure you have the one that you intend to use.

If you are a new user of RSU, you should take some time to learn operation of the program before diving into Florida 2020 compliance. See the Right-Draw® and Load Calculations chapters (at least) of the *RSU Quick Guide* and refer to *Getting the Most Out of Right-Suite® Universal* Chapters 1 – 9. These documents are available under the Help menu choice in RSU (as is this Compliance Supplement). Also useful is the extensive set of training videos available via www.wrightsoft.com/university.

Note that RSU is distributed under several product names. For example, a version for Carrier dealers is published using the ComfortBuilder name. The function of Right-Energy® Florida 2020 is *identical* in these custom versions, so all information in this Compliance Supplement is applicable to all RSU customizations and the Florida Building Commission certification approval applies to all.

You can verify that your installed copy of RSU is current and obtain updates if needed by using the "Check for Right-Suite Universal updates" choice in the Wrightsoft HVAC folder of the Windows Start menu, shown below in Figure 1. Folder and application names will differ in customized versions.

Figure 1 - Check for updates in Windows 10.



Note that even if you have a license for Right-Energy® Florida 2020, some compliance-related inputs may not be visible. On the Options menu, the choice "**Right-Energy® UI options | Florida**" must be checked for all inputs to be available. If your project does not require compliance analysis, you may wish to leave this option un-checked.

Related Publications

The Florida Building Commission makes available several publications that document in detail the standards and compliance procedures. These, along with links to the Florida Building Code can be found at the website of the Florida Building Commission. (http://www.FloridaBuilding.org)

2020 Compliance

- *Florida Building Code, Energy Conservation, 7th Edition (2020)* (ISBN: 978-1-60983-695-5) contains the official code adopted by the Florida Building Commission.
- *Energy Simulation Tool Approval Technical Assistance Manual* (TAM-2017-1.0, February 2, 2021) explains the guidelines for approval of the compliance tools (compliance software programs) used to demonstrate compliance with the Florida Building Code (also contains sample compliance forms).

File Locations

RSU places the PDF of the Florida 2020 reports in the same folder as the source RSU project.

For example, for a project named SimpleHouse.rup located in Wrightsoft HVAC, the report PDF file (after running compliance reports) would be:

Wrightsoft HVAC
SimpleHouse-Performance R405 2020.pdf or
SimpleHouse-ERI R406 2017.pdf

Florida 2020 Data in Right-Suite Universal

Right-Suite Universal (RSU) has traditionally been aimed at design tasks – loads calculations and duct layout, for example. In contrast, Florida Building Code 2020 compliance procedures support energy efficiency and embody many carefully crafted rules about analysis assumptions. From the RSU point of view, there are two classes of data --

- ***Equivalent data*** are items that RSU uses and can be also be used for Florida 2020 compliance. Examples include surface areas and HVAC equipment types.
- ***Florida 2020-only data*** are items that are needed for compliance but have no other uses in RSU. A simple example is the project's windows can have impact rated glass. For this situation, new screens or input fields have been added to RSU.

The compliance implications of specific RSU inputs are discussed in the Input Details section of this Supplement. It must be again emphasized that Florida 2020 Compliance procedures are not simple. Care must be used to make sure your RSU project accurately reflects the residence. The report produced by the analysis is the sole information used by building officials for inspection and enforcement. What appears on RSU screens or reports is useful for checking your work but ultimately has no compliance significance unless it is properly represented on the Florida 2020 Compliance reports.

Mandatory Requirements

Note that there are a number of mandatory requirements specified in the Code. These requirements apply when compliance is demonstrated using either Performance or ERI methods. When you start the compliance run, RSU will check that your project complies with the mandatory requirements particular to the selected compliance method. If mandatory requirements fail, they will be noted in the list on the screen along with the Code reference that applies. Some of the mandatory requirements will prevent the compliance from running. Some are allowed under certain circumstances. You should review the referenced Code section to confirm that your project meets these circumstances. There are cases where RSU will model projects that include features that do not satisfy all mandatory requirements. Beware! It is your responsibility to ensure your design meets all of the requirements of the Code, including a Pass from Right-Energy® Florida 2020. See Appendix A. Mandatory Requirements for a list of the mandatory requirements that are checked prior to running the compliance.

Checklist for Compliance Submittal

The forms and documentation needed for compliance submittal include an electronic version of the Compliance reports. The first page of this set of reports is a checklist of the other reports. Supporting documentation that could also be required are the RSU load calculation reports, the roofing material rating from the Cool Roof Rating Council, solar water heating documentation to support a modeled solar fraction, AHRI certified efficiency of cooling, heating and/or water heating equipment, NFRC certified U-factor and Solar Heat Gain Coefficient for windows and skylights, Air Barrier and Insulation Inspection Component Criteria Report, Envelope Leakage Test Report, and Duct Leakage Test Report.

Terminology

Proposed Design. The building that you draw in RSU is called the Proposed Design. The energy use of the Proposed Design is compared to the Standard Reference Design to determine if the building complies with the standards.

Standard Reference Design. Right-Energy® Florida 2020 creates a version of the Proposed Design that meets the minimum requirements of the code and is used to determine the maximum annual energy use for compliance based on total building performance. The Standard Reference Design is compared to the Proposed Design.

RSU will look up the appropriate climate zone based on the Weather Location in the Project Information Screen.

Detailed information about how the Standard Reference Design is established can be found in the *Florida Building Code, Seventh Edition (2020), Energy Conservation*.

To save the Standard Reference Design as a Right-Energy® Florida 2020 project:

1. Select **File | Save As | Alternate Building** from the RSU main menu.
2. In the screen that is displayed, select 'Reference House' as the 'Alternate building' and 'Florida Residential 2020 R405' as the 'Energy code'. You may select another alternate building or energy code from the drop-down lists if you wish.
3. Click the 'OK' button.

Before saving the reference building, if you have unsaved changes to your open project, RSU will prompt you to save it. The new reference design will be saved as an RSU project in the same folder as the original project and opened in RSU. It will have the same name with '_AB3' appended to the original name. For example, if the original project was named 'SimpleHouse.rup', the new (reference) project will be named 'SimpleHouse_AB3.rup'.

Mandatory Requirements.

Projects for the Performance compliance method and ERI method should comply with section R405 and the provisions identified as Mandatory in section R401 through R404 of the Code.

Projects for the Energy Rating Index compliance method have additional requirements as specified in section R406.2 of the Code.

Any requirement that is mandatory (some are modeled, some are not) shouldn't be removed from the proposed building.

Climate Zone. Florida has 2 Climate Zones. The Climate Zone can be found in the Code, Table R301.1, by looking up the county. The Climate Zone determines the measures that are part of the building's Standard Design. In RSU, the Climate Zone is selected automatically based on the Weather Location.

Counties in Florida Climate Zone 1	Broward, Collier, Hendry, Lee, Miami-Dade, Monroe, Palm Beach
Counties in Florida Climate Zone 2	Alachua, Baker, Bay, Bradford, Brevard, Calhoun, Charlotte, Citrus, Clay, Columbia, DeSoto, Dixie, Duval, Escambia, Flagler, Franklin, Gadsden, Gilchrist, Glades, Gulf, Hamilton, Hardee, Hernando, Highlands, Hillsborough, Holmes, Indian River, Jackson, Jefferson, Lafayette, Lake, Leon, Levy, Liberty, Madison, Manatee, Marion, Martin, Nassau, Okaloosa, Okeechobee, Orange, Osceola, Pasco, Pinellas, Polk, Puntam, Santa Rosa, Sarasota, Seminole, St. Johns, St. Lucie, Sumter, Suwannee, Taylor, Union, Volusia, Wakulla, Walton, Washington

Procedures in Brief

This section is a brief guide on how to perform Florida 2020 compliance analysis in Right-Suite Universal (RSU) using the Right-Energy® Florida 2020 module. The goal is to walk through the process without getting into the details. Two other sections follow that provide information from additional viewpoints –

- Step-by-step Example shows how to enter and perform compliance analysis on a simple project.
- Detailed Input Description fully documents all inputs related to Florida 2020 compliance.

There are only two major steps involved in preparing a building for Florida 2020 Code compliance:

1. Enter the building data for the load calculation
2. Enter the energy data for Florida 2020 Code compliance

It will be noted when the procedures differ between the Performance and ERI methods.

Turn on the Right-Energy Florida® user interface

Start a new project in RSU (or open an existing one).

From the **Options** menu at the top of the RSU screen, make sure that '**Right-Energy® UI options | Florida**' is checked (see RSU will also prompt you to turn on the Right-Energy Florida® UI if you try to run compliance without turning on the Florida UI options.

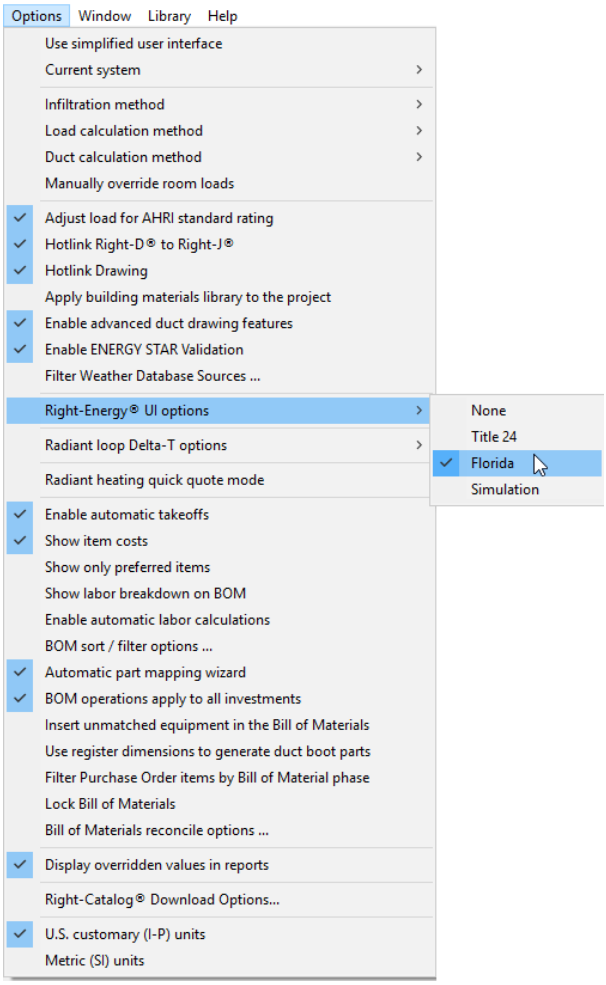
To go back to the normal UI, follow the same steps and select **None**.

Figure 2). This enables some project inputs that are used only for Florida 2020 and disables some project inputs that are not used for Florida 2020.

RSU will also prompt you to turn on the Right-Energy Florida® UI if you try to run compliance without turning on the Florida UI options.

To go back to the normal UI, follow the same steps and select **None**.

Figure 2 - Turn on the Florida specific user interface.



If that option is missing or grey, you may need to update your software or make sure your license has Right-Energy® Florida 2020 enabled. Go to **Help | Licensing** to see your support subscription expiration date (it must be current to update) and licensed features. To add/renew your WSS or add Right-Energy® Florida 2020, contact sales at sales@wrightsoft.com or 1-800-225-8697 ext. 3.

Enter project data

Using Right-Draw and other input screens, enter the description of the residence to be analyzed. Here are the instructions in brief. For detailed instructions, see page 19.

Project Information Screen

1. Building address (including the zip code), Contractor information, front orientation, number of bedrooms, weather location

Right-Draw Construction Screens and Property Sheets

2. Conditioned floor area and average ceiling height
3. Attic/roof details including roofing material
4. Ceilings below attic and vaulted ceiling R-values
5. Wall areas, orientation, and construction details,
6. Door areas and orientation
7. Slab or raised floor area and construction details
8. Window and skylight areas, orientation, U-factor, Solar Heat Gain Coefficient
9. Building overhang and side fin shading

Equipment Screens

10. Mechanical heating and cooling equipment type and efficiency
11. Distribution system location and construction details
12. Domestic water heating system details, including type of water heating equipment, fuel type, efficiency, distribution system details.

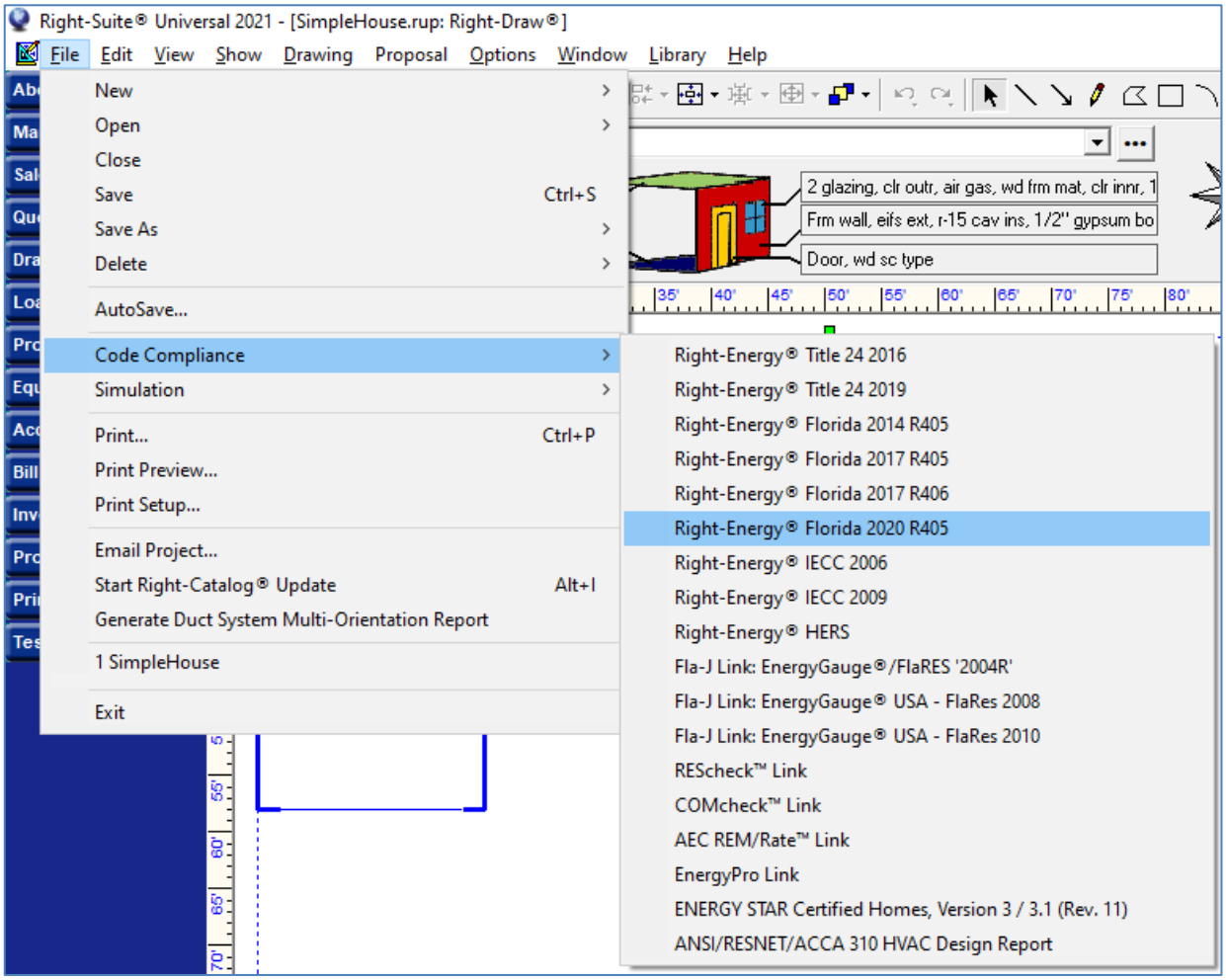
Zone Information Screen

13. Method for providing mechanical ventilation

As discussed in the section *Florida 2020 Data in Right-Suite Universal* on page 7 of this manual, much of the information required for energy calculations is available in RSU so you need enter only standard data that would be typically used for load calculations. The main example of this type of information is surface areas and constructions – the required Right-Energy® Florida 2020 data is derived directly from the Right-Draw drawing and properties.

There are a number of screens that capture information specific to Florida 2020 analysis. These are accessed via the Code Compliance choice on the File menu, see Figure 3.

Figure 3 - Choose the type of compliance.



This choice brings you to the following, depending on compliance method selected, Figure 4 for Performance, or Figure 5 for ERI. The various tabs allow input of Florida 2020 specific information not found on other RSU screens that is used *only* for Florida 2020 compliance. In some cases, default information is provided from elsewhere in RSU, but no data entered here has any effect on other RSU calculations.

See Step-by-Step Example and Detailed Input Description for specifics.

Figure 4 - Compliance Screens for R405 (Performance)

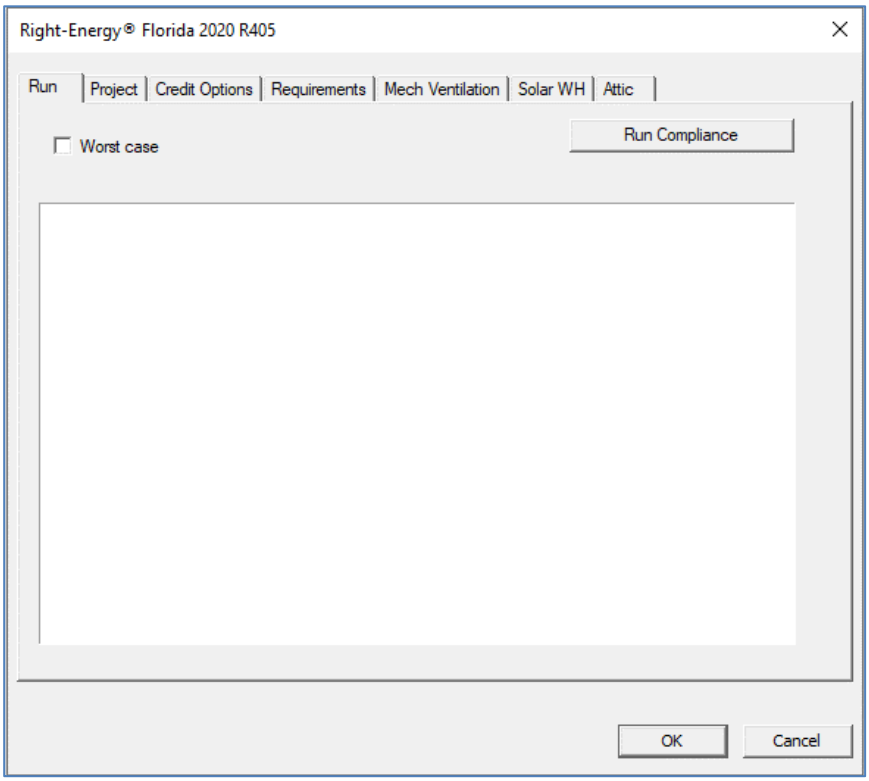
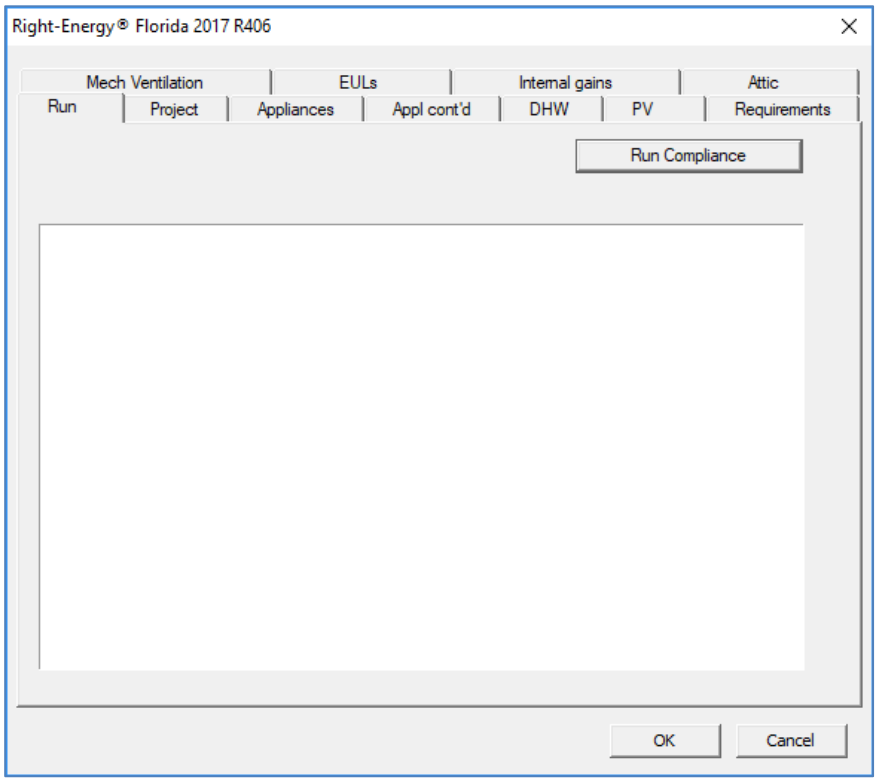


Figure 5 - Compliance Screens for R406 (ERI)



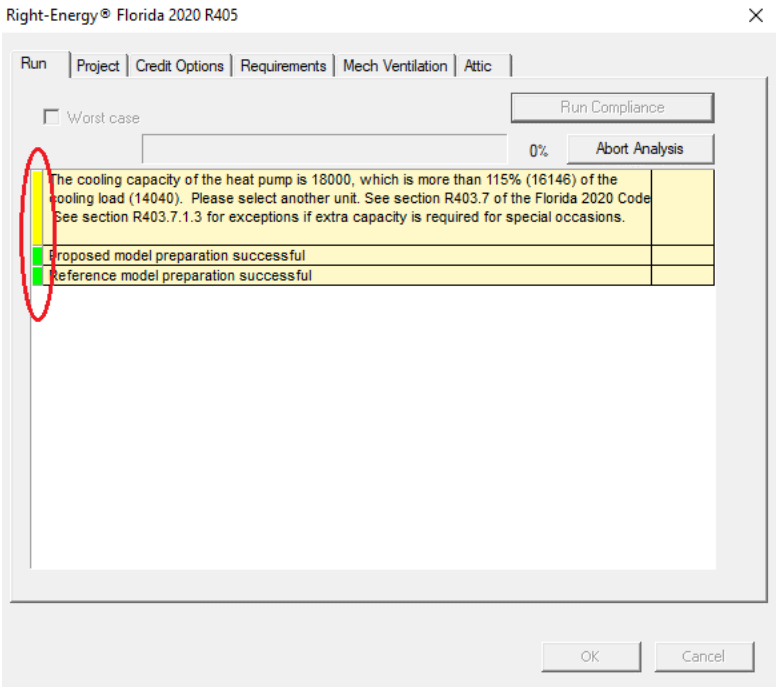
Run Compliance

Once input has been prepared, save your work (via File | Save) and then press Run Compliance on the Run tab of the Right-Energy® Florida 2020 screens. This section will show images from running the Performance method. The Run tab for the ERI method will look the same except the messages may differ due to the different requirements of the code.

At this point, Right-Energy® Florida 2020 gathers information from the RSU project. Right-Energy® Florida 2020 then checks the mandatory requirements. Any error or warnings for the mandatory requirements are shown in the window on the Run tab. Warning messages are shown with a yellow tag, as circled in Figure 6, below. Warnings do not prevent the run from proceeding, but should be investigated (see Appendix A and B). Error messages have a red tag. The run will not proceed if there are errors.

If there are no errors in the mandatory requirements, the compliance run will begin. A small progress bar will appear to keep you informed of run progress.

Figure 6 - Running Performance compliance. ERI compliance will look the same.



When the run is complete, the overall energy model results are displayed in the Results tab. See Figure 7 for example Performance results or Figure 8 for ERI results). PASS or FAIL is shown in large letters in the lower part of this screen.

Figure 7 - Compliance Summary for Performance Compliance.

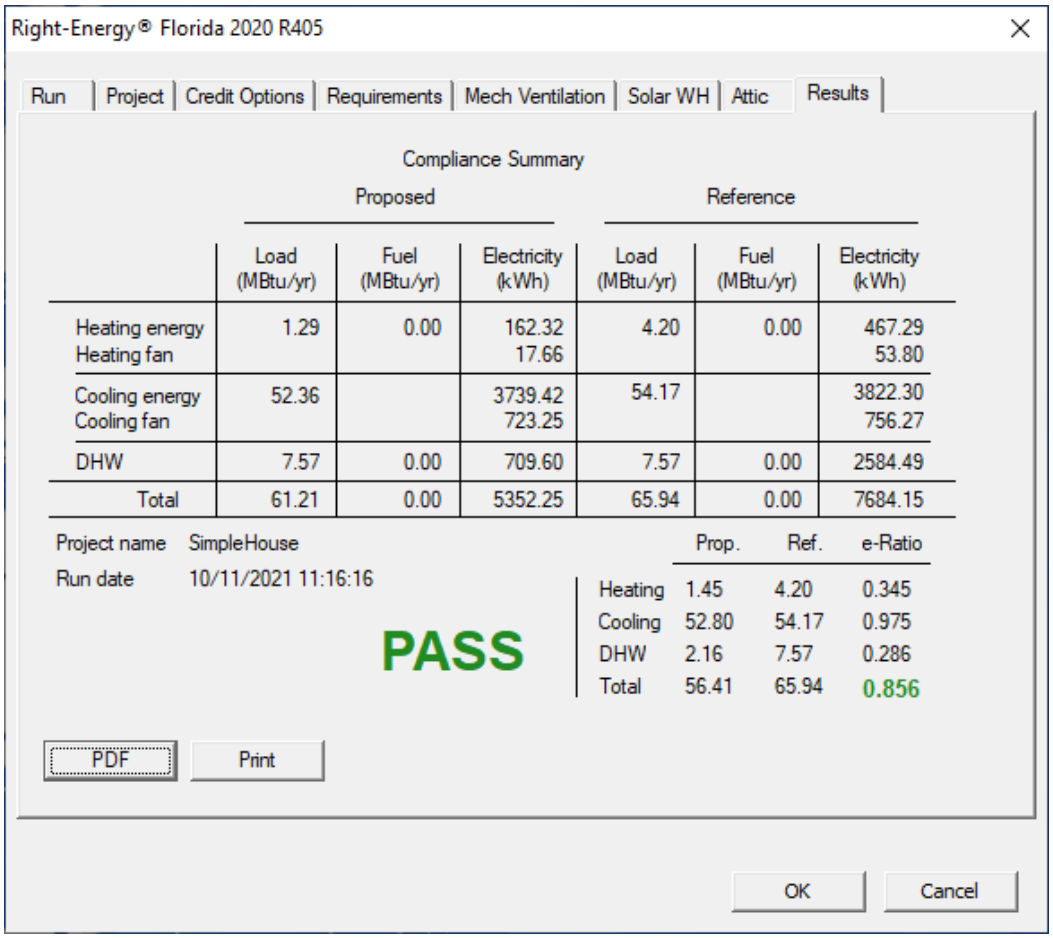
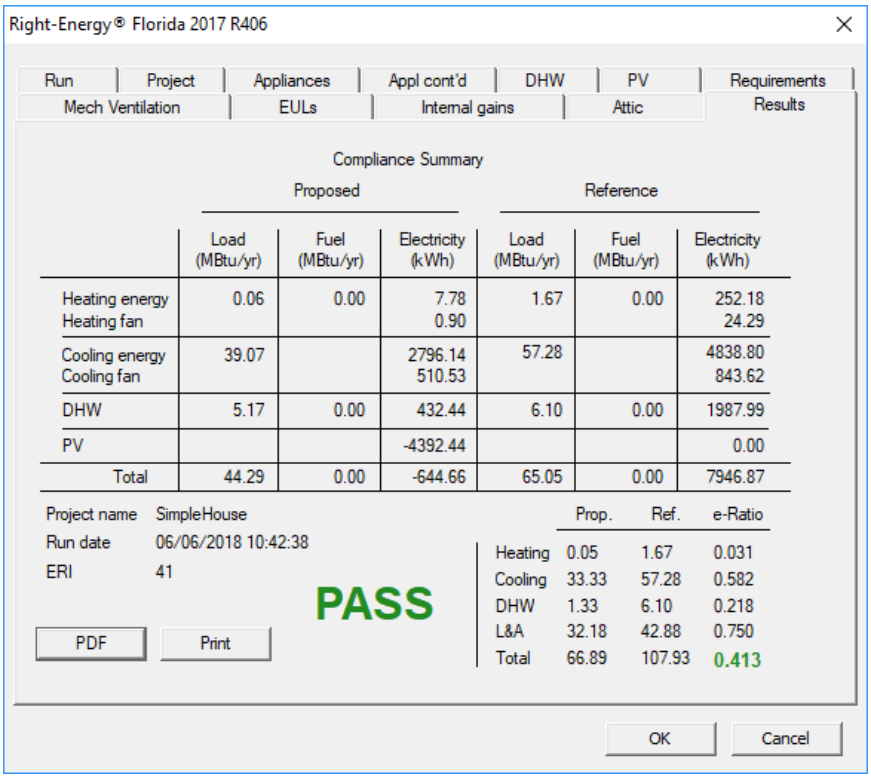
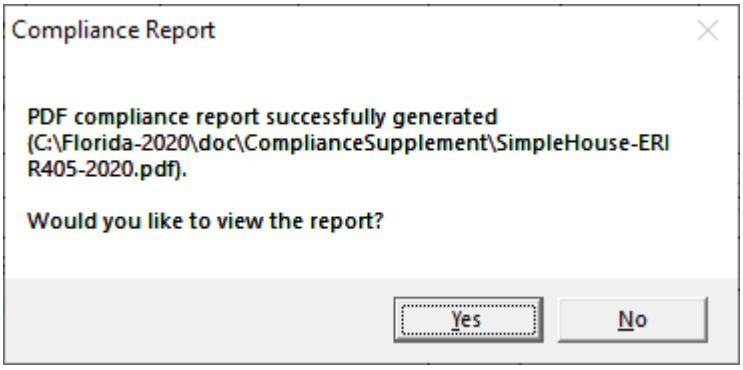


Figure 8 - Compliance Summary for ERI Compliance.



Click on the 'Print' button to generate and print the reports directly. Click on the 'PDF' button to generate, view and print a PDF document of the reports that you can view and print if you have a PDF viewer. The PDF document will be generated in the same folder as the original RSU project (.rup) file. The exact location of the PDF document will appear in the screen below (Figure 9). See Appendix C for an example report.

Figure 9 - After clicking the PDF button.



Investigating errors

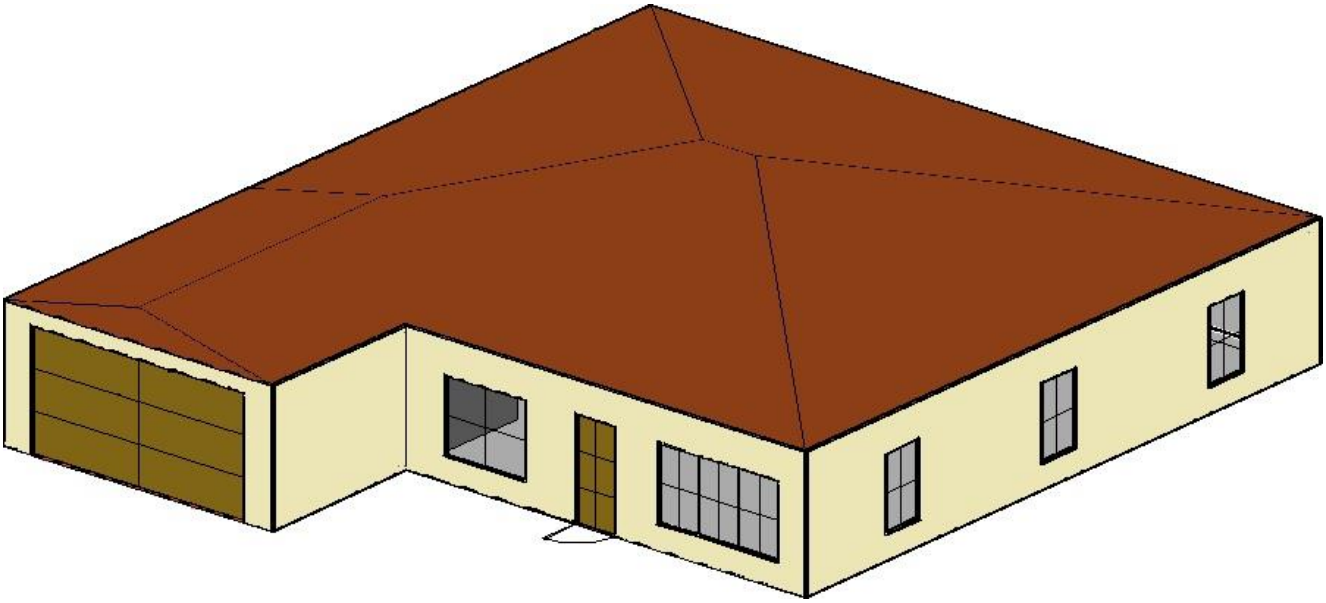
Some errors are self-explanatory and can be immediately corrected via changes to the RSU project. Others may require you to review the Code to determine exactly what needs to be changed.

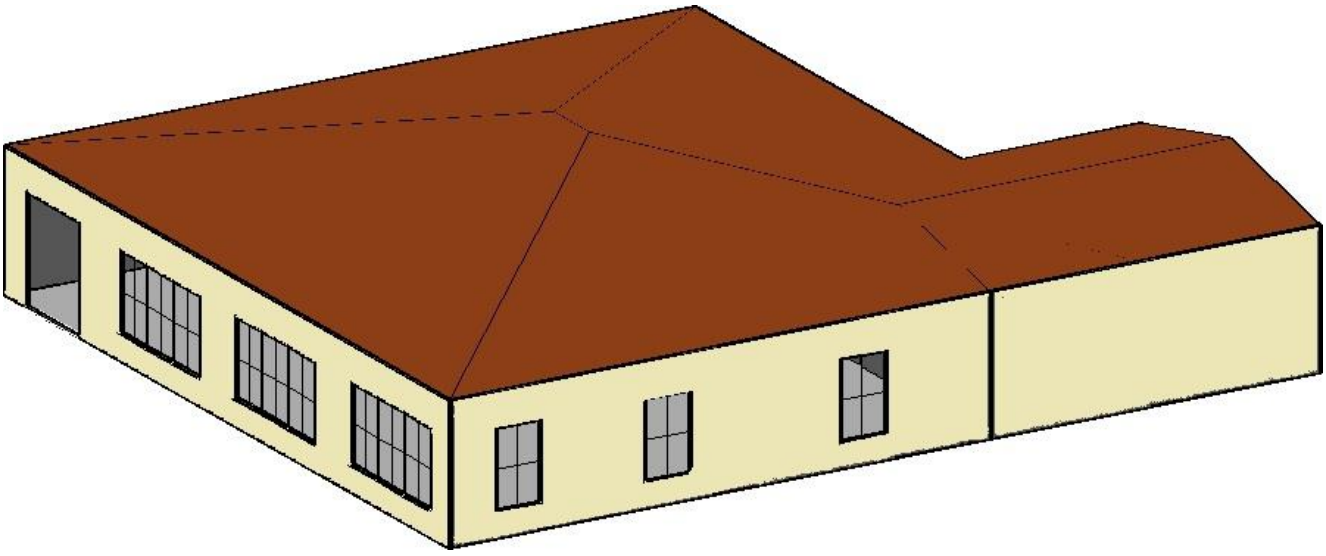
Next steps

Once you have completed a run and achieved PASS, you should review the printed reports (both RSU and Compliance reports) carefully to verify that they accurately represent your project. You should make corrections and re-run as needed.

Step-by-Step Example

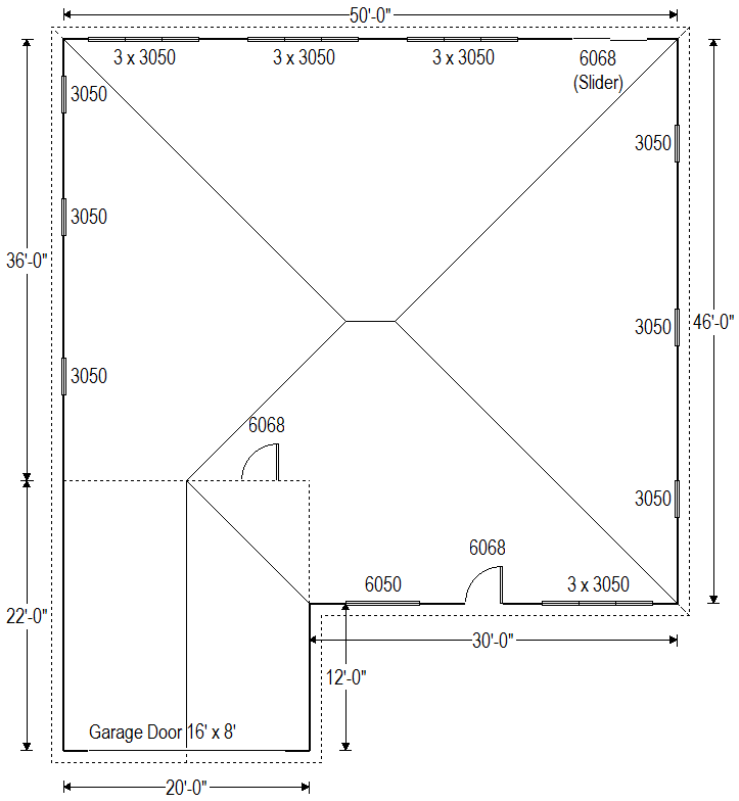
This example will take you through the steps necessary to prepare a project for Florida 2020 Compliance in RSU. The house pictured below has a living area, 9-ft ceilings with an attic above, and a slab-on-grade floor. There is also an unconditioned garage with an attic above. It is located in Tampa.





Example Building Overview

Envelope Area Description	
Component	**Description**
Ceiling height	9 ft
Conditioned floor area	2100 ft²
Conditioned volume	18,900 ft³
Gross areas	
Slab	2100 ft²
Slab perimeter	162 ft
Ceiling	2100 ft², vent attic
Front wall (South)	270 ft²
Front garage wall	180 ft², shaded
Left wall (West)	324 ft²
Left garage wall	90 ft², shaded
Back wall (North)	450 ft²
Right wall (East)	414 ft²
Front door	20 ft²
Door from garage	20 ft²
Garage door	128 ft²
Overhangs	1 ft



Building Material Description (required additions in custom layer mode in **bold**)	
Component	**Description**
Exterior Wall (Main House)	Frame wall, R4 exterior insulation finishing system, R-15 cavity insulation, 2x4 wood framing, 16” on center, 1/2" gypsum board interior finish
Partition Wall (Main House)	Frame wall, 1/2" gypsum board exterior finish, r-15 cavity insulation, 2x4 wood framing, 16" on center, 1/2" gypsum board interior finish
Exterior Wall (Garage)	Frame wall, stucco exterior, 2x4 wood framing, 16" on center, 1/2" gypsum board interior finish
Ceiling (Main House)	Attic ceiling, tile roof, vented attic with radiant barrier, r-38 ceiling insulation, 2x4 wood framing, 16" on center**,** 1/2" gypsum board interior finish
Ceiling (Garage)	Attic ceiling, tile roof, air gap, vented attic with radiant barrier, r-0 ceiling insulation, 2x4 wood framing, 16" on center**,** 1/2" gypsum board interior finish
Floor (all)	Slab floor on grade, light dry soil, no insulation, 80% Carpet / 20% Bare
Doors (3068)	Wood door, solid core
Garage Door	Wood door, overhead wood panel
Windows (all)	U-0.32, SHGC-.25, Shading as follows: Overhang 1’ horizontally out and 1.33’ vertically up

Getting Started

- Start RSU or start a new project from the default template
- Select **Options | Right-Energy® UI options | Florida** from the RSU menu. This will limit and add input fields in RSU to those that pertain to Florida 2020 compliance.

Customer Information

- Select **Show | Project Information** from the main menu
- Enter 'Mr. and Mrs. Henry Wagner' as the Customer name (or any name you wish).
- Enter '1516 Ninth Street' for the Customer Address
- Enter 'Tampa' for the Customer City
- Enter 'FL' for the Customer State
- Enter '33601' for the Customer Zip code
- All other Customer Information fields are optional for the purposes of successfully using Right-Energy® Florida 2020, though may be required for submittals

Contractor/Designer Information

- Select 'Contractor' from the drop-down list in the section below the Customer information. Enter the name and/or company of the contractor that will be building this project. The name will appear on the Right-Energy® Florida 2020 reports. All of the other Contractor/Designer information fields are optional for the purposes of successfully using Right-Energy® Florida 2020, though may be required for submittals. They will appear on the standard RSU reports.

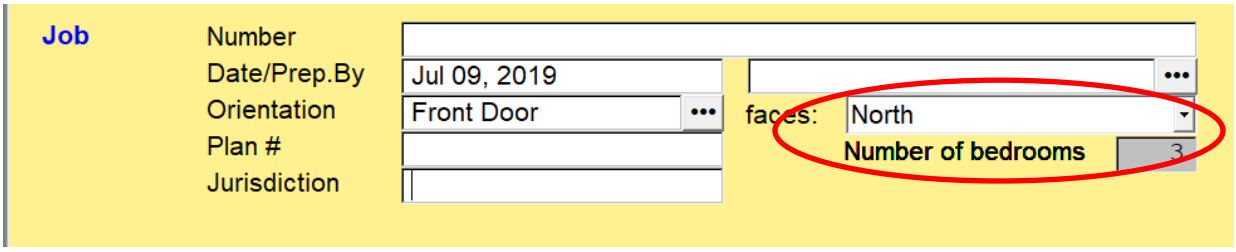
Site

- Check the "Same as customer" box. Enter the County (Hillsborough for this example) and Lot #. These will appear on the Right-Energy® Florida 2020 reports.

Job

- Select the Orientation as the 'Front Door' faces 'North'
- Enter the appropriate Jurisdiction.

Figure 10 - Building orientation



Save

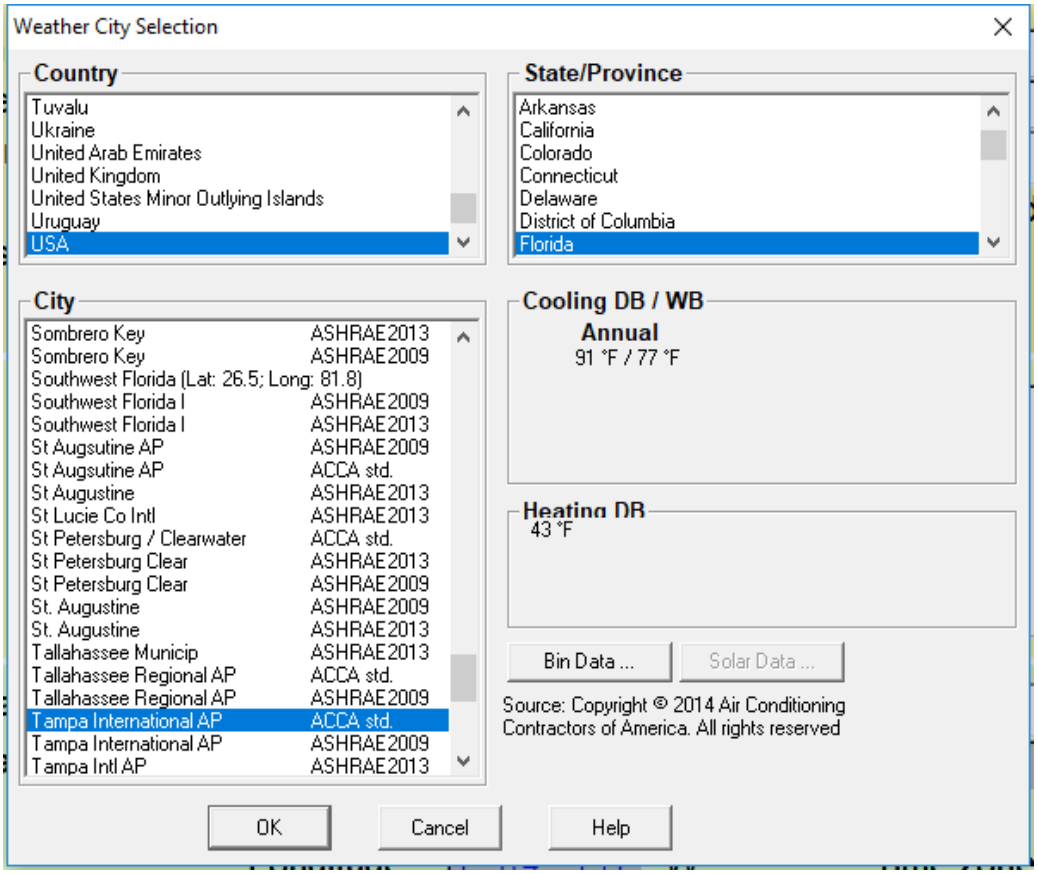
- Select **File | Save As | Project …** to save the project before we go any further. Enter whatever project name you like – SimpleHouse.rup, for example. It is good practice to save the project periodically as you enter data. If something should happen, the saved project can be recovered – saving you from having to re-enter the data.

Weather Location

The weather location is (indirectly) required for Florida 2020 Compliance, since a Manual J load calculation is required and to lookup the Climate Zone.

- Scroll down to the 'Weather location' in the 'Location' section.
- Click on the  button to the right of the 'Weather location' field.
- Select 'Tampa International AP, Florida'. RSU includes weather data from a number of sources. There will be several Tampa choices. Select the one that has 'ACCA std.' next to it (unless you know that your inspector will accept other sources). Click the 'OK' button.

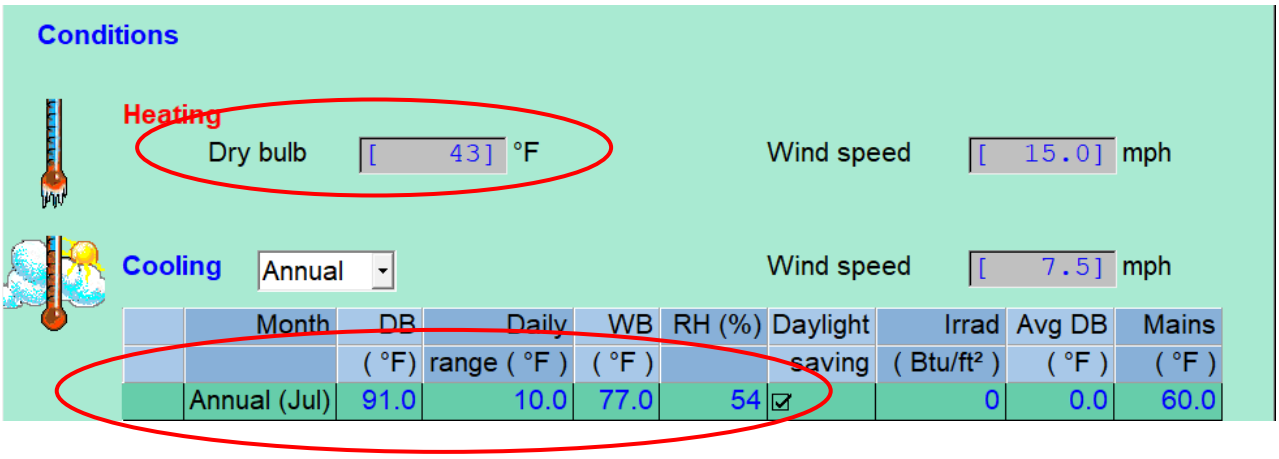
Figure 11 - Weather City Selection



- You may notice the 'Earth temperature city' on the Project Information Screen. This is used by Right-Loop for geothermal loop calculations. You may ignore this for this example.

- Scroll down to the 'Conditions' section (Figure 12) and verify the Heating Dry bulb temperature and Cooling Annual (Jul) Dry Bulb, Daily Range, Wet Bulb/Relative Humidity

Figure 12 - Conditions section of Project Information screen.



- The weather information we have selected is used to calculate the load. However, the Performance method requires hourly weather information to do the energy simulations. Right-Energy® Florida 2020 will automatically select the correct TMY3 hourly weather file based on the Site Zip Code of the project. The selected TMY3 file will be identified in the final compliance reports.

Right-Draw®

- Select **Show | Right-Draw®** to display the Right-Draw screen.
- We'll define constructions first. Find the Default Construction bar at the top of the drawing screen:

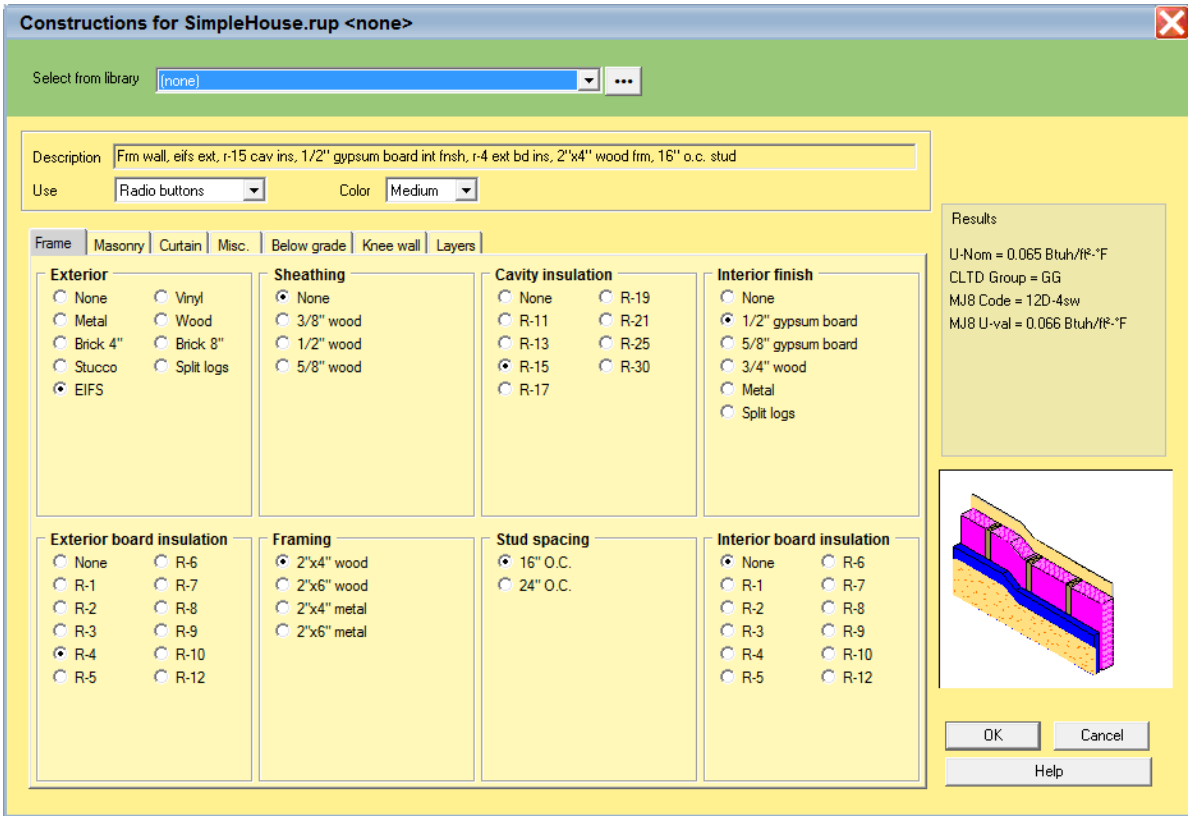
Figure 13 - Default Construction Bar

- Each button points to a different type of material (wall, ceiling, floor, window, and door)
- Default Materials are a *starting point. C*hanges can be made after the building is drawn

Default Wall

- Click on the wall type in the Default Construction bar (Figure 13, page 23, right middle option).
- Select 'Radio buttons' from 'Use' drop down. Select the 'Frame' tab.
- Select the following radio button options:
  - **Color**: Medium
  - **Exterior**: EIFS; **Sheathing**: None
  - **Cavity insulation:** R-15
  - **Interior finish:** ½" gypsum board
  - **Exterior board insulation:** R-4
  - **Framing:** 2" x 4" wood
  - **Stud spacing:** 16" O.C.
  - **Interior board insulation:** None
- Click the 'OK' button to accept this construction and return to the Right-Draw screen.

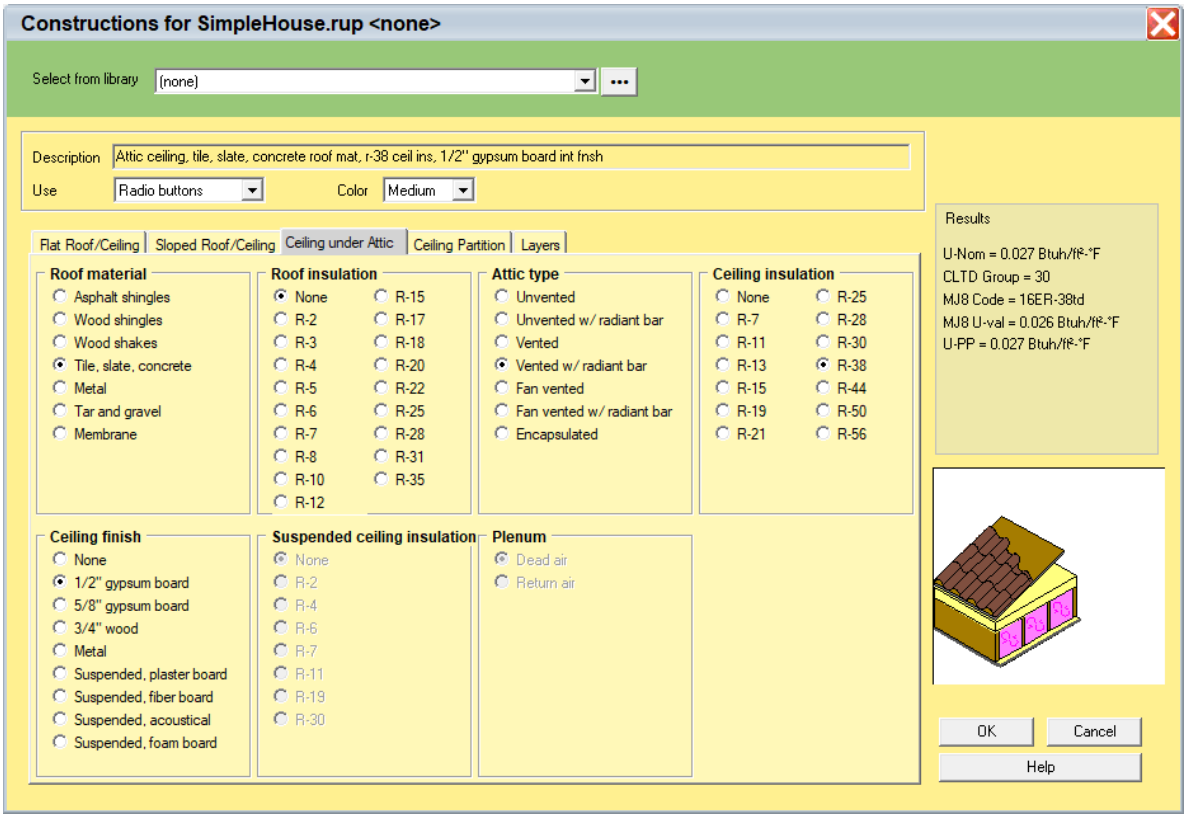
Figure 14 - Default wall construction



Default Ceiling

- Click on the ceiling type in the Default Construction bar (top left)

Figure 15 - Default ceiling construction



- Select 'Medium' from the Color drop-down list.
- Click on the 'Ceiling under Attic' tab
- Select the following radio button options:
  - **Color**: Medium
  - **Roof material:** Tile, slate, concrete
  - **Roof insulation:** None
  - **Attic type:** Vented w/ radiant bar
  - **Ceiling insulation:** R-38
  - **Ceiling finish:** ½" gypsum board
- Click the 'OK' button to accept this construction and return to the Right-Draw screen.

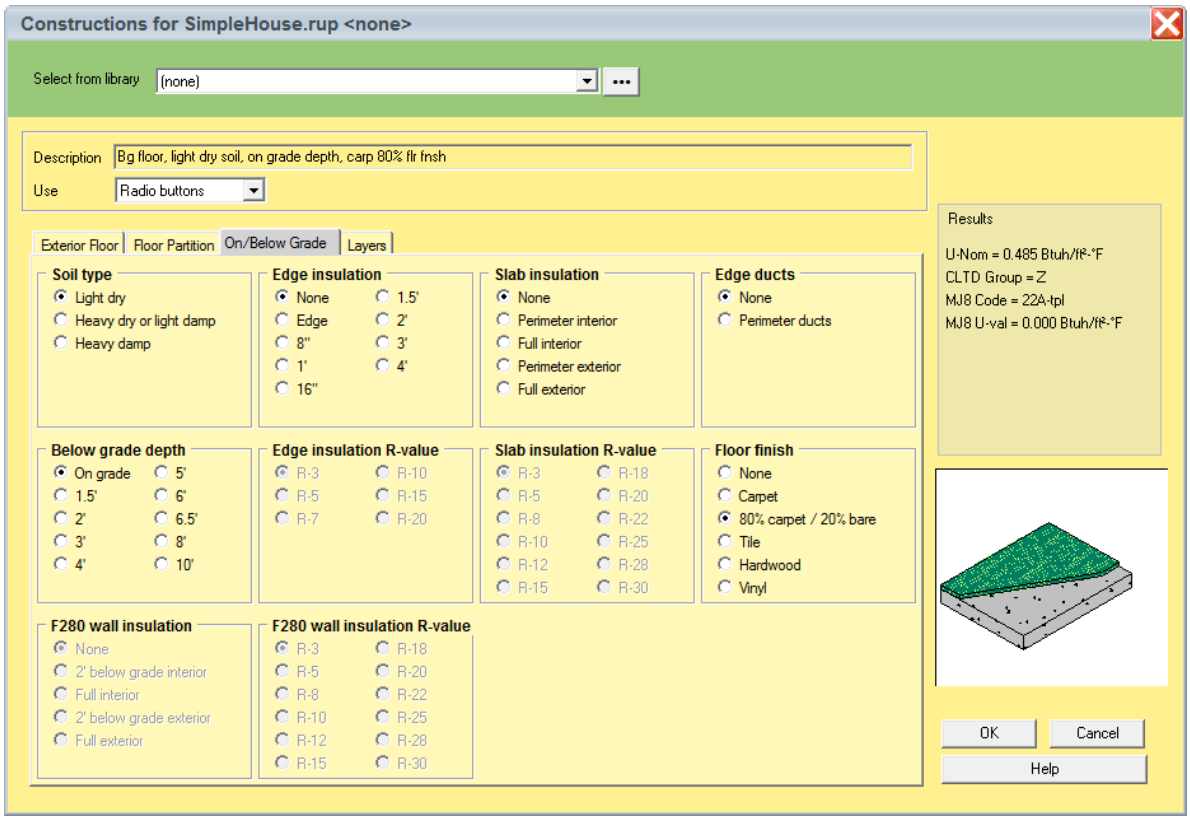
Note that the 'Attic type' above is for the load calculation. The 'Attic Type' in the Input Summary Report will be determined automatically by Right Energy to be either 'Full attic' if the building has an unconditioned attic (a room that has the room type set to 'Uncond Attic') or 'No attic' if the building doesn't have an unconditioned attic.

An 'Encapsulated Attic' is a tightly sealed attic that has foam insulation under the deck and on the gables (and knee walls, when applicable) and is an unconditioned space. See ACCA Manual J Eighth Edition, Appendix 4, Section A4-17 for details.

Default Floor

- Click on the floor type in the Default Construction bar (bottom left).

Figure 16 - Default floor construction

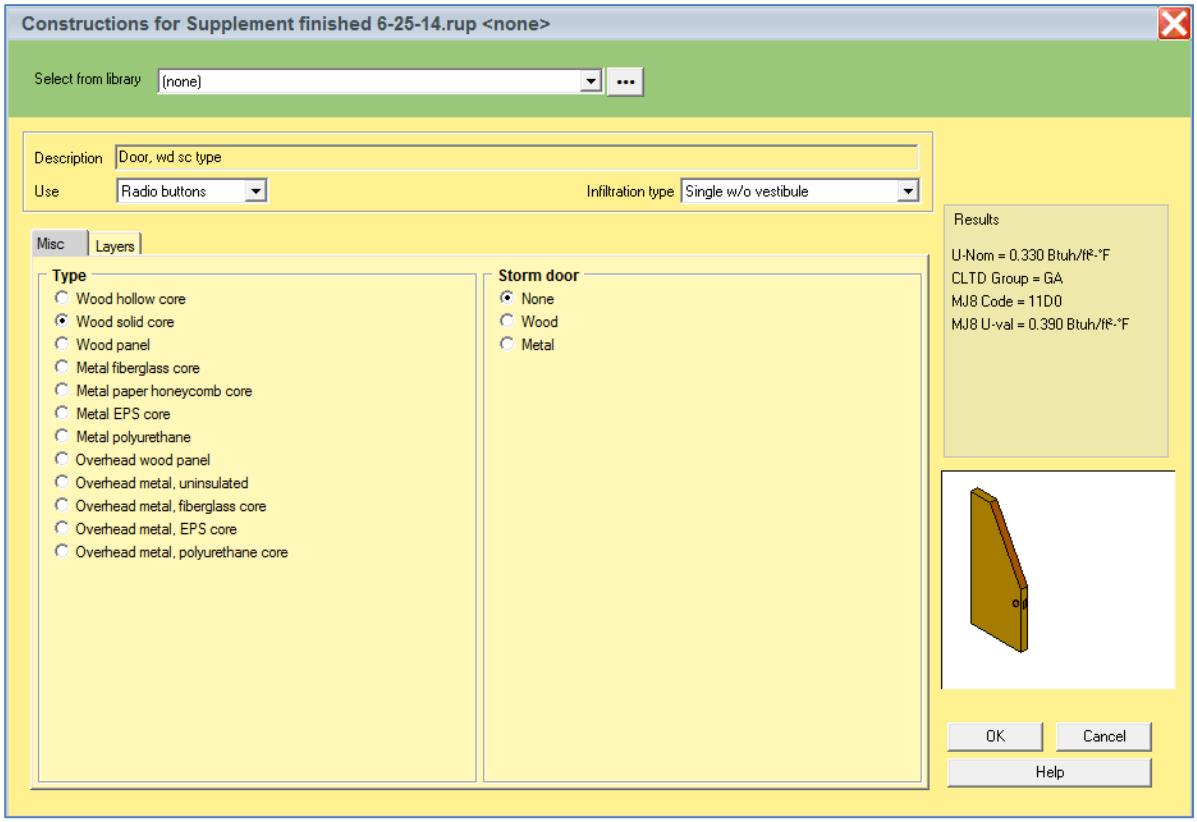


- Select 'Radio buttons' from 'Use' drop down. Select the 'On/Below Grade' tab.
- Select the following radio button options:
  - **Soil type:** Light dry
  - **Below grade depth**: On grade
  - **Edge insulation:** None
  - **Slab insulation:** None
  - **Edge ducts:** None
  - **Floor finish:** 80% carpet / 20% bare
- Click the 'OK' button to accept this construction and return to the Right-Draw screen.

Default Door

- Click on the door type in the Default Construction bar (bottom right).

Figure 17 - Default door construction

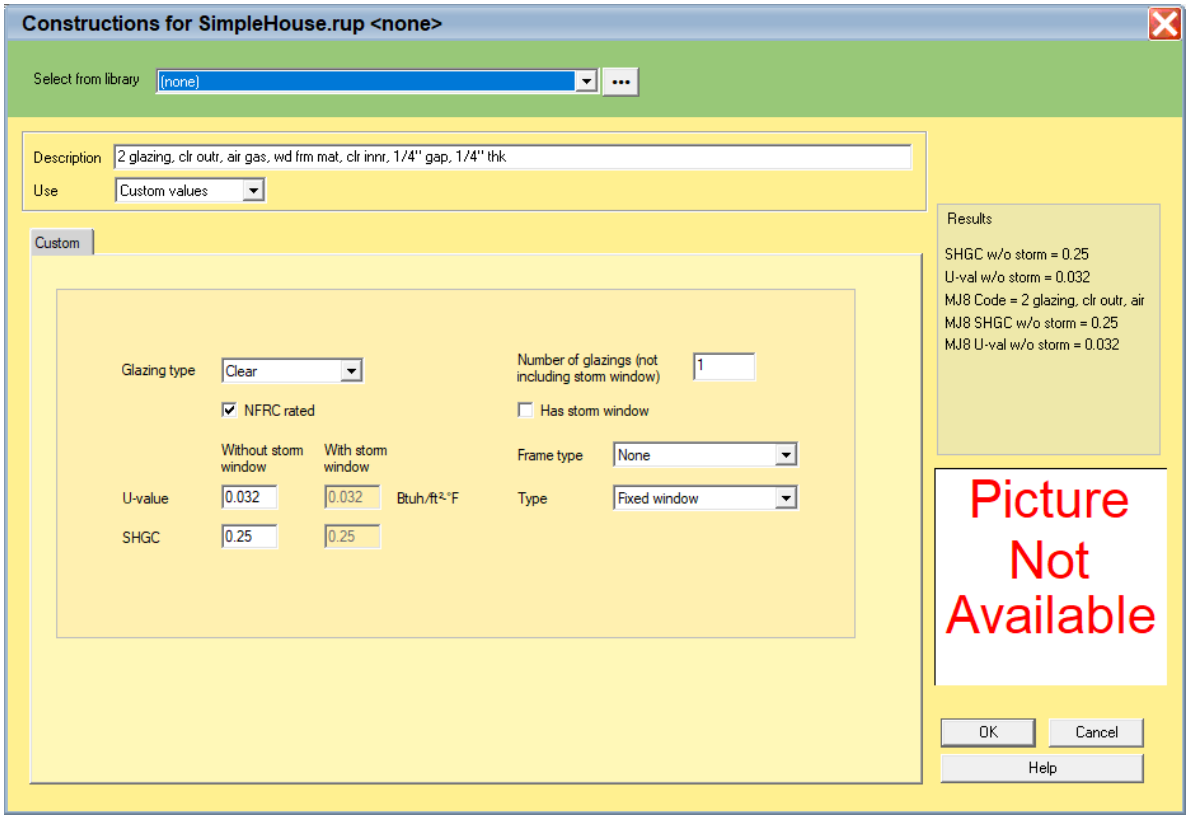


- Select 'Radio buttons' from 'use' drop down. Select the 'Misc' tab.
- Select the following radio button options:
  - **Type:** Wood solid core
  - **Storm Door:** None
- Click the 'OK' button to accept this construction and return to the Right-Draw screen.

Default Window

- Click on the glazing type in the Default Construction bar (middle right)

Figure 18- Default window construction



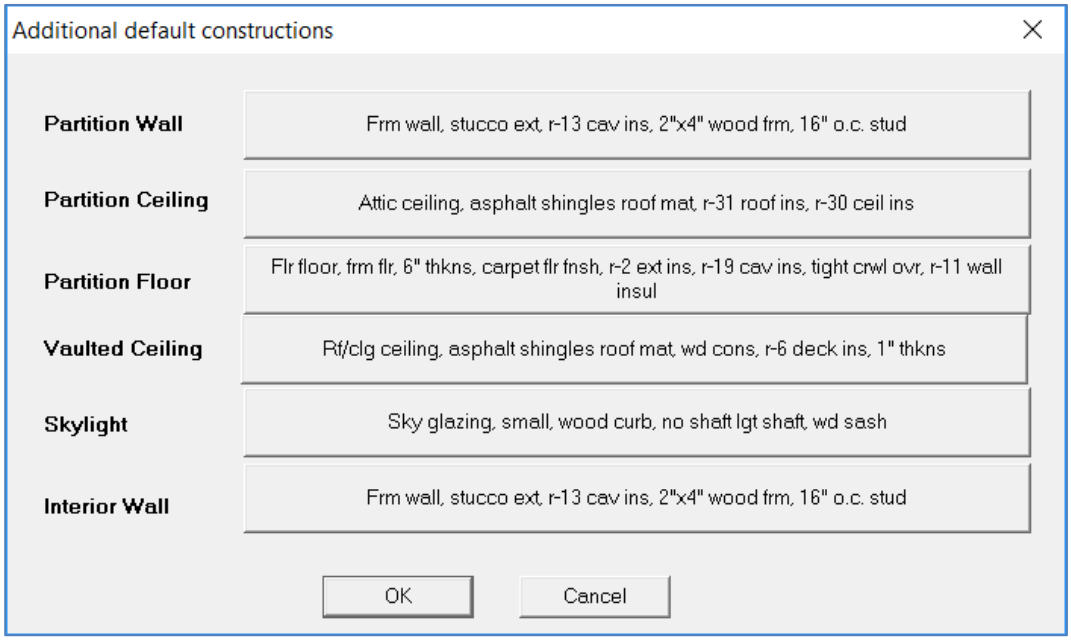
- Select 'Custom values' from the drop-down list at the top of the screen.
- Select 'Clear' for the Glazing type, check the NFRC rated box, enter 0.320 for the U-value, enter 0.25 for the SHGC, enter 1 for the Number of glazings, un-check the Has storm window, and set the Frame type to 'None'.
- Note that you can edit the description (at the top of the screen) when 'Custom values' or 'Custom layers' are selected.
- Click the 'OK' button to accept this construction and return to the Right-Draw screen.

Default Partition Ceiling and Vaulted Ceiling

These last two default constructions are found in a different screen.

- Click on the 'More constructions …' button to the right of the Default Door button.

Figure 19 - More default constructions

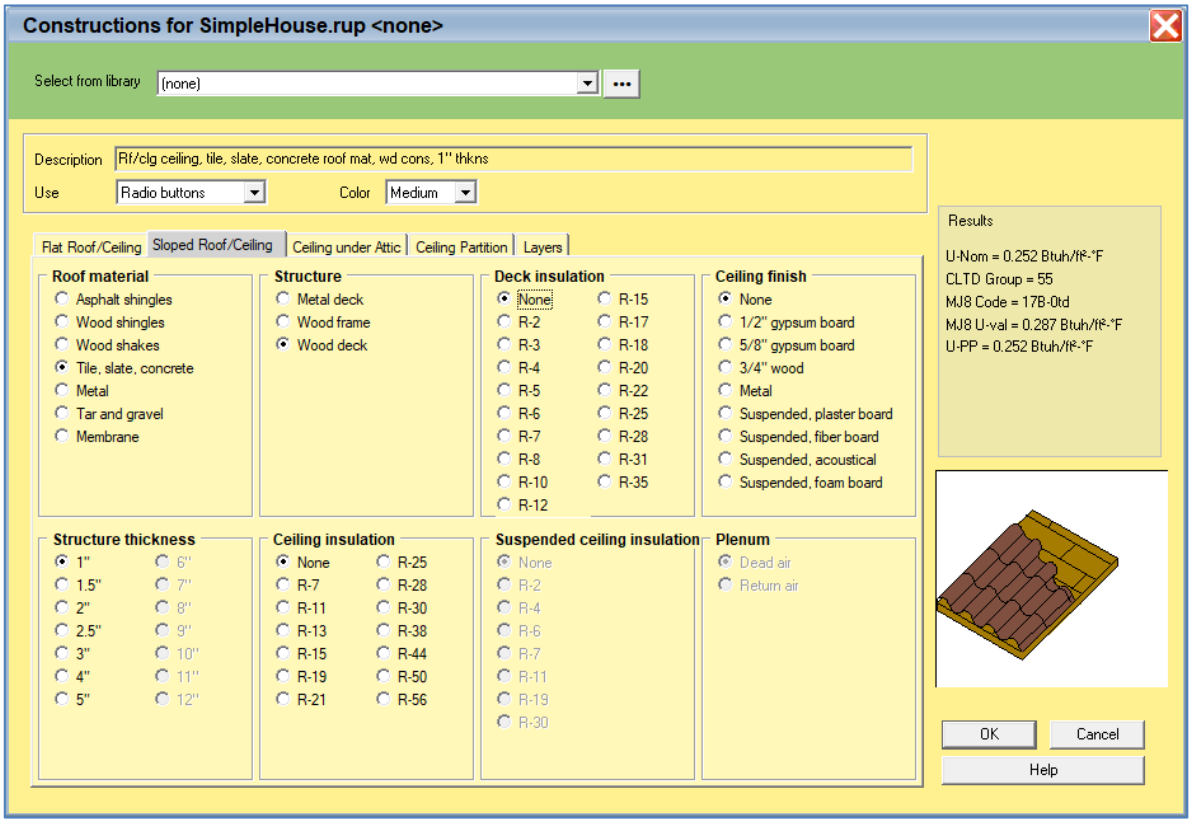


- Click on the Partition Ceiling button and enter the following in the 'Ceiling under Attic' tab:
- Select the following radio button options to be consistent with the ceiling construction on page 26:
  - **Color**: Medium
  - **Roof material:** Tile, slate, concrete
  - **Roof insulation:** None
  - **Attic type:** Vented w/ radiant bar
  - **Ceiling insulation:** R-38
  - **Ceiling finish:** ½" gypsum board
- Click on the 'OK' button to return to the 'Additional default constructions' screen.

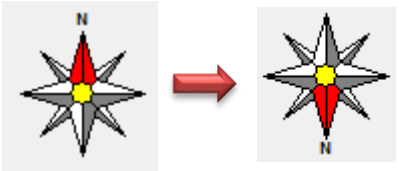
It should look the same as Figure 15 - Default ceiling construction.

- Click on the Vaulted Ceiling button and enter the following in the 'Sloped Roof/Ceiling' tab:
  - **Color**: Medium
  - **Roof material**: Tile, slate, concrete
  - **Structure**: Wood deck
  - **Deck insulation**: None
  - **Ceiling finish**: None
  - **Structure thickness**: 1"
  - **Ceiling insulation**: None
- Click on the 'OK' button to return to the 'Additional default constructions' screen.
- Click on the 'OK' button to return to the Right-Draw screen.

Figure 20 - Vaulted ceiling construction



Orientation

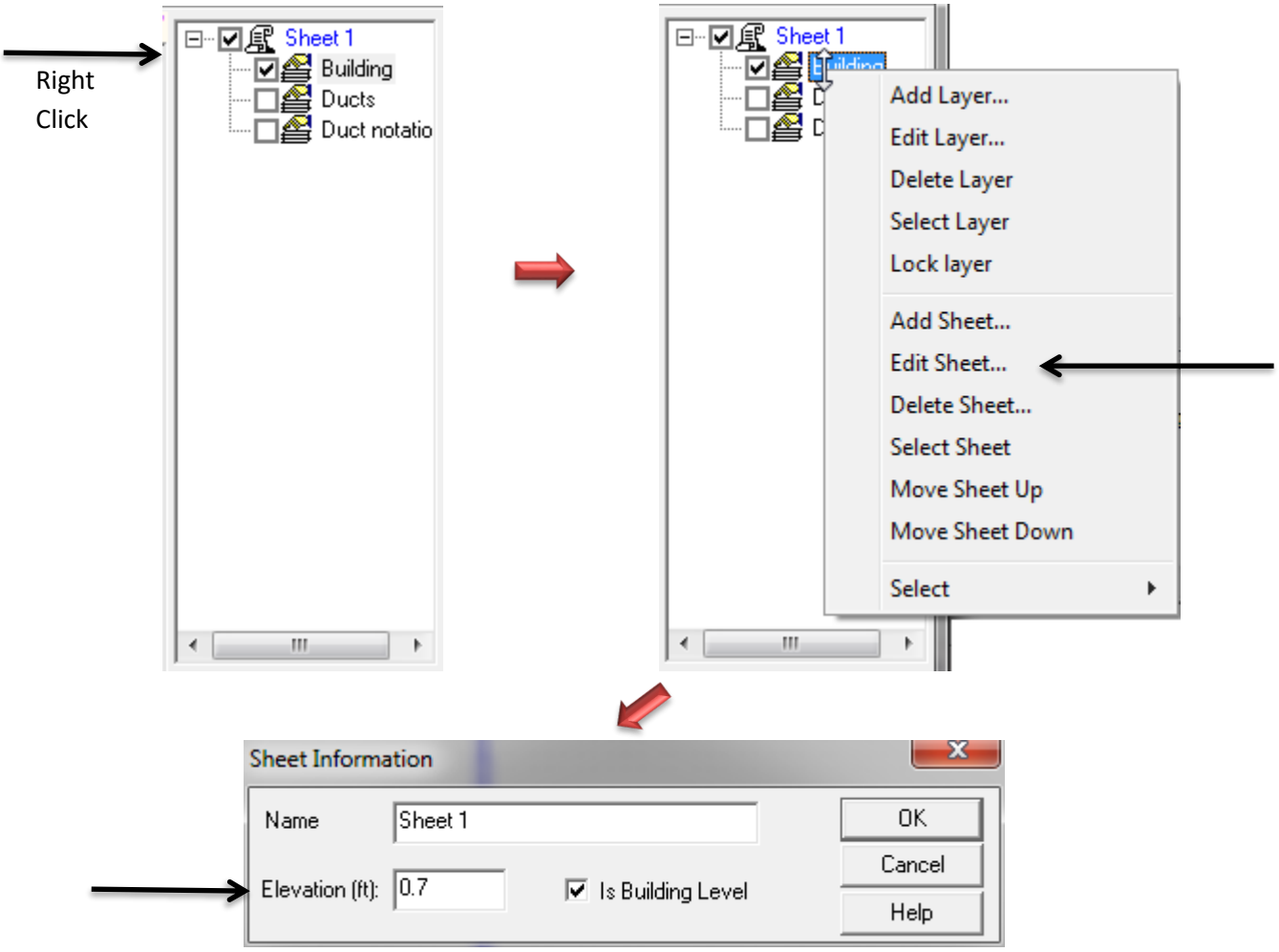


- We'll set the orientation of the building first. Double-click on the bottom point of the compass rosette. This can be done at any time during the design. However, be aware that if we were to do this after the building was drawn, the building would be rotated. That is, the orientation of the windows would be changed by 180 degrees – North-facing windows would face South, East-facing would face West, etc. Setting the orientation now is just a convenience so that our drawing is easy to draw.

Elevation

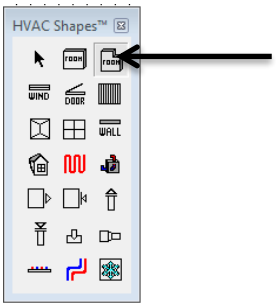
Before we start adding rooms, we need to set the height above grade of the floor in these rooms. **This is an important factor for Florida 2020 purposes.**

- Click the right mouse button on 'Sheet 1' in the list of Sheets and Layers on the right.
- Select 'Edit Sheet …' from the menu that appears.



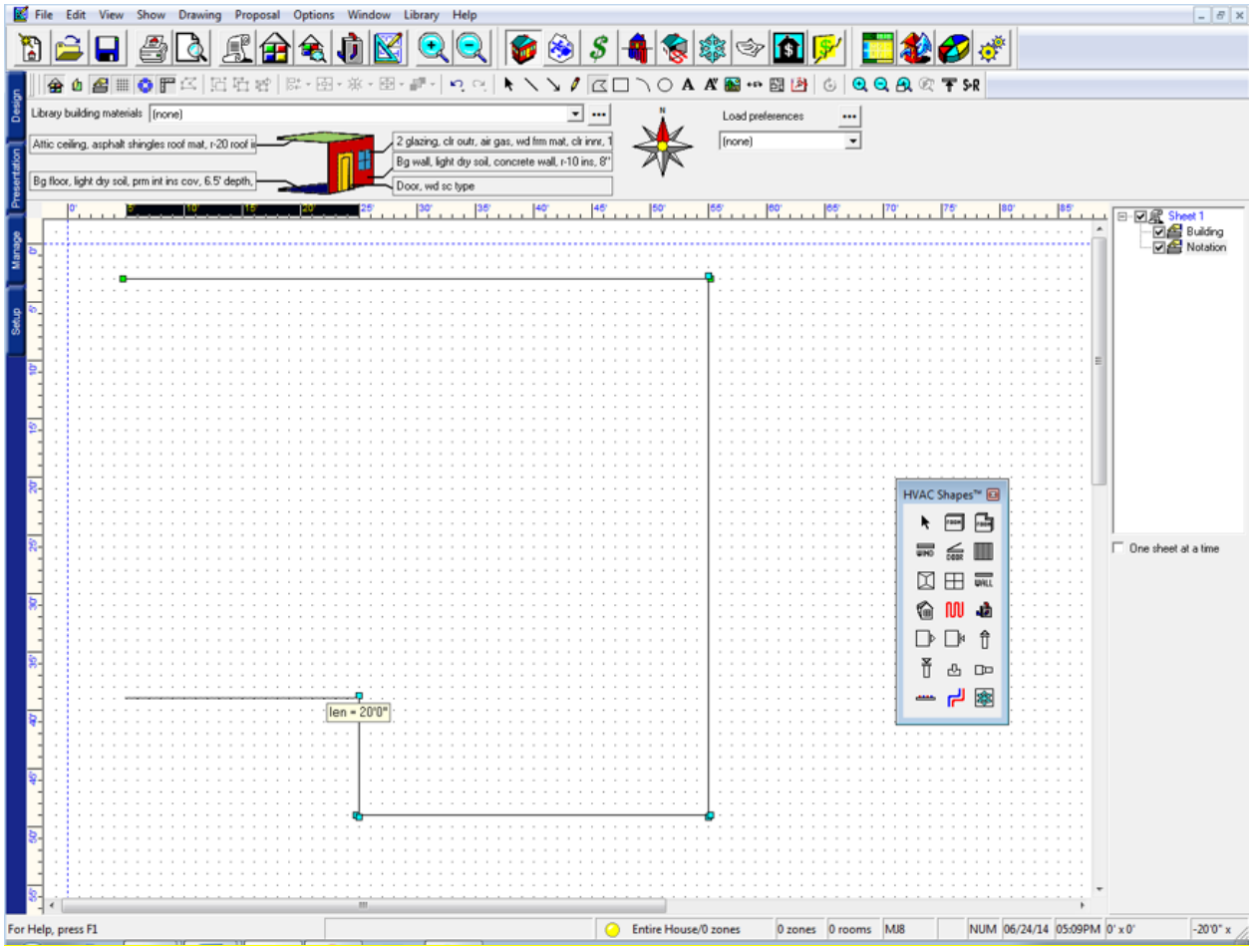
- Enter 0.7 ft for the Elevation.
- Click the 'OK' button to return to the drawing.

Draw the Living Space



- Click on the Room Wall by Wall tool on the HVAC Shapes™ toolbar
  If the HVAC Shapes™ toolbar isn't visible, select **Drawing | Show HVAC Shapes™ toolbox** in the RSU menu.
- Start your cursor in the upper left hand corner of the drawing area
- Left click, hold, and drag to the right. A dimension will apear.
  Go 50' and let go of the left mouse button. This will set your first wall in place.
- No longer holding left click, drag the cursor in a straight line
  (see tip 1 below) down 46' and tap left click. The second wall will be drawn.
- Continue this process: Left 30', Up 10', Left 20', and up 36'
- Once you click on the place you started, this will "close the loop" and you'll be left with your space

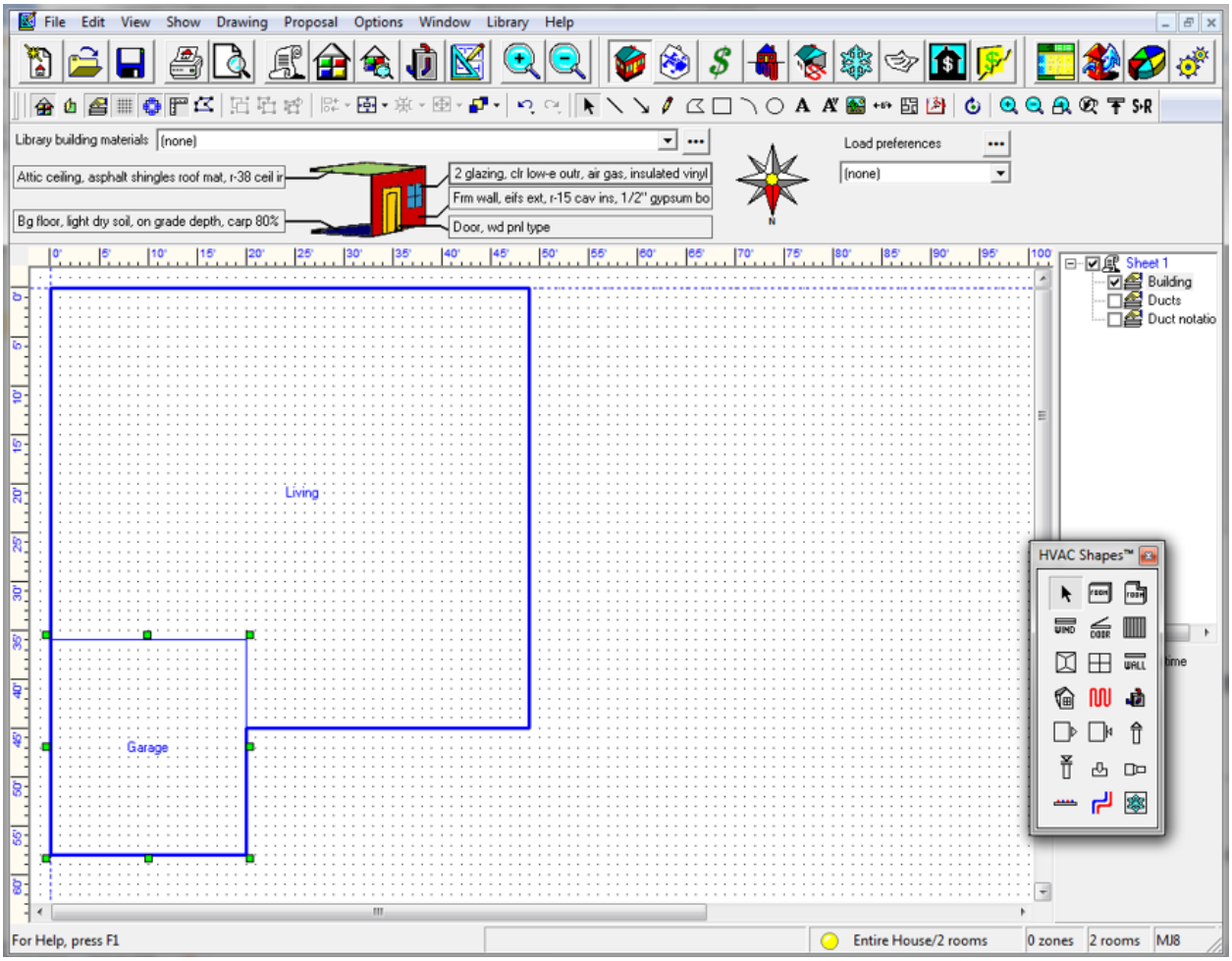
TIP #1: Holding the shift key while you draw linear objects such as walls will lock them into 90 and 45 degree angles.



TIP #2: Right clicking will "close the loop" of the room from wherever you are. This is useful for drawing the very last wall and as a "bail out" (giving you a room you can then delete and start over) if you get turned around while using this tool.

Draw the Garage

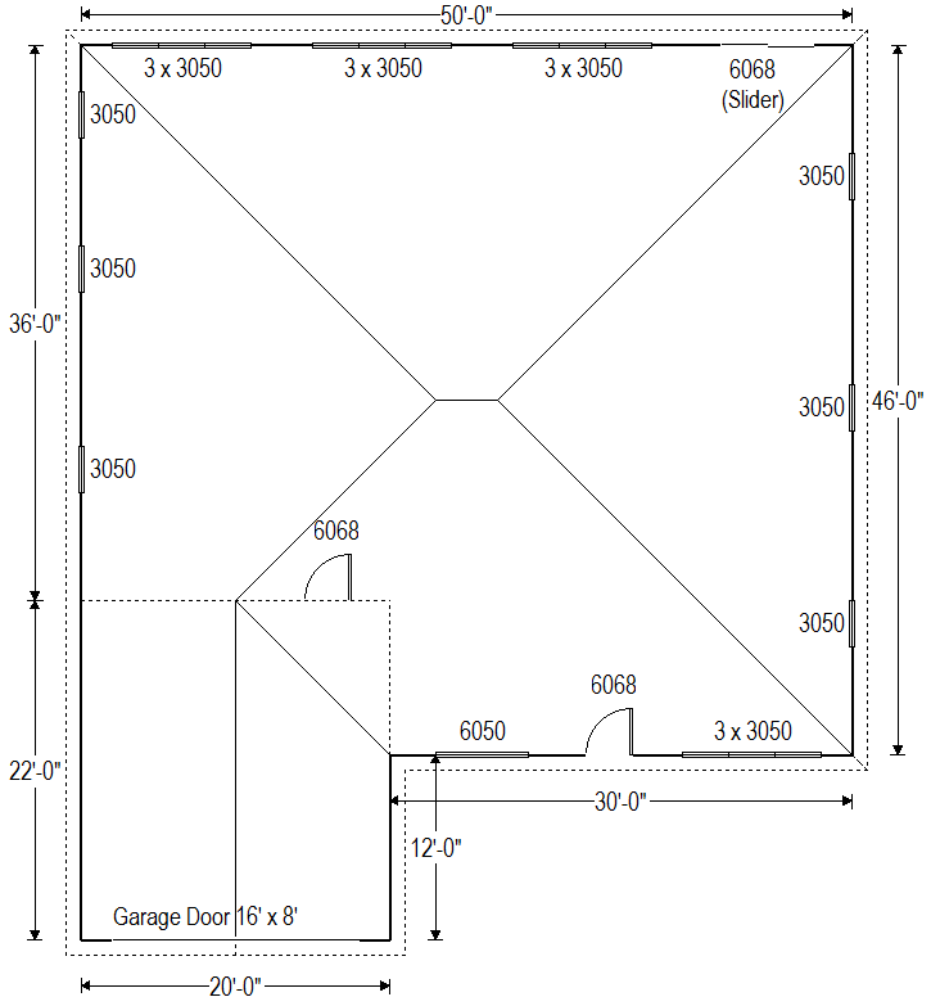
- Click on the Room tool on the HVAC Shapes toolbar and draw a 20’ wide by 22’ high room. Fit it into the notch that we just made.



- To rename the rooms, simply left click on the rooms (not the room names) and start typing.

Draw the Doors and Windows (excluding the overhead garage door)

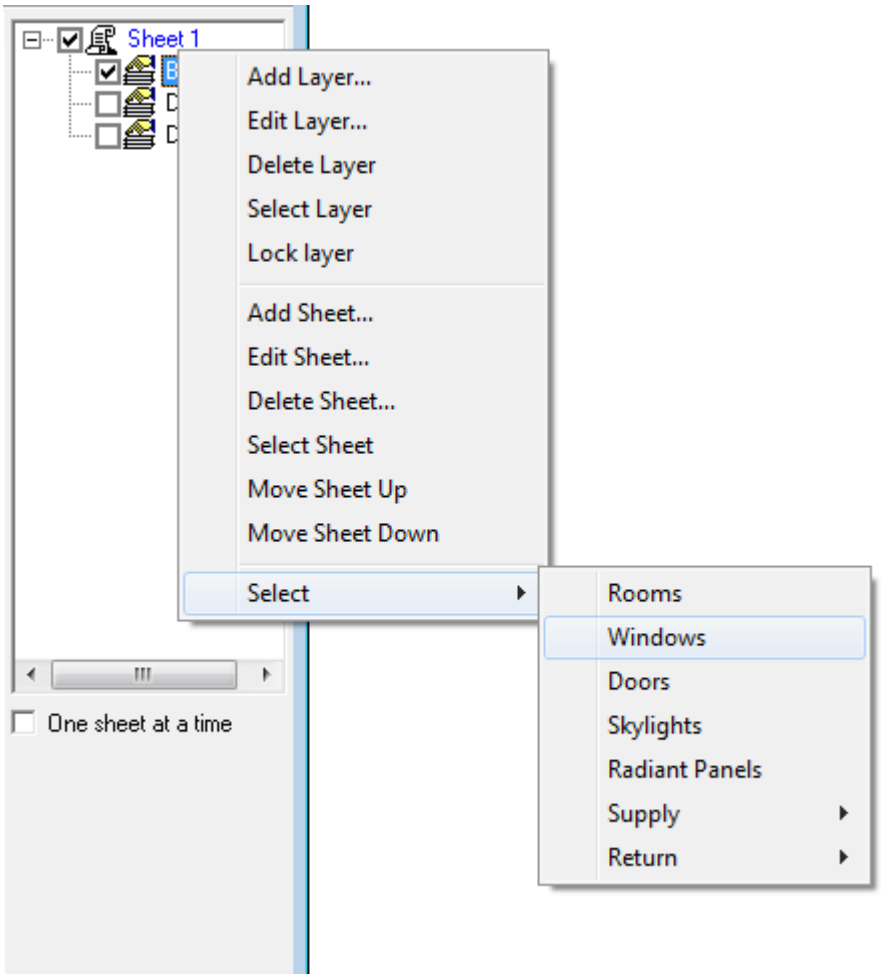
- Simply drag and drop windows from the HVAC Shapes Box wherever there are windows in the plan. We'll add the details like size and shade later.
- There are 4 Windows on the North/Front wall, 3 each on the left/right/east/west, and 10 on the back/south wall (including 1 for the sliding glass door). The location of the window in the wall does not affect the calculations but here's another look at the diagram for context:



- For doors we'll use a copy trick. Drag and drop a door from the HVAC Shapes to the drawing where it belongs (north/front wall or living/garage partition).
- Right click on the door to view its properties. Change the height to 6'8" (note the calculator that pops up on its own when you type a ' (single quote) or " (double quote) symbol- it'll convert foot (') and inch (") notation to decimal feet once you click okay or enter).
- Hold the Ctrl key on the keyboard and drag this edited door to the other location. When you move an object while holding Ctrl, it will copy rather than move it. (You can also repeat the previous 2 steps to create the 2 doors).

Properties (Windows)

- Click the right mouse button anywhere on the drawing screen to see the Property Sheet.
- Right click on the sheet on the right side of the draw screen (from the elevation step) and use the 'select' option at the bottom of that menu to select all of the windows on this floor of our building.

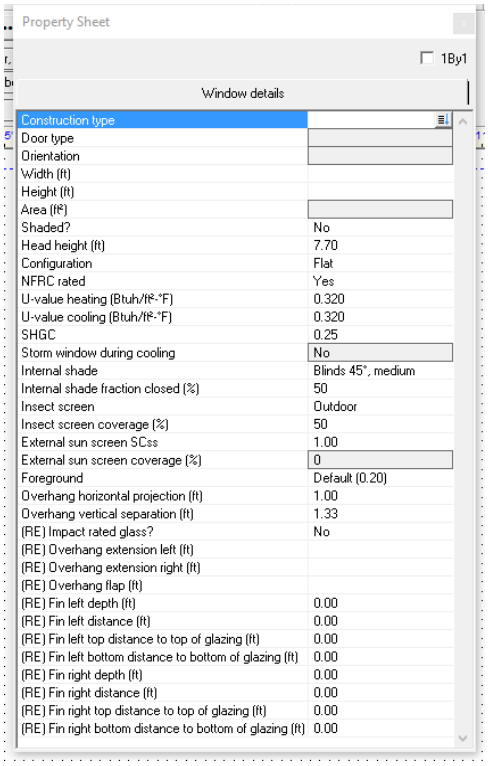


- While 2 of our windows are different sizes the vast majority of our windows are identical, and even those that are different have a lot of things in common with the rest. This will allow us to set all of these common settings in one go.

Note 1: Most of these windows have unique overhang settings (the left and right overhang extension in particular). As determining the left and right extension of each window would be very time consuming, we will be using the worst case (smallest amount of shade) applied to every window in this example. As this is a disadvantage, if the building passes with the worst case shading, adding individual shade would not prove to be worthwhile for most users. If the building does not pass this measure could be considered. If individual shading is desired or required, simply click each window with the Property Sheet open and adjust individually.

- If you have not closed the Property Sheet as instructed you will now see the Window Details. If you have closed the Property Sheet, simply right click one of the now selected windows.

- Set **Width** 3.0; **Height** 5.0; **Head height** 7.70; **Internal shade:** Blinds 45° medium; **Internal shade fraction closed:** 50; **Insect screen** 'Outdoor'; **Overhang horizontal projection** 1.00; **Overhang vertical separation** 1.33 ft. (see example right)



Construction type	
Door type	
Orientation	
Width (ft)	
Height (ft)	
Area (ft²)	
Shaded?	No
Head height (ft)	7.70
Configuration	Flat
NFRC rated	Yes
U-value heating (Btuh/ft²-°F)	0.320
U-value cooling (Btuh/ft²-°F)	0.320
SHGC	0.25
Storm window during cooling	No
Internal shade	Blinds 45°, medium
Internal shade fraction closed (%)	50
Insect screen	Outdoor
Insect screen coverage (%)	50
External sun screen SCss	1.00
External sun screen coverage (%)	0
Foreground	Default (0.20)
Overhang horizontal projection (ft)	1.00
Overhang vertical separation (ft)	1.33
(RE) Impact rated glass?	No
(RE) Overhang extension left (ft)	
(RE) Overhang extension right (ft)	
(RE) Overhang flap (ft)	
(RE) Fin left depth (ft)	0.00
(RE) Fin left distance (ft)	0.00
(RE) Fin left top distance to top of glazing (ft)	0.00
(RE) Fin left bottom distance to bottom of glazing (ft)	0.00
(RE) Fin right depth (ft)	0.00
(RE) Fin right distance (ft)	0.00
(RE) Fin right top distance to top of glazing (ft)	0.00
(RE) Fin right bottom distance to bottom of glazing (ft)	0.00

- With the property sheet still open, click outside of the building to unselect all of the windows.

- With the property sheet still open, click on the 6050 window in the north/front of the house (between the garage and the front door). It should be the only window selected. Change the **Width** 6.0. You could also set fin shade from the garage, but we will see if we can pass without it (see note above).

- With the property sheet still open, click on the sliding glass door on the back/south wall. Change the **Width** 6.0 **Height** 6.7 (or 6'8").

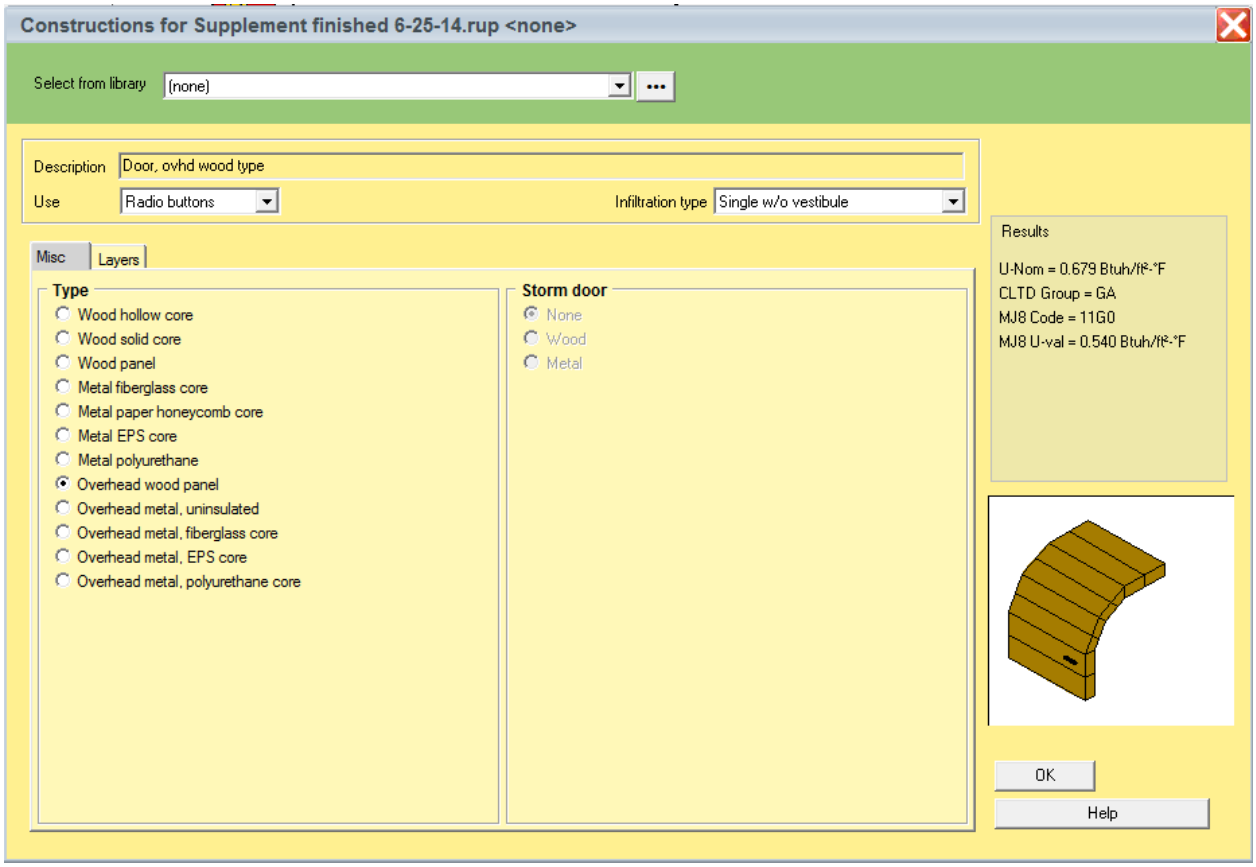
Optional: For both compliance and load purposes, having the right size, u-value, SHGC, and shade settings is enough for proper calculations. However, some users prefer to make the slider **look like** a slider. For this:

- With only the slider selected, click on construction type and change to radio buttons mode.
- Select **Type:** Sliding Glass Door and click 'Okay'. Any tab (except 'Block') and any other radio buttons should have no effect as we have set **NFRC rated:** Yes (see note 2). Check the U-Value and SHGC fields on the property sheet to be sure (should be 0.32, 0.32, and 0.25 respectively as above).
- The window on the drawing will now look like a sliding door.

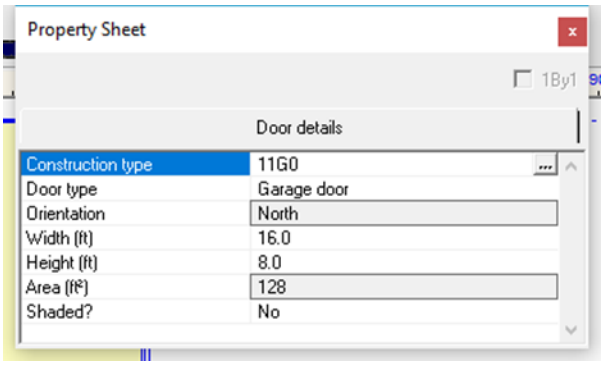
Note 2: The construction type field automatically selects the U-Value and SHGC fields. When using Custom Values you can directly input that information. If you use radio buttons, you can also input that same information directly to the property sheet by designating **NFRC Rated:** Yes. Either way, what matters is the U-Value and SHGC.

Properties (Overhead Garage Door)

- With the Property Sheet still open drag and drop a door into place (or select it if you already have)
- Click on 'Construction type' at the type to display the Door Construction screen
- Select 'Radio buttons' from the drop-down list at the top of the screen
- Change the **Type:** Overhead wood panel.



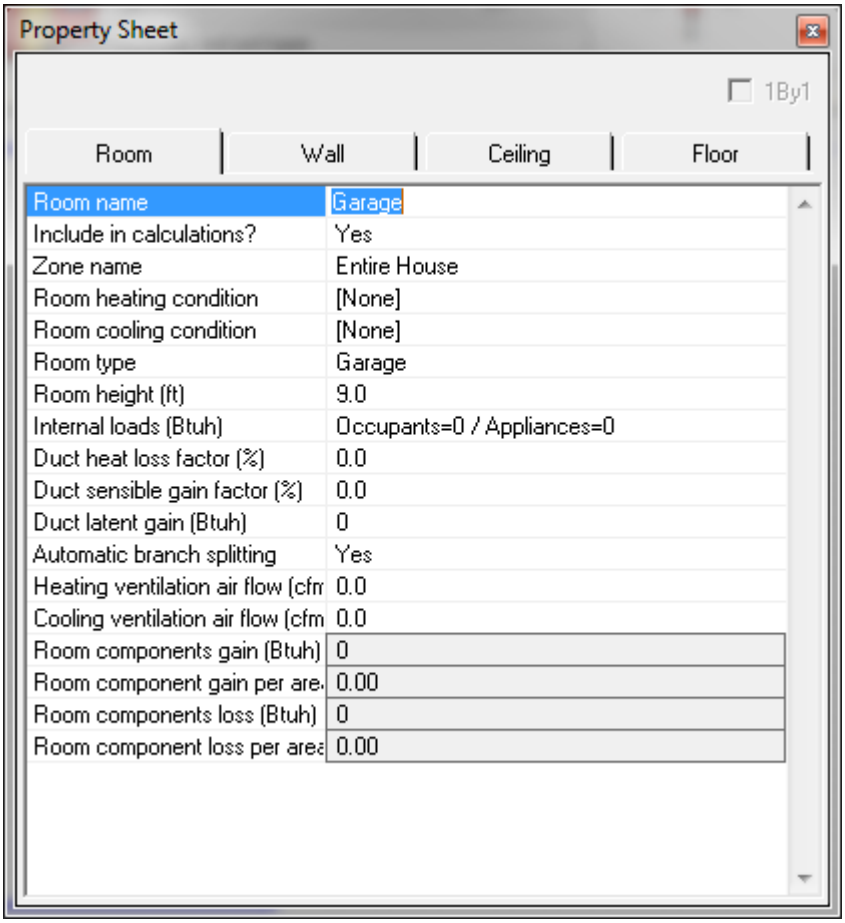
- Click on the 'OK' button to return to the Property Sheet.
- Select 'Garage door' for the Door type.
- In the Property Sheet, set the Width to 16.0' and the Height to 8.0'. Once you do this, you may need to reposition the door on the drawing.



Properties (Garage-General)

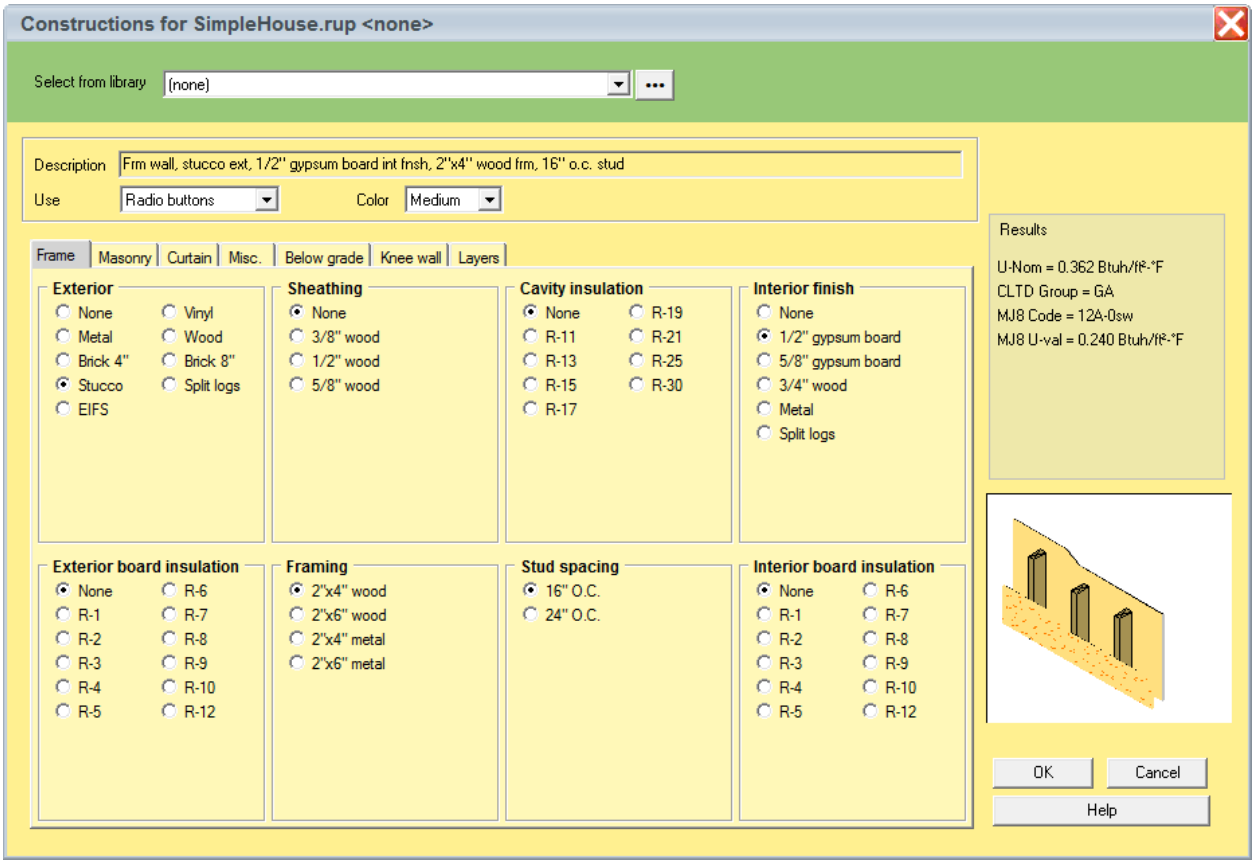
The garage must be included in the load and energy calculations but it is unconditioned space.

- With the Property Sheet open click on the Garage (if the property sheet isn't open- right click).
- Go to the room tab. Set **Include in calculations?:** Yes; **Room heating condition:** None; **Room cooling condition:** None; **Room type:** Garage; **Room Height:** 9



Properties (Garage- Exterior Wall)

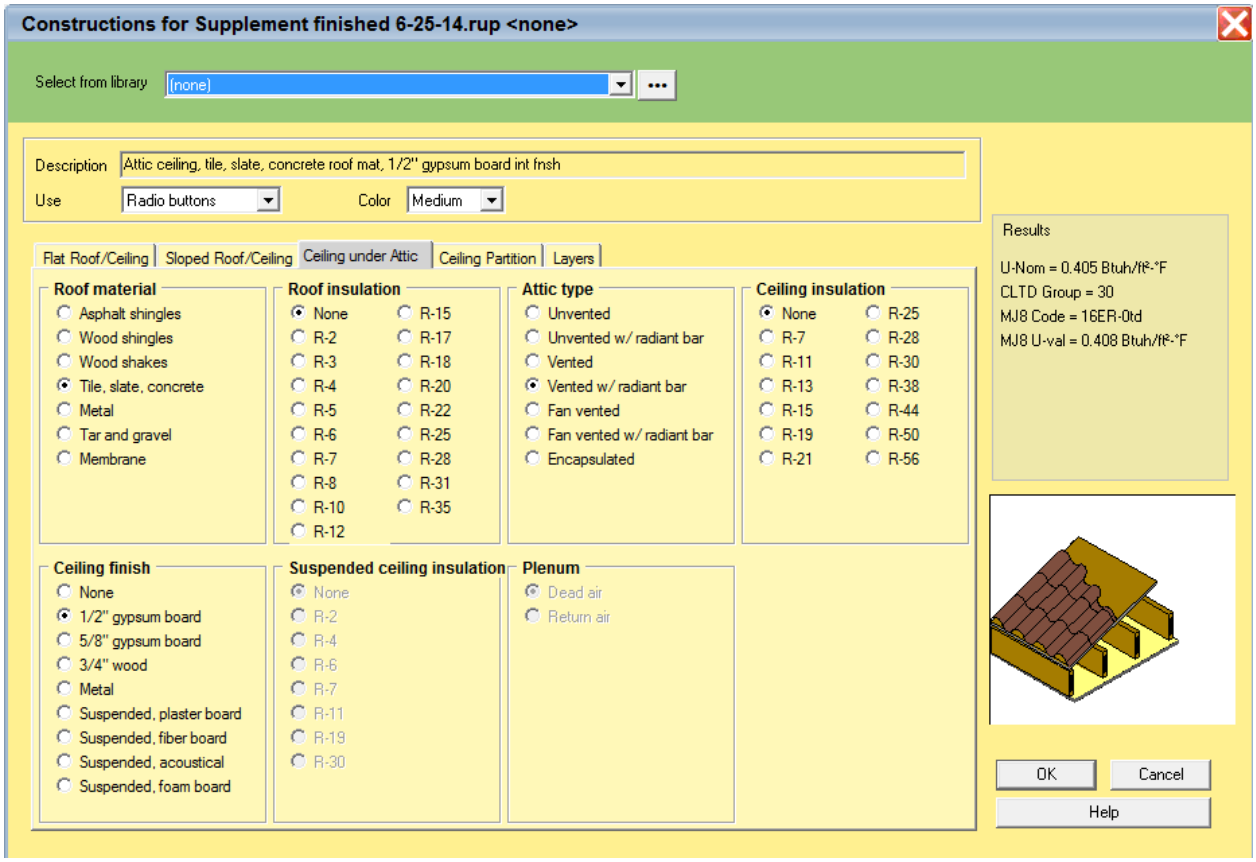
- With the Garage Property Sheet still open (right click Garage if not) click on the 'Wall' tab
- Click on the Wall 1, type field. (Wall 1 is exterior wall by default)
- Select 'Stucco' for the Exterior and 'None' for the Cavity and Exterior board insulation.



- Click the 'OK' button to return to the drawing screen.

Properties (Garage- Ceiling below Attic)

- With the Garage Property Sheet still open (right click Garage if not) click on the 'Ceiling' tab
- Click on the 'Ceiling type' field
- Use the following radio button options:: **Roof material:** Tile, slate, concrete; **Roof insulation:** none; **Attic type:** Vented w/ radiant bar; **Ceiling insulation:** None; **Ceiling finish:** ½" gypsum board



- Click the 'OK' button to return to the drawing screen and the Garage Property Sheet.

Properties (Garage- Floor)

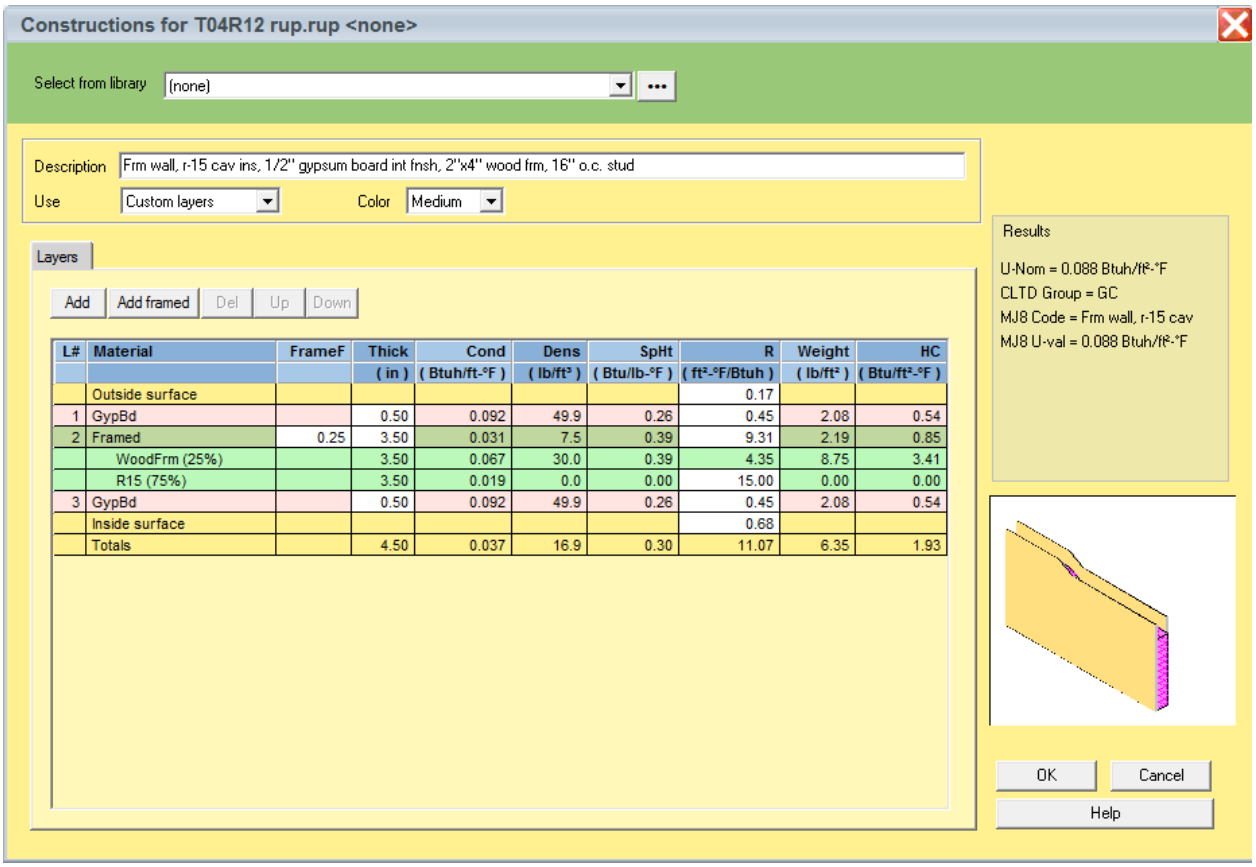
- Click on the 'Floor' tab and then click on the 'Floor type' field.
- Select 'None' for the 'Floor finish'.
- Click on the 'OK' button to accept the change and return to the Property Sheet.

Properties (Garage-Living Partition Wall)

As load on this wall is experienced by the conditioned space, we find this wall in the Living area properties.

Note: The material we need cannot be exactly described using the radio buttons alone. We will need to use the 'Custom Layers' option from the use field, **but before we do we should get the material as close as possible using the radio buttons method to save considerable time and effort.**

- With the Property Sheet still open, click on the main 'Living' room and click the 'Wall' tab
- Click on the 'Wall 2 type' field. While still in radio buttons mode, Select the following options: **Exterior**: Stucco; **Sheathing**: None; **Cavity insulation:** R-15; **Interior finish:** ½" gypsum board; **Exterior board insulation:** None; **Framing:** 2" x 4" wood; **Stud spacing:** 16" O.C.; **Interior board insulation:** None.
- Select 'Custom layers' from the list at the top of the screen.
- Double-click on the 'Stucco' material and select 'GypBd' from the list of materials. Click the 'Select' button to transfer the change to the Custom Layers screen. Change the thickness to 0.50. Press the 'Tab' key and then click the 'OK' button to return to the drawing screen.
- Note that you can edit the Description (at the top of the screen) when 'Custom layers' or 'Custom values' are selected.



- Click the 'OK' button on the Partition Adjacent Conditions screen that is displayed to accept the defaults.

Attic Rooms

Attics do not need to be entered for calculating heating and cooling loads. However, The Florida 2020 Code requires information about the attic. There are 2 ways that you can enter attics:

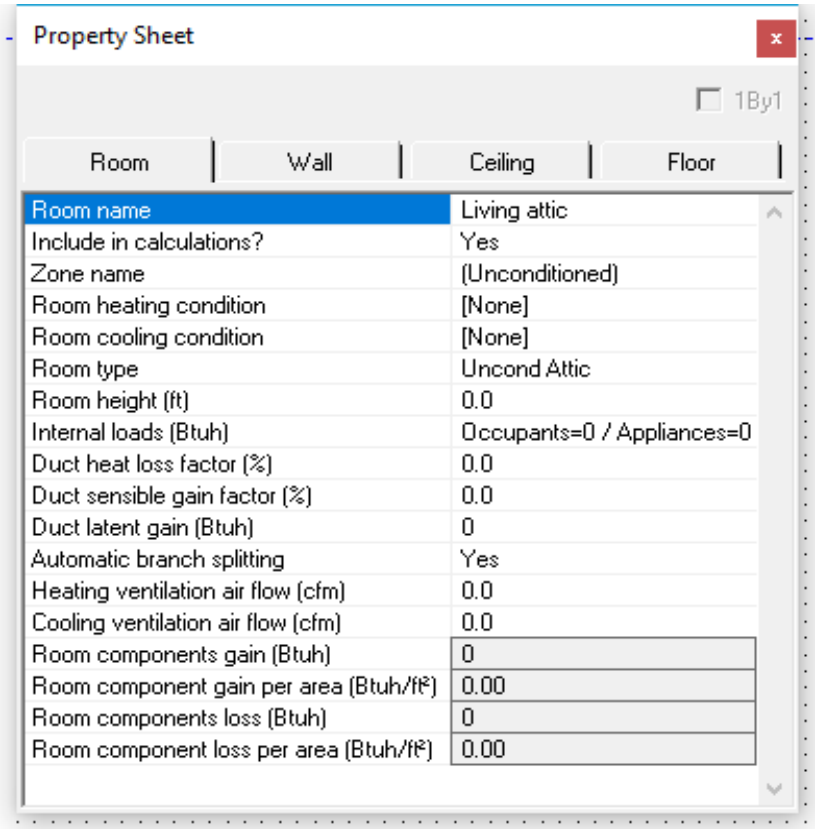
1. The **detailed attic method** – specify a 'ceiling below attic' and then draw the attic and roof in Right-Draw. Right-Energy Florida 2020 will derive the necessary details of the attic from your drawing.
2. The **simplified attic method** – specify a 'ceiling below attic' and then enter the necessary details of the attic in the Compliance screen.

For this example, we will use the detailed attic method. So, we will add unconditioned rooms for the attic above the Living room and Garage.

1. Select **Show | Right-Draw®** from the RSU menu.
2. We will add another Sheet to the drawing for the attic rooms. Click the right mouse button on 'Sheet 1' in the list of Sheets and Layers on the right side of the screen. Select 'Add Sheet…' from the menu that appears.
3. Enter 'Attic' for the Sheet name. Enter '9' for the Elevation. Leave 'Is Building Level' checked. Click the 'OK' button to return to the drawing.

4. Click on the Attic Sheet that you just created. Any rooms you add will be put in the Attic Sheet rather than the Sheet 1 Sheet. Leave the Sheet 1 Sheet checked (visible) so that you can trace the rooms.
5. Draw a room on top of the Living room. Use the 'Room wall by wall' HVAC Shape like you did when you added the Living room. Name the room 'Living attic'.
6. Click the right mouse button over the 'Living attic' room that you just created to display its Property Sheet.
7. Click on the 'Room' tab. Set the following options: **Include in calculations?:** Yes; **Room heating condition:** [None]; **Room cooling condition:** [None]; **Room type:** Uncond Attic; **Room height:** 0.

   Note that since we have indicated that this is an unconditioned attic, the Florida 2020 reports will show the attic type as 'Full attic'. If there are no rooms that are of the 'Uncond Attic' type, the Florida 2020 reports will show the attic type as 'No attic'.

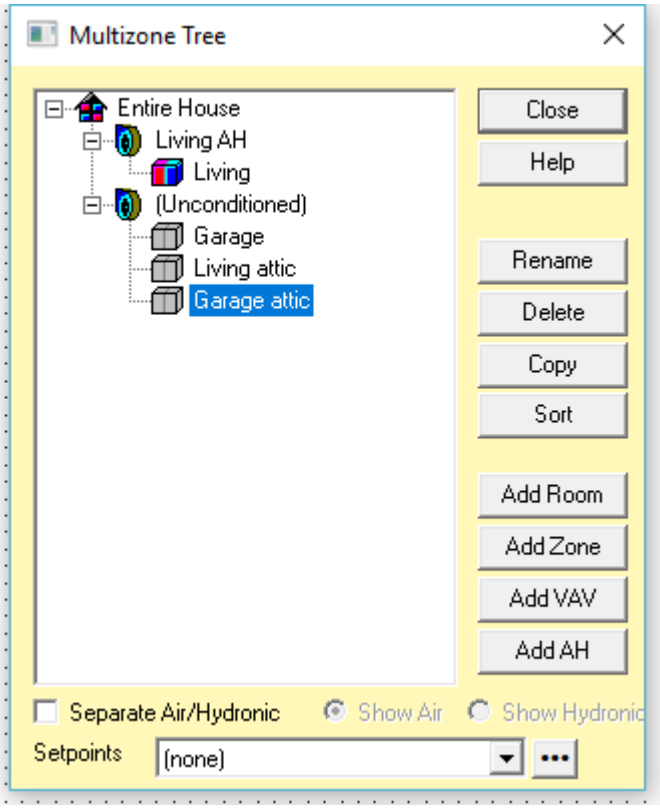


8. Draw another room on top of the Garage room. Name the room 'Garage attic'.
9. In the Property Sheet for the 'Garage attic' room that you just created, change the Room Properties to the same as in step 7 above.

Creating the Air Handlers

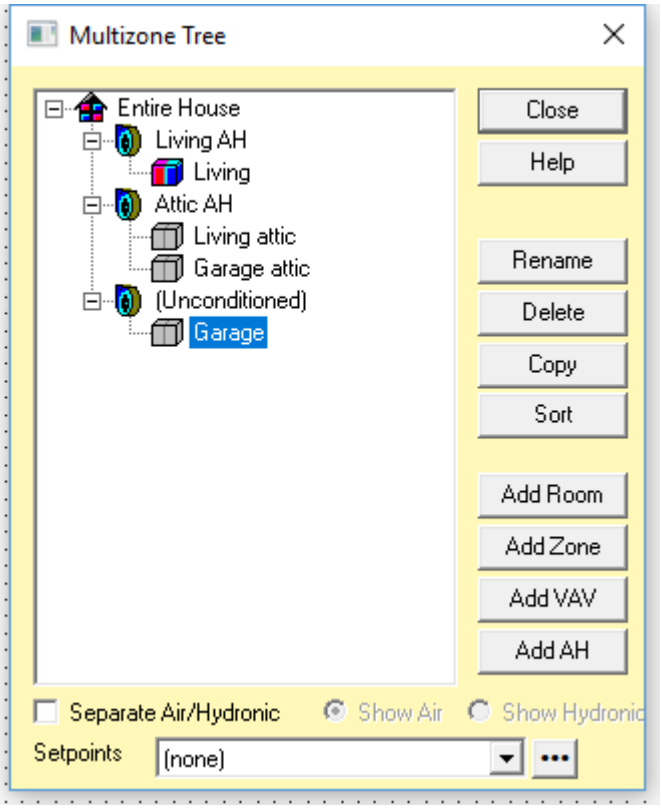
For Florida energy calculations, the attic rooms need to be grouped together. We do this with an 'unconditioned' air handler. The garage also needs its own 'unconditioned' air handler. In total, we need to create 3 air handlers.

10. Select **Show | Multizone** from the RSU menu.
11. Click the right mouse button on the Living room and select 'Add AH…' from the menu that appears. Type 'Living AH' for the name of the air handler and click the 'OK' button.



12. Click on the (Unconditioned) air handler and click the 'Rename' button on the right of the screen. Type 'Attic AH' for the new name. Click anywhere else (the Garage room, for example) on the Multizone Tree screen to set the new name.

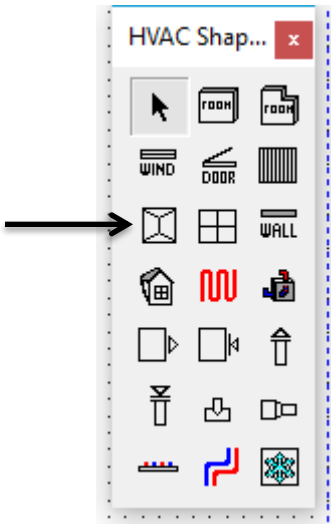
13. Click on the Garage room and click the ‘Add AH’ button. A new air handler named ‘(Unconditioned)’ will be created with the Garage in it.



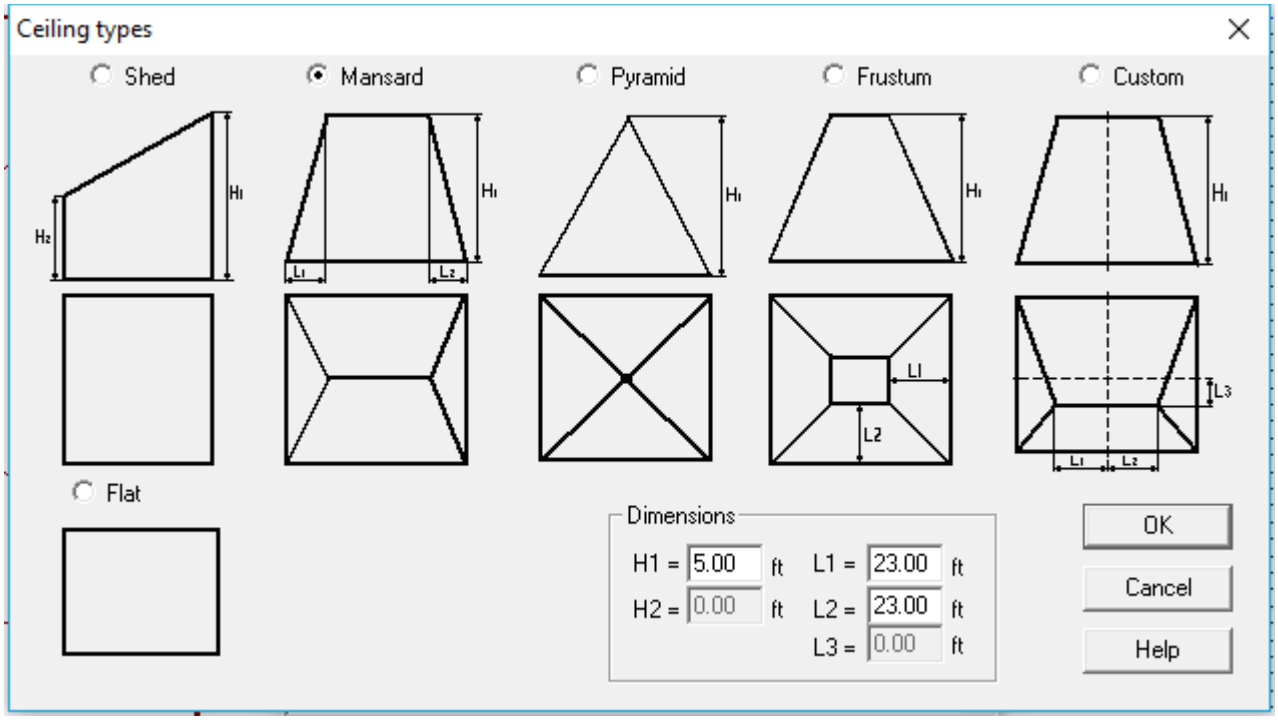
Roof

Now we need to add the roof to the attic rooms. Make sure that the Attic sheet is selected on the list of Sheets and Layers on the right.

1. Click on the Ceiling HVAC Shape on the HVAC Shapes toolbar.

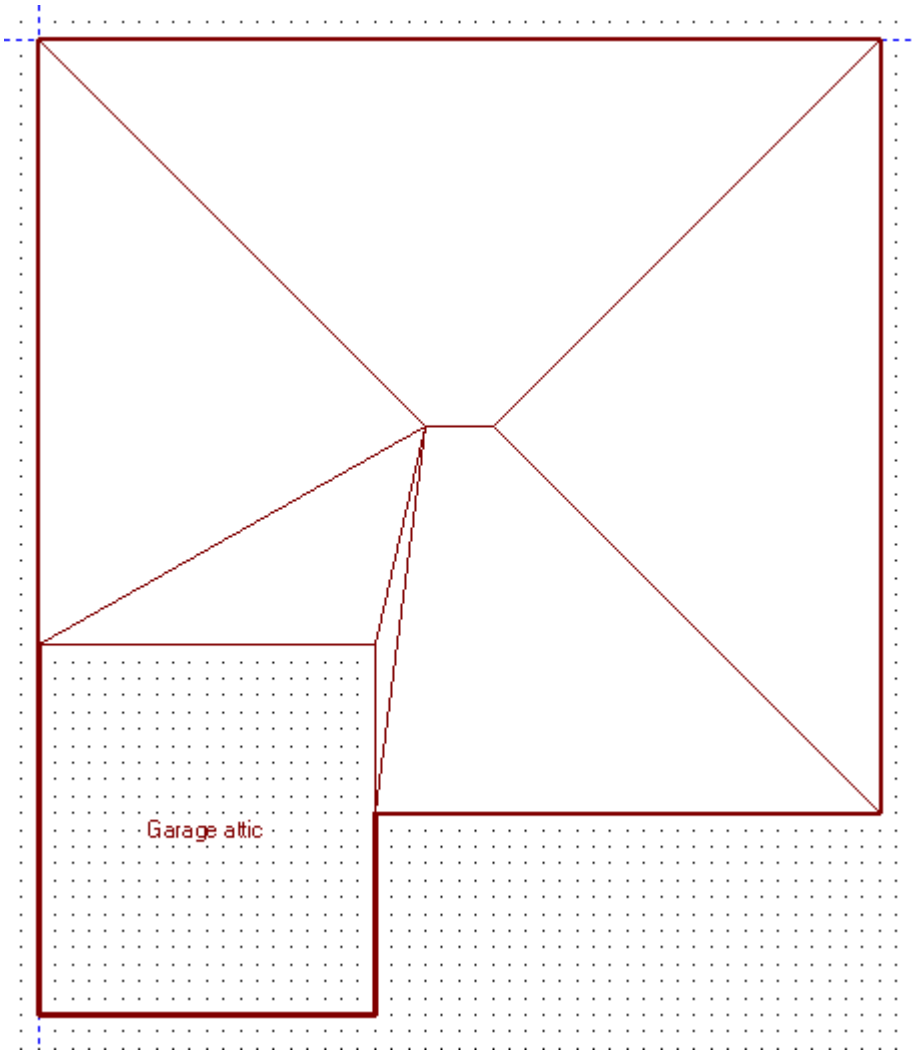


2. Draw a roof over the Living attic room. Just a rectangular one for now. We will re-shape it a little later.
3. A screen will be displayed for you to describe the roof.



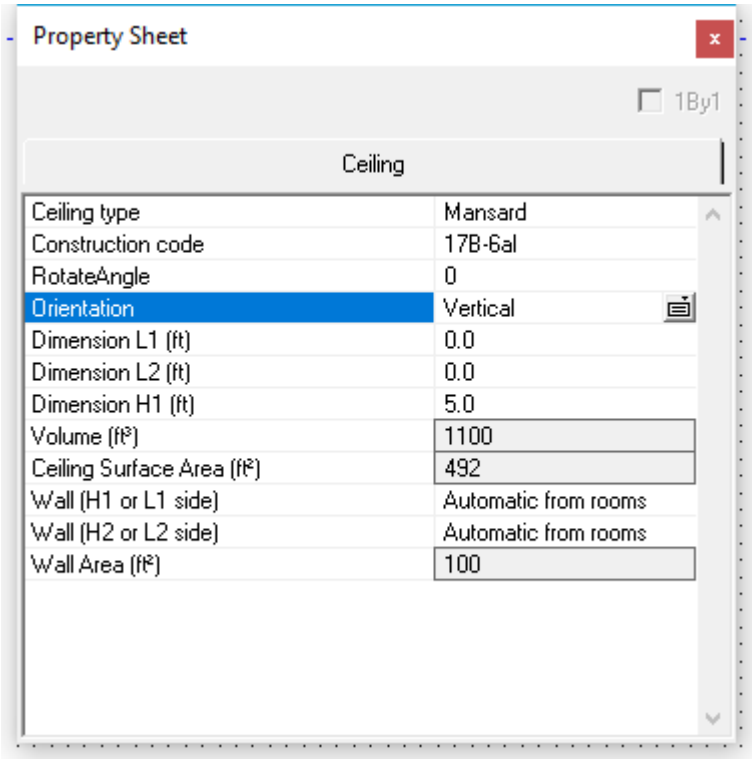
4. Select the 'Mansard' type at the top of the screen. Enter 5 for the H1 dimension. Enter 23 for both the L1 and L2 dimensions.

5. Click the 'OK' button to return to the drawing screen.
6. We need to change the shape of the roof to match the shape of the room. We will use the 'Edit Points' feature of Right-Draw. Click on the 'Edit points' button -  on the Drawing toolbar (just under the RSU toolbar toward the top of the screen). When you do this, the green handles on the corners of the roof will change to black points.
   - To move a point, click on it and drag it to the new location.
   - To delete a point, hold the Ctrl key down and click on the point that you want to delete.
   - To add a point, click on a line and drag the new point to the new location.
   - If you make a mistake, you can press Ctrl-Z to undo it.
7. Change the shape of the roof to match the Living attic room.

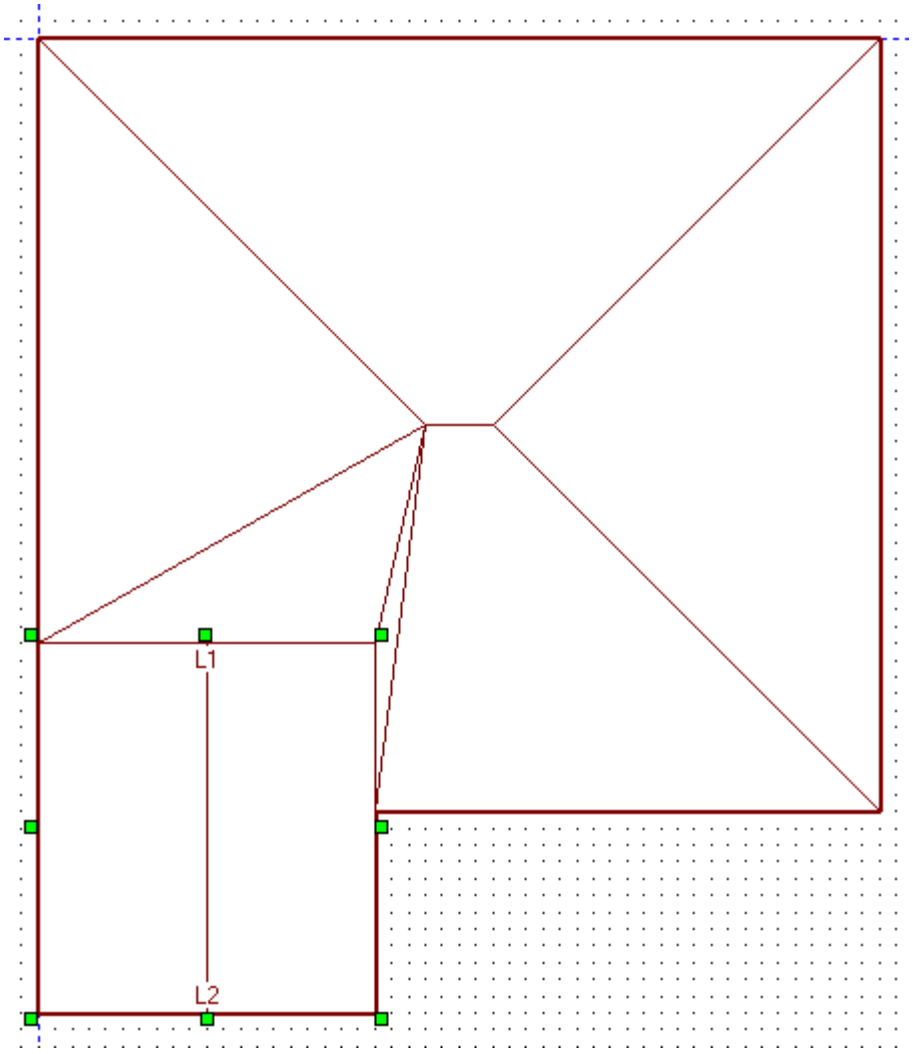


8. Draw another Ceiling over the Garage attic room. Select the Mansard type, enter 5 for the H1 dimension and 0 for both the L1 and L2 dimensions. It's just a rectangle, so it is easier to draw.
9. We need to rotate the roof over the Garage attic so that the ridge runs up and down rather than left and right. Click the right mouse button over the Garage attic roof to display the property sheet.

10. Select ‘Vertical’ for the Orientation from the drop-down list.



11. The roof ridge is now correct.



Note that the roof type in the Input Summary report will be derived from the characteristics of the ceiling/roof that you just drew:

Roof type	Derivation
Flat	Roof pitch is less than 5 degrees
Shed or Gable	Roof pitch is greater than 5 degrees and the gable area is greater than zero
Hip	Roof pitch is greater than 5 degrees and the gable area is zero

Other Load Options

There are other settings important to the load calculations that are not otherwise required for Florida 2020 Code compliance. So, we won't cover them here. They are, however, necessary for an accurate load calculation, which

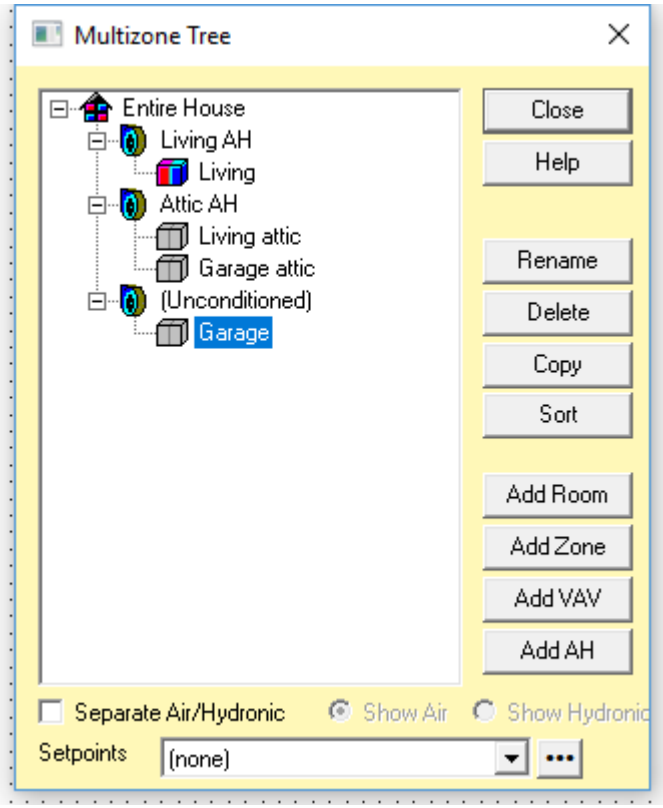
is required by the Code. Please refer to the ***Getting the Most Out of Right-Suite® Universal*** manual for complete details.

- Internal Gains: 4 occupants and 1200 Btuh for appliances
- Duct Load:
  - **Supply: Location:** Conditioned space; **Roof Material:** Tile, slate, or concrete; **Roof color:** Medium; **Configuration:** Trunk and branch, perimeter outlets; **Sealing:** Extreme; **Insul R:** 8.0; **Heating air temp**: 100°
  - **Return: Location:** Conditioned space; **Roof Material:** Tile, slate, or concrete; **Roof color:** Medium; **Configuration:** Trunk and branch; **Sealing:** Extreme; **Insul R:** 8.0
- Infiltration **Heating ACH** 0.41; **Cooling ACH** 0.21 (7 ACH at 50 Pa). Note that the greater of the Heating or Cooling ACH will appear in the Building Input Summary Report.

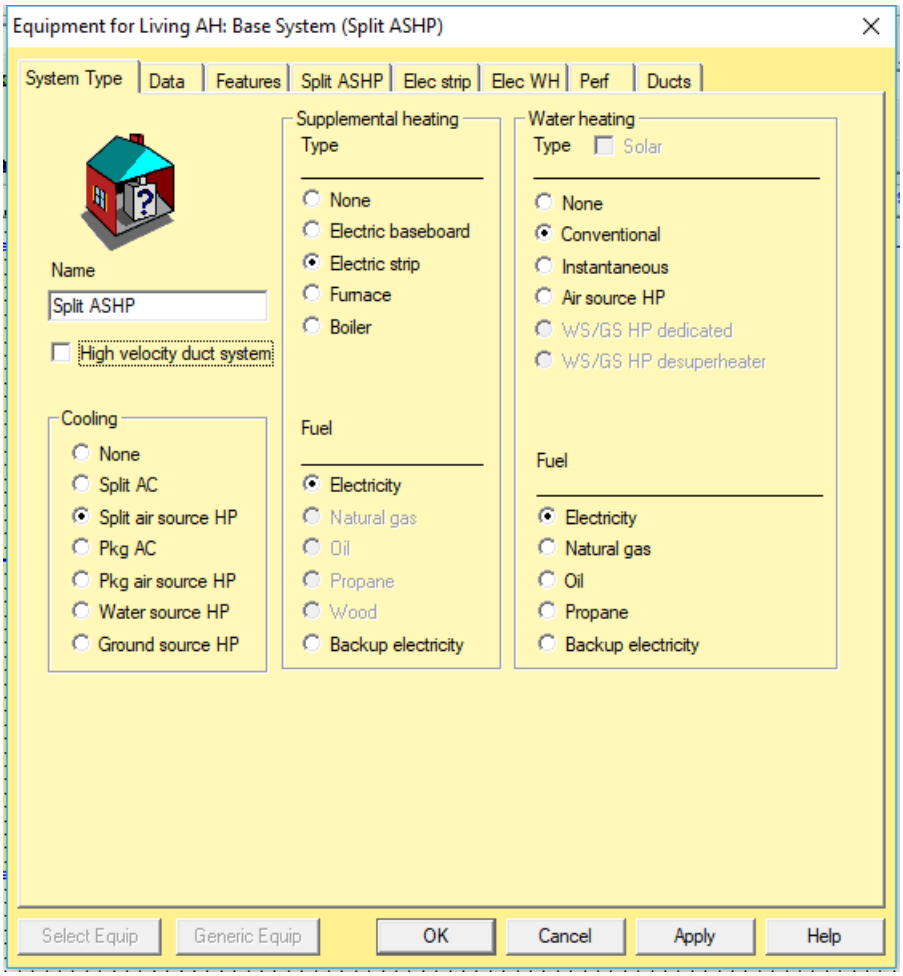
Equipment (System Type)

RSU can now calculate the load and we can select equipment. Since the attic and garage are both unconditioned, we need to select the air handler for the Living room.

- Select **Show | Multizone** to display the Multizone Tree screen. You can see that the Living room is in the air handler named 'Living AH'. You can name this air handler if you wish.
- Click on the 'Living AH' air handler. This will allow us to select equipment for this air handler.



- Select **Show | Equipment** from the top menu.



- Select the following radio buttons: **Cooling:** Split air source HP; **Heating Type:** Electric strip; **Heating Fuel:** Electricity; **Water Heating Type:** Conventional; **Water Heating Fuel:** Electricity. The Water Heating Type "Solar" checkbox will not be available when the Florida Right-Energy® UI options is selected.

Note: You can select any type of equipment, but just as we've dictated Tampa design conditions for example purposes, we're dictating the equipment types.

Equipment (Split ASHP Tab)

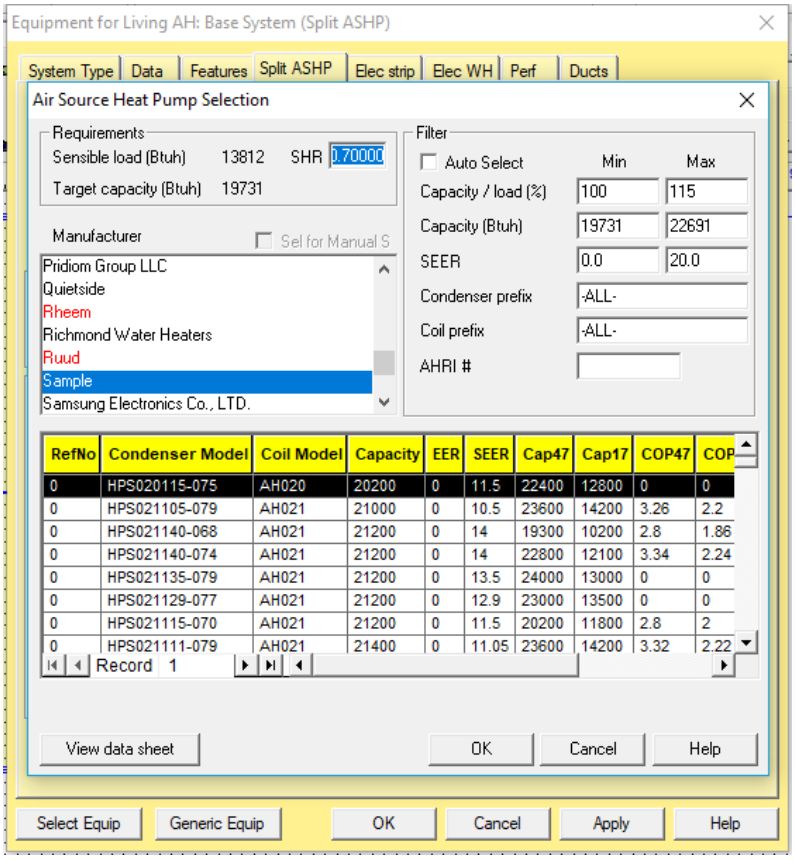
Normally, you would select whatever equipment you are going to use in this building. The easiest way to do this is clicking on the 'Select Equip' button and using RSU's integrated AHRI database. See our other support documentation especially our video 'Manually Selecting Equipment'. (http://www.wrightsoft.com/university/rsu_video_tutorials_series_1/equipment_and_operating_cost/manually_selecting_equipment.aspx)

So as not to play favorites with particular brands, we'll be using the Sample equipment manufacturer (included with RSU) for this example.

- Click on the 'Split ASHP' tab
- Click on the 'Select Equip' button (bottom left)
- In the 'Manufacturer' list, scroll down to 'Sample' and click on it. The list of available equipment manufactured by Sample will appear in the bottom half of the screen. The first one in the list will be the first unit that has a rated capacity that is greater than the Target capacity at the top of the screen. This is just a convenience to help you select. It is not necessarily true that the first unit in the list will meet Manual S requirements. There isn't extended performance available for Sample, so the 'Sel for Manual S' checkbox isn't 'check-able'. The manufacturers that have extended performance data available appear in red in the Manufacturer list. When the 'Sel for Manual S' checkbox is checked, the list of equipment will change to only units that meet Manual S requirements for your project's loads. The list will have the capacities (sensible and latent) at the design conditions of your project. Note that the Florida 2020 Code requires that equipment that meets the prevailing minimum efficiency standards be used. There are units in this list that may not meet this criterion. When this manual was written, the prevailing minimum efficiencies for split air source heat pumps in Florida were 14 SEER and 8.2 HSPF.
  For now we will select the Condenser Model HPS020115-075 and Coil Model AH020 even though the SEER is only 11.5. We will change it in the next section.

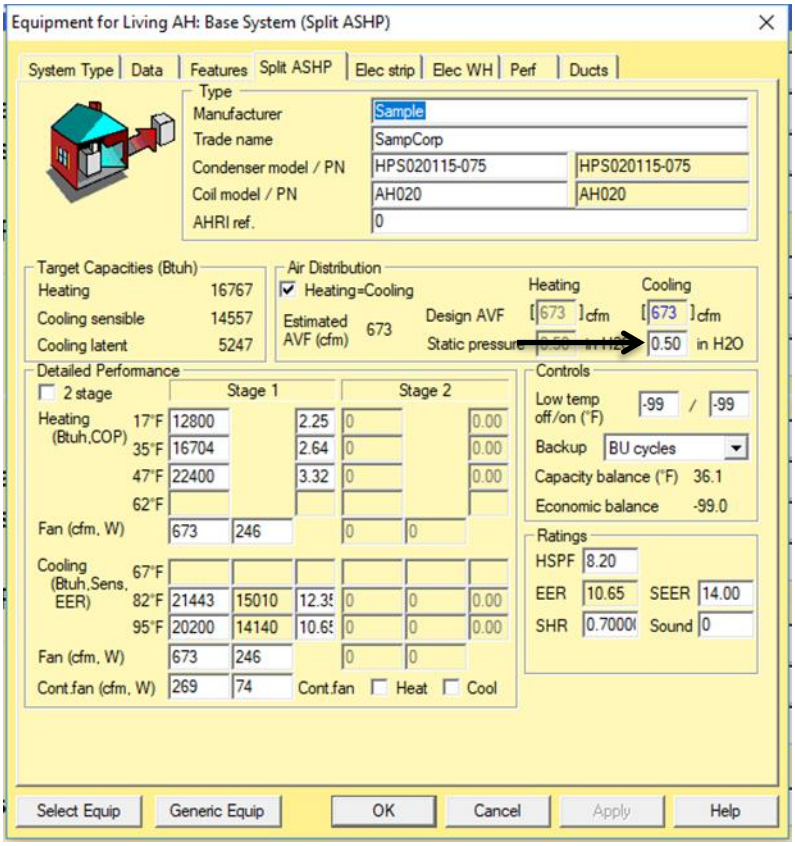
Note: You can adjust the filters in the Filter section of this screen to only show equipment that is close to what you are looking for. For example, if you enter 35.0 for the Minimum SEER and 45.0 for the maximum SEER, only units that have a SEER between 35.0 and 45.0 will be displayed in the list. If no units are displayed when you do this, just 'widen the spread' between the minimum and maximum until one that you want is displayed.

Note: If this were an actual design with real world equipment you would be responsible for checking that the CFM and subsequent fan wattage matched your design criteria as the designer may be making adjustments to these to meet Manual S requirements.



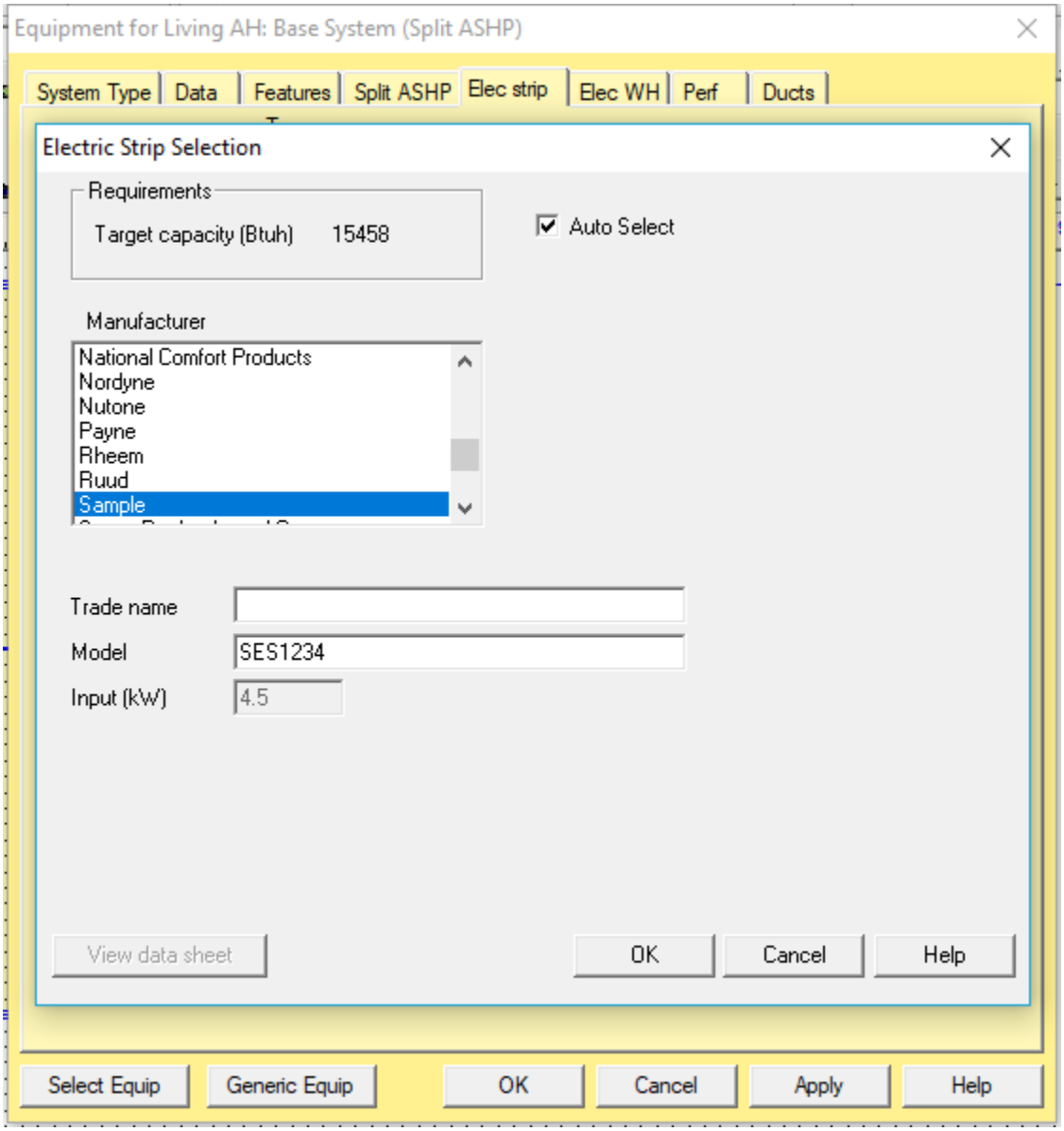
- Click ‘OK’ to select the unit and transfer the data to the Split ASHP screen.

- The SEER and HSPF are not sufficient for Florida 2020 compliance. When you do real projects, you would not be able to use this unit. For the purposes of this example, we will change this data manually.
- In the Ratings section in the lower right corner, change the SEER to 14 and the HSPF to 8.2.
- For the load calculation to be complete, a duct system must be generated. The static pressure that is available is needed to size the ducts. This is entered on this screen. When you do a real project, the data sheet for the equipment you select will have this data. For this example, we will use 0.5. Enter 0.5 in the Cooling Static pressure field:



Equipment (Elec strip)

- Click on the 'Elec strip tab
- Click on the 'Select Equip' button (bottom left)



In this screen, enter the data associated with the unit that you intend to use. Note that if you check the 'Auto Select' checkbox at the top of the screen (next to the Target capacity), the 'Input (kW)' field will be filled in with the required kW. If this exact size isn't available, uncheck the checkbox and change the 'Input (kW)' for the unit that you want to use.

- Check the 'Auto Select' checkbox.
- Fill in the rest of the data in this screen (as above) and click the 'OK' button to transfer the data to the 'Elec strip' screen.

Equipment (Solar WH)

Solar hot water heating systems usually have equipment associated with the solar side (collector, tank, pump, etc.) as well as a conventional hot water heating unit that is used for backup (e.g. when the sun isn't out). RSU has a database of both conventional hot water heaters and solar components. However, when preparing a project for Florida 2020 compliance, you should use the special solar hot water screen rather than the standard RSU Solar WH screen.

Note that the Florida 2020 Code has specific requirements for solar water heating systems. Please review R403.5.6.2.

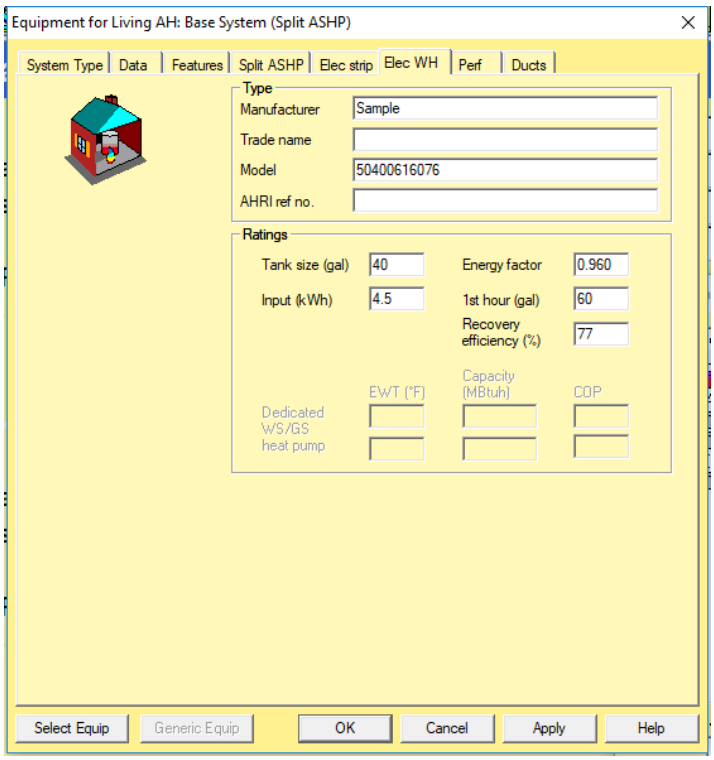
Solar component

The solar component for the Performance method will be entered via the compliance screens. (See page 61.)

Backup component

The backup component should be sized to meet the entire hot water load requirements.

1. In the Electric water heater tab (Elec WH), enter the following information in the 'Ratings' box as above: **Manufacturer:** Sample; **Model:** 50400616076; **Tank size (gal):** 40; **Input (kWh):** 4.5; **Energy factor:** 0.960; **1st hour (gal):** 60; **Recovery efficiency (%):** 77.



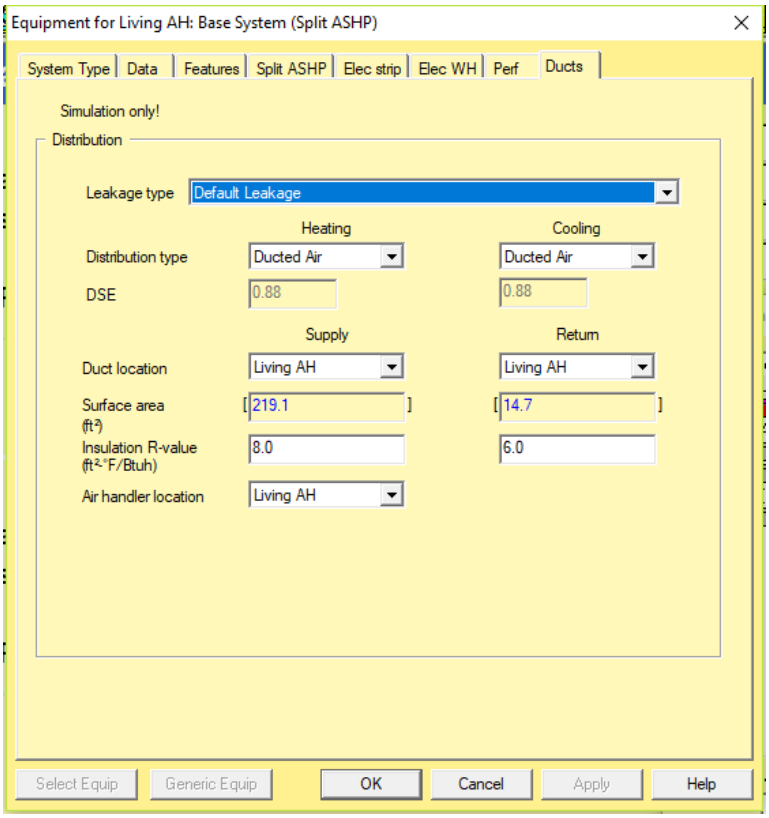
Note that when RSU is not in Right-Energy® Florida 2020 mode, the above screen has additional inputs for estimating water usage. However, the Florida 2020 Code has specific use information that it uses. Therefore, those fields do not appear when in this mode.

2. When you do your own projects, you can click on the 'Select Equip' button at the bottom of the screen and select the hot water heater from the database.

Equipment (Ducts)

The Ducts tab of the Equipment screen has data that is used only for Right-Energy® Florida 2020 simulations.

1. Click on the 'Ducts tab.



   a. Select 'Default Leakage' from the 'Leakage type' drop-down list. Select 'Ducted Air' from each of the drop-down lists for 'Distribution type'. The required default DSE (distribution system efficiency) will be looked up and placed in the DSE fields. If the values are 0, reselect 'Ducted Air' and the default values will be entered.

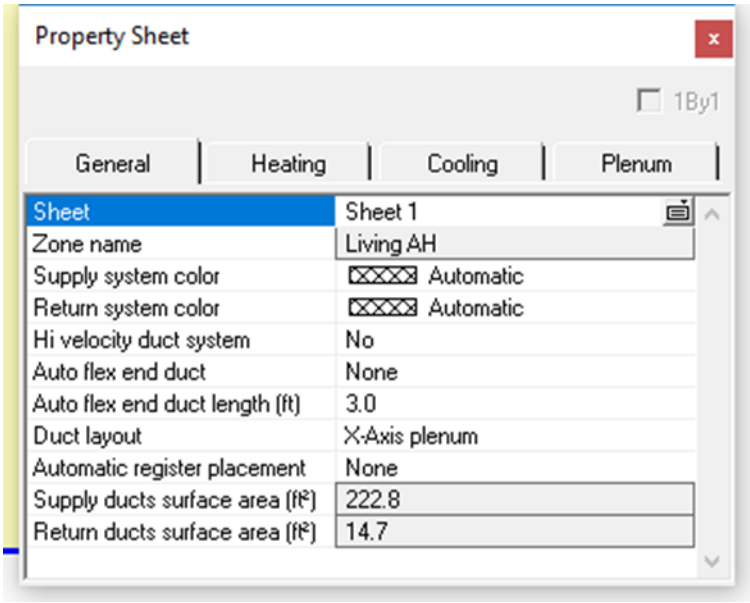
      The other choices for 'Leakage type' are: 'Proposed Qn' and 'Proposed Leak Free'. When either of these 2 choices is made, you may select the 'Duct location' from the drop-down lists.

2. Enter 8 for the Supply and Return Insulation R-values.
3. If you have the Right-D module and you have entered the available static pressure in the cooling equipment screen, the duct surface area fields will be filled in. If you do not have Right-D, you may enter the surface areas of the supply and return ducts by overriding these fields. Highlight the field that you want to change and press the F8 key. The brackets will change from square brackets ('[' and ']') to angle brackets ('<' and '>'). You will then be able to enter the values.
4. Click the 'OK' button to exit from the Equipment screen.

Duct System with Right-D

Now we need to generate a duct system. Make sure you are in the Right-Draw screen. Make sure that the 'Ducts' layer in Sheet 1 is checked in the Sheets and Layers section on the right side of the screen. You should see a small square in the middle of the 'Living' room. This represents the equipment. If you can't see it, uncheck the 'Attic' layer in the Sheets and Layers section. You should also see a number of squares with an X in them. These represent the supply registers. There will also be one square with a diagonal line through it. This represents the return register.

1. Drag the supply registers to where you would like them (for example next to the windows).
2. Right click on the equipment square to display its Property Sheet.
3. On the 'General' tab, select 'X-Axis plenum' for the 'Duct layout'.



4. Close the Property Sheet and a duct system will be drawn.

Final Entries and Running Compliance

Performance and ERI methods each have their own set of screens for entering the information that is used *only* for Florida 2020 compliance. In some cases, default information is provided from elsewhere in RSU, but no data entered here has any effect on other RSU calculations.

Some compliance screens are common to both methods. Some are particular to either the Performance method or the ERI method. We will note this as we go.

- Select **File | Code Compliance | Right-Energy® Florida 2020 R405** for Performance.
- Select **File | Code Compliance | Right-Energy® Florida 2017 R406** for ERI.

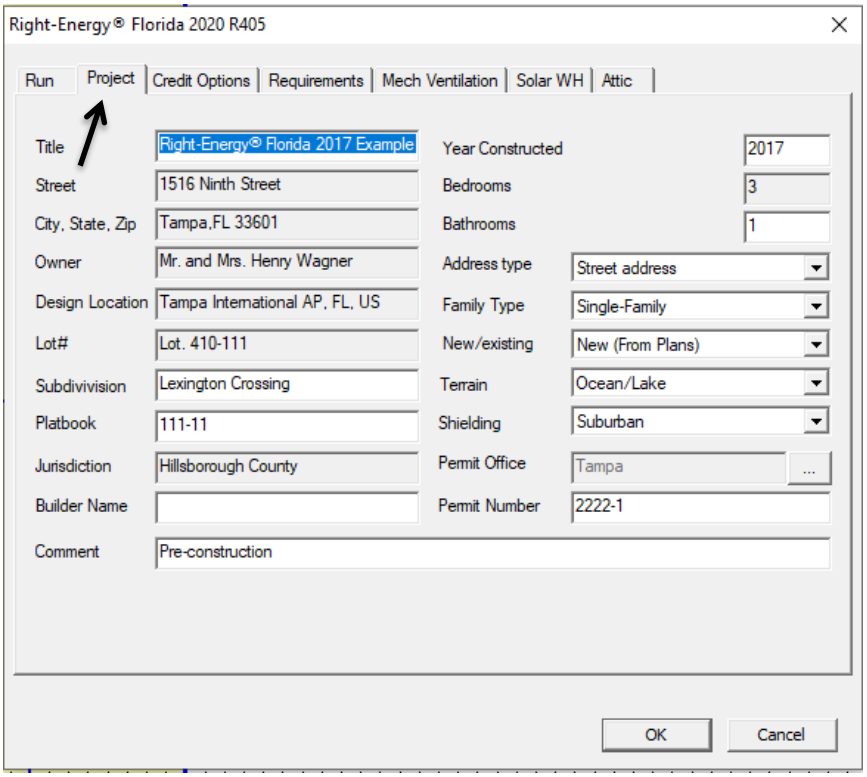
Compliance - Project Tab (Performance and ERI)

There are some additional project-wide entries that are needed for Florida 2020 code compliance. These entries are entered in the Project tab. The Project tab also displays the project-wide entries that we previously entered in the Project Information screen (on page 21). All of this information will appear on the Florida 2020 reports.

The Project tab is common to Performance and ERI methods. The following image, Figure 21, is from the Performance screens but the Project tab in the ERI screens is identical.

1. Click on the Project tab
2. Enter all of the information on this screen.

Figure 21 - Project tab (Performance and ERI)

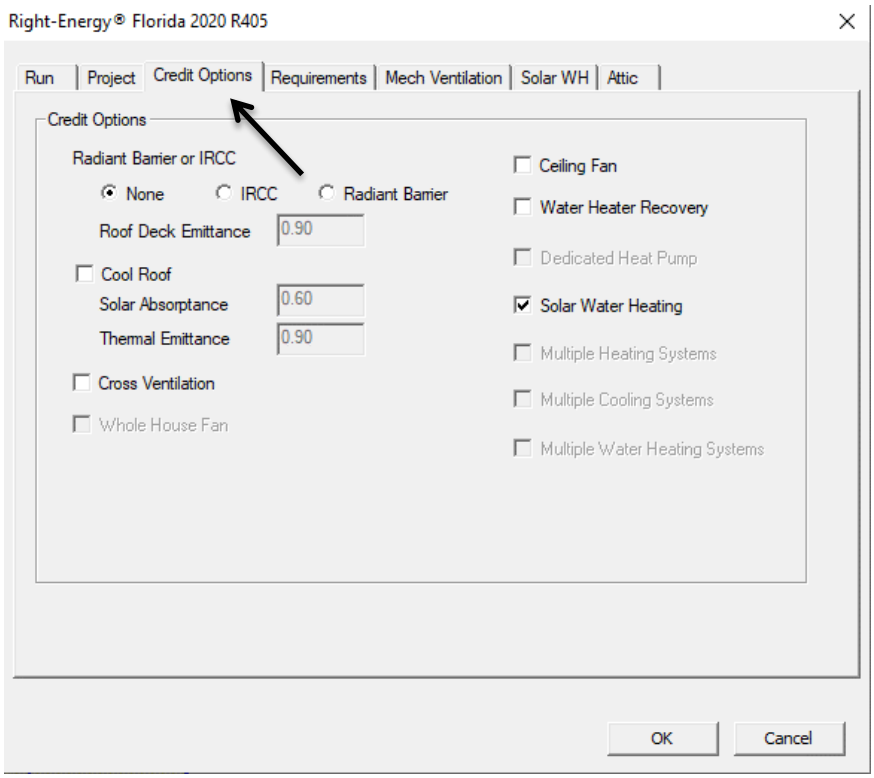


Compliance - Credit Options Tab and Solar Water Heater (Performance only)

You can select the optional Florida 2020 Credit Options here. This will not be visible if you are in the ERI screens.

- Click on the 'Credit Options' tab.

Figure 22 - Credit Options Tab (Performance Only)

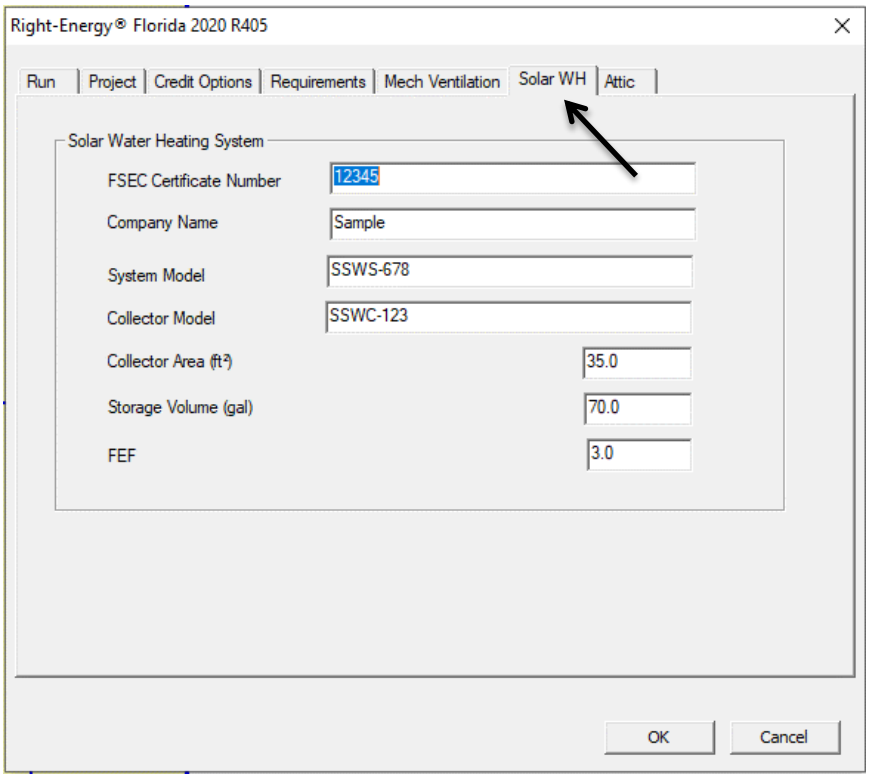


- When you select either IRCC or Radiant Barrier, the Roof Deck Emittance field will be enabled. Please confirm that this value represents your project. See Section R405.7.1 in the Code for installation requirements.
- When you check the 'Cool Roof' box, the Solar Absorptance and Thermal Emittance fields will be enabled. Please confirm that this value represents your project. See Section R405.7.2 in the Code for installation requirements.
- Check the 'Ceiling Fan' checkbox if you want to use the ceiling fan option. See Section R405.7.6 in the Code for installation requirements.
- Check the 'Water Heater Recovery' checkbox if you wish to claim that option. See Section R405.7.7 in the Code for installation requirements.

For this example, we will select the Solar Water Heating.

1. Click on the **Solar Water Heating** checkbox. The Solar WH tab will appear.
2. Click on the Solar WH tab.

Figure 23 - Solar Water Heater Tab (Performance Only)



All of the information on this screen is required for Florida 2020 Code compliance. You must use a solar hot water system that is rated by the Florida Solar Energy Center (FSEC). FSEC certifies systems. The Certificate Number can be determined from the *Florida Solar Energy Center Directory of Certified Solar Systems*. See https://tcp.fsec.ucf.edu/Certification/Ratings/RatingssummaryPage.aspx.

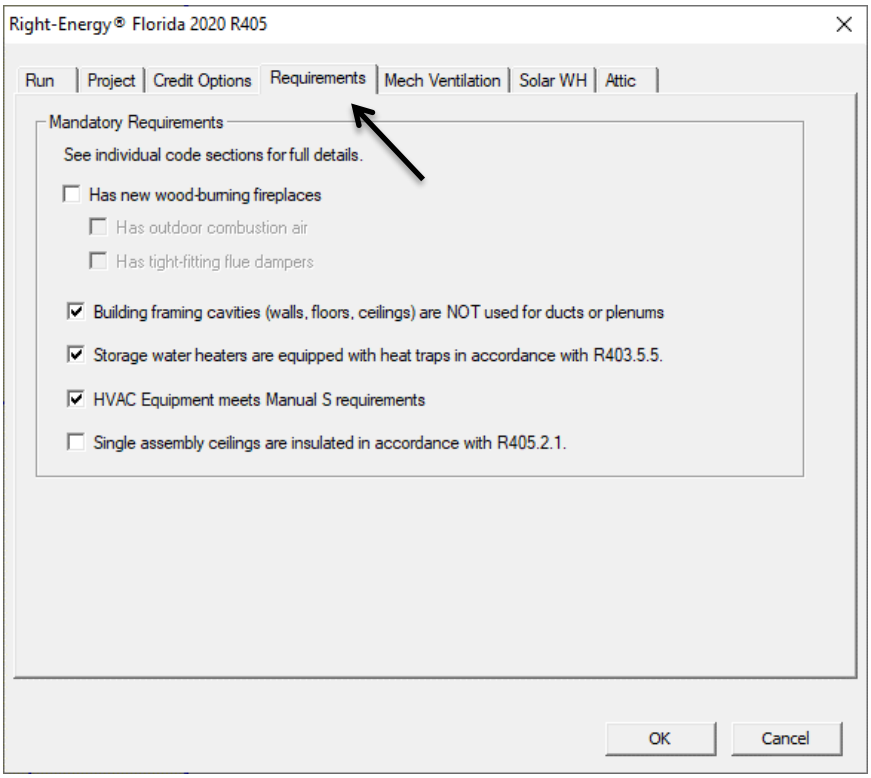
Compliance - Requirements Tab (Performance and ERI)

We are now ready to select the mandatory requirements. This screen shows items that are required by the Florida 2020 Code that RSU does not cover elsewhere because they are not needed to perform calculations. Items on this screen are selected by a checkbox. They are set to pass the mandatory requirements of the Florida 2020 Code when the checkboxes are checked.

There are some differences between the Performance and ERI mandatory requirements so each compliance type has its own version of the Requirements tab. See Figure 24 and Figure 25.

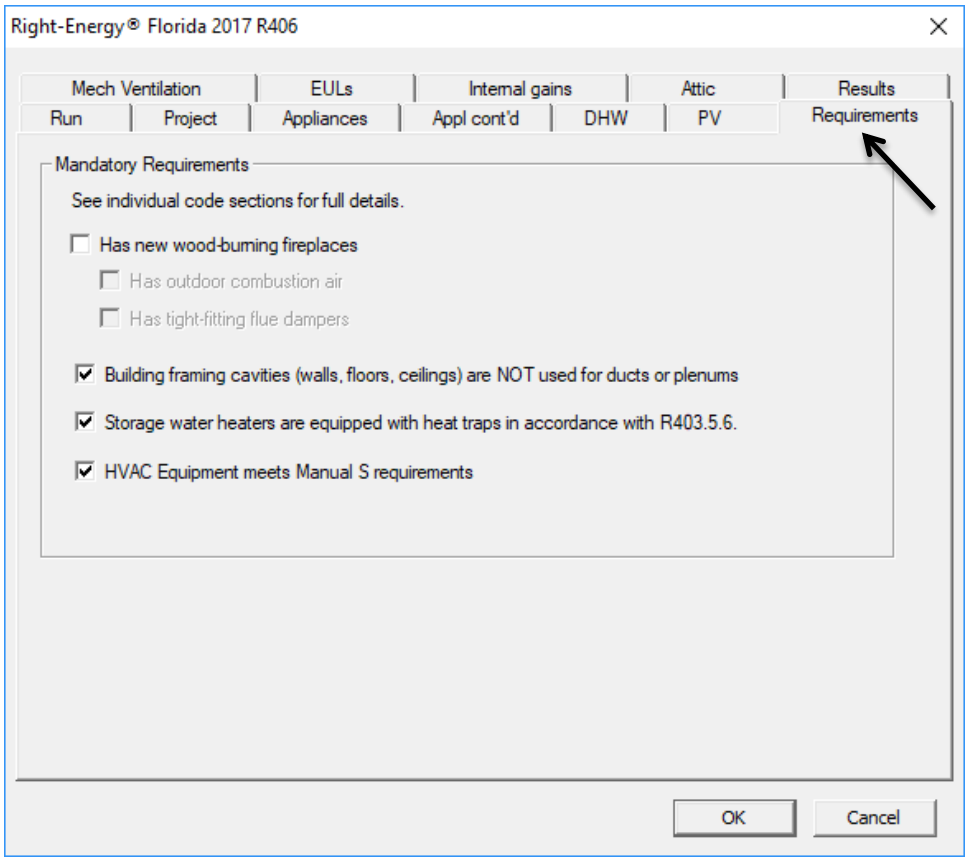
- Click on the 'Requirements' tab.

Figure 24 - Requirements Tab (Performance Version)



- If your project has fireplaces, you should check the box at the top. The 2 checkboxes below that will become active. The Florida 2020 Code requires that both of those 2 checkboxes be checked. You should confirm that they represent the conditions of your project and check them. If they are not checked, the compliance will not run.
- You should also confirm that the next 3 check boxes represent your project and make sure that the checkboxes are checked.
- The final checkbox item is specific to Performance and pertains to single assembly ceilings. The requirements are different for this type of ceiling construction. See the section in the Code for details. We will leave it unchecked for this example. It will not appear on the ERI version of the Requirements tab.

Figure 25 - Requirements Tab (ERI Version)



Compliance - Mechanical Ventilation Tab (Performance and ERI)

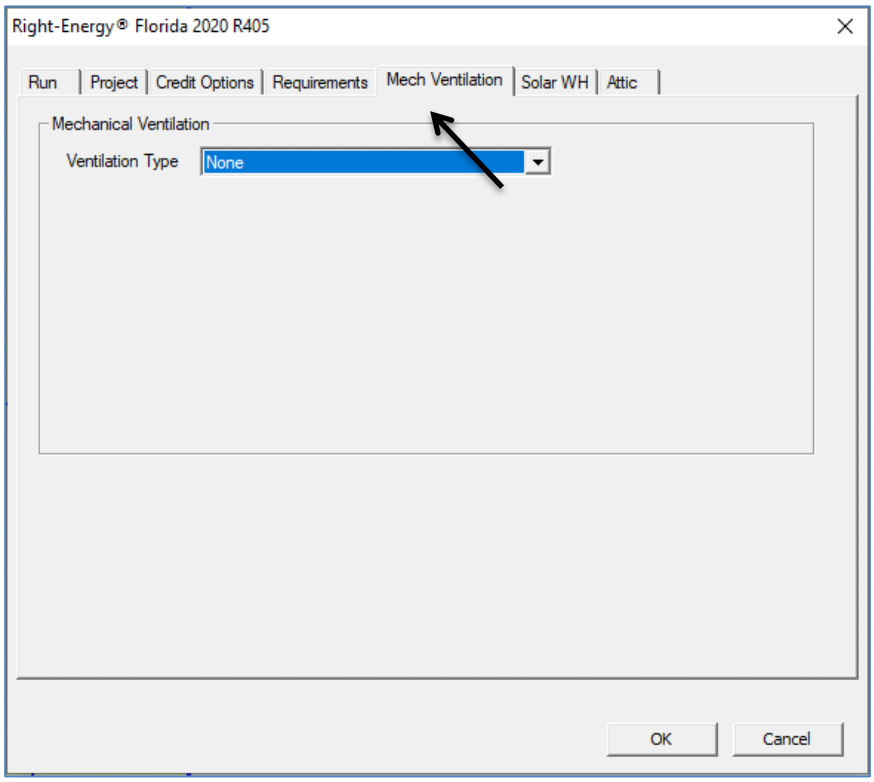
We are now ready to set the mechanical ventilation. The Ventilation Type that you select from the drop-down list will determine what other data is required.

- Click on the 'Mech Ventilation' tab.

Ventilation type 'None'

- Select 'None' for the Ventilation type. For Ventilation Type 'None', no other data is required.

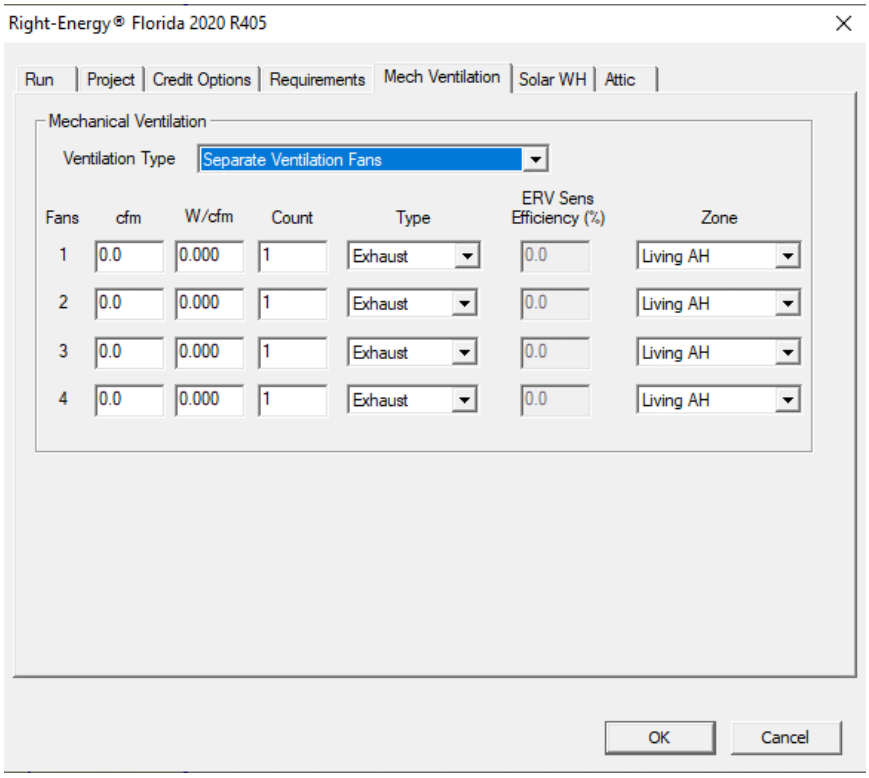
Figure 26 - Mechanical Ventilation Tab - Selected None (Performance version is the same as ERI version)



Ventilation type 'Separate Ventilation Fans'

- Select 'Separate Ventilation Fans' from the drop-down list.
- Now you can specify up to 4 types of fans for your project. These are fans that are not integrated with the heating and cooling equipment.

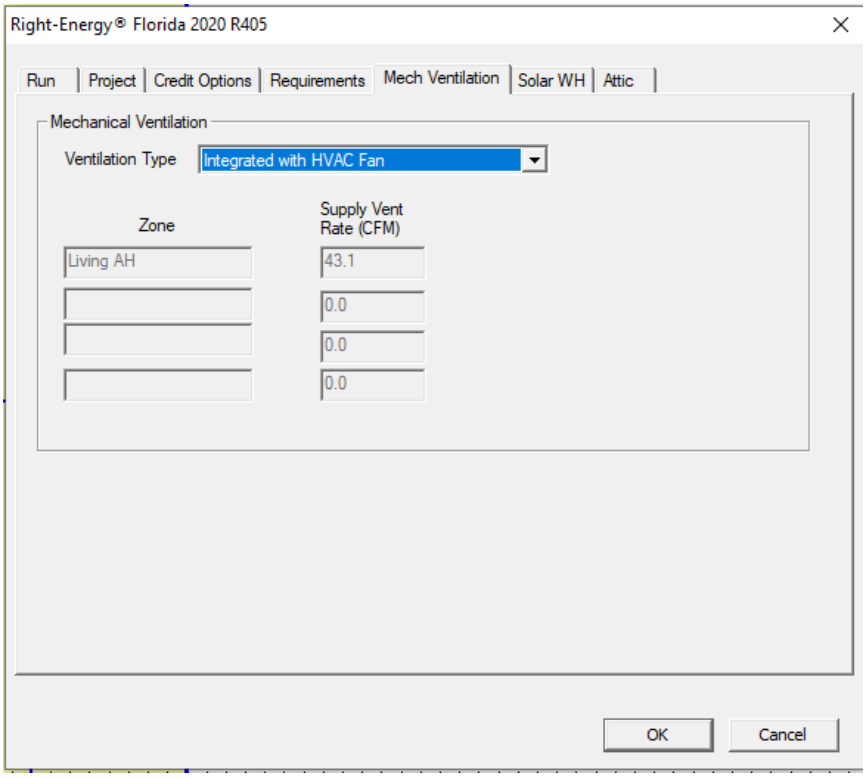
Figure 27 - Mechanical Ventilation Tab - Selected Separate Ventilation Fans (Performance version is the same as ERI version)



Ventilation type 'Integrated with HVAC Fan'

- Select 'Integrated with HVAC Fan' from the drop-down list.

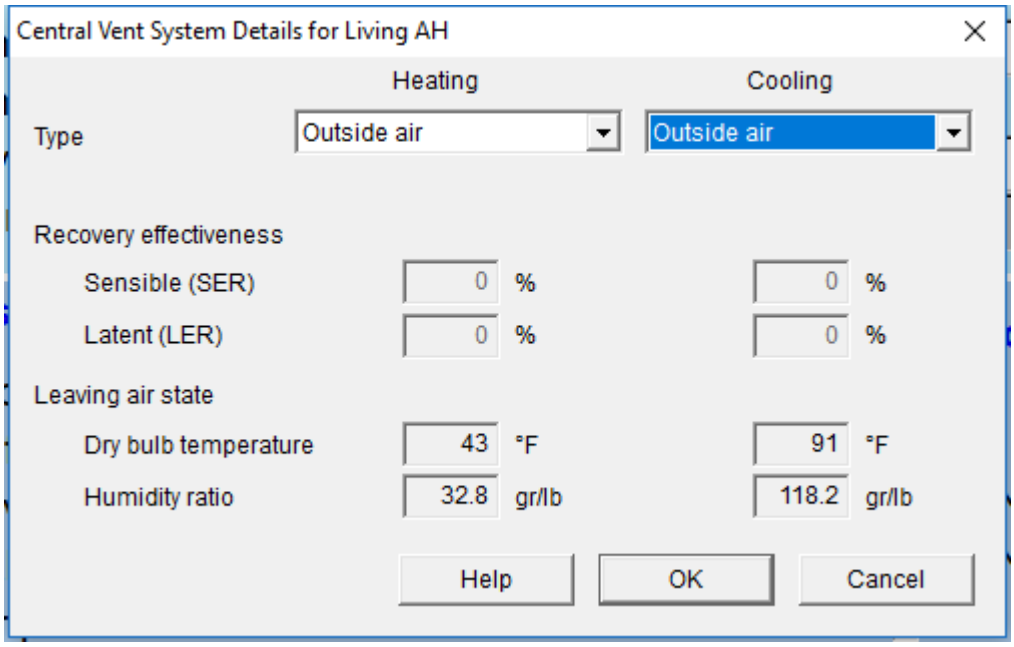
Figure 28 -Mechanical Ventilation Tab - Integrated with HVAC Fan (Performance version is the same as ERI version)



The values in this screen will be filled in from RSU's ventilation screen. You would go to this screen before you open the Right-Energy® Florida 2020 screen.

- Click the OK button to close the Right-Energy® Florida 2020 screen.
- Select **Show | Multizone** from the RSU menu to display the Multizone screen.
- Select the 'Living AH' air handler, since this is the air handler that has equipment associated with it.
- Close the Multizone screen and select **Show | Zone Information** from the RSU menu to display the Zone Information screen.
- In the 'System Characteristics' section, click on the  button next to 'Central vent type' to display the Central Vent System Details screen (Figure 29, below).

Figure 29 - Central Vent System Details



- Select 'Outside air' from the drop-down lists for Heating and Cooling.
- Click the 'OK' button to transfer your selection to RSU.
- Select the Ventilation Method that you want to use from the drop-down list in the 'Ventilation' section.

The 'Central vent supply AVF' and 'Exhaust AVF' for Heating and Cooling will be displayed in the 'Ventilation' section. These values will also be transferred to the 'Mech Ventilation' page of the Right-Energy® Florida 2020 screen.

- Select **File | Code Compliance | Right-Energy® Florida 2020** from the RSU menu.
- Click on the 'Mech Ventilation' tab.

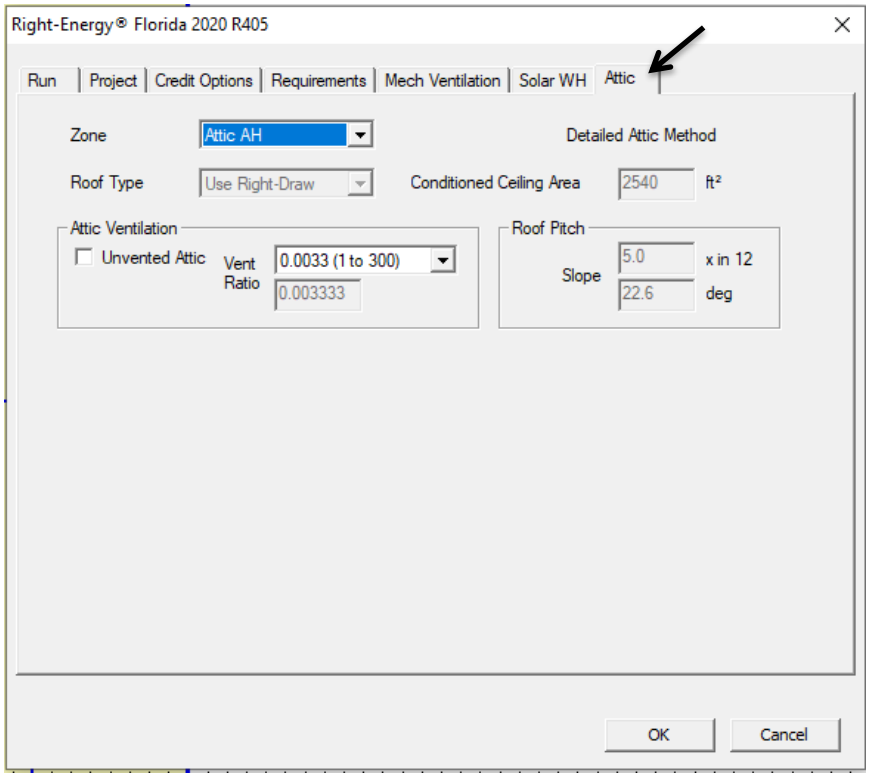
Note that the Supply Vent Rate has been transferred from the Zone Information screen.

Compliance - Attic Tab (Performance and ERI)

Next is the attic. This appears in both Performance and ERI screens.

- Click on the 'Attic' tab.

Figure 30 - Attic Tab



- Since we drew our attic, the 'Roof Type' is set to 'Use Right-Draw'. Right-Energy Florida 2020 will derive the attic type from your drawing. If we were using the simplified attic method, you would be able to select a Flat, Gable, or Hip roof type.
- The ceiling area has been extracted from the room that we drew. Select whether the attic is ventilated or not and the ventilation ratio. Our attic is ventilated. So, leave the checkbox unchecked. Leave the 'Vent ratio' at 1 to 300.
- Attic ventilation. If your project has an unvented attic, check the 'Unvented Attic' checkbox. Otherwise select the 'Ventilation Ratio' from the dropdown list. If you select 'Custom…', enter the custom ratio that you want to use. For this example, we will leave the checkbox unchecked (indicating that we have a vented attic) and leave the 'Vent Ratio' set to '0.003 (1 to 300). See Section R405.7.3 in the Code for installation requirements.
- The slope (tilt) of the roof has been calculated from our drawing. If we were using the simplified attic method, you would need to enter this information.

Compliance - Appliances and Lighting Tabs (ERI only)

ERI requires the details of the household appliances. These two tabs do not appear in the Performance screens.

The sources for the appliances and lighting inputs are defined in ANSI/RESNET/ICC 301/2014.Figure 1

Figure 31, below, covers Refrigerator and Freezer, Range and Oven, Clothes Dryer and Washer.

Figure 31 - "Appliances" Tab (ERI only)

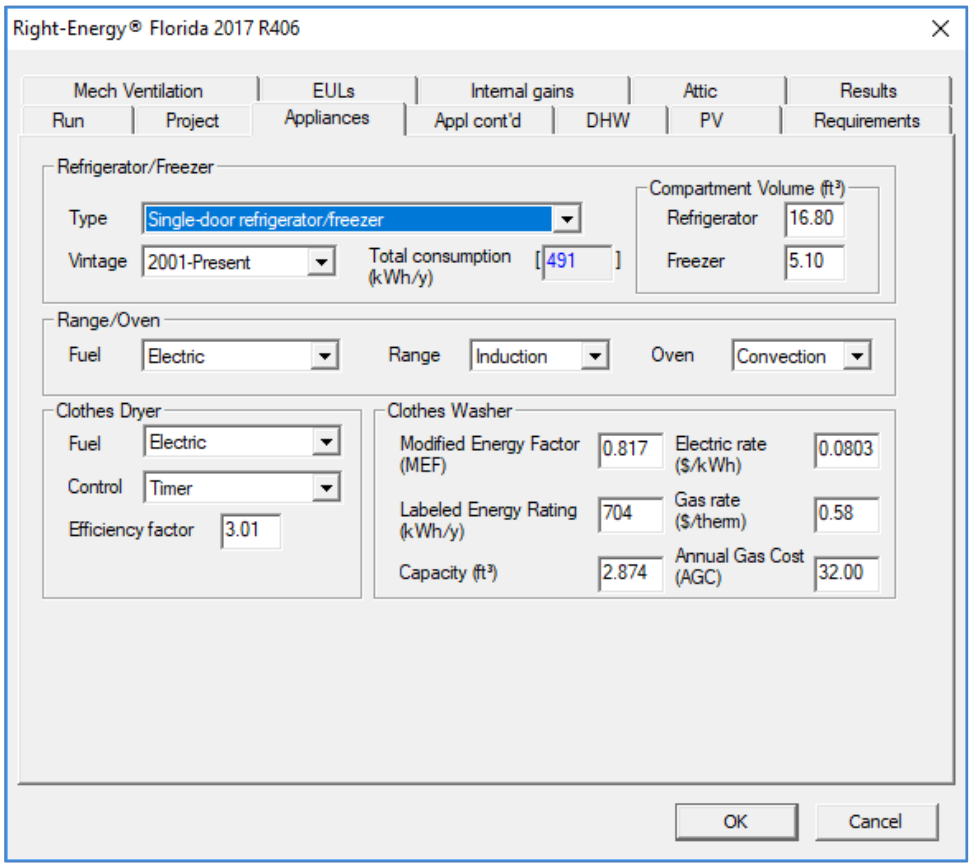
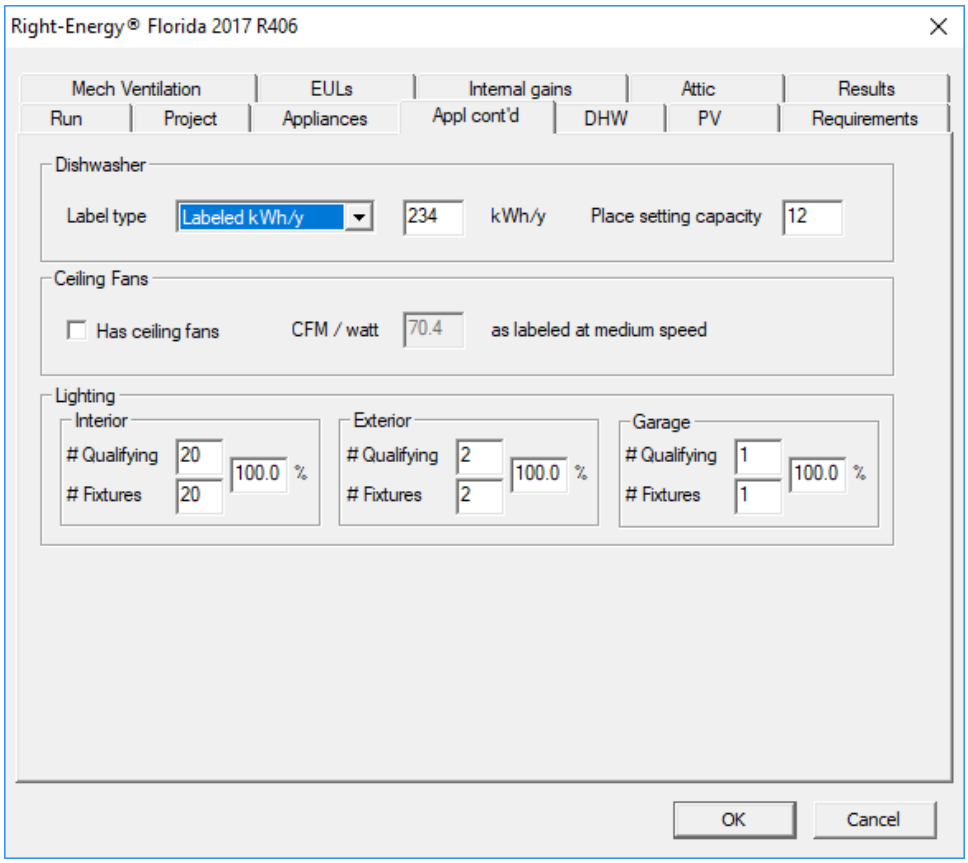


Figure 32, below, covers Dishwasher, Ceiling Fans and Lighting.

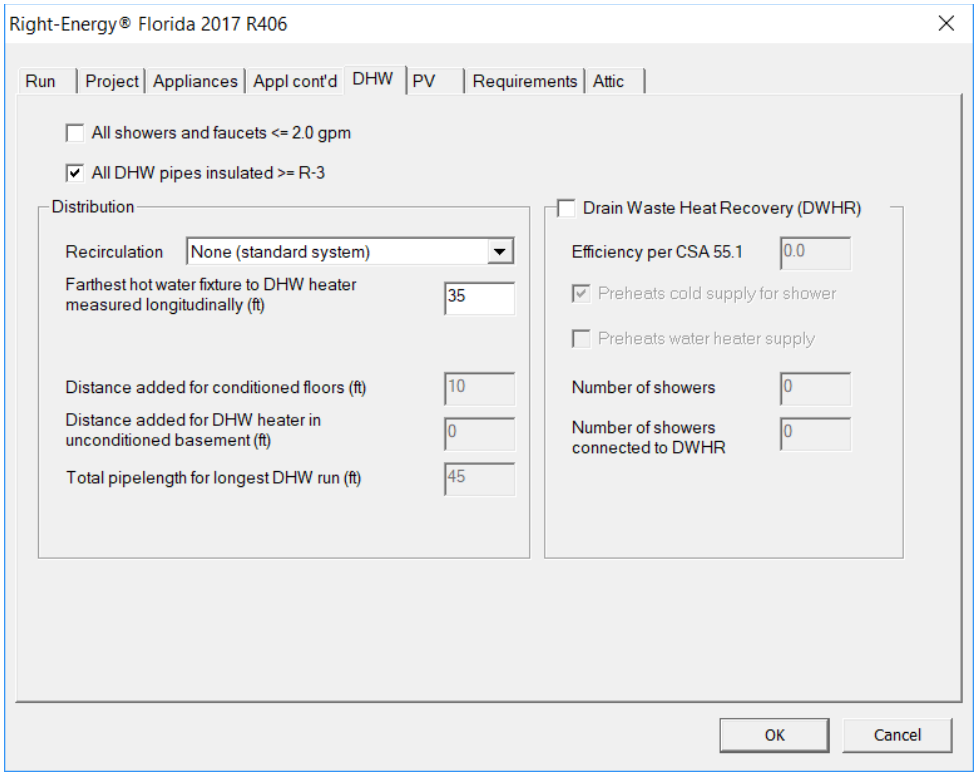
Figure 32 - "Appliances con'd" Tab (ERI only)



Compliance - Domestic Hot Water "DHW" Tab (ERI only)

This tab does not appear in the Performance screens.

Figure 33 - DHW Tab (ERI only)



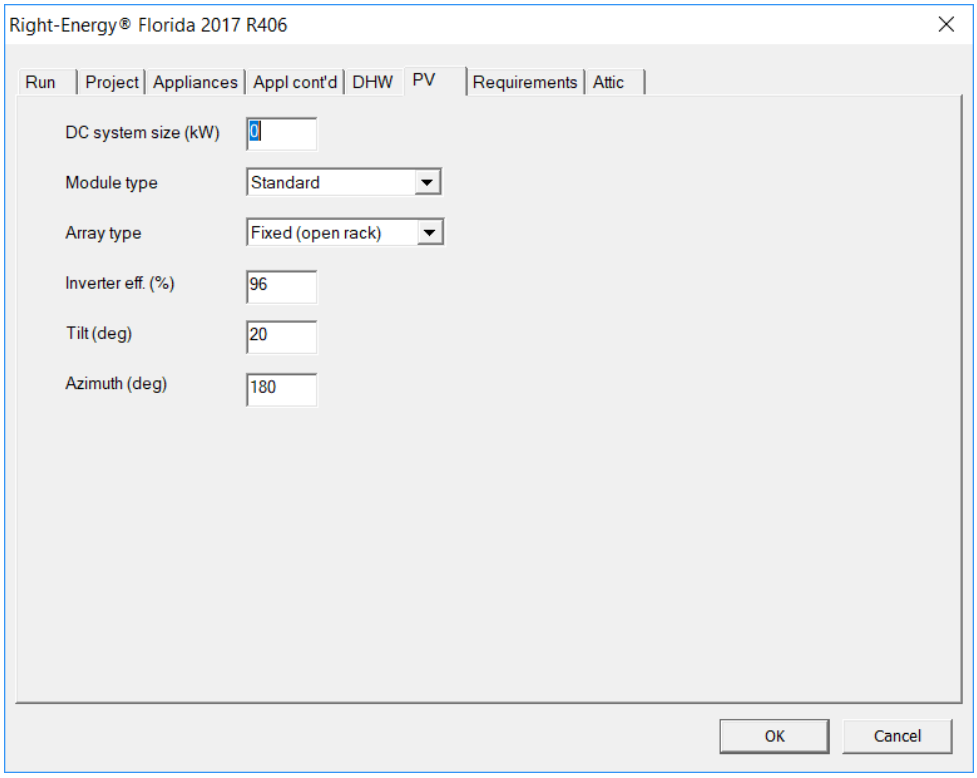
Compliance - Photovoltaics “PV” Tab(ERI only)

This tab does not appear in the Performance screens.

If your project includes a photovoltaic system to generate power on-site, enter the characteristics of the system here. The amount of electricity generated will be calculated and used in the ERI calculation.

- Click on the ‘PV’ tab.

Figure 34 - Photovoltaics "PV" Tab (ERI only)

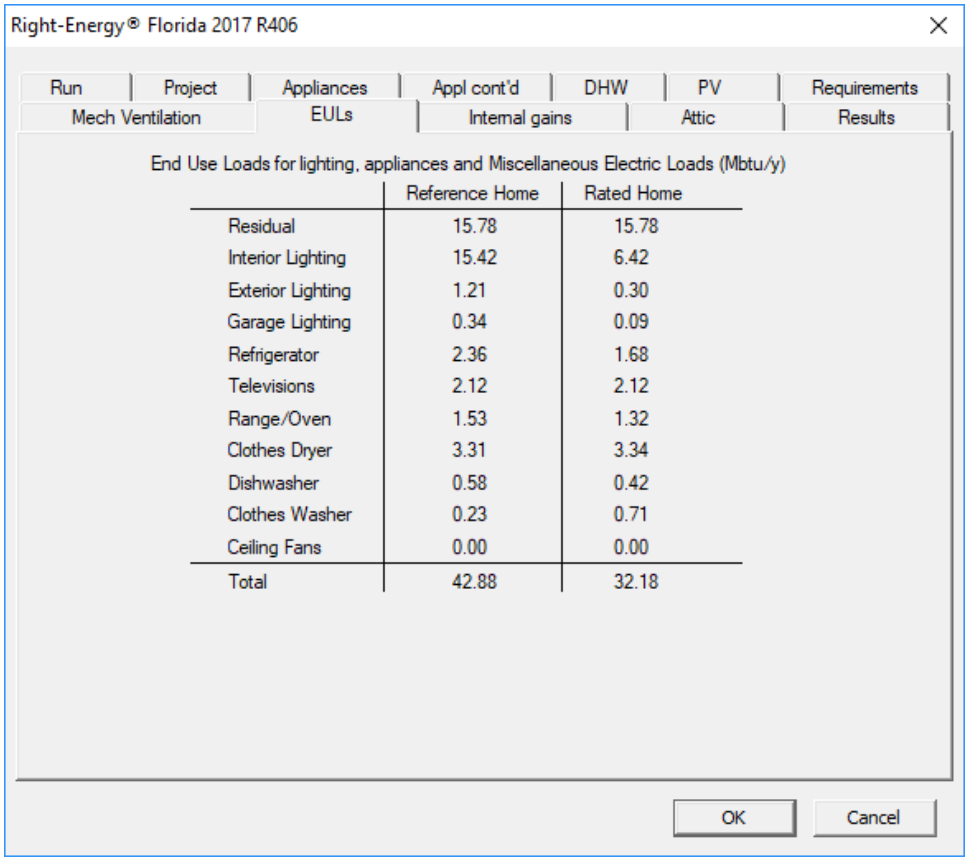


- Enter ‘3’ for the ‘DC system size’. The other values are appropriate for this example.

Compliance - End Use Loads (EULs) and Internal Gains Tabs (ERI Only)

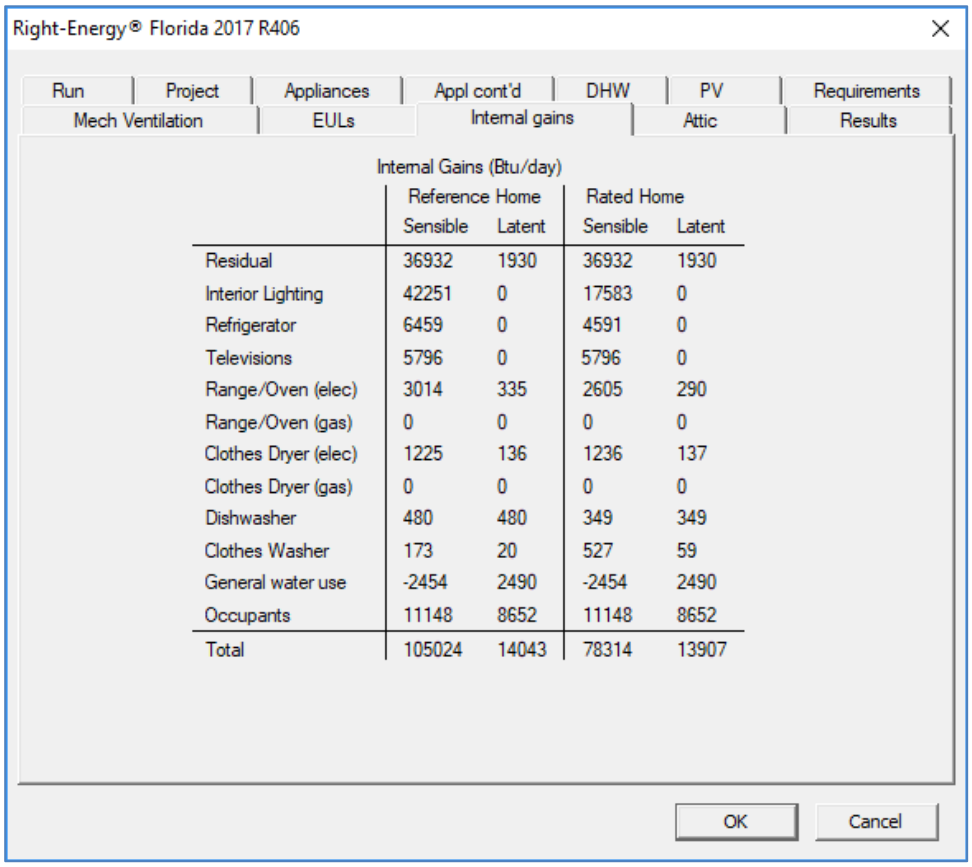
Here you can see how changes to the project affect the end use loads and internals gains for the reference and proposed buildings. The following tabs are informational only and do not take inputs from the user.

Figure 35 - End use loads (EULs) (ERI only)



	Reference Home	Rated Home
Residual	15.78	15.78
Interior Lighting	15.42	6.42
Exterior Lighting	1.21	0.30
Garage Lighting	0.34	0.09
Refrigerator	2.36	1.68
Televisions	2.12	2.12
Range/Oven	1.53	1.32
Clothes Dryer	3.31	3.34
Dishwasher	0.58	0.42
Clothes Washer	0.23	0.71
Ceiling Fans	0.00	0.00
Total	42.88	32.18

Figure 36 - Internal gains tab (ERI only)

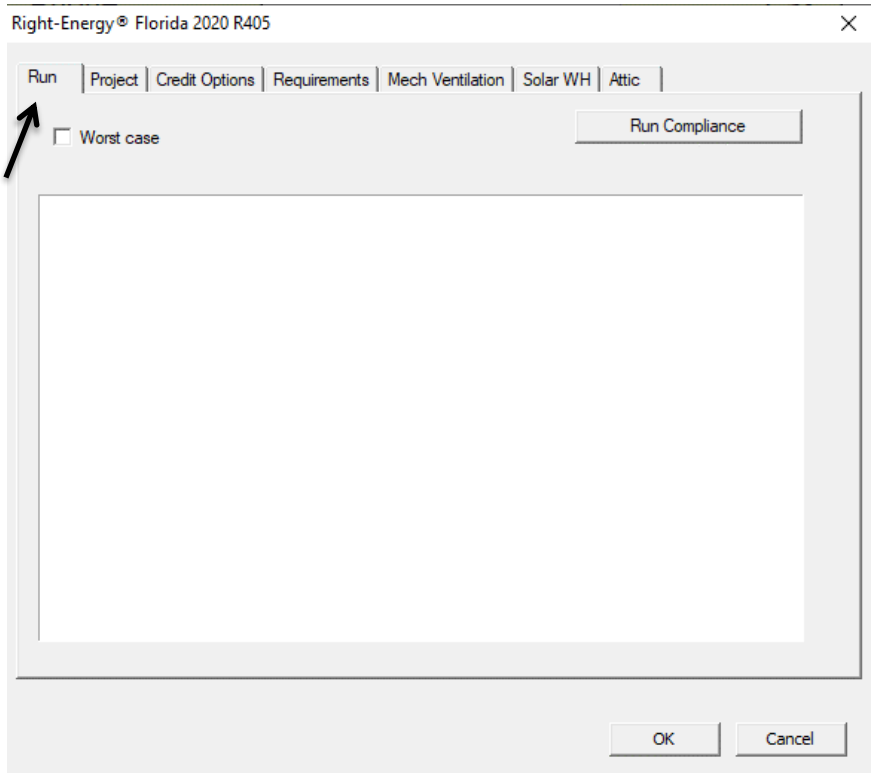


Compliance - Run Tab

We are now ready to run the compliance calculations. The run tab is the same for the Performance and ERI screens.

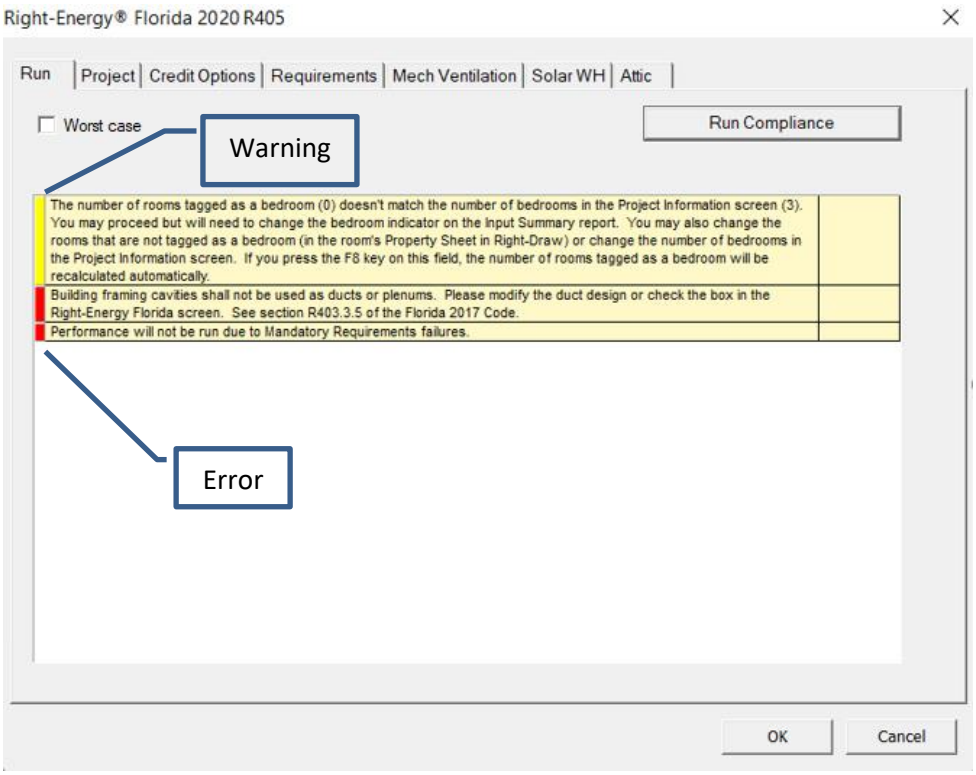
- Click on the 'Run' tab.

Figure 37 - Run Tab (Performance version is the same as ERI version)



- Click the 'Run Compliance' button.
- If RSU finds any warnings or errors prior to running the simulation, such as a building material that cannot be mapped, you will see them in this window (Figure 38, below).

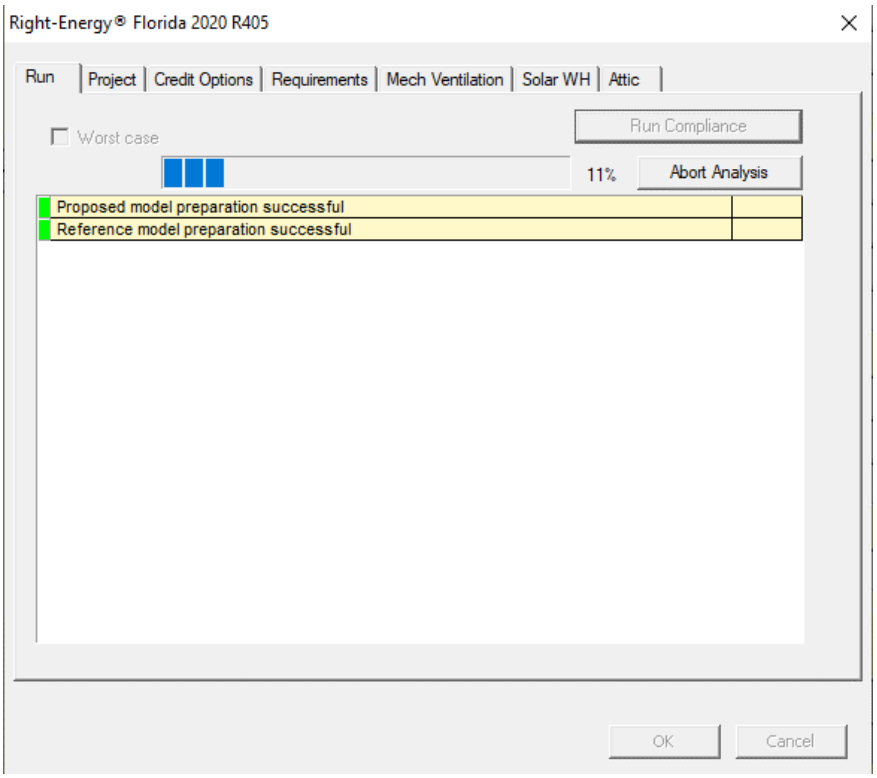
Figure 38 - Run Tab - Compliance did not run due to an error in the project.



- Warning messages are shown with a yellow tag, as indicated above. Warnings do not prevent the run from proceeding, but should be investigated.
- Error message have a red tag. The run will not proceed if there are errors.
- Messages with a green tag are just for information.

When the analysis gets underway, a small progress bar will appear to keep you informed of run progress.

Figure 39 - Compliance analysis is in progress.



Compliance - Reports

When the run is complete, the overall energy model results are displayed. PASS or FAIL is shown near the bottom of this screen (Figure 40, Performance, and Figure 41, ERI).

Figure 40 - Performance Results

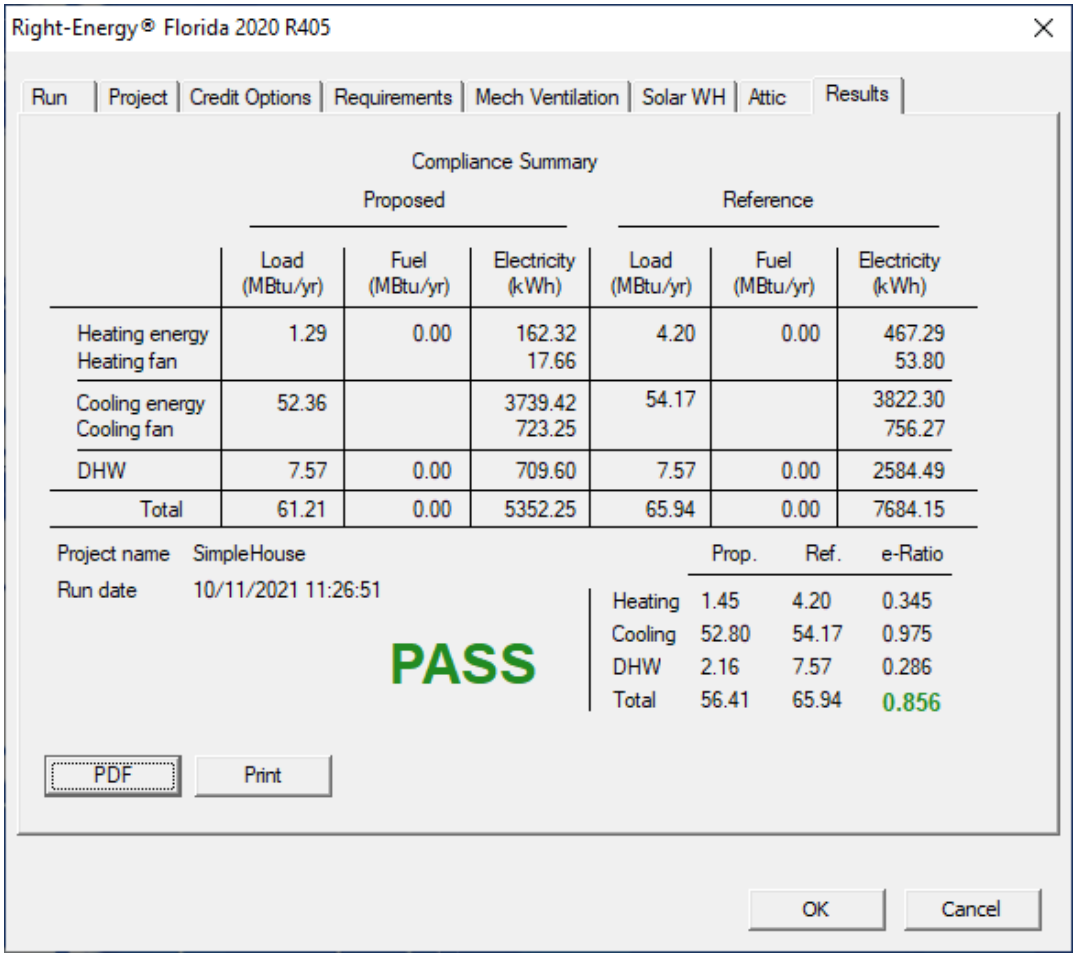
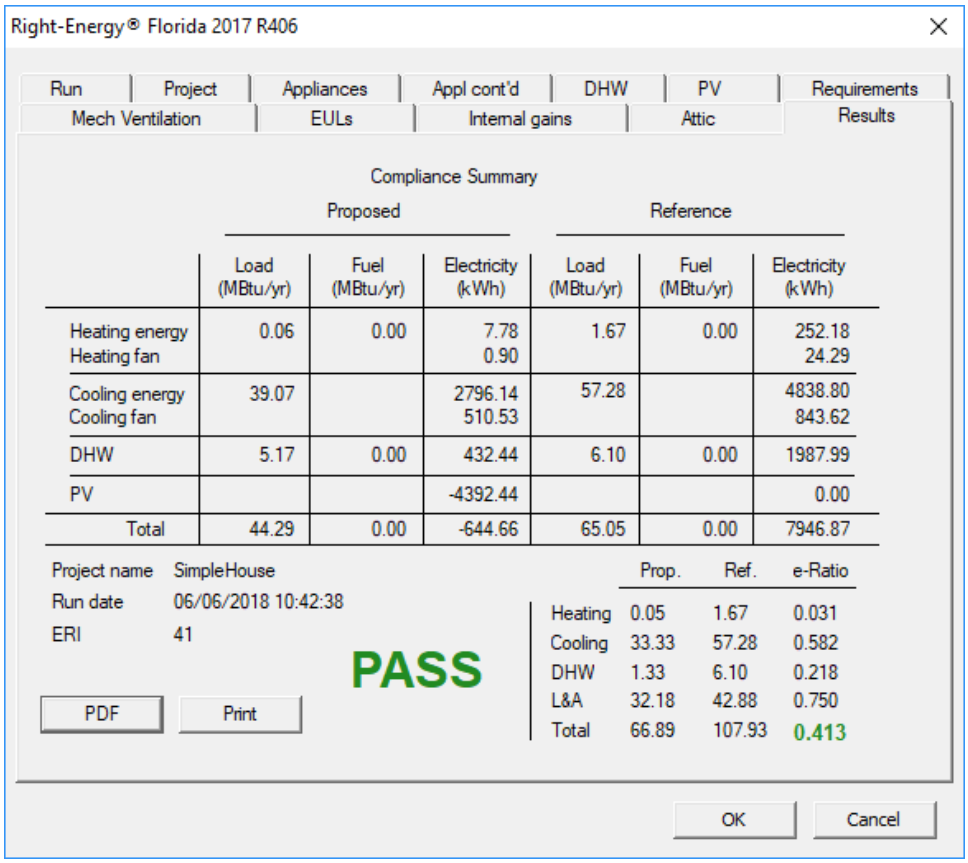
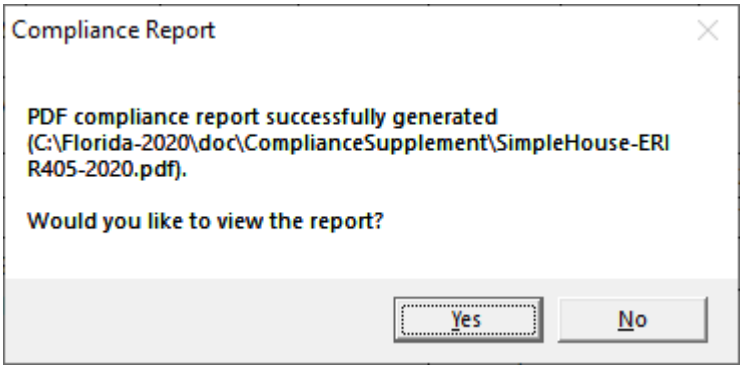


Figure 41 - ERI Results.



Click on the 'Print' button to generate and print the reports directly. Click on the 'PDF' to generate, view and print a PDF document of the reports. When the reports are generated, you are given the opportunity to view the reports (not shown here, see Appendix C for an example). The reports are generated as a PDF document that you can view and print if you have a PDF viewer. The PDF document will be generated in the same folder as the original RSU project (.rup) file. The exact location of the PDF document will appear in the screen below.

Figure 42



Detailed Input Description

This section provides specific details about Right-Suite Universal (RSU) inputs that are used by Right-Energy® Florida 2020.

If you are a new RSU user, you should refer to other documentation to become familiar with general input capabilities. In particular, note the use of overrides (activated using the F8 key) that allow altering default input values.

Project Information Screen

This screen should be filled out just like it would for the load calculations. Pay careful attention to the following:

- Note that the Florida Climate zone is linked to the Weather Location project data. You have to select the Weather Location in the Project Information Screen.
- In the 'Customer' section, enter the Name, Address, City State, Zip Code
- In the 'Contractor' section, enter the Name and/or Company.
- In the 'Site' section, you can check the checkbox at the top to copy the information that is in the 'Customer' section. Enter the County and Lot info. (if appropriate).
- In the 'Job' section, the Orientation information is used for documentation only and does not modify or effect modeled surface orientations.
- Number of bedrooms is important for Florida 2020. The default value is derived from Right-Draw room type property. You should override the default if it is not correct.
- Enter the Jurisdiction in the Job section.
- The Weather location is not needed for Florida 2020 compliance. However, it is good practice to select appropriate weather data for the building location. With accurate weather data, you can use all the other features of RSU, such as load calculations, duct design, and equipment operating cost comparison (assuming you have any required module licenses). It is also used to derive the Climate Zone.

Zone Information Screen

The zone information screen includes information about ventilation. This information is used *only* for loads calculations.

Infiltration

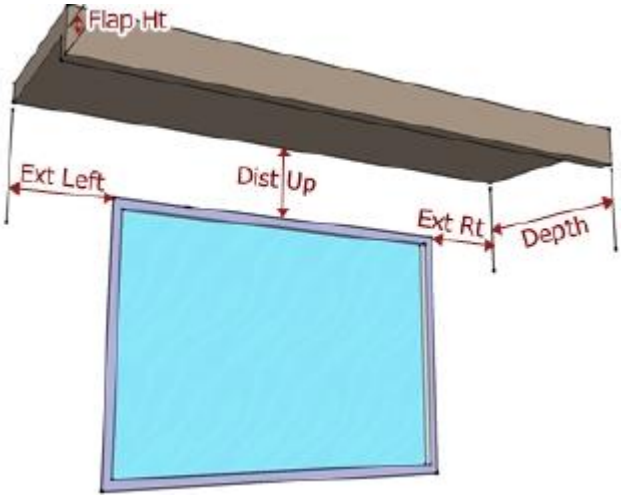
Infiltration data for compliance is entered on the normal RSU Infiltration screen. The greater of the heating or cooling ACH will appear in the Building Input Summary Report.

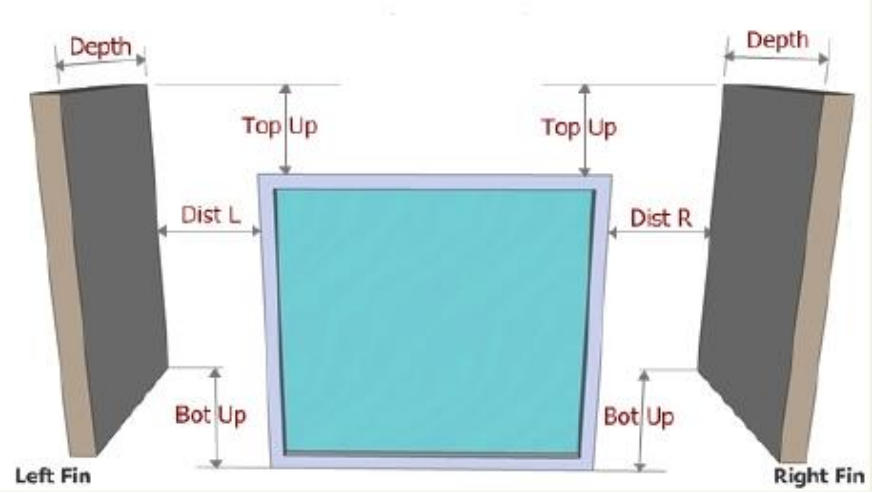
Right-Draw®

Drawing procedures are identical to those used for loads calculations. Right-Energy® Florida 2020 models the house at the zone level (not room level), so if you are not doing room-by-room load calculations (e.g. for duct design), you do not need to draw each room (i.e., draw the building as if you are doing a block load). Right-Energy® Florida 2020 combines all rooms within each zone, so compliance analysis will work correctly with or without room level input.

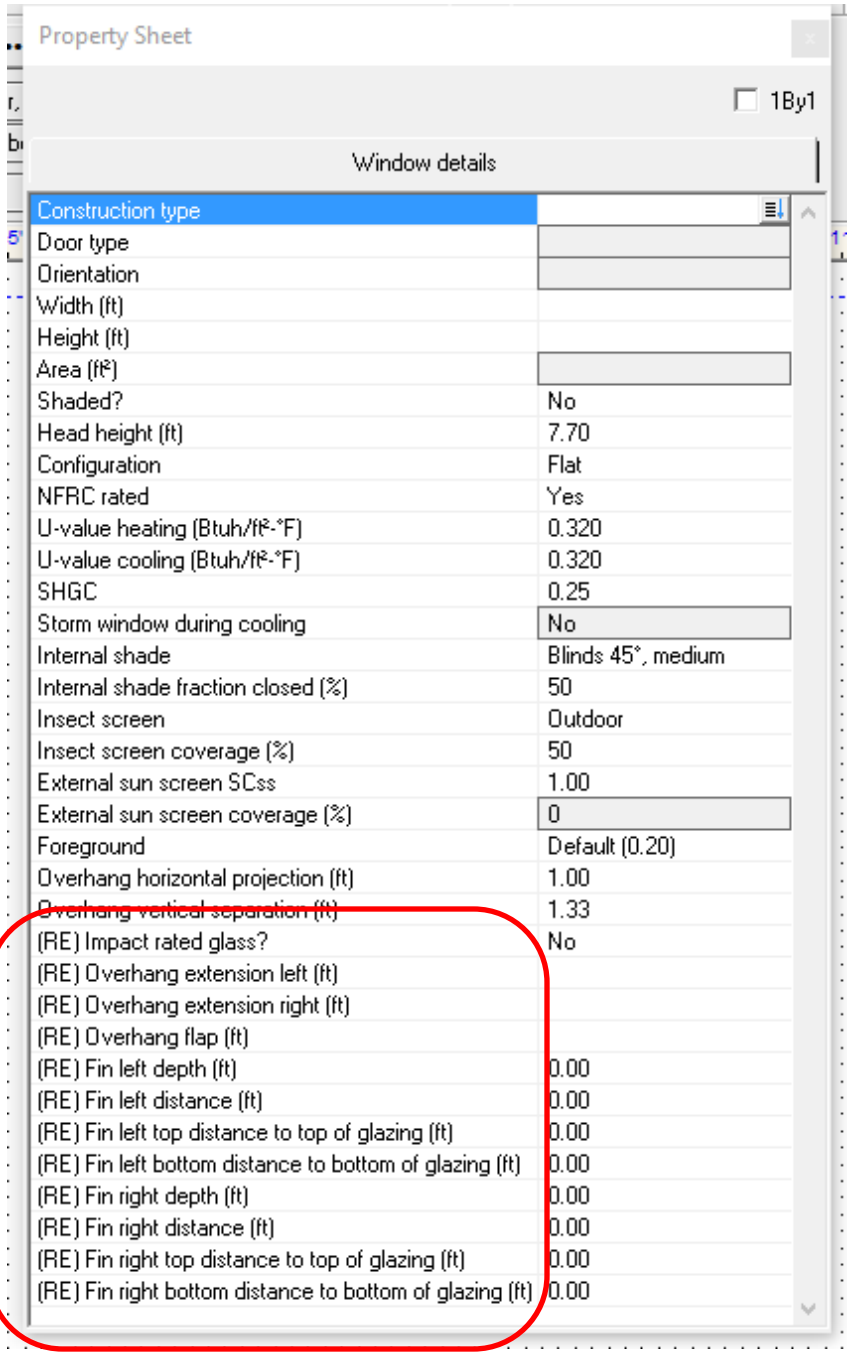
Pay careful attention to the following:

- When adding sheets, be sure that the 'Elevation' is accurate. RSU doesn't require the elevations to be real, just in ascending order to determine which sheet is above which. For compliance, however, the actual elevation is needed. This means that even the lowest level may not be at 0 elevation. If the floor is 3" above grade, you need to indicate that. If the floor is slab-on-grade, use the thickness of the slab as the elevation.
- Even though attics don't need to be entered for RSU load calculations, they need to be entered for Florida 2020 compliance. You may use the simplified attic method in the Compliance screen or you must draw the attic. Draw a room (or rooms) in a separate level and set the room type to 'Unconditioned attic'. If there are no walls in the attic, set the room height to zero. Set the 'Room heating condition' and 'Room cooling condition' to 'None'. Make sure the rooms below the attic and the attic rooms themselves have the ceiling construction set to a 'ceiling below attic' construction. Also be sure to add a Right-Draw Ceiling with the appropriate roof type. If you have other rooms that are unconditioned (like a garage), put the attic rooms in a separate zone.
- **Room property sheet**: Set the Room type. Attics, bedrooms and garages are particularly important for compliance. If you do not draw each room, be sure to override Number of bedrooms on the Project Information screen.
- **Wall property sheet**: Wall constructions (accessible via the […] buttons on e.g. Wall 1, type) provide many standard constructions plus some recently added for consistency with Right-Energy® Florida 2020. EIFS (exterior insulating finish system) is a new choice – to use it you must select EIFS (under Exterior) and the appropriate Exterior board insulation (to represent the foam layer of the system).
- **Ceiling property sheet**: For ceilings under an attic, wood shakes; tile, slate, concrete; and metal roof materials will include an air gap under the roof. Other roof materials do not include an air gap. Therefore, if you have another roof material selected, and there is an air gap, you will need to switch to 'Custom layers' and add an air gap manually. For ceilings under an attic, you can specify the attic by either using Right-Draw to draw the attic rooms and roof (detailed attic method) or by entering the necessary data in the Attic tab of the Compliance screen (simplified attic method).
- **Floor property sheet**: For 'On/Below Grade' floors, there is an option for '80% carpet / 20% bare' in the Floor finish group. This is the Right-Energy® Florida 2020 default for slab floor construction.
- **Window property sheet**: The construction and dimensions of the window are used in compliance. The width, height, and head height are needed for compliance, as well as the presence of an insect screen. There is an additional option of 'Impact rated glass'. If you are using this type of glass in your project, be sure to indicate it here. The Florida 2020 Code requirements are different for this type of glass than for other types. There are more overhang options needed than there are for RSU load calculations:



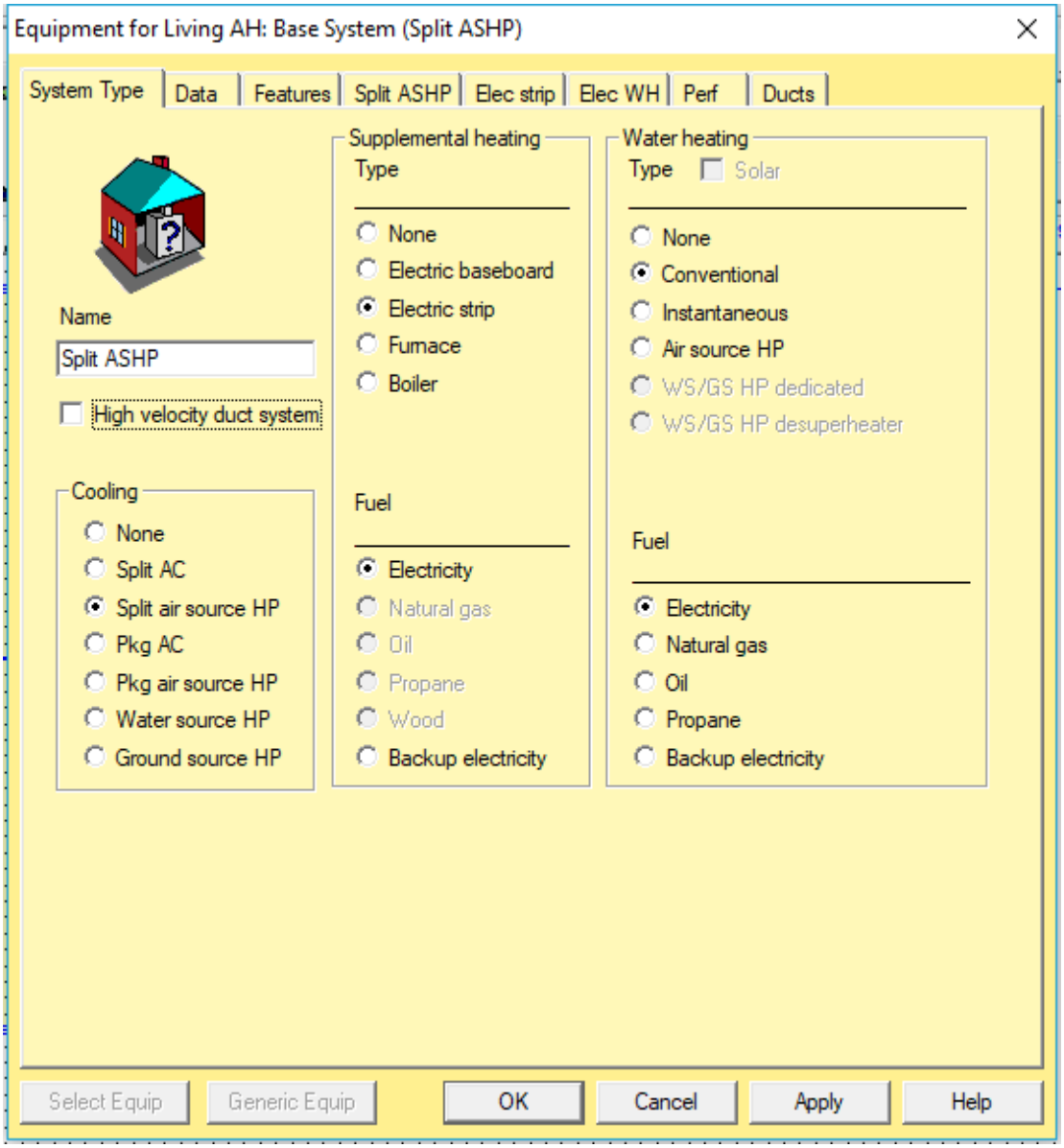


Enter these values in the Property Sheet for the window (see below).



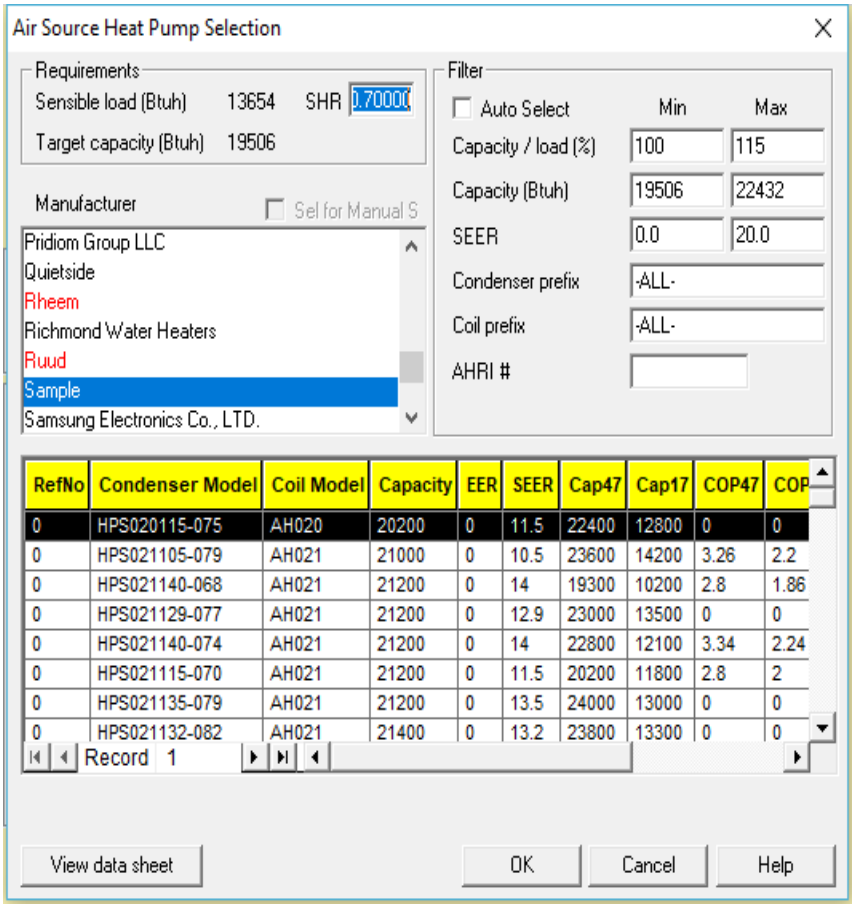
Equipment Screens

You need to select heating, cooling, and DHW equipment for compliance. Select **Show | Equipment** from the main RSU menu to display the Equipment Screen.

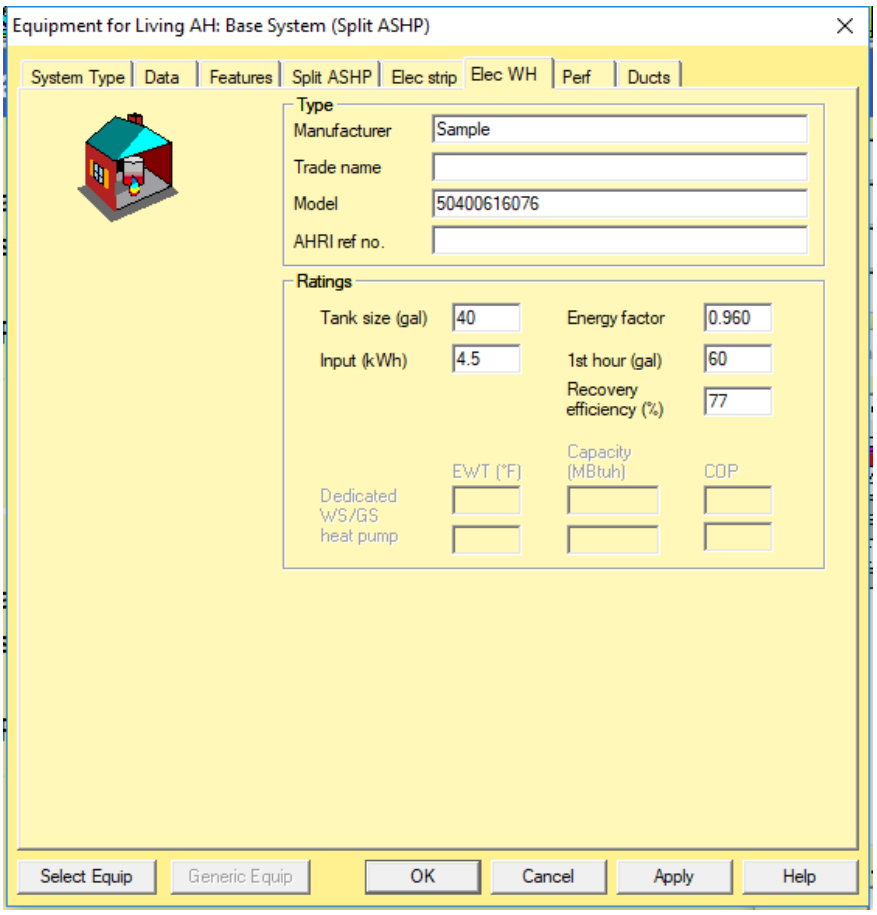


In this screen, enter the cooling, heating, and water heating equipment types. You will select the specific units in other screens.

Right-Energy® Florida 2020 handles split and packaged air-conditioning and heat pump HVAC systems.



The Split AC tab contains detailed information about the air conditioner. To select the specific unit, click the 'Select Equip' button. The fan cfm and Watts must be carefully chosen.



The Gas WH tab has information about the specific water heating unit. Click the 'Select Equip' button to select the unit.

Additional Considerations

Attics – Attics are not normally explicitly described in RSU. However, they need to be defined for compliance. RSU will generate a default attic when there is a 'Ceiling under Attic' in the building and an attic is not defined above it. Wood shakes; tile, slate, concrete; and metal roof materials will include an air gap under the roof. Other roof materials do not include an air gap. Therefore, if you have another roof material selected, and there is an air gap, you will need to switch to 'Custom layers' and add an air gap.

Garages – Garages are usually not conditioned and, therefore, not considered for load calculations. However, compliance requires that they be defined. When you enter an attached garage, be sure to set the following in the Room Property Sheet for the garage:

1. Set 'Include in calculations?' to 'Yes'.
2. Set the 'Room heating condition' and 'Room cooling condition' to '[None]'.
3. Set the 'Room type' to 'Garage'.

Appendix A. Mandatory Requirements

The following mandatory requirements are checked prior to performing a compliance run. Errors (tagged red on the Florida 2020 Code Compliance screen) will prevent the compliance from being run. These must be corrected and the compliance re-run. Warnings (tagged yellow on the Florida 2020 Code Compliance screen) will not prevent the compliance from being run. However, you should review the message and the Code carefully to be sure that you comply.

The following mandatory requirements are checked prior to performing a compliance run:

Requirement	Code reference	Description	Prevents compliance from running
Climate zone		Must be 1 or 2. This is derived by RSU from the selected Weather Location in the Project Information Screen.	Yes
Site state, Weather Location state		The Site State and Weather Location state must be 'FL'. These are in the Project Information Screen.	Yes
Infiltration ACH	R402.4.1.2	The building or dwelling unit shall be tested and verified as having in air leakage rate of not exceeding 7 (Performance) or 5 (ERI) air changes per hour in Climate Zones 1 and 2.	Yes
Fireplaces must use outdoor combustion air	R402.4.2	Please change this option in the Requirements tab of the Right-Energy® Florida 2020 screen.	Yes
Fireplaces must use flue dampers	R402.4.2	Please change this option in the Requirements tab of the Right-Energy® Florida 2020 screen.	Yes
Supplementary heating equipment controls	R403.1.3	The supplementary heating equipment cannot run when the heat pump can meet the load by itself. Set the controls in the heat pump page of the Equipment Screen	Yes
Building framing cavities as ducts	R403.3.5	Building framing cavities shall not be used as ducts or plenums.	Yes
Air handler in attic		Air handlers can be in the attic when several conditions are met. See the code for these conditions.	No
Hot water heater heat traps	R403.5.5	Heat traps must be used with storage water heaters. Please check the checkbox in the Florida 2020 Screen	Yes
Solar water heating systems	R403.5.6.2.1	Solar water heating systems must be rated (FEF) and certified (FSEC Cert.) by the Florida Solar Energy Center. Please enter this information in the Solar WH tab in the Right-Energy® Florida 2020 screen.	Yes
Load calculation method	R403.7	The Manual J load calculation method must be used. Select this in the Options menu.	Yes
Equipment specified	R403.7	The make, model, and capacities must be selected. Enter this data in the Equipment Screens.	Yes
Equipment capacities	R403.7	Equipment capacities must be between the low and high limits. See the code for details and exceptions.	No

Requirement	Code reference	Description	Prevents compliance from running
Equipment size to Manual S	R403.7	Heating and cooling equipment shall be sized in accordance with ACCA Manual S. Please check the box in the Right-Energy® Florida 2020 screen.	Yes
Ceiling insulation	R405.2.1	Ceiling insulation is below the required minimum. Change the ceiling construction.	Yes
Equipment efficiencies	R303.1.2	Equipment efficiencies must be at least the prevailing Federal minimum standards.	Yes

Appendix B. Error Messages

When you run a compliance, RSU does a 'consistency check and a mandatory requirements check before running the compliance. Consistency Check messages probably won't prevent the compliance from running. However, if the message indicates a condition that you weren't expecting, you should correct it.

Consistency Checks

- Rooms in an unconditioned attic must ALL be in a separate zone and have the 'Uncond Attic' type set in the Room's Property Sheet in Right-Draw®. RSU will check to see if this condition is true. If it finds a room that is set to 'Uncond Attic', it will check to make sure that all of the other rooms in that zone are set to 'Uncond Attic'. If not, it will display the following message in the Right-Energy® Florida 2020 screen:

  > Zone 'xxx' contains rooms of type 'Uncond Attic', however not all rooms in this zone have type 'Uncond Attic'.

When you run a compliance, the mandatory requirements will be checked before the compliance is run. There may be error and warning messages in the Run tab of the Right-Energy® Florida 2020 screen during this operation. The messages should be self-explanatory and they give the section of the Code for further explanation.

When the compliance starts, you probably won't get any errors. The purpose of the mandatory requirements check is to ensure that the compliance will run successfully. However, you may occasionally get error messages during the compliance run. The message on the screen will indicate that 'Data retrieval failed…'. This indicates that the simulation itself could not complete.

If you get an error message that you cannot decipher, please call Wrightsoft technical support at 800-225-8697 or email us at support@wrightsoft.com.

Footnotes on the Form R405-2020 Summary Report

At the bottom of the Form R405-2020 Summary Report, there will be a series of footnotes. These footnotes are reminders of further action required. Some appear based on inputs that you have provided.

The first two appear on all reports:

- Compliance requires certification by the air handler unit manufacturer that the air handler enclosure qualifies as certified factory-sealed in accordance with R403.3.2.1.
- Compliance requires an Air Barrier and Insulation Inspection Checklist in accordance with R402.4.1.1 and starting July 1, 2020, this project requires an envelope leakage test report with envelope leakage no greater than 7.0 ACH50 (R402.4.1.2).[1]

If you selected the Cool Roof option in the Credit Options tab of the Right-Energy® Florida 2020 screen, the following will appear as a footnote:

[1] The value for ACH50 will be that used in the calculations for the rated building. 7.0 is the maximum allowed under the code.

- Compliance requires a roof absorptance test and roof emittance test in accordance with R405.7.2.

If you selected Proposed Qn for the Leakage type on the Ducts tab of the Equipment screen, the following will appear as a footnote:

- Compliance with a proposed duct leakage Qn requires a Duct Leakage Test Report confirming duct leakage to outdoors, tested in accordance with Section 803 of RESNET Standards, is not greater than x.xxx Qn for whole house.
  Note that 'x.xxx' above will be replaced with the Qn value that you entered on the Ducts tab.

If you selected Proposed Leak Free for the Leakage type on the Ducts tab of the Equipment screen, the following will appear as a footnote:

- Compliance with a proposed leak free duct leakage requires a Duct Leakage Test Report confirming duct leakage to outdoors, tested in accordance with Section 803 of RESNET Standards, is not greater than 0.030 Qn for whole house.
  Note that '0.030' above is a Code requirement and cannot be modified.

Appendix C. Sample Compliance Documentation

RESIDENTIAL ENERGY CONSERVATION CODE DOCUMENTATION CHECKLIST

Florida Department of Business and Professional Regulation
Simulated Performance Alternative (Performance) Method

Applications for compliance with the 2020 Florida Building Code, Energy Conservation via the residential Simulated Performance method shall include:

- ☐ *This Checklist*
- ☐ *Form R405-2020 report*
- ☐ *Input summary checklist that can be used for field verification (usually four pages/may be greater).*
- ☐ *Energy Performance Level (EPL) Display Card (one page)*
- ☐ *HVAC system sizing and selection based on ACCA Manual S or per exceptions provided in Section R403.7*
- ☐ *Mandatory Requirements (five pages)*

Required prior to CO:

- ☐ *Air Barrier and Insulation Inspection Component Criteria checklist (Table 402.4.1.1 - one page)*
- ☐ *A completed 2020 Envelope Leakage Test Report (usually one page); exception in R402.4 allows dwelling units of R - 2 Occupancies and multiple attached single family dwellings to comply with Section C402.5*
- ☐ *If FORM R405 duct leakage type indicates anything other than "default leakage", then a completed 2020 Duct Leakage Test Report - Performance Method (usually one page).*

FORM R405-2020

FLORIDA ENERGY EFFICIENCY CODE FOR BUILDING CONSTRUCTION

Florida Department of Business and Professional Regulation - Residential Performance Method

Project Name:	Right-Energy® Florida 2017 Example	Builder Name:	
Street:	1516 Ninth Street	Permit Office:	Tampa
City, State, Zip:	Tampa, FL 33601	Permit Number:	2222-1
Owner:	Mr. and Mrs. Henry Wagner	Jurisdiction:	Hillsborough County
Design Location:	FL, Tampa International AP	County:	Hillsborough (Florida Climate Zone 2)

1. New construction or existing	New (From Plans)
2. Single family or multiple family	Single-Family
3. Number of units, if multiple family	1
4. Number of bedrooms	3
5. Is this a worst case?	No
6. Conditioned floor area above grade (ft²)	2100.00
Conditioned floor area below grade (ft²)	0

7. Windows (340 ft²)	Description	Area (ft²)
a. U-Factor:	Sgl, 0.032	299.17
SHGC:	0.25	
b. U-Factor:	Dbl, 0.032	40.56
SHGC:	0.25	
c. U-Factor:		
SHGC:		
d. U-Factor:		
SHGC:		

Area Weighted Average Overhang Depth: 1.000 ft
Area Weighted Average SHGC: 0.250

8. Floor types (2100.00 ft²)	Insulation (R)	Area (ft²)
a. Bg floor, light dry soil, on gra	0.0	2100.00
b. N/A		
c. N/A		

9. Wall types (1728 ft²)	Insulation (R)	Area (ft²)
a. Frm wall, eifs ext, r-15 cav ins	19.0	1458.00
b. Frm wall, stucco ext, r-15 cav i	15.0	270.00
c. N/A		
d. N/A		

10. Ceiling types (2100 ft²)	Insulation (R)	Area (ft²)
a. Attic ceiling, asphalt shingles	38.0	2100.00
b. N/A		
c. N/A		

11. Ducts	R	Area (ft²)
a.Sup: Living AH, Ret: Living AH, AH: Living AH	8.0	222.79
b.		

12. Cooling systems	kBtu/hr	Efficiency
a.Split air source heat pump	20.2	SEER: 14.0
b.		

13. Heating systems	kBtu/hr	Efficiency
a.Split air source heat pump	22.4	HSPF: 8.2
b.		

14. Hot water systems
a.Electric conventional (40 gal) — Cap: 40 gal, UEF: 0.92
b.Conservation features
Solar:FEF=3.0

15. Credits Solar WH

Glass/Floor area: 0.162

Total Proposed Modified Loads: 56.41
Total Baseline Loads: 65.94

PASS

I hereby certify that the plans and specifications covered by this calculation are in compliance with the Florida Energy Code.

PREPARED BY:_____

DATE:_____

I hereby certify that this building, as designed, is in compliance with the Florida Energy Code.

OWNER/AGENT:_____

DATE:_____

Review of the plans and specifications covered by this calculation indicates compliance with the Florida Energy Code. Before construction is completed, this building will be inspected for compliance with Section 553.908 Florida Statutes.

BUILDING OFFICIAL:_____

DATE:_____

- Compliance requires certification by the air handler unit manufacturer that the air handler enclosure qualifies as certified factory-sealed in accordance with R403.3.2.1.

- Compliance requires an Air Barrier and Insulation Inspection Checklist in accordance with R402.4.1.1 and this project requires an envelope leakage test report with envelope leakage no greater than 7.0 ACH50 (R402.4.1.2).

Building Input Summary Report

PROJECT

Title:	Right-Energy® Florida 2017	Bedrooms:	3	Address type:	Street address
Building Type:	FLAsBuilt	Bathrooms:	1	Lot#:	Lot. 410-111
Owner:	Mr. and Mrs. Henry Wagner	Conditioned Area:	2100	Block/Subdivision:	Lexington Crossing
# of Units:	1	Total Stories:	1	Platbook:	111-11
Builder Name:		Worst Case:	No	Street:	1516 Ninth Street
Permit Office:	Tampa	Rotate Angle:	0	County:	Hillsborough
Jurisdiction:	Hillsborough County	Cross Ventilation:	No	City, State, Zip:	Tampa, FL 33601
Family Type:	Single-Family	Whole House Fan:	No		
New/Existing:	New (From Plans)	Terrain:	Ocean/Lake		
Year Construct:	2017	Shielding:	Suburban		
Comment:	Pre-construction				

CLIMATE

✓	Design Location	TMY Site	IECC Zone	Design Temp 97.5 %	Design Temp 2.5 %	Int Design Temp Winter	Int Design Temp Summer	Heating Degree Days	Design Moisture	Daily Temp Range
	FL, Tampa International AP	FL_Tampa_Intl_AP	2	43	91	70	75	0	53	Low

BLOCKS

#	Name	Area	Volume
1	Living AH	2100.00 ft²	18900.00 ft³

SPACES

#		Area	Volume	Kitchen	Occupants	Bedrooms	Infil ID	Finished	Cooled	Heated
1	Living	2100.00 ft²	18900.00 ft³	No	4	0	1	Yes	Yes	Yes

FLOORS (Total Exposed Area = 2100 sq.ft.)

✓	#	Floor Type	Space	Perimeter	R-Value	Area	U-Factor	Tile	Wood	Carpet
	1	Bg floor, light dry soil, on grade depth, carp 80	Living	192 ft	0	2100.00 ft²	0.989	0	0	0.8

ROOF

✓	#	Type	Materials	Roof Area	Gable Area	Roof Color	Rad Barr	Solar Absor.	SA Tested	Emitt	Emitt Tested	Deck Insul.	Pitch (deg)
	1	Gable or shed	RoofTile	2661 ft²	100 ft²	Medium	N	0.75	No	0.90	No	0	22

ATTIC

✓	#	Type	Ventilation	Vent Ratio (1 in)	Area	RBS	IRCC
	1	Full attic	Vented	300	2540.00 ft²	N	N

CEILING (Total Exposed Area = 2100 sq.ft.)

✓	#	Ceiling Type	Space	R-Value	U-Factor	Area	Framing Fraction	Truss Type
	1	Attic ceiling, asphalt shingles roof	Living	38	0.026	2100.00 ft²	0.10	–

WALLS (Total Exposed Area = 1728 sq.ft.)

✓	#	Ornt	Adjacent To	Wall Type	Space	Cavity R-Value	Width Ft	Width In	Height Ft	Height In	Area	Sheathing R-Value	U-Factor	Frm. Frac.	Solar Absor.	Below Grade%
	1	N	Exterior	Frm wall, eifs ex	Living	15	30	0	9	0	270.0 ft²	4	0.066	0.25	0.75	0
	2	E	Exterior	Frm wall, eifs ex	Living	15	36	0	9	0	324.0 ft²	4	0.066	0.25	0.75	0
	3	S	Exterior	Frm wall, eifs ex	Living	15	50	0	9	0	450.0 ft²	4	0.066	0.25	0.75	0
	4	W	Exterior	Frm wall, eifs ex	Living	15	46	0	9	0	414.0 ft²	4	0.066	0.25	0.75	0
	5	-	Partition	Frm wall, stucco	Living	15	30	0	9	0	270.0 ft²	0	0.088	0.25	0.75	0

DOORS (Total Exposed Area = 41 sq.ft.)

✓	#	Ornt	Door Type	Space	Storms	U-Value	Width Ft	Width In	Height Ft	Height In	Area
	1	N	Door, wd sc type	Living	None	0.390	3	0	6	8	20.0 ft²
	2	N	Door, wd sc type	Living	None	0.390	3	2	6	8	21.1 ft²

FORM R405-2020

WINDOWS (Total Exposed Area = 340 sq.ft.)

✓	#	Ornt	Wall ID	Frame	Panes	NFRC	U-Factor	SHGC	Impact	Area	Overhang Depth	Overhang Separation	Interior Shade	Screening
	1	N	1	None	Single (Clear)	Yes	0.032	0.25	No	14.6ft²	1 ft 0 in	1 ft 4 in	Blinds 45°	outdoor
	2	N	1	None	Single (Clear)	Yes	0.032	0.25	No	30.0ft²	1 ft 0 in	1 ft 4 in	Blinds 45°	outdoor
	3	N	1	None	Single (Clear)	Yes	0.032	0.25	No	30.0ft²	1 ft 0 in	1 ft 4 in	Blinds 45°	outdoor
	4	E	2	None	Single (Clear)	Yes	0.032	0.25	No	45.0ft²	1 ft 0 in	1 ft 4 in	Blinds 45°	outdoor
	5	S	3	Wood	Double (Clear)	Yes	0.032	0.25	No	40.6ft²	1 ft 0 in	1 ft 4 in	Blinds 45°	outdoor
	6	S	3	None	Single (Clear)	Yes	0.032	0.25	No	135ft²	1 ft 0 in	1 ft 4 in	Blinds 45°	outdoor
	7	W	4	None	Single (Clear)	Yes	0.032	0.25	No	14.6ft²	1 ft 0 in	1 ft 4 in	Blinds 45°	outdoor
	8	W	4	None	Single (Clear)	Yes	0.032	0.25	No	30.0ft²	1 ft 0 in	1 ft 4 in	Blinds 45°	outdoor

GARAGE

✓	#	Floor Area	Ceiling Area	Exposed Wall Perimeter	Avg. Wall Height	Exposed Wall Insulation
	1	440 ft²	440 ft²	54 ft	9 ft	0

INFILTRATION

#	Scope	Method	SLA	CFM 50	ELA	EqLA	ACH	ACH 50
1	Wholehouse	Blower Door	0.000401	2205	121.3	227.8	0.53	7.00

HEATING SYSTEM

✓	#	System Type	Subtype	Efficiency	Capacity	Block	Ducts
	1	Split air source heat pump		HSPF: 8.2	22.4 kBtu/hr	1	sys#1

COOLING SYSTEM

✓	#	System Type	Subtype	Efficiency	Capacity	Air Flow	SHR	Block	Ducts
	1	Split air source heat pump		SEER: 14.0	20.2 kBtu/hr	673 cfm	0.70	1	sys#1

HOT WATER SYSTEM

✓	#	System Type	Subtype	Location	EF	Cap	Use	SetPnt	Conservation
	1	Electric conventional			0.92 UEF	40 gal	60 gal	120 °F	None

SOLAR HOT WATER SYSTEM

✓	FSEC Cert #	Company Name	System Model #	Collector Model #	Collector Area	Storage Volume	FEF
	12345	Sample	SSWS-678	SSWC-123	35.0 ft²	70.0 gal	3.0

DUCTS

✓	#	Supply Location	Supply R-Value	Supply Area	Return Location	Return Area	Leakage Type	Air Handler	CFM 25 Out	Percent Leakage	QN	RLF	HVAC # Heat	HVAC # Cool
	1	Living AH	8.0	223 ft²	Living AH	15 ft²	Default Leakage	Living AH	(Default)	6.00			1	1

TEMPERATURES

Programmable Thermostat: N Ceiling Fans:

Cooling	[X]Jan	[X] Feb	[X] Mar	[X] Apr	[X] May	[X] Jun	[X] Jul	[X] Aug	[X] Sep	[X] Oct	[X] Nov	[X] Dec
Heating	[X]Jan	[X] Feb	[X] Mar	[X] Apr	[X] May	[X] Jun	[X] Jul	[X] Aug	[X] Sep	[X] Oct	[X] Nov	[X] Dec
Venting	[X]Jan	[X] Feb	[X] Mar	[X] Apr	[X] May	[X] Jun	[X] Jul	[X] Aug	[X] Sep	[X] Oct	[X] Nov	[X] Dec

Thermostat Schedule: Schedule Type	Florida Building Code, 7th Edition (2020)	Hours 1	2	3	4	5	6	7	8	9	10	11	12
Cooling (WD)	AM	75	75	75	75	75	75	75	75	75	75	75	75
	PM	75	75	75	75	75	75	75	75	75	75	75	75
Cooling (WEH)	AM	75	75	75	75	75	75	75	75	75	75	75	75
	PM	75	75	75	75	75	75	75	75	75	75	75	75
Heating (WD)	AM	72	72	72	72	72	72	72	72	72	72	72	72
	PM	72	72	72	72	72	72	72	72	72	72	72	72
Heating (WEH)	AM	72	72	72	72	72	72	72	72	72	72	72	72
	PM	72	72	72	72	72	72	72	72	72	72	72	72

ENERGY PERFORMANCE LEVEL (EPL) DISPLAY CARD

ESTIMATED ENERGY PERFORMANCE INDEX = 86

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

1. New home or addition	1.	New (From Plans)
2. Single-family or multiple-family	2.	Single-Family
3. Number of units, if multiple-family	3.	1
4. Number of bedrooms	4.	3
5. Is this a worst case? (yes/no)	5.	No
6. Conditioned floor area (ft²)	6.	2100.00
7. Windows, type and area*		
a. U-Factor:	7a.	Sgl(Avg), 0.032
b. Solar Heat Gain Coefficient (SHGC):	7b.	0.25
c. Area (ft²)	7c.	340
8. Skylights		
a. U-Factor:	8a.	
b. Solar Heat Gain Coefficient (SHGC):	8b.	
9. Floor type, insulation level		
a. Slab-on-grade (R-value):	9a.	0.0
b. Wood, raised (R-value):	9b.	
c. Concrete, raised (R-value)	9c.	
10 Wall type and insulation:		
a. Exterior:		
1. Wood frame (Insulation R-value):	10a1.	19
2. Masonry (Insulation R-value):	10a2.	
b. Adjacent:		
1. Wood frame (Insulation R-value):	10b1.	15
2. Masonry (Insulation R-value):	10b2.	
11. Ceiling type and insulation level		
a. Under attic (R-value):	11a.	38.0
b. Single assembly (R-value):	11b.	
c. Knee walls/skylight walls (R-value)	11c.	
d. Radiant barrier installed	11d.	

12. Ducts, location & insulation level		
a. Supply ducts:	R	8.0
b. Return ducts:	R	6.0
c. AHU location:		Living AH
13. Cooling systems	Capacity	20.2
a. Split system:	SEER	14.00
b. Single package:	SEER	
c. Ground/water source:	SEER/COP	
d. Room unit/PTAC:	EER	
e. Other:		
14. Heating systems	Capacity	22.4
a. Split system heat pump:	HSPF	8.20
b. Single package heat pump:	HSPF	
c. Electric resistance:	COP	
d. Gas furnace, natural gas:	AFUE	
e. Gas furnace, LPG:	AFUE	
f. Other:		
15. Water heating systems		
a. Electric resistance:		0.92 UEF
b. Gas fired, natrual gas:		
c. Gas fired, LPG:		
d. Solar system with tank:		
e. Dedicated heat pump with tank:		
f. Heat recovery unit:	HeatRec%	
g. Other:		
16. HVAC credits claimed (Performance Method)		
a. Ceiling fans:		
b. Cross ventilation:		
c. Whole house fan:		
d. Multizone cooling credit:		
e. Multizone heating credit:		
f. Programmable thermostat:		

*Label required by Section 303.1.3 of the Florida Building Code, Energy Conservation, if not DEFAULT.

I certify that this home has complied with the Florida Building Code, Energy Conservation,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: 1516 Ninth Street City/FL Zip: Tampa, FL 33601

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

Mandatory Requirements for Residential Performance, Prescriptive and ERI Methods

ADDRESS:	1516 Ninth Street Tampa, FL 33601	PERMIT #:	2222-1

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 Statues) 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. completed and signed by the builder The building official shall verify that the EPL display card accurately reflects the plans and specifications submitted to demonstrate compliance for the building. A copy of the EPL display card can be found in Appendix RD.

SECTION R402 BUILDING THERMAL ENVELOP

☐ **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 402.4.1.1, 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/RESET/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 labeledin accordance with UL 127, the doors shall be tested and listed for the fireplace. Where using tight-figging 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 apliances 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 and 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 air flow 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. Post construction 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. All registers shall be taped or otherwise sealed during the test.

Exceptions:

1. A duct 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 Qn to the outside of less than 0.080 (where Qn = 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).** Heated water circulation systems shall be in accordance with Section R403.5.1.1. Heat trace termperature 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 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 how 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 1/2 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 Storage water heater temperature controls.**

☐ **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 met the criteria of Section R403.5.6.2.1.

☐ **R403.5.6.2.1 Solar water heating system.** 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 mechanical ventilation fans are integral to tested and listed HVAC equipment, they shall be powered by an electronically commutated motor.

☐ **R403.6.2 Ventilation air.** Residential buildings designed to be operated at a positive indoor pressure of 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 spaces(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 or 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 methodologies, heating and cooling calculation 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 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 403.7, 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 IECC—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 operations.
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.

Exception: Low-voltage lighting.

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

TABLE 402.4.1.1
AIR BARRIER AND INSULATION INSPECTION COMPONENT CRITERIA

Project Name:	Right-Energy® Florida 2017 Example	Builder Name	
Street:	1516 Ninth Street	Permit Office:	Tampa
City, State, Zip:	Tampa, FL 33601	Permit Number:	2222-1
Owner:	Mr. and Mrs. Henry Wagner	Jurisdiction:	Hillsborough County
Design Location:	FL, Tampa International AP		

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 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 attics paces 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 with 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 are insulated and include an 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 sideof 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 in lieu of floor insulation, insulation shall be permanently attached to the crawlspace walls.	☐
Shafts, penetrations	Duct shafts, utility penetrations, and flue shaft openings 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 drywall.	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 shall be installed behind electrical or communication boxes or air-sealed boxes shall be installed.	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 register boots that penetrate building thermal envelope shall be sealed to the subfloor or drywall.		☐
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: Hillsborough County	Permit Number: 2222-1

Job Information

Builder:	Community: Lexington Crossing	Lot: Lot. 410-111
Address: 1516 Ninth Street	Unit:	
City: Tampa	State: FL	Zip: 33601

Air Leakage Test Results

Passing results must meet either the Performance, Prescriptive, or ERI Method.

☐ **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.

☐ **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): 7.000

$$\frac{\text{CFM(50)}}{\text{\_\_\_\_\_}} \times 60 \div \frac{18900}{\text{Building Volume}} = \frac{\text{\_\_\_\_\_}}{\text{ACH(50)}}$$

☐ **PASS**

☐ When ACH(50) is less than 3, Mechanical Ventilation installation must be verified by building department.

Method for calculating building volume:

- ☐ Retrieved from architectural plans
- ☑ Code software calculated
- ☐ Field measured and calculated

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), Florida Statues, or individuals licensed as set forth in Section 489.105(3)(f), (g), or (i) or and 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.

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, 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

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: _____

Duct Leakage Test Report

Residential Perscriptive, Performance or ERI Method Compliance
2020 Florida Building Code, Energy Conservation, 7th Edition

Jurisdiction: Hillsborough County	Permit Number: 2222-1

Job Information

Builder:	Community: Lexington Crossing	Lot: Lot. 410-111
Address: 1516 Ninth Street	Unit:	
City: Tampa	State: FL	Zip: 33601

Duct Leakage Test Results

System 1	_____ cfm25
System 2	_____ cfm25
System 3	_____ cfm25
Sum of any additional systems	_____ cfm25
Total of all systems	**_____ cfm25**

_____ ÷ 2100 = _____ Qn
Total of all systems / Total Conditioned Square Footage

☐ **PASS** ☐ **FAIL**

☐ **Prescriptive Method** cfm25 (Total)

To qualify as "substantially leak free" Qn Total must be less than or equal to 0.04 if air handler unit is installed. If air handler unit is not installed, Qn Total must be less than or equal to 0.03. This testing method meets the requirements in accordance with Section R403.3.3.

Is the air handler unit installed during testing? ☐ YES *(<= 0.04 Qn)* ☐ NO *(<= 0.03 Qn)*

☐ **Performance / ERI Method** cfm25 (Out or Total)

To qualify using this method, Qn must be not greater than the proposed duct leakage Qn specified on Form R405-2020 or R406-2020.

Leakage Type selected on Form R405-2020 (Energy Calc) or R406-2020	*Qn specified on Form R405-2020 (Energy Calc) or R406-2020*
Default Leakage	

Duct tightness shall be verified by testing in accordance with ANSI/RESNET/ICC380 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 Statues.

Testing Company

Company Name: _____ Phone: _____

I hereby verify that the above duct leakage test 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: _____

Reference Home Characteristics

Mr. and Mrs. Henry Wagner
1516 Ninth Street
Tampa, FL 33601

Title: SimpleHouse
FLBase2020

TMY City: FL_Tampa_Intl_AP

Above-grade Walls (Uo)	0.084
Above-grade Wall Solar Absorptance	0.75
Above-grade Wall Infared Emittance	0.90
Basement Walls (Uo)	n/a
Above-grade Floors (Uo)	n/a
Slab Insulation R-Value	0.0
Ceilings (Uo)	0.030
Roof Solar Absorptance	0.75
Roof Infared Emittance	0.90
Attic Vent Area (ft²)	8.47
Crawlspace Vent Area (ft²)	n/a
Exposed Masonry Floor Area (ft²)	508.00
Carpet & Pad R-Value	2.0
Door Area (ft²)	40.00
Door U-Factor	0.400
North Window Area (ft²)	78.75
South Window Area (ft²)	78.75
East Window Area (ft²)	78.75
West Window Area (ft²)	78.75
Window U-Factor	0.400
Window SHGC (Heating)	0.2169
Window SHGC (Cooling)	0.2169
ACH50	7.00
Internal Gains * (Btu/day)	80192
Water heater gallons per day	60.00
Water Heater set point temperature	120.00
Water heater efficiency rating	0.91
Labeled Heating System Rating and Efficiency	HSPF = 8.2
Labeled Cooling System Rating and Efficiency	SEER = 14.0
Air Distribution System Efficiency	0.88
Thermostat Type	Manual
Heating Thermostat Settings	72.0 (All hours)