



v3.14

USER'S MANUAL ■ March 2015

ENERGY SYSTEMS LABORATORY

Texas Engineering Experiment Station
Texas A&M University System

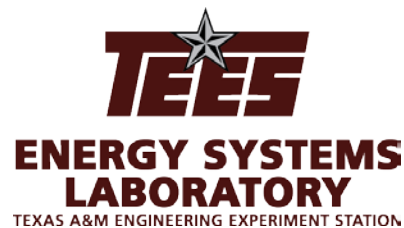
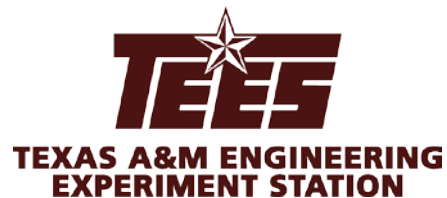


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1 Introduction

The International Code Compliance Calculator (IC3) software is a simple, performance based, software tool for verifying and demonstrating that the annual performance of proposed new residences in Texas (of three stories or less) is in compliance with the Texas Building Energy Performance Standards (TBEPS). The software is web-based and available at no charge, for builders, inspectors, architects, engineers, and others.

With the intention to cover the majority of residences that are being built in Texas, the IC3 focuses on residential construction of three stories or less which uses conventional wood framing, foundation systems of slab on grade, pier and beam, or raised floors, and that has between 100 to 10,000 square feet of conditioned space per floor. Other types of residential construction such as steel framing, mass (concrete, CMU blocks, logs and insulated concrete forms) may not be candidates for this software and the User should contact the local building official for other energy code compliance options.

The IC3 uses simplified singular inputs, which encourage weighted averages for various energy components with multiple values, including wall and ceiling insulation, windows, ceiling heights and multiple A/C tonnages. Energy compliance for repairs and remodels of existing construction may be demonstrated with this software only if the repairs/additions are included as a whole house approach.

The IC3 calculates the above code performance of a new home and how much pollution is reduced (emissions reduction) by the home's energy efficiency. For projects that meet or exceed the Texas Building Performance Standards, the IC3 generates a detailed seven-page climate zone specific field inspection list, a three-page energy report (with/without a signature block), as well as a certificate. All of the documents are generated in a PDF format and may be saved to the user's PC.

1.1 Background

The Federal Clean Air Act (FCAA) requires each state to produce and regularly update a State Implementation Plan (SIP). The FCAA also requires that SIPs include a description of control strategies, or measures to deal with pollution, for areas that fail to achieve national ambient air quality standards (NAAQS). Finally, this Act grants powers of

enforcement to the United States Environmental Protection Agency (EPA).

The EPA originally designated four areas in Texas as having unacceptable ozone levels in excess of the National Ambient Air Quality Standard (NAAQS) limits, leading to a designation as non-attainment areas.

In response, the 77th Texas Legislature's Senate Bill 5 (2001) established the Texas Emissions Reduction Plan (TERP). An element of the TERP is the Texas Building Energy Performance Standards (TBEPS) which adopts energy codes and provides implementation steps. This legislation assigned the Energy Systems Laboratory (ESL) at the Texas Engineering Experiment Station of The Texas A&M University System several important roles, including calculation of emissions reduction from energy efficiency and renewable energy programs and initiatives and providing state-wide technical assistance regarding energy standards/codes to the state, municipalities and the building industry.

The ESL has developed several web-based energy efficiency and emissions reduction calculators including Texas Climate Vision (TCV) developed for Austin, TX, and legacy calculators eCalc and AIM. The IC3 is used to benchmark the estimated energy performance of new residential and multifamily construction in Texas of three stories or less, and is available via the internet to the general public at no charge.

The ESL is working with the different Councils of Government in Texas to develop a verification mechanism in order to maximize SIP Credits by aggregating emissions reduction accomplished by above-code-compliance.

1.2 Requirements

1. Browser: Microsoft Internet Explorer v7/8/9 or Mozilla Firefox v4+ or Google Chrome v16+
2. Adobe Acrobat Reader 8.x or greater (to view/print/save the certificates)
3. Apple Safari (Mac/iPad/iPhone)– not fully tested. Please report any issues to us (ic3_support@esl.tamu.edu). Please include a screen shot showing the problem.



1.3 What's New!

In Version 3.14 (March 2015)

1. Added 2012AE code base for Austin Energy..
2. Added heat pump type for water heater
3. Added sealed attic option
4. Revised the last page of the single family energy report

In Version 3.13 (July 2013)

5. Added a preliminary IECC 2012 code. This code used a preliminary calculation for cooling and heating capacity that does not fully comply with the IECC specifications. This will be corrected in a future release.
6. Added new field needed in the IECC 2012.

In Version 3.12 (January 2012)

1. Depreciated the IECC 2001 code and IECC 2006 Houston codes. If you need a job re-run with these codes please contact ic3_support@esl.tamu.edu.
2. Added "Energy Report w/ Signature" tab to generate an Energy Report with a signature line present.
3. Some help images were cleaned up
4. Added optional inputs for hot water eater size and burner capacity.

In Version 3.11 (December 2011)

1. Added support for IECC 2009 Austin Amendments

In Version 3.10 (September 2011)

1. Three IECC 2009 compliant reports (i.e. energy, inspection list, and certificate)
2. Paging enhancements on "My Page" to help organize large quantities of projects.
3. Multi-family usability increased with Plan/Unit information being displayed on pages.
4. Elimination of flash animation (so we will *become* iPad compatible).
5. Updated/expanded help text.
6. Updated illustrations.
7. Tweaked min/max values on duct insulation, water heaters.

In Version 3.9.x (October 2010)

1. Added slab insulation

2. Updated the manual

In Version 3.8.x (September 2010)

1. Fixed default of Multi-family Units to be "Ducts in Conditioned Space" to YES
2. Fixed wrong IECC code version on certificate
3. Enhanced input screens by moving several fields from Units to Floor Plans

In Version 3.7.x (June 2010)

1. Simple multi-family code compliance
2. Updated model
 - a. Floor Insulation R-Value
 - b. Four foundation types
3. Updated illustrations
4. Updated manual

In Version 3.6.2 (April 2010)

1. Fixed defect in 2nd Floor, Back Window issue
2. Reference A/C tonnage matches the proposed A/C tonnage.
3. Updated model
4. Updated illustrations

In Version 3.6.1 (December 2009)

1. Foundations
2. Opt out of emails
3. Copy a project
4. Moved orientation from Floors tab to Project Information

In Version 3.5.2 (November 2009)

1. Three code choices: IECC 2009, IECC 2006 (with Houston Amendments) and IECC 2000/2001.
2. Duct insulation values
3. Improved input of overhang values to allow for just inches



2 Common Screens

2.1 User Login Screen

IC3 International CODE COMPLIANCE CALCULATOR

User Login

Welcome! This is publicly accessible energy code compliance software based on the Texas Building Energy Performance Standards. You must register a username and password in order to continue. You may then access your records using your user name and password.

Email Address:

Password:

[Register](#) [Forgot Password](#)

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[Credits](#) • [Help/FAQ](#) • [Manual](#) • [IC3 v3.12.1](#) • [ESNET](#)

THE CURRENT VERSION OF THE SOFTWARE IS FOUND HERE

Users who have registered on the current version of IC3, simply enter their Email Address and Password in the spaces specified and left-click on the **“Login”** tab.

If the user has forgotten or needs to change their password, they left-click on the **“Forgot Password”** link and be led through the secure process of changing their password. (See Section 2.2)

A User who has not registered on the current version of IC3, they left-click on the **“Register”** link and is redirected to the **“User Registration”** page. (See Section 2.3).

Users who have an account and enter their password correctly are led to **“My Page”**. (See Section 2.4)



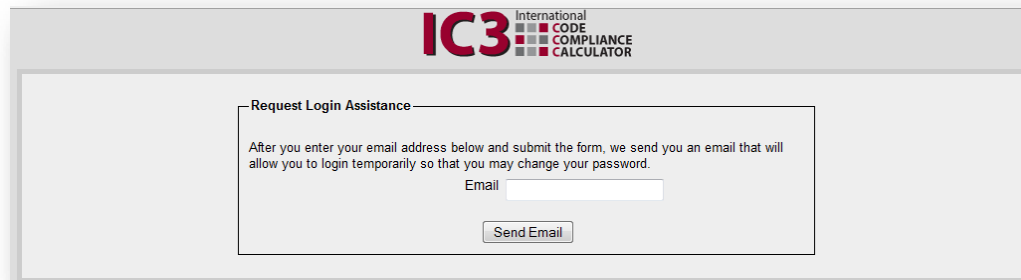
2.2 User Resets Password



The screenshot shows the IC3 International CODE COMPLIANCE CALCULATOR User Login page. The page features logos for SECO, T&E, and HER on the left and right sides. The central content area is titled "User Login" and contains a welcome message: "Welcome! This is publicly accessible energy code compliance software based on the Texas Building Energy Performance Standards. You must register a username and password in order to continue. You may then access your records using your user name and password." Below this message, there is a form with the following fields and text: "Email Address: admin@tees.tamu.edu", "Email or password is incorrect." (in red), and "Password: *****". There is a "Login" button and links for "Register" and "Forgot Password". At the bottom of the page, there is a copyright notice: "© 2012 Energy Systems Laboratory, Texas Engineering Experiment Station, The Engineering Agency of The State of Texas" and links for "Credits", "Feedback", "Manual", "IC3 v3.12.1", and "RESNET".

Users who enter the wrong password, see the screen above.

Users who have forgotten or want to change their password, enter their email address and left-click on the **"Forgot Password"** link.



The screenshot shows the IC3 International CODE COMPLIANCE CALCULATOR Request Login Assistance page. The page features the IC3 logo at the top. The central content area is titled "Request Login Assistance" and contains the following text: "After you enter your email address below and submit the form, we send you an email that will allow you to login temporarily so that you may change your password." Below this text, there is a form with an "Email" label and a text input field. At the bottom of the form, there is a "Send Email" button.

The user enters his/her email address in the space provided and then left-clicks on the **"Send Email"** button. The system then sends an email with a special link for finishing the reset process and then redirects the user to the login screen.

This is a sample of the email message the user will receive.



From: ic3_support@esl.tamu.edu [mailto:ic3_support@esl.tamu.edu]
Sent: Monday, March 24, 2008 3:12 PM
To: someone@tamu.edu
Subject: IC3: Password Reset Request

**THE EMAIL ADDRESS YOU ENTERED ABOVE
WILL APPEAR HERE**

A password request has been submitted from this address. If you did not request a new password, you may simply discard this message and continue using IC3 as you normally do. If you did request a new password, please visit the following link, or copy and paste it into a browser.

<http://ic3.tamu.edu/authenticate/cd75dd50-1fde-4965-98b0-d8496dfd91f0>

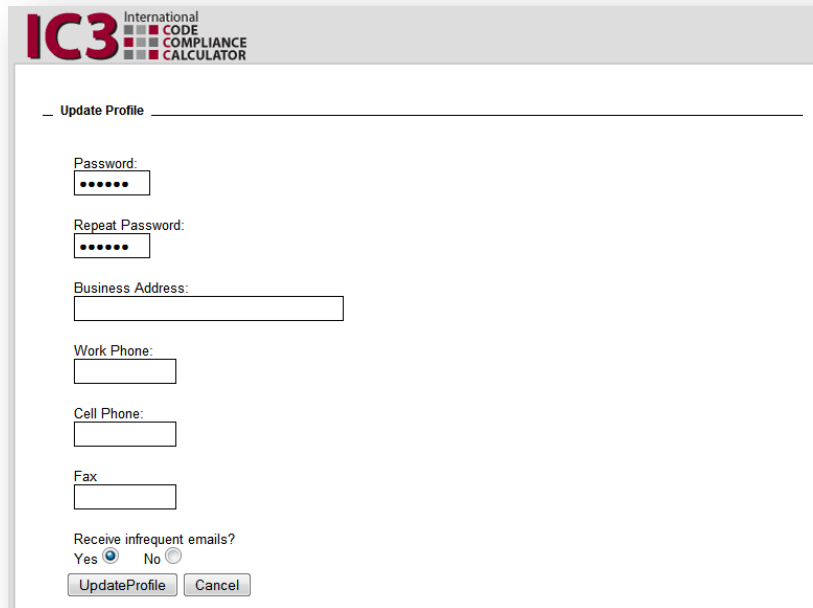
If you have any questions about IC3, please visit our help page at

<http://esl.eslwin.tamu.edu/software/iccc.html>

**COPY AND PASTE THIS LINK INTO YOUR
INTERNET BROWSER, OR CLICK ON THE LINK
TO RESET YOUR PASSWORD. THIS WILL
ALLOW TEMPORARY ACCESS TO YOUR
PROFILE**



The users simply enter their password twice, and if they match, they will be taken to “**My Page**”. (See Section 2.4)

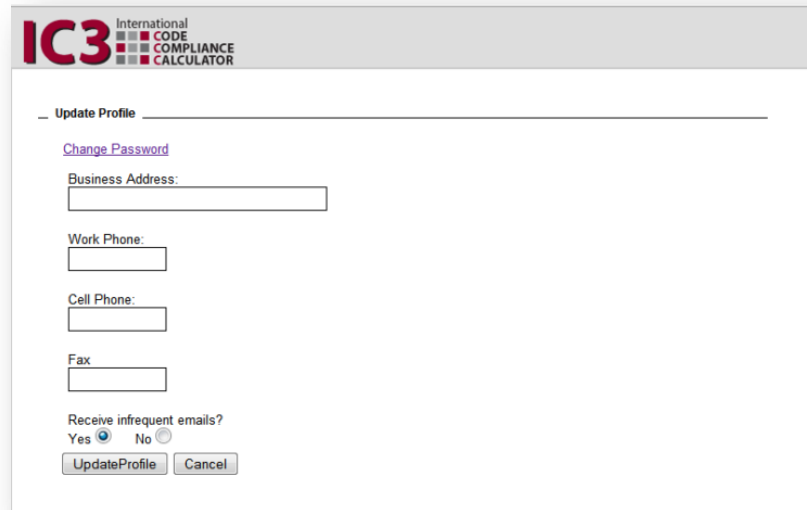


The screenshot shows a web form titled "Update Profile" from the "IC3 International CODE COMPLIANCE CALCULATOR". The form contains the following fields and options:

- Password:** A text input field with six dots indicating a masked password.
- Repeat Password:** A text input field with six dots indicating a masked password.
- Business Address:** A text input field.
- Work Phone:** A text input field.
- Cell Phone:** A text input field.
- Fax:** A text input field.
- Receive infrequent emails?** A question with two radio button options: "Yes" (selected) and "No".
- Buttons:** "UpdateProfile" and "Cancel".



2.3 User Registration



The screenshot shows a web form titled "Update Profile" from the IC3 International CODE COMPLIANCE CALCULATOR. The form includes a link for "Change Password", input fields for "Business Address", "Work Phone", "Cell Phone", and "Fax", and a section for "Receive infrequent emails?" with "Yes" and "No" radio buttons. At the bottom are "UpdateProfile" and "Cancel" buttons.

IC3 International
CODE COMPLIANCE CALCULATOR

— Update Profile —

[Change Password](#)

Business Address:

Work Phone:

Cell Phone:

Fax

Receive infrequent emails?
Yes ☒ No ☐

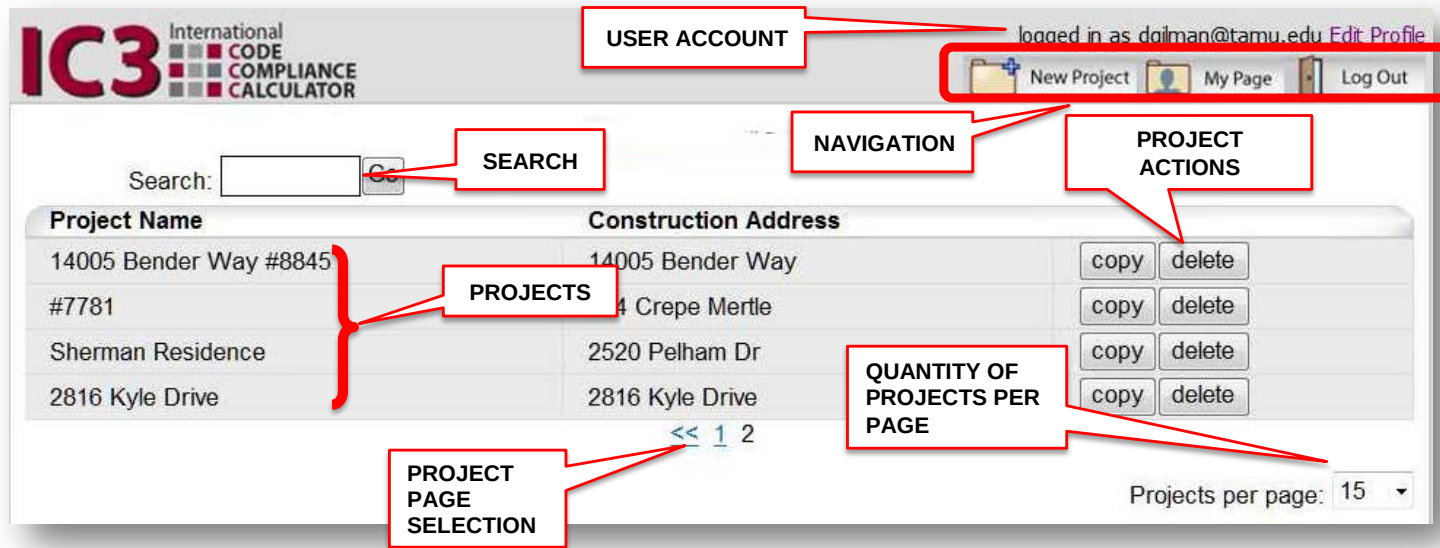
After clicking on the **“Register”** tab on the **“User Login”** (See Section 2.1) page, a new User may register the first time they use IC3.

The user may specify if they want to receive informational emails about new versions or planned outages. ESL reserves the right to send critical emails as necessary.

Once the page is successfully completed, the user is taken to **“My Page.”** (See Section 2.4).



2.4 My Page



This is the central page where a user can manage their projects.

2.4.1 User Account

Shows the user login (useful if you are in a larger inspection company on a shared computer) and a link to edit your user profile (See Section 2.3).

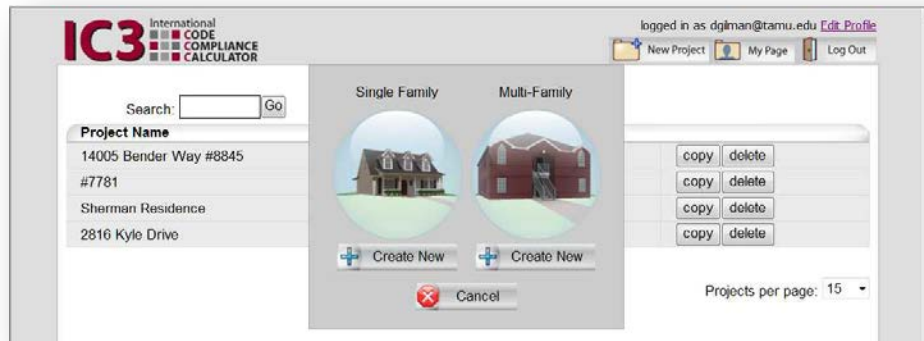
2.4.2 Navigation

On this page there are three buttons in the upper right hand side of the screen:

1. **"New Project"** – creates a new Multi Family or Single family project. The button allows a user to select either **"Single Family"** project or **"Multi-Family"** project.
2. **"My Page"** – brings the user back to this page (**"My Page"**) from anywhere in the program.
3. **"Log Out"** – the preferred way to leave the system when a user finishes. The session will close after 2 minutes of inactivity or will close if the browser closes.

The system does save incomplete projects.





2.4.3 Search

The **“Search”** function will search both the **“Project Name”** and the **“Construction Address”** columns. The **“Search”** function will search on any part of the **“Project Name”** and **“Construction Address”** and all matches as well as partial matches will appear. Entering “Smithstone” will return all houses on any street with “Smithstone” or “Smith” or “stone” in the **“Construction Address”** column; and will return “Smith” if it is listed in the **“Project Name”** under this account. Likewise, entering “Smith” will result in “Granny Smith Lane” as well as “Smithstone Ct” and “Smithstone Ln”.

If you have more projects than you can see, simply press the **“Go”** button without any text in the search field. This will bring up all of the projects, and may take a while if you are a frequent user of the system. You may also navigate to the additional projects by selecting a larger “Projects per page” in the lower right hand corner of the screen; or, by navigating between the pages at the bottom of the screen.

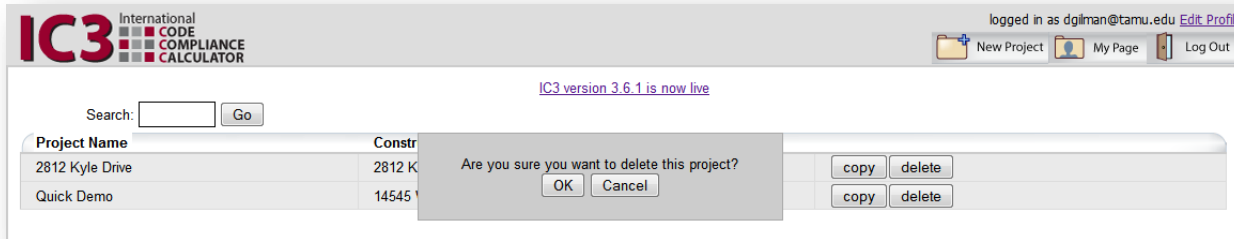
To navigate out of the “Search” function simply left-click on **“My Page.”**



2.4.4 Project Actions

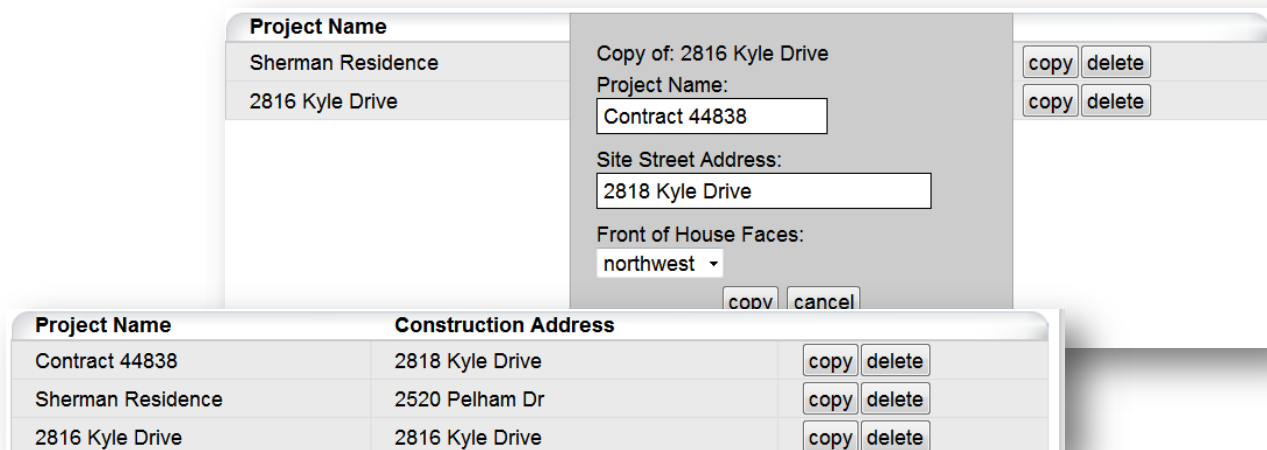
2.4.4.1 The “Delete” button

The “Delete” button allows a User to remove a project from their account, there is no UNDO nor is there any way for ESL to retrieve the project. This is a permanent delete, therefore, we ask you to confirm your selection.



2.4.4.2 The “Copy” button

The copy feature allows a user to take an existing project and duplicate it by answering a few questions to differentiate the copy from the original. Resulting in a copy with only those three fields being different:



2.4.5 Projects

One project per line is displayed. The “**Project Name**” field is intended to capture the builder or inspector's project number (which is often the street address). However, the actual street address is also shown to facilitate searching.

2.4.6 Project Page Selection

These only appear when the user has more projects than can fit on a single page. The numbers allow the user to jump to a specific page by simply clicking on them. The “<<” and “>>” allow a user to move to the last or next page on the list. If the number is not underlined then it is the page number of the current page. In the example, the user is on page 2 of 2:



2.4.7 Quantity of Projects per Page

Some users prefer to see more of their projects on a page, others less. Here the user can select 15, 25, 50, or 100 projects per page. The Project Page Selection will re-calculate when the new value is selected and the page refreshes (which may require the user to refresh the page using the browser's tool bar, right clicking the mouse or pressing the F5 key at the top of the keyboard).



3 Single Family Specific

3.1 Project Information

Project Information | Floors | Windows | Insulation / Mechanical | HVAC / DHW | Roof | Horizontal Projections | Status

Energy Code

Choose Your Energy Code:
IECC 2006 Houston

Site Address

NOTE: All fields on this page (except notes) must be completed to print a certificate.

Project Name:
2816 Kyle Drive

Builder Name:
Simpson (Test Run)

Builder Phone:
214 244 7510

Site Street Address:
2816 Kyle Drive

City:
Houston

County:
HARRIS

Zip Code:
75075

Inspection and Plan Review Notes (Limit 255 characters):
TEST

Orientation

Front of House Faces:
west

Next

The “**Project Information**” screen allows a User to enter the details of the current project. The address entered is the address where the house will be built. Notes are shown on the certificate. This is a great place to document specific information that the inspector or others may need to know in the future. (i.e.; information such as area weighted averages). Note that the screen is longer than displayed, with the “**Front of House**” faces being superimposed.



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Energy Code		<u>Drop Down Menu:</u> • IECC 2006 Houston* • IECC 2000/2001* • IECC 2009 • IECC 2009 Austin • IECC 2012 • IECC NCTCOG • IECC 2012 Austin	Choose the energy code version accepted by the authority having jurisdiction for the location of construction.	* As of January 1, 2012, the State of Texas has depreciated all energy codes prior to 2009. These codes are available to view legacy projects, but you cannot print an energy report or certificate for them.
Project Name		n/a	Enter a unique name for your proposed project.	
Builder Name			Enter the name of the client.	
Builder Phone			Enter the phone number of the client.	
Site Street Address			Enter the address of the unit.	
City			Enter the city in which the unit will be built.	
County		<u>Drop Down Menu:</u> List of 252 counties in Texas	Select the county in which the unit will be built.	When "IECC 2009 Austin" is selected as the Energy Code, this field restricts the User input to Travis county (Austin).
Zip Code		n/a	Enter the zip code in which the unit will be built.	
Inspection and Plan Review Notes			Add any other notes about the unit you would like to add.	Limit the notes to 255 characters.
Front of House Faces		<u>Drop Down Menu:</u> • South • Southwest • West • Northwest • North • Northeast • East • Southeast	Select the orientation of the unit.	The front of the unit is the direction the front door faces. The right side of the Unit is to the right of the front door when facing it.



3.2 Floors

[Project Information](#) [Floors](#) [Windows](#) [Insulation / Mechanical](#) [HVAC / DHW](#) [Roof](#) [Horizontal Projections](#) [Status](#) [Debug](#)

— Floors —

Number of Floors:

— 1st Floor —

Conditioned Floor Area (sq ft):

Perimeter of Conditioned Area (ft):

Average Ceiling Height (ft):

— Bedrooms —

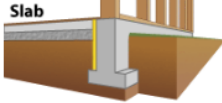
Number of Bedrooms:

— Foundation —

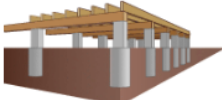
Foundation Type:

[Add Slab Insulation](#)

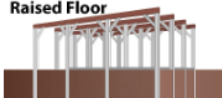
Slab



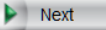
Pier and Beam



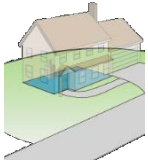
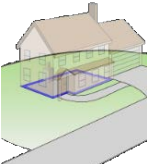
Raised Floor



Please select the type of foundation the house will have.

 Next



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Number of Floors		<u>Drop Down Menu:</u> • 1 • 2 • 3	Select the number of floors the unit will have.	On selecting either two or three floors, the page expands to show fields for second and / or third story entries. Split level units are not modeled at this time. First floor displays regardless of selection of the number of floors.
Conditioned Floor Area (sq ft)		100 – 10,000 (ft. ²)	Enter the square-footage of conditioned space on this floor.	This entry should exclude the unconditioned garage or any porches. This field is repeated for the each floor selected.
Conditioned Floor Area Overhanging Unconditioned Space (sq ft)		0 – 10,000 (ft. ²)	Please enter the total length of the walls separating conditioned space from unconditioned space on this floor.	This entry should exclude any porches. This field is repeated for the each floor selected, except the bottom floor.
Perimeter of Conditioned Area (ft)		45 – 800 (ft.)	Enter the total length of the walls separating conditioned space from unconditioned space on this floor.	The perimeter wall length includes wall lengths between unconditioned garages or porches and the conditioned interior of the structure. This field is repeated for the each floor selected.

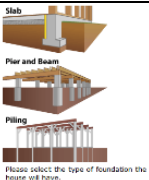
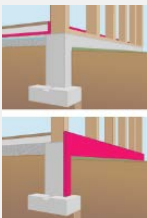


TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Average Ceiling Height (ft)		6.67 – 40 (ft.)	Enter the average ceiling height for this floor.	This value should be a weighted average of the ceiling heights. The impact from averaging is not large relative to the other fields the builder is providing. If a two-story unit has a foyer or a room on the first floor that is two storied in height, then the ceiling height input for this space will be the same as the input value for the rest of the average ceiling height. This field is repeated for the each floor selected.

Comment [jm1]: ED DRYDEN
The top illustration is very good in explain the weighted avg approach. The bottom illustration is difficult to understand. I don't get it – I'm going to run this by some others to see if they can apply this.

Number of Bedrooms		1 – 10	Enter the number of bedrooms the unit will have.	A room without an external window or door and closet is not to be counted towards this value.
Stud Type		2 x 4 or 2 x 6	Enter the size of the wall studs	This option is only used in IECC 2012.
Stud Spacing		16 or 24 (in)	Enter the spacing of the wall studs.	This option is only used in IECC 2012 when a Stud Type of 2 x 6 is used.



Foundation Type		<u>Drop Down Menu:</u> • Slab On Grade • Pier and Beam • Raised Floor	Select the type of foundation the unit will have.	If "Slab On Grade" is selected then "Add Slab Insulation" appears in lieu of the Floor Insulation Field. IC3 doesn't model basements at this time.
Floor Insulation		• 0 – 20	Enter the R-value of the floor insulation.	This field automatically appears for "Pier and Beam" and "Raised Floor" options. Appropriate R-values can be found in Table 402.1.1 of the IECC 2009.
Slab Insulation		0 – 20	Enter the R-value of the slab insulation.	This field automatically appears if the user selects "Add Slab Insulation" link (as shown above). Do not use "0" to remove slab insulation, use the "Remove Slab Insulation" link. Not recommended for use in areas with a high likelihood of termite infestation. Please refer to your local building code office if you are unsure whether your project requires slab insulation. Appropriate R-values can be found in Table 402.1.1 of the IECC 2009.

Note: Information in shaded cells appears only when appropriate values are selected in the IC3.



3.3 Windows

Project InformationFloorsWindowsInsulation / MechanicalHVAC / DHWRoofHorizontal ProjectionsStatus

- Glazing Properties

Solar Heat Gain Coefficient:

U-factor:

- 1st Floor Windows

Front (sq ft):

Right (sq ft):

Back (sq ft):

Left (sq ft):

Next

Windows

ENERGY PERFORMANCE RATING

U-factor (SI) SHGC (SI)

0.35 0.32

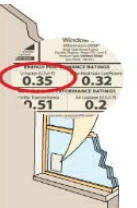
ADDITIONAL PERFORMANCE RATING

U-factor (Imperial) SHGC (Imperial)

0.51 0.2

Please enter the Solar Heat Gain Coefficient (SHGC) for the fenestrations (e.g., windows and doors). (This information should be provided on the construction documents to be verified at the time of inspection.)



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Solar Heat Gain Coefficient		0.20 – 0.50	Enter the Solar Heat Gain Coefficient (SHGC) for the fenestrations (e.g., windows and doors).	If the house has different values, the user either enters the highest value or calculates a weighted average based on square footage. Appropriate SHGC-values can be found in Table 402.1.1 of the IECC 2009.
U-factor		0.25 – 1.22	Enter the U-Factors of fenestration products (e.g., windows and doors).	If the house has different values, the user either enters the highest value or calculates a weighted average based on square footage. Appropriate U-factor values can be found in Table 402.1.1 of the IECC 2009.
Front / Right / Back / Left Window area (sq ft)		* ≥ 0 (ft. ²)	Enter the total combined area of all windows and glass doors in each of the provided fields; measured using the rough opening and including the sash, curbing or other framing elements.	Make sure your directions (front, back, left, and right) correspond to the orientation of the unit. For doors where the glazing area is less than 50% of the rough opening of the door area, the glazing area entered is the actual glazing area only. For doors where the glazing area is 50% for more of the rough opening of the door area, the glazing area entered is the rough opening area for the door including the door and frame. These fields are repeated for the each floor selected.



3.4 Insulation/Mechanical

Project InformationFloorsWindowsInsulation / MechanicalHVAC / DHWRoofHorizontal ProjectionsStatus

Mechanical

Mechanical in conditioned space?:
Yes ☐ No ☒

Measurements for Blower Door:
Not Tested

Measurements for Duct Blaster:
Not Tested

Insulation

Wall Cavity Insulation R-Value:
13

Insulated Wall Sheathing R-Value:
2

Exterior Wall Finish:
Brick

Total Roof/Ceiling Insulation R-Value:
30

Supply Duct Insulation R-Value:
8

Return Duct Insulation R-Value:
8

Stucco

Vinyl

Brick

Cement Board

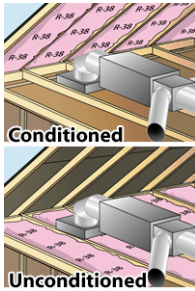
Wood Siding

Please select the exterior wall finish from the drop-down menu.

Next

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v3.12.1 USER'S MANUAL

23/68

TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Mechanical in conditioned space		<u>Radio Button:</u> • Yes • No	Mark your answer according to the location of the mechanical equipment and the duct system.	When the insulation is applied on the underside of the roof decking the attic space is considered a conditioned space.
Measurements for Blower Door		<u>Drop Down Menu:</u> • Not Tested • Estimated • Tested	Select "Not Tested" if project will not have a Blower Door Test. Select "Estimated" if you want to estimate the project's results for the Blower Door Test. Select "Tested" if the Blower Door test has been performed.	The input for the "Measurements for Blower Door" is set at untested if no blower door test was performed. "Estimated" Blower Door measurements or results are those expected before construction. "Tested" measurements or results are those actually measured or verified after construction. If "Estimated" or "Tested" is selected, then the following Input appears as shown on the next section – "Blower Door (@ACH50)".



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Blower Door (@ ACH50)		$0 \leq \text{ACH}@50 < *$	Please enter the expected results from the Blower Door test for the proposed unit.	Typical Blower Door ACH50 test ranges fall between 0 and 6.99 ACH50. The IECC 2009 (Section 402.4.2.1) requires the building envelope tightness to be less than seven air changes per hour (7 ACH) when tested with a blower door at a pressure of 50 Pa. * The upper limit of < 7 ACH is enforced during the execution of the project for IECC 2009 and <=5 for IECC 2012.
Type of Mechanical Ventilation		• None • Balanced • Exhaust Only • Supply Only	Enter the type of mechanical Ventilation.	Option is only available in IECC 2012. Option is required when Blower door Test result is < 5@ACH50. 'None' is not a valid option in this case.
Rate of Mechanical Ventilation (CFM)		1 or greater	Enter the mechanical ventilation rate in CFM.	Option is only available in IECC 2012. Option is required if Mechanical Ventilation Type is not 'None'
Operation of Blower (hrs./day)		1 through 24	Enter the length of time the blower operates in hours per day.	Option is only available in IECC 2012. Option is required if Mechanical Ventilation Type is not 'None'
Power of Fan (Watts)		1 or greater	Enter the power of the blower in Watts.	Option is only available in IECC 2012. Option is required if Mechanical Ventilation Type is not 'None'



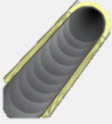
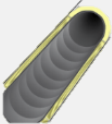
Measurements for Duct Tightness		<u>Drop Down Menu:</u> • Untested* • Estimated** • Tested**	Specify whether measurements for duct tightness test are untested, estimated, or tested.	* "Untested" can be selected only when the air handler and all ducts are positioned in conditioned space. ** If "Estimated" or "Tested" is selected, then the additional input of information is required as shown in the next section.
Type of Duct Tightness Measurement		• Total Leakage • Leakage to Outdoors	If you are measuring only the leakage to outdoors, answer 'Leakage To Outdoors'. If you are measuring the total leakage, answer 'Total Leakage'.	This option is only available in IECC 2012.
Duct Tightness (@ CFM25, Post-Construction Test)		$0 < \text{cfm} \leq *$	Enter the expected results from the duct tightness test for the proposed unit.	The IECC 2009 (Section 403.2.2) requires the duct tightness to be verified. However, the duct tightness test is not required if the air handler and all ducts are located within the conditioned space. The calculator accepts post construction leakage to the outdoors values for the duct tightness test. * The upper limit of the postconstruction leakage to the outdoor value is $\leq 8 / 100 \text{ ft}^2$ of conditioned floor area and is enforced during the execution of the project.
Fraction of Duct Area Outside the Conditioned Space		0 - 1	Input the percentage (0 to 100) of the duct area located outside of conditioned space.	This option is only available in IECC 2012 and when the Type of Duct Measurement is 'Total Leakage'

Note: Information in shaded cells appears only when appropriate values are selected in the IC3.



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Wall Cavity Insulation Value		5 – 50	Enter the R-Value for the wall cavity insulation.	Insulation R-Values are verified during inspection. This is the value of the insulation installed between the studs. Appropriate R-values can be found in Table 402.1.1 of the IECC 2009.
Insulated Wall Sheathing R-Value		0 Or ≥ 2	Enter the R-Value for insulated wall sheathing if applicable. If none is used, enter "0".	This is the value of the continuous insulated sheathing applied to the exterior of the wall assembly. If no sheathing is used, enter 0. If sheathing is used, then the minimum value is R-2. Prescriptive R-values can be found in Table 402.1.1 of the IECC 2009.
Exterior Wall Finish	 Stucco  Vinyl  Brick  Cement Board  Wood Siding	<u>Drop Down Menu:</u> • Stucco • Vinyl Siding • Brick • Fibrous Cement Board • Wood Siding	Select the exterior wall finish from the drop-down menu.	If your siding type is not listed, please choose the closest material for an approximation.
Total Roof/ Ceiling Insulation R-Value		13 – 60	Enter the weighted average R-Value for the roof/ceiling cavity insulation.	Insulation R-values are verified at inspection. Regardless of the type of insulation, the value here reflects the cavity insulation installed at the ceiling or the roof. Appropriate R-values can be found in Table 402.1.1 of the IECC 2009.



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Supply Duct Insulation R-Value		For IECC 2009 ≥ 6 IECC 2009 Austin ≥ 8	Enter the R-Value of the supply duct insulation.	Only appears if Mechanical in Conditioned Space is "No". Appropriate R-values can be found in Section 405.2 of the IECC 2009.
Return Duct Insulation R-Value		For IECC 2009 ≥ 6 IECC 2009 Austin ≥ 8	Please enter the R-Value of the return duct insulation.	Only appears if Mechanical in Conditioned Space is "No". Appropriate R-values can be found in Section 405.2 of the IECC 2009.

Note: Information in shaded cells appears only when appropriate values are selected in the IC3.



3.5 HVAC/DHW

Single Family House

Passing Single-Family Project

Project Information Floors Windows Insulation / Mechanical HVAC / DHW Roof Horizontal Projections Status Debug

Heating

Heating Type:
Heat Pump

Heating Efficiency (HSPF):
11.2

Cooling

A/C Efficiency (SEER):
13

A/C Size(tons):
6

Water Heater

Water Heater Type:
Electric

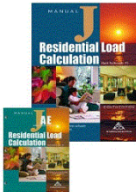
Energy Factor:
0.91

Use Detailed DHW Input
Yes ☒ No ☐

Water Heater Size (gal):
45

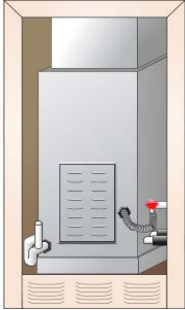
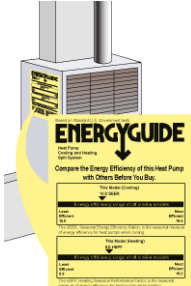
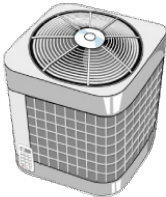
Burner Capacity (KW)
10000

Next

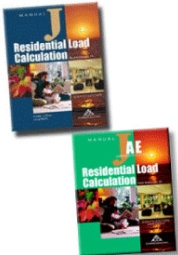
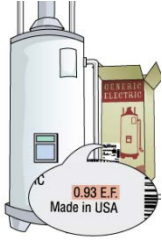
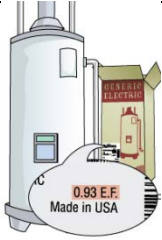


Please enter the tonnage of the air conditioning equipment. Equipment must be sized according to method acceptable to the building official or authority having jurisdiction.

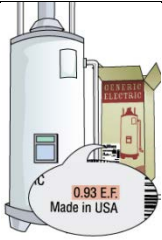
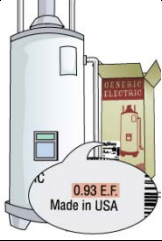


TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Heating Type		<u>Drop Down Menu:</u> • Natural Gas • Heat Pump • Electric Resistance*	Select the heating type for the unit (e.g., heat pump, natural gas).	The software assumes that the space cooling equipment is electric. The "Heat Pump" option is provided with a backup electric resistance heating. * "Electric Resistance" is not allowed when the "IECC 2009 Austin" option is selected.
Heating Efficiency (AFUE / HSPF)		For AFUE 0.6 – 1 For HSPF 7.7 – 12	Enter either the Annual Fuel Utilization Efficiency (AFUE) or Heating Seasonal Performance Factor (HSPF) depending on the "Heating Type" selected.	Note that the label changes based on your heating type, and that if you enter an AFUE value, and change the heating type, you will see a reminder that the fractional AFUE isn't an acceptable HSPF value. In case of "Electric Resistance" option being selected, the efficiency of the heater is fixed by the IC3 at 100%.
A/C Efficiency (SEER)		13 – 21	Enter the Seasonal Energy Efficiency Ratio (SEER) of the air-conditioner.	This entry applies to Heat Pumps too.



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
A/C Size (tons)		1.0 – 15.0 (tons)	Enter the tonnage of the air-conditioner.	Equipment must be sized according to method acceptable to the building official or authority having jurisdiction.
Water Heater Type		<u>Drop Down Menu:</u> • Natural Gas • Electric • Heat Pump	Select the type of fuel the water heater uses.	
Energy Factor		For Water Heater Type Electric 0.7 – 1.0 For Water Heater Type Gas 0.3 – 0.96 For Water Heater Type Heat Pump 0 – 2.37	Enter the Energy Factor (EF) for the water heating equipment to be installed in the proposed unit.	The software works with both tank-type and tank-less water heaters. If you have more than one water heater, please do a weighted average of the units, or use the efficiency rating of the least efficient water heater here. Equations providing minimum requirements of EF can be found in Table 504.2 of the IECC 2009.
Use Detailed DHW Input		Yes-No	If yes is entered, it will allow a user to input the water heater size and burner capacity. If no is entered, then the default (average for your region) are used.	Previous versions of IC3 always used the defaults. In most cases, the simple, default inputs will be fine. But, you may use the detailed inputs for more accurate results.



Water Heater Size		20-120 gallons	The size of the water heater	This optional input is only used if Detailed DHW Input is set to Yes. If the Detailed DHW Input option is used, both size and burner capacity must be entered.
Water Heater Burner Capacity		For Water Heater Type Electric 3000-12000 KW For water Heater Type Gas 30000-70000 Btu/hr	The burner capacity of the water heater	This optional input is only used if Detailed DHW Input is set to Yes. If the Detailed DHW Input option is used, both size and burner capacity must be entered.



3.6 Roof

Project InformationFloorsWindowsInsulation / MechanicalHVAC / DHWRoofHorizontal ProjectionsStatus

Roof

Roof Covering Material:
Comp Shingle

Uses Radiant Barrier:
Yes ☐ No ☒

Ceiling Area

Flat Roof Area (sq ft):
0

Cathedral Ceiling Area (sq ft):
1253

Attic Floor Area (sq ft):
2003

Area of Wall Adjacent to Unconditioned Attic Space (sq ft):
416

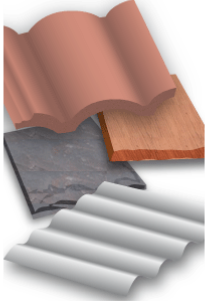
Ceiling Area Explained

Current Ceiling Area: 3256 sq ft

Minimum Ceiling Area: 2500 sq ft

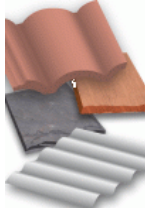
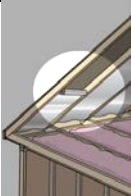
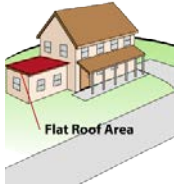
Ceiling Area over:
1st Floor: 2500 sq ft

Next



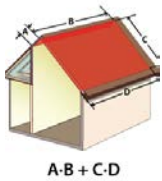
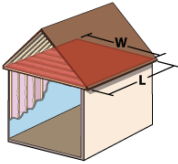
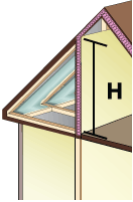
Please select the type of roof covering for the proposed house.



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Roof Covering Material		<u>Drop Down Menu:</u> • Clay or Concrete Tile • Comp Shingle • Metal • Slate • Wood Shingles • Other	Select the type of roof covering for the proposed unit.	This field uses the type of roof covering material to estimate the reflectivity and absorbance properties of the roof.
Radiant Barrier		<u>Radio Button:</u> • Yes • No	Select option according to the construction specifications for the roof assembly.	This field uses the specifications of the layer of material under the roof surface to estimate the reflectance and emmissivity of the interior surface of the roof assembly.
Sealed Attic		<u>Radio Button:</u> • Yes • No	Select option according to the construction specifications for the roof assembly.	Important: If you use a sealed attic, then your ductwork must be listed as outside of conditioned space. Also, you cannot have both a sealed attic and a radiant barrier in the same project. If you violate either of these rules, the project will refuse to run.
Flat Roof Area (sq ft)		0 – 30,000 (ft ²)	Enter the square footage of the ceiling area covered by a flat roof.	

Comment [jm2]: I need to reword it correctly.



Cathedral Ceiling Area (sq ft)		0 – 30,000 (ft ²)	Enter the square footage of the cathedral ceilings.	
TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Attic Floor Area (sq ft)		0 – 30,000 (ft ²)	Enter the square footage of the attic area (measured horizontally).	
Area of Wall Adjacent to Unconditioned Attic Space (sq ft)		0 – 10,000 (ft ²)	Enter the square footage of any walls adjacent to unconditioned attic space.	The calculator assigns the wall R-value to these walls.



3.7 Horizontal Projections

Project InformationFloorsWindowsInsulation / MechanicalHVAC / DHWRoofHorizontal ProjectionsStatus

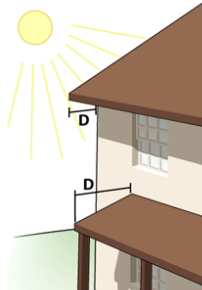
1st Floor Horizontal Projections

Front: (feet and inches i.e.: 4' - 6")

Right: (feet and inches i.e.: 4' - 6")

Back: (feet and inches i.e.: 4' - 6")

Left: (feet and inches i.e.: 4' - 6")



Please enter the distance measured from the wall to the outer edge of the projection.

Next



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Front/Right/Back/Left (ft)		≥ 0 (ft.)	Enter the distance measured from the wall to the outer edge of the projection.	The projections are located at the roof level, and provide shade to both the windows and to the walls. It is ok to enter values here as well as the Conditioned over non-Conditioned question on the Floors Tab. These are focused on shading of the windows; the other is focused on thermal loss through the exposed floor. Enter the horizontal distance (ft) from the wall to the edge of the overhang, eave, or permanently attached shading device on this side of the unit for this floor. If you enter measurements in inches, the software will convert to feet and inches. These inputs are repeated for any 2nd or 3rd floors.



3.8 Status

The screenshot shows the 'Status' tab of a software interface. At the top, a navigation bar includes 'Project Information', 'Floors', 'Windows', 'Insulation / Mechanical', 'HVAC/DHW', 'Roof', 'Horizontal Projections', and 'Status'. The 'Status' tab is active, displaying 'Project Details for: AE_2009_02152012'. The page is divided into three main sections: Project Information, Insulation / Mechanical, and Project Status. The Project Information section contains fields for Energy Code (IECC 2009 Austin), Builder Name (Umphress), Builder Phone (2222222222), Site Street Address (xxx xxx xxx), City (Austin), Zip (22222), County (TRAVIS), and Notes. The Insulation / Mechanical section contains fields for Mechanical in Conditioned Space (Yes), Wall Cavity Insulation (R-13), Insulated Wall Sheathing (R-0), Exterior Finish (Stucco), Total Roof/Ceiling Insulation (R-30), Blower Door (6.99 (Estimated)), Duct Blaster (88 (Estimated)), Heating Type (Natural Gas), Heating Efficiency (0.78 AFUE), A/C Efficiency (SEER) (13 SEER), A/C Size (tons) (2.2), Water Heater Type (Natural Gas), and Water Heater Energy Factor (0.65). The Project Status section shows '2.7% Above Code' and 'Congratulations! Your project has passed code requirements!'. Below this, there is a list of documents to generate: 'Inspection List', 'Certificate', 'Energy Report', and 'Energy Report w/ Signature'. A red box labeled 'PASS / FAIL %' points to the '2.7% Above Code' text. Another red box labeled 'CREATE PDFs' points to the document list.

Project Information	
Energy Code:	IECC 2009 Austin
Builder Name:	Umphress
Builder Phone:	2222222222
Site Street Address:	xxx xxx xxx
City:	Austin
Zip:	22222
County:	TRAVIS
Notes:	

Insulation / Mechanical	
Mechanical in Conditioned Space:	Yes
Wall Cavity Insulation:	R-13
Insulated Wall Sheathing:	R-0
Exterior Finish:	Stucco
Total Roof/Ceiling Insulation:	R-30
Blower Door:	6.99 (Estimated)
Duct Blaster:	88 (Estimated)

HVAC/DHW	
Heating Type:	Natural Gas
Heating Efficiency:	0.78 AFUE
A/C Efficiency (SEER):	13 SEER
A/C Size (tons):	2.2
Water Heater Type:	Natural Gas
Water Heater Energy Factor:	0.65

Roof	
Roof Covering Material:	Comp Shingle
Radiant Barrier:	No
Flat Roof Area:	0 sq ft
Cathedral Ceiling Area:	0 sq ft
Attic Floor Area:	1100 sq ft
Wall Area Next To Attic:	0 sq ft

Horizontal Projections	
First Floor Horizontal Projections:	
Front:	0' 0"
Right:	0' 0"
Back:	0' 0"
Left:	0' 0"

Project Status

2.7% Above Code

Congratulations! Your project has passed code requirements!

Inspection List

Certificate

Energy Report

Energy Report w/ Signature

Several Documents are available on a passing project. These are available on clicking the “**Inspection List**”, “**Certificate**”, and “**Energy Report w/wo Signature**” tabs. They are detailed below. These reports will only be available for a passing project. Please note that if you want the certificate to appear in its own window, right click on any print button. Then select “**Open in New Window.**” The documents may be saved.

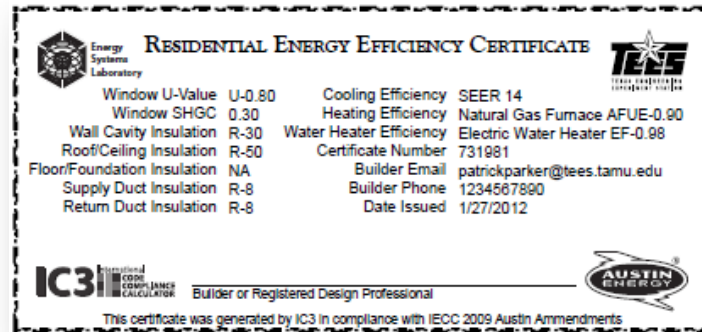
The project may pass or fail. The level at which it passes or fails is detailed at the upper right of the screen.

If a project fails, it can be from one of three reasons:

1. If a specific reason is given below the failure messages, it means that your project has failed to meet a mandatory requirement. The error message will detail the exact reason for the failure.
2. If the project is incomplete, one or more sections in the Project Details portion of the screen will state this fact. Clicking on the link in this section will take you back to the appropriate tab.
3. Otherwise, if the only information given is 'XX.X% Below Code', then the project has failed this review. This means that the entered house uses more energy than the code house for the given energy code. You will need to go back and improve the efficiency in one or more areas to generate a passing score. The best candidates are usually improving the windows (SHGC and/or U-Value) or adding more insulation.



3.9 Certificate



The image shows a Residential Energy Efficiency Certificate (REEC) form. It includes logos for Energy Systems Laboratory, TEE (Texas Engineering Experiment Station), and Austin Energy. The form lists various energy efficiency metrics and their values, along with contact information for the builder or registered design professional.

RESIDENTIAL ENERGY EFFICIENCY CERTIFICATE			
Window U-Value	U-0.80	Cooling Efficiency	SEER 14
Window SHGC	0.30	Heating Efficiency	Natural Gas Furnace AFUE-0.90
Wall Cavity Insulation	R-30	Water Heater Efficiency	Electric Water Heater EF-0.98
Roof/Ceiling Insulation	R-50	Certificate Number	731981
Floor/Foundation Insulation	NA	Builder Email	patrickparker@tees.tamu.edu
Supply Duct Insulation	R-8	Builder Phone	1234567890
Return Duct Insulation	R-8	Date Issued	1/27/2012

IC3 International Building Code Compliance Calculator

Builder or Registered Design Professional _____

AUSTIN ENERGY

This certificate was generated by IC3 in compliance with IECC 2009 Austin Amendments

Certificates are small documents that are to be placed in the electrical panel of the inspected house. They are to be signed by the builder or 'registered design professional'.

3.10 Energy Report

The energy report is a multipage document detailing the results of the analysis run on the project. There are 2 versions available: with or without signature. The signature version includes a signature line of the first page of the report. Although IECC standards do not require these reports to be signed, some municipalities do require a signature. Please check with your local government to determine what their exact requirements are.

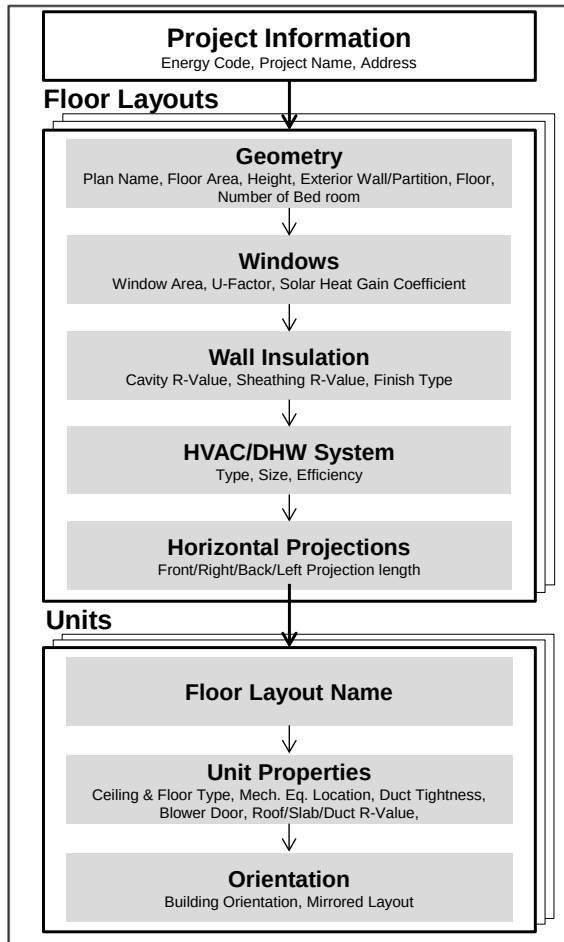
3.11 Checklist

Section 405.4.2 of the 2009 IECC requires an inspection checklist be provided by a performance software. This checklist is specific to the Climate Zone determined by the selection of the County in which the project is located. This checklist may be used for inspection of the projects. The user should check with the code official to determine if the use of the checklist is mandatory in the specific municipality.



4 Multi-Family Specific

In this release of IC3, you can run simple multi-family simulations. The flowchart presented below provides a step-by-step instruction of inputting a multi-family building.



In the FIRST step, the user is prompted to input information regarding the energy code being adopted, project name and the address.

In the SECOND step, the user is prompted to input information regarding specifications of the different floor layouts in the multifamily building being simulated.

There can be more than one layout in the multi-family project.

Information for floor layouts includes floor plan dimensions and the number of bedrooms; window area and specifications; exterior wall finish type and wall insulation specifications; specification for mechanical systems; and specifications for horizontal projections.

In the THIRD step, the user is prompted for information specific to the position of the "Floor Layout" in the multi-family building being simulated.

The user is first required to input the name of the "Floor Layout" being assessed. The user is then asked to specify the position of the "Floor Layout" in the multi-family building and other relevant information specific to the position of the "Floor Layout" in the building being simulated. This information includes input for ceiling and floor type, the location of mechanical equipment, duct tightness and blower door test specifications.

The user is then required to input the orientation of the unit and specify whether the "Floor Layout" being used is mirrored.



4.1 Project Information

This screen allows the user to enter relevant project information.

Project Information

Energy Code:
IECC 2009

Project Name:
Test #1

Builder Name:
John Doe

Builder Phone:
999 999 9999

Site Street Address:
Test Drive

City:
Dallas

County:
TARRANT

Zip Code:
75221

Inspection and Plan Review Notes (Limit 255 characters):



Please select the county in which the house will be built.



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Energy Code		<u>Drop Down Menu:</u> • IECC 2006 Houston* • IECC 2000/2001* • IECC 2009 • IECC 2009 Austin	Choose the energy code version accepted by the authority having jurisdiction for the location of construction.	* As of January 1, 2012, the State of Texas has depreciated all energy codes prior to 2009. These codes are available to view legacy projects, but you cannot print an energy report or certificate for them.
Project Name		n/a	Enter a unique name for your proposed project. (Preferably a name not used by any other project.)	
Builder Name			Enter the name of the client.	
Builder Phone			Enter the phone number of the client.	
Site Street Address			Enter the address of the unit.	
City			Enter the city in which the unit will be built.	
County		<u>Drop Down Menu:</u> List of 252 counties in Texas	Select the county in which the unit will be built.	
Zip Code		n/a	Enter the zip Code in which the unit will be built.	



Westin #12

Energy Code:

IECC 2000/2001

Builder Name:

Greeley

Builder Phone:

979 845 8888

Site Street Address:

4512 Westin Way

City:

Bryan

County:

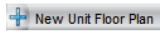
BRAZOS

Zip Code:

77808

[edit](#)

You will need to create a floorplan before entering individual units.

 New Unit Floor Plan

To enter a multi-family project, first you must create a new floor plan. Units in multi-family structures often share common characteristics (i.e. square footage, ceiling height, etc.). A floor plan is just a way to collect those common characteristics between units with an identical or "mirrored" layout.

This screen appears after filling in the required information. In order to proceed, click on “**New Unit Floor Plan**” button at the lower left corner of the page.



4.2 Geometry Information

Geometry Windows Insulation / Mechanical HVAC / DHW Horizontal Projections

— Plan Name —

Plan Name:
Long B

— Geometry —

Conditioned Floor Area:
850

Linear Feet of All Walls:
85

Linear Feet of Common Wall(s):
15

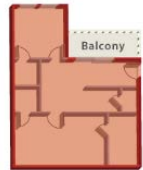
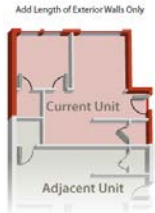
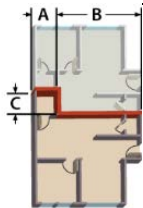
Average Ceiling Height:
9

Number of Floors:
1 ▼

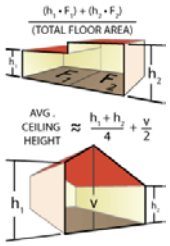
Number of Bedrooms:
2

Next Back to Project



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Plan Name		n/a	Enter a unique name for the plan. (Preferably a name not used by any other project.)	You can use a very long name if you wish. This field is configured to accept 30+ characters.
Conditioned Floor Area		100 – 10,000 (ft. ²)	Enter the square-footage of conditioned space on this floor.	
Linear Feet of All Exterior Walls		45 – 800 (ft.)	Enter the total length of the walls separating conditioned space from unconditioned space on this floor.	
Linear Feet of Common Wall(s)		≥ 0 (ft)	Enter the total length in feet wall area shared between units.	



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Average Ceiling Height		6.67 – 40 (ft.)	Enter the average ceiling height for this type of unit.	This value should be a weighted average of the ceiling heights. The impact from averaging is not large relative to the other fields the builder is providing. If a two-story unit has a foyer or a room on the first floor that is two storied in height, then the ceiling height input for this space will be the same as the input value for the rest of the average ceiling height. This field is repeated for the each floor selected.
Number of Floors		<u>Drop Down Menu:</u> • 1 • 2 • 3	Select the number of floors the unit will have.	On selecting either two or three floors, the page expands to show fields for second and / or third story entries. Split level units are not modeled at this time. First floor displays regardless of selection of the number of floors.
Number of Bedrooms		1 – 10	Enter the number of bedrooms the unit will have.	A room without an external window or door and a closet is not to be counted towards this value.



4.3 Windows

[Geometry](#) [Windows](#) [Insulation / Mechanical](#) [HVAC / DHW](#) [Horizontal Projections](#)

Windows

Front Window Area:

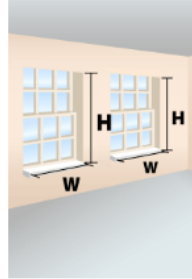
Right Window Area:

Back Window Area:

Left Window Area:

Solar Heat Gain Coefficient:

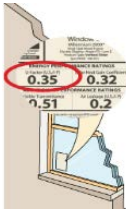
U-factor:



Please enter the total combined area of all windows and glass doors; measured using the rough opening and including the sash, curbing or other framing elements. For doors where the daylight opening is less than 50% of the door area, the glazing area is the daylight opening area only. For glass doors, the glazing area is the rough opening area for the door including the door and frame.

[Next](#) [Back to Project](#)



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Front/Right/Back/Left Window Area		* ≥ 0 (ft. ²)	Enter the total combined area of all windows and glass doors in each of the provided fields; measured using the rough opening and including the sash, curbing or other framing elements.	Make sure your directions (front, back, left, and right) are correspond to the orientation of the unit. For doors where the daylight opening is less than 50% of the door area, the glazing area is the daylight opening area only. For glass doors, the glazing area is the rough opening area for the door including the door and frame. * Upper limit of the range depends on the floor area of the unit.
Solar Heat Gain Coefficient		0.20 – 0.50	Enter the Solar Heat Gain Coefficient (SHGC) for the fenestrations (e.g., windows and doors).	This information is provided on the construction documents verified at the time of inspection. In the event of the Unit having different values, one enters the highest value or one calculates a weighted average based on square footage. Appropriate R-values can be found in Table 402.1.1 of the IECC 2009.
U-factor		0.25 – 1.22	Enter the U-Factors of fenestration products (e.g., windows and doors).	This information is provided on the construction documents verified during inspection. In the event of the Unit having different values, one enters the highest value or one calculates a weighted average based on square footage. Appropriate R-values can be found in Table 402.1.1 of the IECC 2009.



4.4 Insulation

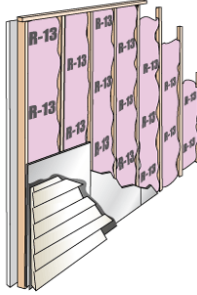
[Geometry](#) [Windows](#) [Insulation](#) [HVAC / DHW](#) [Horizontal Projections](#)

Insulation

Exterior Wall Cavity Insulation:

Insulated Wall Sheathing R-Value:

Exterior Wall Finish:
Stucco



Please enter the R-Value for the wall cavity insulation.
Insulation R-Values are to be verified during inspection.

Next

Back to Project



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Exterior Wall Cavity Insulation		5 – 50	Enter the R-Value for the wall cavity insulation.	Insulation R-Values are verified during inspection. This is the value of the insulation installed between the studs. Appropriate R-values can be found in Table 402.1.1 of the IECC 2009.
Insulated Wall Sheathing R-Value		0 Or > 2	Enter the R-Value for insulated wall sheathing if applicable. If none is used, enter "0".	This is the value of the insulated sheathing applied to the exterior of the wall assembly. If no sheathing is used, enter 0. If sheathing is used, then the minimum value is R-2. Appropriate R-values can be found in Table 402.1.1 of the IECC 2009.
Exterior Wall Finish	 Stucco  Vinyl  Brick  Cement Board  Wood Siding	<u>Drop Down Menu:</u> • Stucco • Vinyl Siding • Brick • Fibrous Cement Board • Wood Siding	Select the exterior wall finish from the drop-down menu.	If your siding type is not listed, please choose the closest material for an approximation.



4.5 HVAC / DHW

Geometry Windows Insulation / Mechanical HVAC / DHW Horizontal Projections

— HVAC/DHW —

Heating Type:
Electric Resistance ▾

A/C Efficiency:
18

A/C Size (tons):
3

Water Heater Type:
Natural Gas ▾

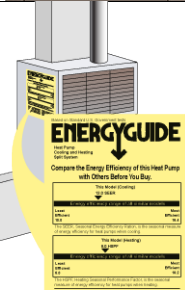
Energy Factor:
0.78

Please select the heating type for the house (e.g., heat pump, natural gas).

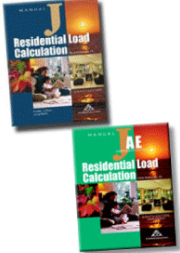
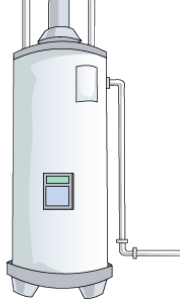
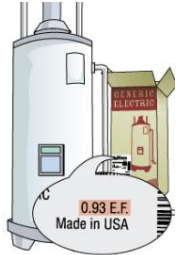
Next

Back to Project



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Heating Type		<u>Drop Down Menu:</u> - Gas Furnace - Heat Pump - Electric Resistance*	Select the heating type for the unit (e.g., heat pump, natural gas).	The software assumes that the space cooling equipment is electric. The "Heat Pump" option is provided with a backup electric resistance heating. * "Electric Resistance" is not allowed when the "IECC 2009 Austin" option is selected.
Heating Efficiency (AFUE / HSPF)		For AFUE 0.6 – 1 For HSPF 7.7 – 12	Enter either the Annual Fuel Utilization Efficiency (AFUE) or Heating Seasonal Performance Factor (HSPF) depending on the "Heating Type" selected.	Note that the label changes based on your heating type, and that if you enter an AFUE value, and change the heating type, you will see a reminder that the fractional AFUE isn't an acceptable HSPF value. In case of "Electric Resistance" option being selected, the efficiency of the heater is fixed by the IC3 at 100%.
A/C Efficiency (SEER)		13 – 21	Enter the Seasonal Energy Efficiency Ratio (SEER) of the air-conditioner.	This entry applies to heat pumps too.



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
A/C Size (tons)		1 – 15 (tons)	Please enter the tonnage of the air conditioning equipment.	Equipment must be sized according to method acceptable to the building official or authority having jurisdiction.
Water Heater Type		<u>Drop Down Menu:</u> - Gas - Electric	Select the type of fuel the water heater uses.	
Energy Factor		For Water Heater Type Electric 0.7 – 1.0 For Water Heater Type Gas 0.3 – 0.96	Please enter the Energy Factor (EF) for the water heating equipment to be installed in the proposed unit.	The software works with both tank-type and tank-less water heaters. If you have more than one water heater, please do a weighted average of the units, or use the efficiency rating of the least efficient water heater here. Equations providing minimum requirements of EF can be found in Table 504.2 of the IECC 2009.



4.6 Horizontal Projections

[Geometry](#) [Windows](#) [Insulation / Mechanical](#) [HVAC / DHW](#) [Horizontal Projections](#)

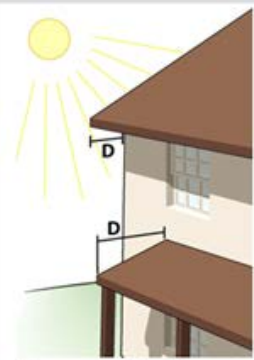
Horizontal Projections

Front Horizontal Projection:

Right Horizontal Projection:

Back Horizontal Projection:

Left Horizontal Projection:



Please enter the distance measured from the wall to the outer edge of the projection.

[Back to Project](#)



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Front/Right/Back/Left (ft)		≥ 0 (ft.)	Please enter the distance measured from the wall to the outer edge of the projection.	The projections are located at the roof level, and provide shade to both the windows and to the walls. It is ok to enter values here as well as the conditioned over non-conditioned question on the Floors Tab. These are focused on shading of the windows; the other is focused on thermal loss through the exposed floor. Enter the horizontal distance (ft) from the wall to the edge of the overhang, eave, or permanently attached shading device on this side of the unit for this floor. If you enter measurements in inches, the software will convert to feet and inches. These inputs are repeated for any 2nd or 3rd floors.



Westin #12

Energy Code:IECC 2000/2001

Builder Name:Greeley

Builder Phone:979 845 8888

Site Street Address:4512 Westin Way

City:Bryan

County:BRAZOS

Zip Code:77808

Notes:

edit

Floor Plan Name	Status	Actions
Long B	complete	edit delete copy

+ New Unit Floor Plan

+ New Unit

To enter a multi-family project, first you must create a new floor plan. Units in multi-family structures often share common characteristics (i.e. square footage, ceiling height, etc.). A floor plan is just a way to collect those common characteristics between units with an identical or "mirrored" layout.

This screen appears after filling in the required information. In order to proceed, click on either the **"New Unit Floor Plan"** button to create a new unit or on **"New Unit"** to start compiling the entire multi-family unit.



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v3.12.1 USER'S MANUAL

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4.7 “New Unit” – Unit Properties

[Properties](#) [Orientation](#)

Unit Properties

Unit Name:

Floor Plan:

Conditioned Floor Area Overhanging Unconditioned Space:

Floor Type:

[Remove Slab Insulation](#)

Slab Insulation R-Value:

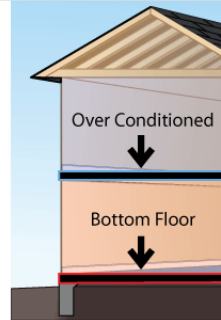
Not recommended for use in areas with a high likelihood of termite infestation. Please refer to your local building code office if you are unsure whether your project requires slab insulation.

Ceiling Type:

Mechanical in Conditioned Space?
Yes ☒ No ☐

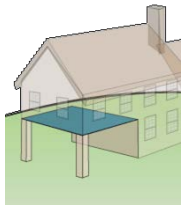
Measurements for Blower Door are:

Measurements for Duct Blaster are:



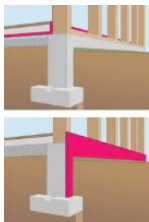
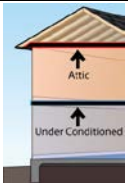
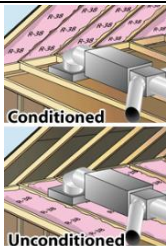
Floor type.



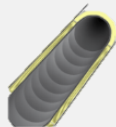
TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Unit Name		n/a	User input to identify the unit.	
Floor Plan		n/a	Pull down menu of the previously defined unit floor plans.	
Conditioned Floor Area Overhanging Unconditioned Space		0 – 10,000 (ft ²)	Enter the total square-footage of conditioned space of this floor overhanging ambient (unconditioned) air. (i.e.- 2nd floor overhanging an unconditioned porch or garage.)	This does not negate or replace the overhang values to be entered on the "Horizontal Projection" tab. This entry is to allow the simulation to calculate heat loss/gain via the exposed floor. The Overhang tab is to collect information on shading on the windows. The area of this value must be less than the floor area. So if you have a 500sq ft 2nd floor, you may only enter 499 for the overhang. This is a modeling limitation.
Floor Type		<u>Drop Down Menu:</u> - Bottom Floor - Over Conditioned	Enter an appropriate floor type	If you select "Bottom Floor", you will see a link for adding Slab Insulation.

Comment [jm3]: Need to confirm this! Am not very clear about this one.



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Slab Insulation		0 – 20	Enter the R-value of the slab insulation. was	This field automatically appears if the user selects "Add Slab Insulation" link (as shown above). Do not use "0" to remove slab insulation, use the "Remove Slab Insulation" link. Not recommended for use in areas with a high likelihood of termite infestation. Please refer to your local building code office if you are unsure whether your project requires slab insulation. Appropriate R-values can be found in Table 402.1.1 of the IECC 2009.
Ceiling Type		<u>Drop Down Menu:</u> - Attic - Under Conditioned	Enter the appropriate ceiling type	
Mechanical in conditioned space		<u>Radio Button:</u> - Yes - No	Mark your answer according to the location of the mechanical equipment and its duct-work.	This entry is referring to the location of the mechanical equipment and its duct system. When the insulation is applied on the underside of the roof decking we can consider the attic space is considered as a conditioned space.



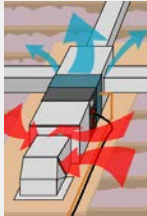
TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Supply Duct Insulation R-Value		For IECC 2009 ≥ 6 IECC 2009 Austin ≥ 8	Enter the R-Value of the supply duct insulation.	Only appears if Mechanical in Conditioned Space is "No". Appropriate R-values can be found in Section 405.2 of the IECC 2009.
Return Duct Insulation R-Value		For IECC 2009 ≥ 6 IECC 2009 Austin ≥ 8	Enter the R-Value of the return duct insulation.	Only appears if Mechanical in Conditioned Space is "No". Appropriate R-values can be found in Section 405.2 of the IECC 2009.

Note: Information in shaded cells appears only when appropriate values are selected in the IC3.



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Blower Door (@ ACH50)		$0 < \text{ACH@50} < *$	Enter the expected results from the Blower Door test for the proposed unit.	Typical Blower Door ACH50 test ranges fall between 0 and 6.99 ACH50. The IECC 2009 (Section 402.4.2.1) requires the building envelope tightness to be less than seven air changes per hour when tested with a blower door at a pressure of 50 Pa. The upper limit of < 7 ACH is enforced during the execution of the project for IECC 2009 and ≤ 5 for IECC 2012.
Type of Mechanical Ventilation		- None - Balanced - Exhaust Only - Supply Only	Enter the type of mechanical Ventilation.	Option is only available in IECC 2012. Option is required when Blower door Test result is $< 5@ACH50$. 'None' is not a valid option in this case.
Rate of Mechanical Ventilation (CFM)		1 or greater	Enter the mechanical ventilation rate in CFM.	Option is only available in IECC 2012. Option is required if Mechanical Ventilation Type is not 'None'
Operation of Blower (hrs./day)		1 through 24	Enter the length of time the blower operates in hours per day.	Option is only available in IECC 2012. Option is required if Mechanical Ventilation Type is not 'None'
Power of Fan (Watts)		1 or greater	Enter the power of the blower in Watts.	Option is only available in IECC 2012. Option is required if Mechanical Ventilation Type is not 'None'
Measurements for Duct Tightness		<u>Drop Down Menu:</u> - Untested* - Estimated** - Tested**	Specify whether measurements for duct tightness test are untested, estimated, or tested.	* "Untested" can be selected only when the air handler and all ducts are positioned in conditioned space. ** If "Estimated" or "Tested" is selected, then the additional input of information is required as shown in the next section.



Type of Duct Tightness Measurement		• Total Leakage • Leakage to Outdoors	If you are measuring only the leakage to outdoors, answer 'Leakage To Outdoors'. If you are measuring the total leakage, answer 'Total Leakage'.	This option is only available in IECC 2012.
Duct Tightness (@ CFM25, Post-Construction Test)		$0 < \text{cfm} \leq *$	Enter the expected results from the duct tightness test for the proposed unit.	The IECC 2009 (Section 403.2.2) requires the duct tightness to be verified. However, the duct tightness test is not required if the air handler and all ducts are located within the conditioned space. The calculator accepts post construction leakage to the outdoors values for the duct tightness test. * The upper limit of the postconstruction leakage to the outdoor value is $\leq 8 / 100 \text{ ft}^2$ of conditioned floor area and is enforced during the execution of the project.
Fraction of Duct Area Outside the Conditioned Space		$0 - 1$	Input the percentage (0 to 100) of the duct area located outside of conditioned space.	This option is only available in IECC 2012 and when the Type of Duct Measurement is 'Total Leakage'



Total Roof/Ceiling Insulation R-Value		13 – 60	Please enter the weighted average R-Value for the roof/ceiling cavity insulation. Insulation R-values are verified at inspection.	This field only appears for the top unit. Appropriate R-values can be found in Table 402.1.1 of the IECC 2009.
--	---	---------	---	---

Note: Information in shaded cells appears only when appropriate values are selected in the IC3.

4.8 “New Unit” – Unit Orientation

Properties

Orientation

Unit Orientation

Orientation:

south

Mirror:

Yes

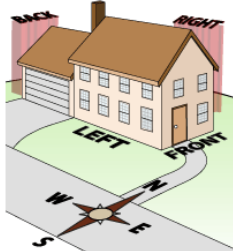
No

40

20

20

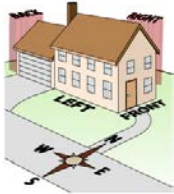
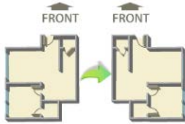
50



Please select the orientation of the unit from the drop-down menu. The front of the unit is the direction the front door faces. The right side of the unit is to the right of the unit when facing it.

Back to Project



TITLE	PICTURE	RANGE	GUIDANCE	NOTES
Orientation		<u>Drop Down Menu:</u> • South • Southwest • West • Northwest • North • Northeast • East • Southeast	Select the orientation of the unit.	The front of the unit is the direction the front door faces. The right side of the unit is to the right of the unit when facing it.
Mirror		<u>Radio Button:</u> • Yes • No	The unit is mirrored from the specified floor plan if the properties of the sides of the unit (i.e. window and door properties) are swapped.	



Westin #12

Energy Code: IECC 2000/2001
Builder Name: Greeley
Builder Phone: 979 845 8888
Site Street Address: 4512 Westin Way
City: Bryan
County: BRAZOS
Zip Code: 77808
Notes:

[edit](#)

Floor Plan Name	Status	Actions
Long B	complete	edit delete copy

[+ New Unit Floor Plan](#)

Unit Name	Floor Plan	Status	Actions
A	Long B	passed	edit delete copy

[+ New Unit](#)

[Print Certificate](#)

[Print Inspection List](#)

To enter a multi-family project, first you must create a new floor plan. Units in multi-family structures often share common characteristics (i.e. square footage, ceiling height, etc.). A floor plan is just a way to collect those common characteristics between units with an identical or "mirrored" layout.

In this case we have pressed the **"Print Certificate"** option which causes the simulation to execute and a certificate to be generated.



5 Other Information

5.1 FAQ

Q – I am confused. How do I know which code option to choose?

A – “IECC 2009” is your choice to show compliance with the 2009 IECC. The “IECC 2009 Austin” code should be used to show compliance with the 2009 amendments published by Austin Energy.

Q – How does an IC3 User access older projects in IC3?

A – You should be able to access your older projects from “My Page”. Initially, IC3 displays the last ten projects entered into IC3. If you need to find projects that are being stored that are older than the last three projects, then simply click on the “Search” button (with nothing typed in the search field). This will open the “project scroll function” and the ability to scroll through all of the projects that you have access to. If there you are still unable to locate your project, it could be that IC3 has undergone an enhancement that affected the status of your project. In this case, you may use the “Help/FAQ's” link at the bottom of every page in IC3. From the web page that opens up, simply select the “Contact Us” option and send us your request and we can help by retrieving the information for you.

Q – How do I use the “Texas A&M Duct Trade-Off Option” in IC3?

A – The “Duct Trade-Off Option” cannot be used with the “IECC 2009” or later code selections.

Q – Why won't the software calculate an addition on the back of a house?

A – IC3 isn't presently configured to do additions, only new single family residences.

Q – IC3 allows Solar Heat Gain Coefficient and U-Factors greater than what is allowed for the climate zone where my project is located. Is this a defect with the software?

A – No, this is not a defect. IC3 has been developed to allow the user to enter the values for SHGC and U-factor that would comply with the State of Texas energy code requirements. It is also intended to demonstrate our interpretation of the simulated performance approach. IC3 allows the user to enter SHGC and U-factor values that may not meet the minimum for a certain area, but will allow the user to see how the entire building will perform according to the users' input. Minimum values for SHGC and U-factor may be dictated by a jurisdiction's currently adopted energy code, or by amendments that the jurisdiction has adopted. It is the responsibility of the jurisdiction and its inspectors and plan reviewers to ensure that current minimums are being met; both at the plan review stage and during construction/inspection stage.



Q – How does the emissions calculator work?

A – The version that we use, utilizes an allocation of power providers for the county selected, and then does a series of “look-ups” from the EPA’s eGrid database. The results are then applied to the energy savings and are displayed.

Q – What does a reduction in tons of CO2 emissions mean?

A – Perform a web search on “reduction in carbon dioxide equivalent” at the website, <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>. The search yields some good explanations from a variety of source. Comparing CO2 reductions to cars being taken off of the road is a poor example sometimes, but works for some. This value is located on the first page of the single family energy report. It does not appear in the multifamily energy report.

Comment [jm4]: Where are we reporting this in the IC3?
I am not sure where to look!

5.2 Getting Help

The following are provided in the order of the quickest response time to you!

1. See the FAQ here: <http://esl.eslwin.tamu.edu/terp/code-compliance-calculators/ic3/help-and-support>

Remember:

- Your window to floor ratio. There are some situations where our model will not calculate window to floor ratios over ~ 80%
 - Think about your overhanging non-conditioned space. The model requires at least 1ft. of the overhang to be over the floor below. So if you have an 800 sq.ft. garage apartment, either simulate it separately OR enter 799 for the overhang (assuming all other construction is the same and it is on a common HVAC system).
2. Please look on this page for the latest updates: http://esl.eslwin.tamu.edu/docs/software/ic3/IC3_latest_release.pdf and in particular the **RELEASE NOTES**
 3. Please send an email to: ic3_support@esl.tamu.edu and in it please put:
 - SUBJECT: IC3 HELP
 - The question
 - The type of browser you are using (Fire Fox, Internet Explorer 6 or 7)
 - A screen shot if you are asking about something specific on the screen.

5.3 General Process

The user enters a house and the system performs two simulations. One for the house as entered, and another for the house as if it was built exactly to code. The difference in total energy usage is the % above code as shown. The software allows a user to make changes to the proposed house, but each time a new certificate (**with unique certificate number**) is generated. Only ONE certificate will be accepted by the Inspector and only that certificate will provide for any emissions reduction credit. This final design then becomes the house of record for the purposes of the inspection.

The software has been, and continues to be, benchmarked against other code-compliant simulation systems. The effective maximum size of the house is 10,000 sq ft. Houses larger than this typically require custom simulations due to the use of construction materials, geometry, and systems that are not common.

Comment [jm5]: This may need to be put upfront.

For more detail, please refer to the IC3 Technical Notes found at: <http://esl.tamu.edu/terp/code-compliance-calculators/ic3/tbr-ic3-reports>



