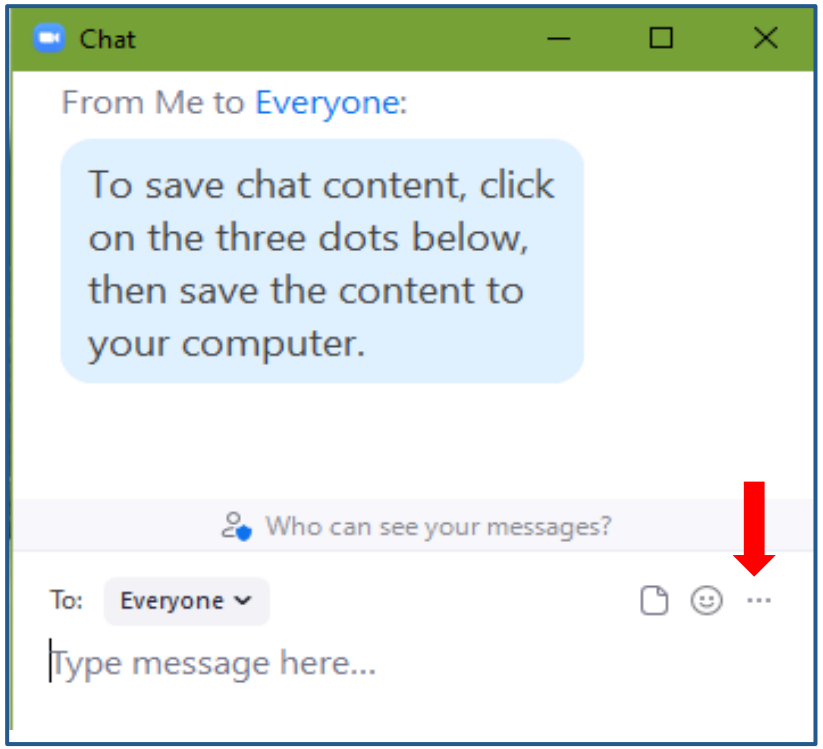
# Using REScheck for Compliance with Maine IECC-2015

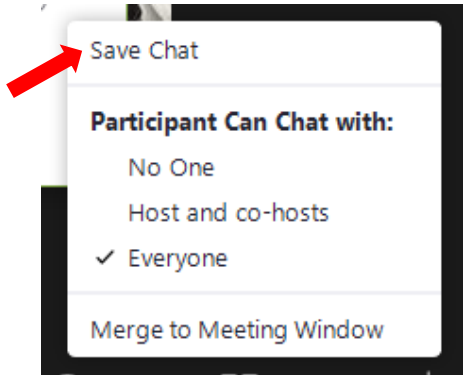


Maine Indoor Air Quality Council

# How to get the most from today's program:

1. **Mute your microphone** during the presentation.
2. **Do ask workshop related questions**. Type your questions (to Everyone) into the meeting chat box.
3. **Save the meeting chat** that contains answers to questions, lists of resources, and helpful links to your computer before you leave the program.
4. **Code specific questions** should be directed to the State Fire Marshal's Office Building Codes: [https://www.maine.gov/dps/fmo/building-codes](https://www.maine.gov/dps/fmo/building-codes).



# Additional Energy Code Resources

- **Additional energy code workshops**
  https://www.efficiencymaine.com/professional-training/building-energy-code-workshops/
- **Additional building energy code resources**
  https://www.efficiencymaine.com/building-energy-codes/
- **State Fire Marshal's Building Codes**
  https://www.maine.gov/dps/fmo/building-codes

**IAQ & Energy Symposium**
www.iaqandenergy.com

Maine Indoor Air Quality Council

www.maineindoorair.org
207-626-8115
Christy@maineindoorair.org



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# Instructor, Rick Karg

- Member of MUBEC Board (2008 – 2013)
- Received Phillip C. Hastings award from Efficiency Maine in 2015
- Inducted into the Building Performance Institute (BPI) Hall of Fame in 2016
- Chair of ASHRAE Residential Buildings Committee
- President of Residential Energy Dynamics (RED)

# Workshop Description

This training provides the necessary details of the use of the free REScheck software (computer or web based) for determining compliance with IECC-2015.

An introduction to the IECC-2015 includes the three residential compliance approaches of prescriptive, building UA (component) tradeoff, and energy analysis (performance alternative).

Using REScheck, the UA trade-off method is explained in detail with an example, leading to compliance.

# Learning Objectives

1. Know the differences among the three compliance paths of the IECC-2015, including prescriptive, component tradeoff, and performance.
2. Understand how REScheck functions and calculates building envelope compliance with the IECC-2015.
3. Be able to identify and correctly enter construction specifications required by the REScheck software.
4. Understand how to create inspection checklists and compliance reports/certificates with the REScheck software.

# Overview

# The I-Codes and REScheck

- REScheck is a tool for verifying compliance with the International Energy Conservation Code (IECC) and parts of the International Residential Code (IRC)
- This workshop focuses on the use of REScheck (desktop version) and will touch on requirements of the IECC
- For a more detailed examination of the IECC and the IRC, please study those documents

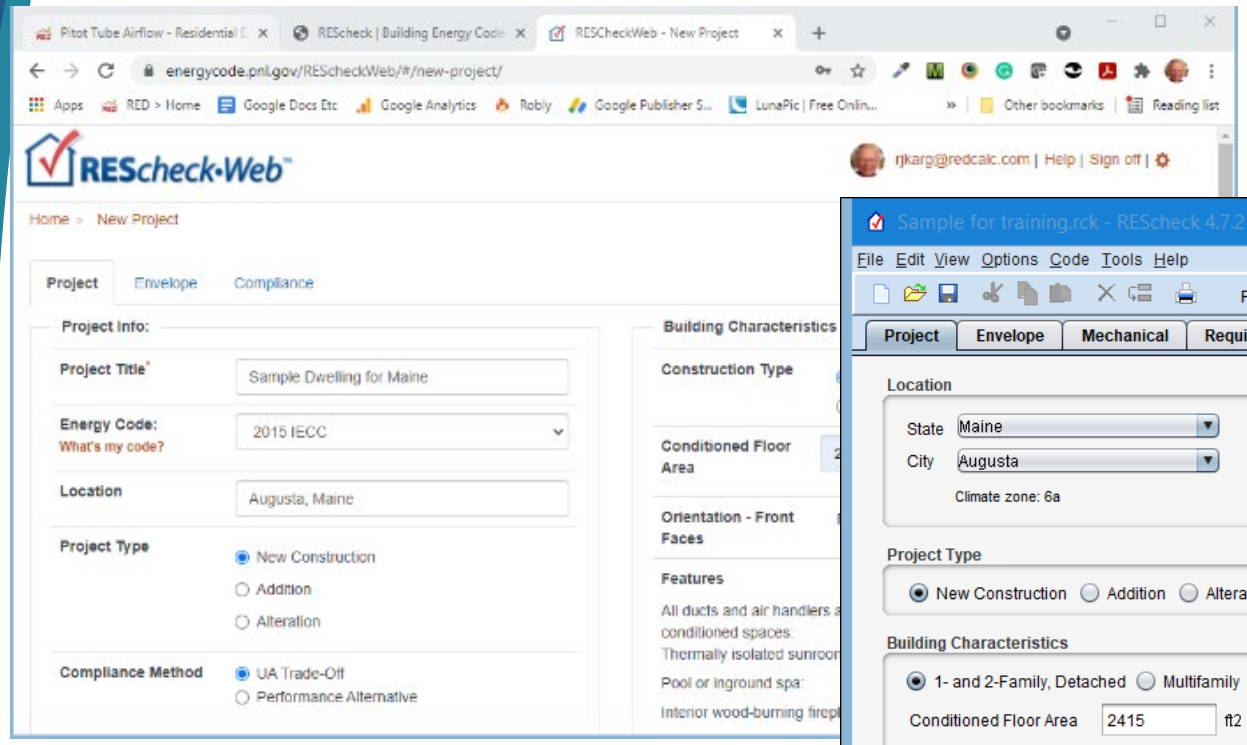
# REScheck

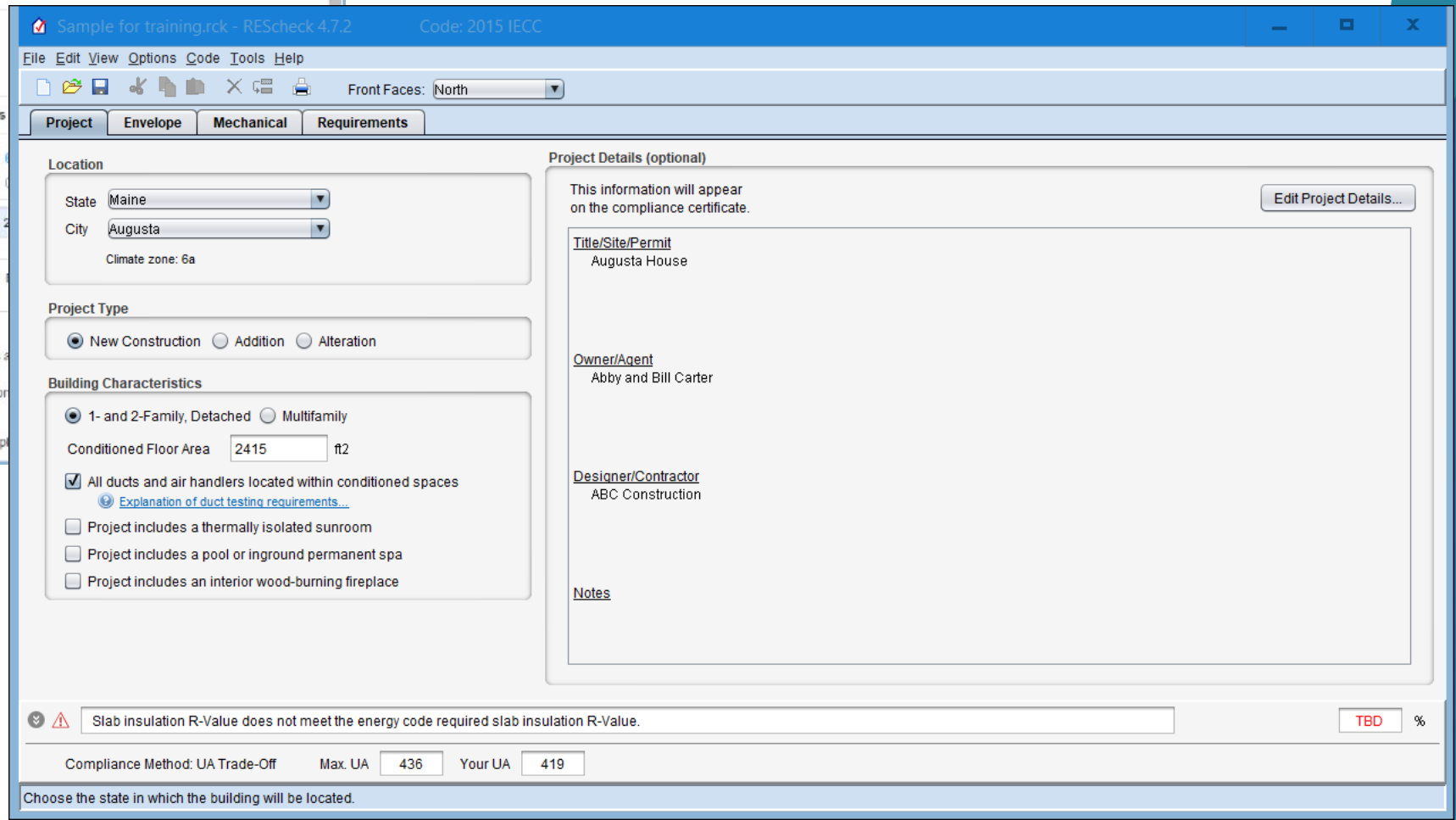
- Available as download (desktop) version and web-based version. We will use desktop version for this workshop.
- Must set to the IECC-2015 version under “Code” dropdown.
- Download includes (as of November 2021)
  - REScheck v4.7.2
  - AreaCalc, v2.4.0

# REScheck

Download (desktop) version 4.7.2

Windows ONLY, NO Mac version




## Web-based version

Can exchange files between Download version and web version

Allows Portland, ME “stretch code” – 2021 IECC

# REScheck Dwelling Types

- One- and two-family detached
- Multifamily buildings three stories or less above grade
- Alteration - "Any construction, retrofit or renovation to an existing structure [-] other than repair or addition [-] that requires a permit. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit." [IRC-2015, Chapter 2]
- Addition - "An extension or increase in the floor area or height of a building structure." [IRC-2015, Chapter 2] *Only significant for REScheck if an increase in conditioned area.*

"Residential Building: For this code, includes detached one-and two-family dwellings (townhouses) as well as Group R-2, R-3 and R-4 buildings three stories or less in height above grade plane."

# REScheck Dwelling Types

"Residential Building: For this code, includes detached one-and two-family dwellings (townhouses) as well as Group R-2, R-3 and R-4 buildings three stories or less in height above grade plane."

- Residential Group R is the occupancy group used for buildings that include sleeping rooms and are not institutional and are not generally regulated by the International Residential Code. The IRC typically regulates single-family homes and duplexes; any structure with more than two units is in the IBC. There are four different occupancy groups within the "R" classification.
  - R-1. This group is for transient uses like hotels, motels, and boarding houses. *Commercial compliance required*
  - R-2 is the group we see most often and it for residences where occupants are primarily permanent. This includes apartments, dormitories, fraternities and sororities. It also includes vacation timeshares (again with more than two units) and convents and monasteries. Congregate living facilities with 16 or fewer occupants are in group R-3.
  - R-3 is something of a catchall group for permanent occupancies that aren't R-1, R-2, or R-4. These include buildings that are in the IBC but have no more than two units. Adult facilities and child care facilities that provide accommodation for five or less people less than 24 hours a day are R-3. Where these facilities are in a single family home they must comply with the IRC.
  - R-4 is for residential care/assisted living facilities including more than five and not more than 16 occupants. Generally it is very similar to R-3's requirements.



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# IECC-2015 Compliance Approaches - 1

- Prescriptive
  - Comply with Table R402.1.2 in IECC-2015 for your climate zone in Maine, 6 or 7 (Aroostook county)
- Total UA Trade-Off
  - REScheck "UA Trade-Off" selection (under "Options" in top dropdown)
  - Trade off below-prescriptive windows for above-prescriptive walls, for example.
  - "Mechanical" not included

# IECC-2015 Compliance Approaches - 2

- Prescriptive
  - Comply with Table R402.1.2 in IECC-2015 for your climate zone in Maine, 6 or 7 (Aroostook county)

TABLE R402.1.2 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

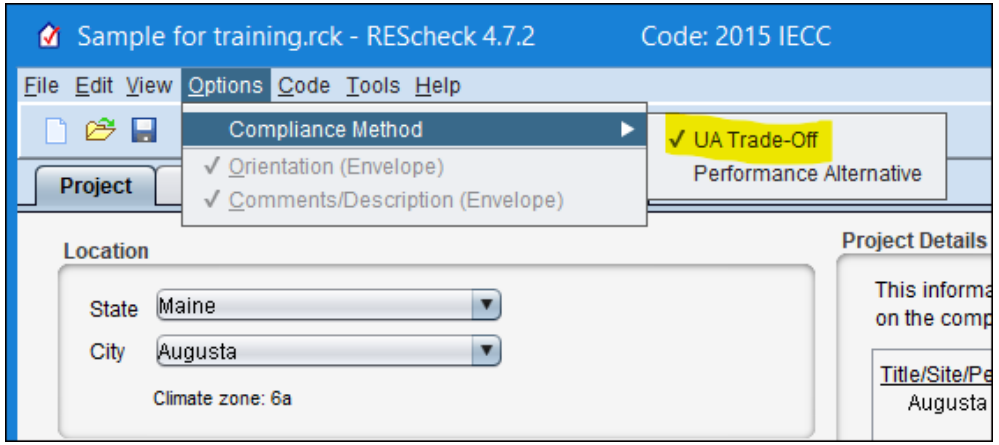
| CLIMATE ZONE | FENESTRATION *U*-FACTOR[b] | SKYLIGHT[b] *U*-FACTOR | GLAZED FENESTRATION SHGC[b, e] | CEILING *R*-VALUE | WOOD FRAME WALL *R*-VALUE | MASS WALL *R*-VALUE[i] | FLOOR *R*-VALUE | BASEMENT[c] WALL *R*-VALUE | SLAB[d] *R*-VALUE & DEPTH | CRAWL SPACE[c] WALL *R*-VALUE |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | NR | 0.75 | 0.25 | 30 | 13 | 3/4 | 13 | 0 | 0 | 0 |
| 2 | 0.40 | 0.65 | 0.25 | 38 | 13 | 4/6 | 13 | 0 | 0 | 0 |
| 3 | 0.35 | 0.55 | 0.25 | 38 | 20 or 13+5[h] | 8/13 | 19 | 5/13[f] | 0 | 5/13 |
| 4 except Marine | 0.35 | 0.55 | 0.40 | 49 | 20 or 13+5[h] | 8/13 | 19 | 10/13 | 10, 2 ft | 10/13 |
| 5 and Marine 4 | 0.32 | 0.55 | NR | 49 | 20 or 13+5[h] | 13/17 | 30[g] | 15/19 | 10, 2 ft | 15/19 |
| 6 | 0.32 | 0.55 | NR | 49 | 20+5 or 13+10[h] | 15/20 | 30[g] | 15/19 | 10, 4 ft | 15/19 |
| 7 and 8 | 0.32 | 0.55 | NR | 49 | 20+5 or 13+10[h] | 19/21 | 38[g] | 15/19 | 10, 4 ft | 15/19 |

# IECC-2015 Compliance Approaches - 3

Don't choose Performance Alternative unless your dwelling fails. This is harder to use.

- Performance Alternative
  - REScheck "Performance Alternative" selection (under "Options" in top dropdown)
  - Includes all features of "Total UA Trade-Off", PLUS heating and cooling under the "Mechanical" tab, and solar gain (orientation)
  - Efficient heating/cooling "systems may impact results, however no trade-off credits for high efficiency mechanical equipment are allowed." (REScheck help)
- Energy Analysis (Systems Performance Approach)
  - REScheck does not calculate this approach
  - Requires more detail and more time
  - Proposed design compared with reference or baseline house based on annual energy use
  - May use REM Rate, REM Design, Energy Gauge, or other qualifying software

# IECC-2015 Compliance Approaches - 4




- Total UA Trade-Off
  - Trade off below-prescriptive windows for above-prescriptive walls, for example.
  - “Mechanical” not included
- Performance Alternative
  - Includes all features of “Total UA Trade-Off”, PLUS heating and cooling under the “Mechanical” tab, and solar gain (orientation)
  - Efficient heating/cooling “systems may impact results, however no trade-off credits for high efficiency mechanical equipment are allowed.” (REScheck help)

Don’t choose Performance Alternative unless your dwelling fails. This is harder to use.

# REScheck

## Getting Started

REScheck-Web™ is accessible directly from the website without having to download and install.

**REScheck™ Desktop** for Windows® may be downloaded and installed directly to your desktop.

- See if your state or county can use REScheck to show compliance.
- View a list of supported software versions for code compliance tools.

## Residential Compliance Using REScheck™

The REScheck product group makes it fast and easy for builders, designers, and contractors to determine whether new homes, additions, and alterations meet the requirements of the IECC or a number of state energy codes. REScheck also simplifies compliance determinations for building officials, plan checkers, and inspectors by allowing them to quickly determine if a low-rise residence meets the code.

REScheck is appropriate for insulation and window trade-off calculations in residential detached one- and two-family buildings and multi-family buildings three stories or less in height above grade, such as apartments, condominiums, and townhouses. REScheck works by performing a simple U-factor x Area (UA) calculation for each building assembly to determine the overall UA of a building. The UA that would result from a building conforming to the code requirements is compared against the UA for your building. If the total heat loss (represented as a UA) through the envelope of your building does not exceed the total heat loss from the same building conforming to the code, the software generates a report that declares your building is compliant with the code.

## REScheck Support

**Have a compliance question or need assistance with the software?**

BECP's team of building energy codes experts is available to answer specific questions submitted through our web-based help desk.

REScheck Technical Support Document

### LATEST RELEASE

LAUNCH RESCHECK-WEB

### DESKTOP VERSION

**DESKTOP VERSION/BUILD:** VERSION 4.7.1.2
**PLATFORM:** WINDOWS
**RELEASE DATE:** OCTOBER 22, 2020

### RELEASE NOTES

**WHAT'S NEW:**

**VERSION 4.7.1.2** ADDRESSES THE FOLLOWING:

- 2011 VERMONT RBES HAS BEEN DISCONTINUED FROM SUPPORT; 2020 VERMONT IS SUPPORTED ALTHOUGH ONLY IN RESCHECKWEB.
- MINOR UPDATES WERE MADE TO 2017 FLORIDA CLIMATE ZONE 1 FENESTRATION U-FACTOR REQUIREMENT

**RESCHECK DESKTOP 4.7.1 SUPPORTED CODES:**

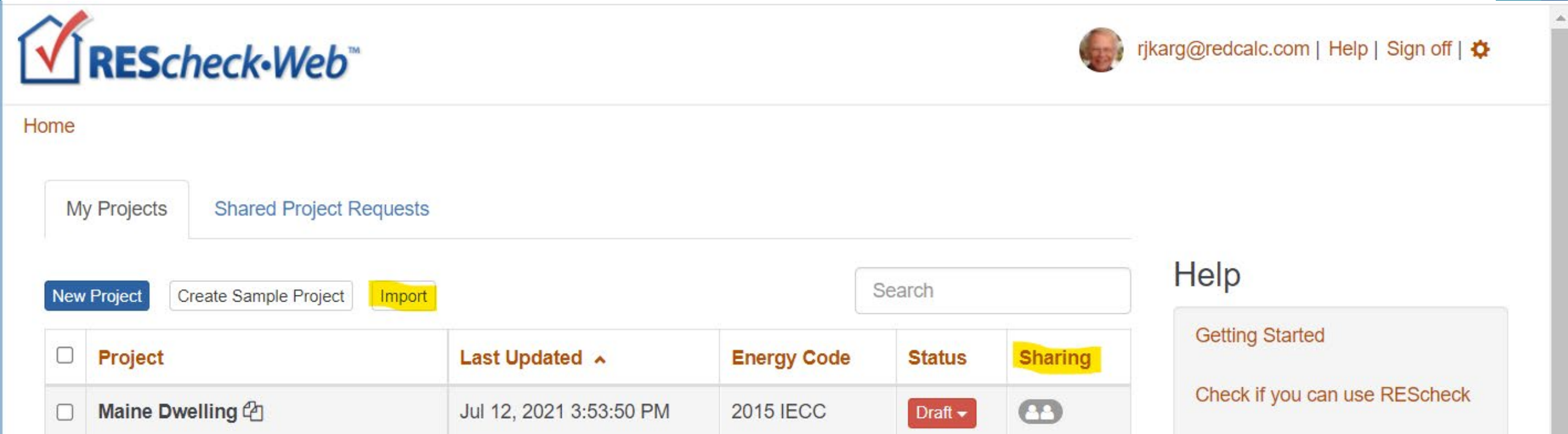
- 2009, 2012, AND 2015 IECC (2018 IECC IS ONLY SUPPORTED IN RESCHECK-WEB)
- STATE ENERGY CODES: FLORIDA, MASSACHUSETTS, NEW YORK CITY, PUERTO RICO, UTAH, VERMONT (2020 MASSACHUSETTS AND 2020 VERMONT ARE ONLY SUPPORTED IN RESCHECK-WEB)

### DOWNLOAD

| | |
|---|---|
| RESCHECK 4.7.1.2 SETUP .EXE | 73.39 MB |

# Download vs Web-Based Version

- May exchange files between download and web-based versions.
  - Login to web-based version
  - My Projects tab, then Import button



# REScheck Steps

1) Select “Preferences” at “Edit” dropdown

2) Enter project information

3) Enter envelope components

4) Enter mechanical equipment (optional)

5) Check “Requirements” tab

6) View/print report

Save

# Example House – Live Desktop Version

Sample for training.rck - REScheck 4.7.2 Code: 2015 IECC

File Edit View Options Code Tools Help

Front Faces: North

Project | Envelope | Mechanical | Requirements

Ceiling | Skylight | Wall | Window | Door | Basement | Floor | Crawl Wall

| | Component | Assembly | Orientation | Gross Area or Slab Perimeter | | Cavity Insulation R-Value | Continuous Insulation R-Value | U-Factor | UA | Wall Height (ft) | Depth Below Grade (ft) | Depth of Insulation (ft) | Comments/Description (Optional) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Building | | | | | | | | | | | | |
| 1 | Ceiling 1 | Raised or Energy Truss | | 2415 | ft2 | 30.0 | 22.0 | 0.019 | 46 | | | | |
| 2 | Wall 1 - North | Wood Frame, 24" o .c. | Front | 911 | ft2 | 20.0 | 5.0 | 0.043 | 22 | | | | |
| 3 | Window 1 | Vinyl/Fiberglass Fram... | Front | 369 | ft2 | | | 0.3 | 111 | | | | |
| 4 | Door 1 | Solid | Front | 21 | ft2 | | | 0.5 | 11 | | | | |
| 5 | Wall 2, South | Wood Frame, 24" o .c. | Back | 834 | ft2 | 20.0 | 5.0 | 0.043 | 29 | | | | |
| 6 | Window 2 | Vinyl/Fiberglass Fram... | Back | 149 | ft2 | | | 0.3 | 45 | | | | |
| 7 | Door 2 | Glass | Back | 21 | ft2 | | | 0.65 | 14 | | | | |
| 8 | Wall 3, West | Wood Frame, 24" o .c. | Left Side | 492 | ft2 | 20.0 | 5.0 | 0.043 | 21 | | | | |
| 9 | Wall 4, East | Wood Frame, 24" o .c. | Right Side | 632 | ft2 | 20.0 | 5.0 | 0.043 | 27 | | | | |
| 10 | Window 3 | Vinyl/Fiberglass Fram... | Right Side | 15 | ft2 | | | 0.3 | 5 | | | | |
| 11 | Knee Wall We | Wood Frame, 16" o.c. | Left Side | 69 | ft2 | 20.0 | 0.0 | 0.059 | 4 | | | | |
| 12 | Knee Wall Eas | Wood Frame, 16" o.c. | Right Side | 84 | ft2 | 20.0 | 0.0 | 0.059 | 5 | | | | |
| 13 | Basement Wa | Solid Concrete or Mas... | Right Side | 216 | ft2 | 0.0 | 15.0 | 0.054 | 12 | 9.0 | 4.5 | 9.0 | |
| 14 | Basement Wa | Solid Concrete or Mas... | Left Side | 144 | ft2 | 0.0 | 15.0 | 0.054 | 8 | 9.0 | 4.5 | 9.0 | |
| 15 | Basement Wa | Solid Concrete or Mas... | Front | 684 | ft2 | 0.0 | 15.0 | 0.048 | 33 | 9.0 | 7.0 | 9.0 | |
| 16 | Floor 1 | All-Wood Joist/Truss:O... | | 783 | ft2 | 30.0 | 0.0 | 0.033 | 26 | | | | |
| 17 | Floor 2 | Slab-On-Grade:Unhea... | | 93 | ft | | 10.0 | 0.655 | 0 | | | 4.0 | Perimeter entry |

Passes 3.9 % Better Than Code

Compliance Method: UA Trade-Off Max. UA 436 Your UA 419

Enter the R-value of continuous insulation, or enter 0 if none will be installed.

Compliance bar

Status bar

# “Preferences” (“Edit” Menu Item)

## General

- File options
- Update check
- Upload usage data

## Project

- Code and location
- Envelope comments

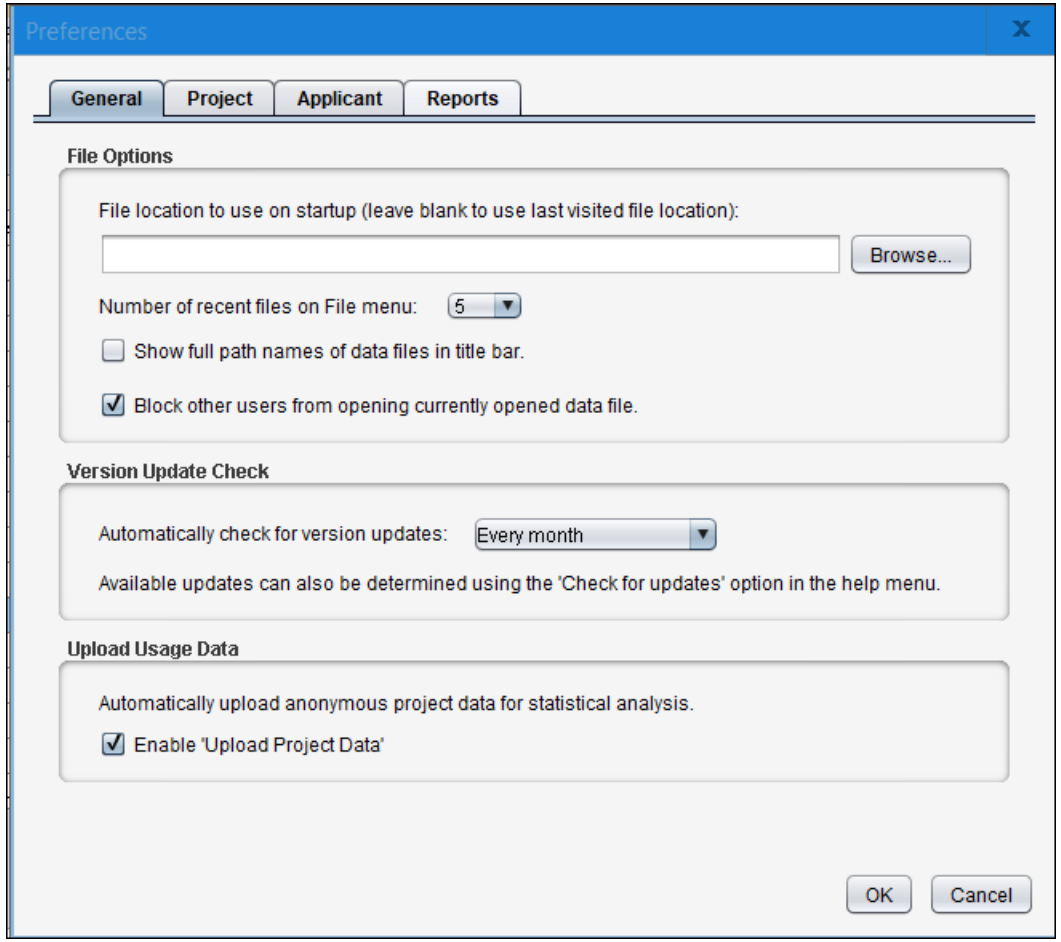
## Applicant

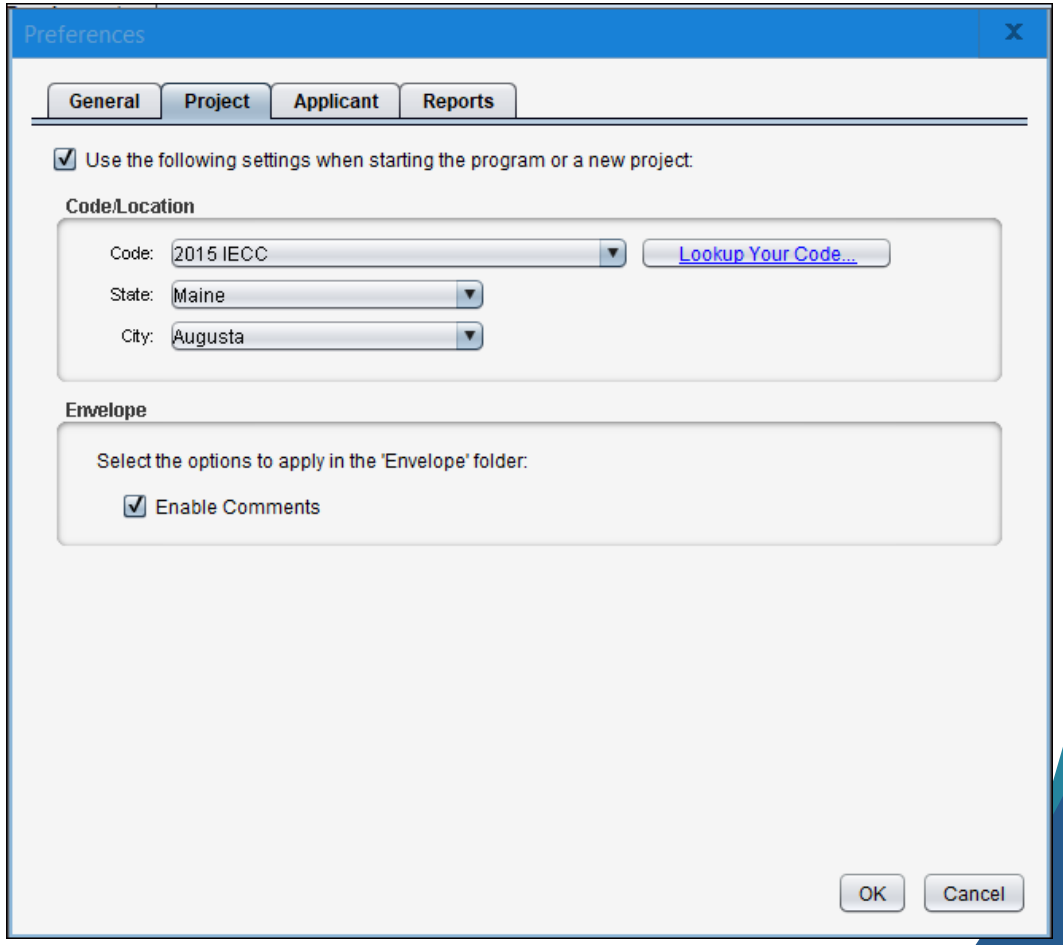
- Default project details

## Reports

- Signatures
- Email reports…

# “Preferences” (“Edit” Menu Item)



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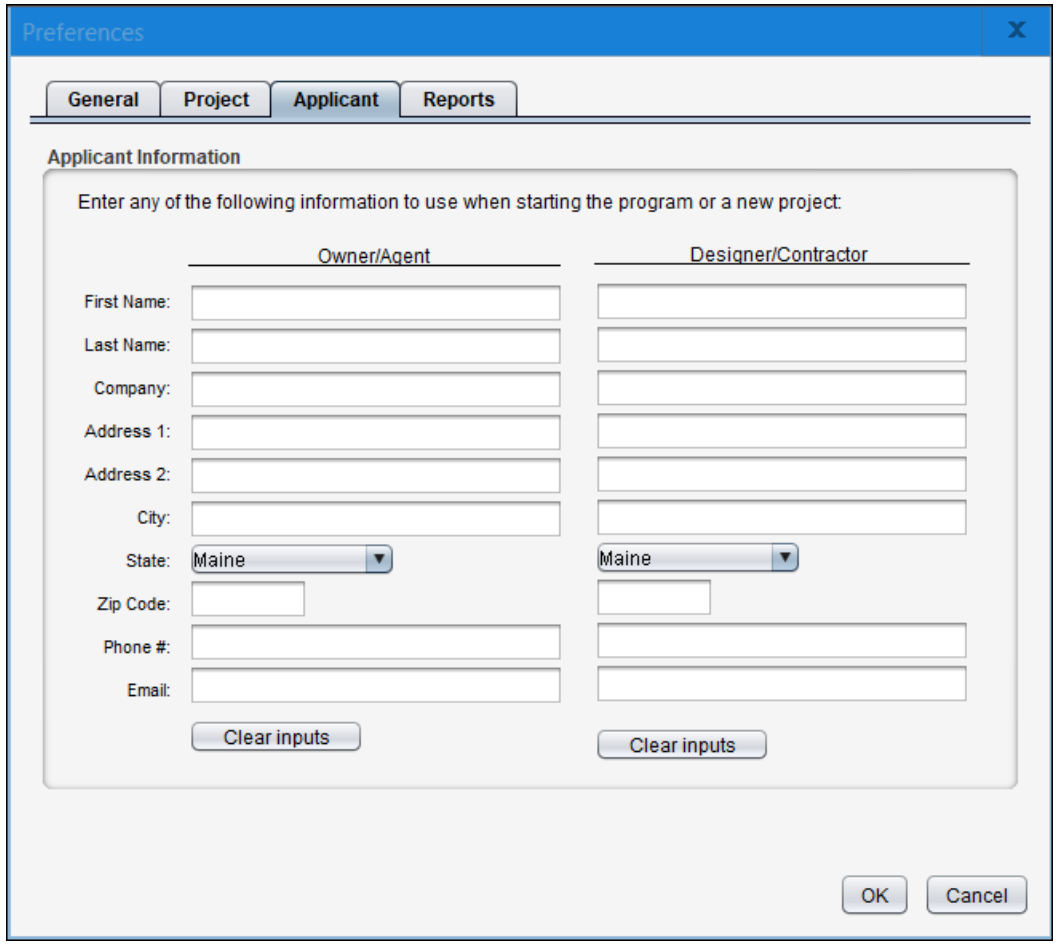
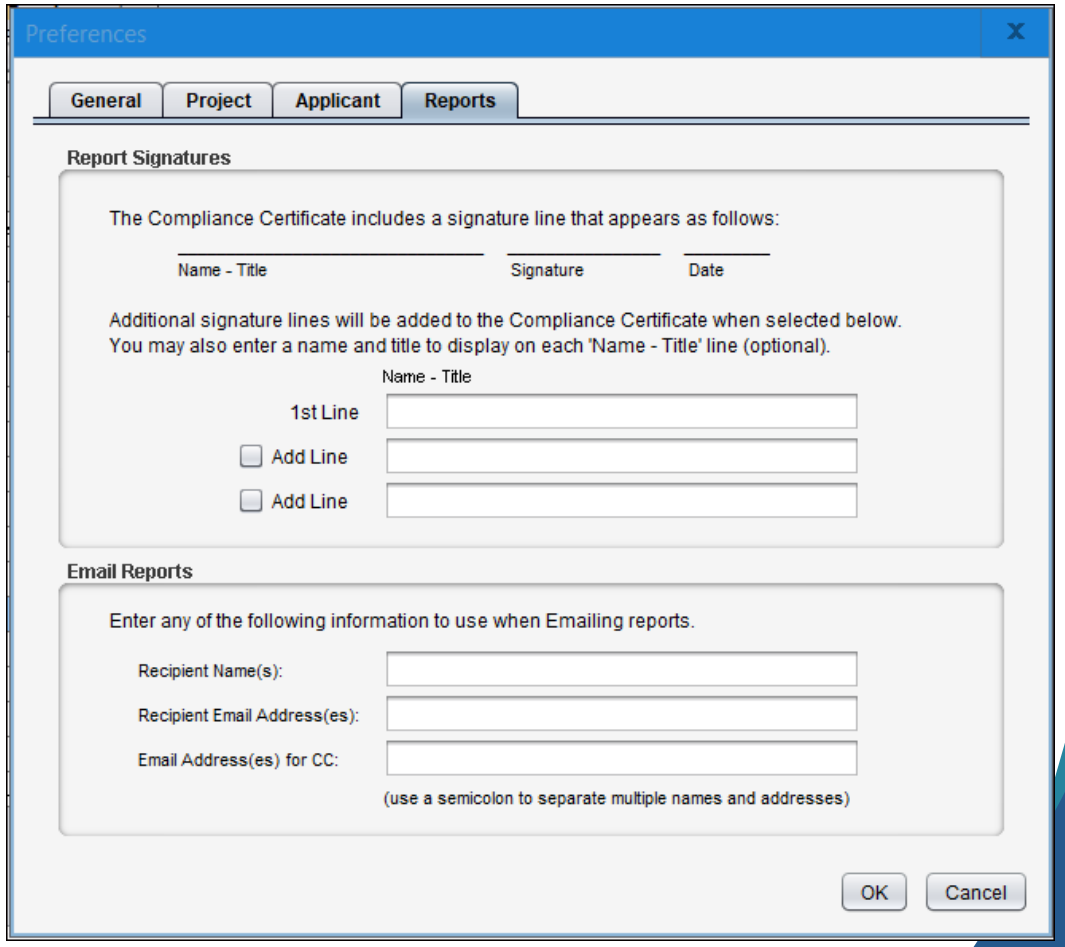
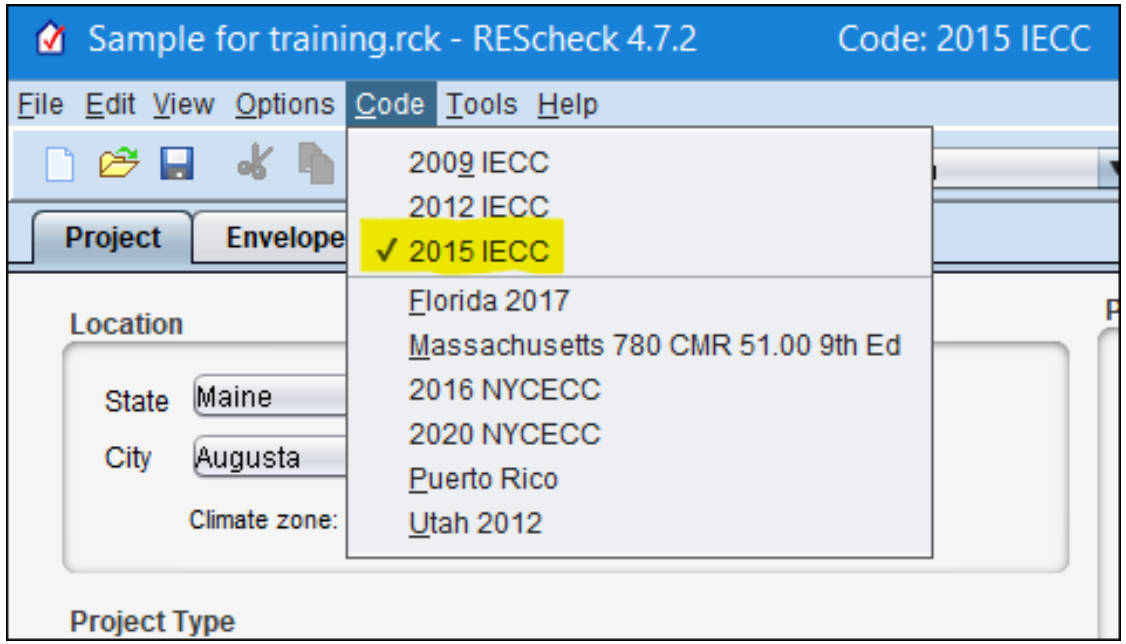


# “Code”

- This is really a Preference
- Once you select the IECC code year, each new project will default to that code year

- If working in Portland, may use the web version of REScheck and select 2021 IECC for compliance with Portland’s “stretch code”



# REScheck Steps

1) Select “Preferences” at “Edit” dropdown

2) Enter project information

3) Enter envelope components

4) Enter mechanical equipment (optional)

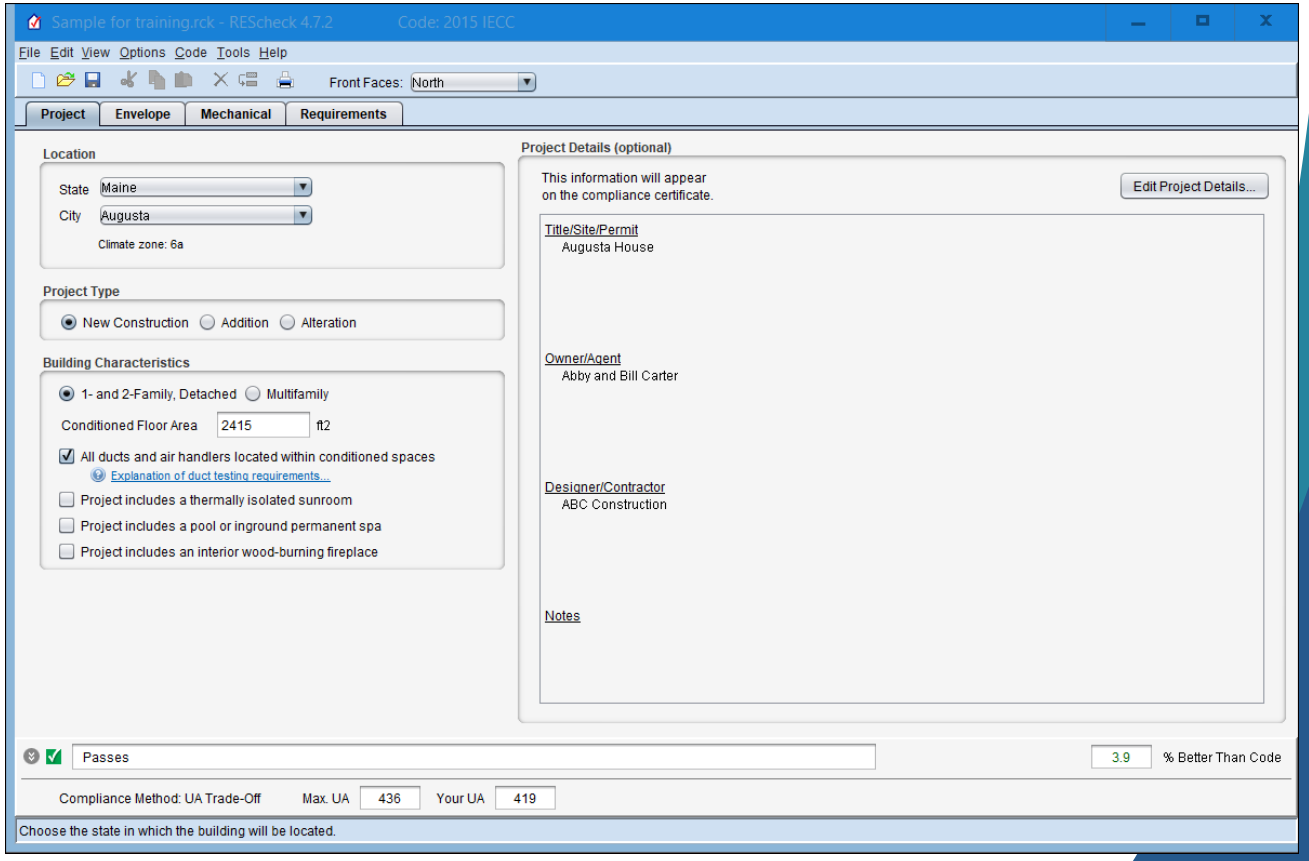
5) Check “Requirements” tab

6) View/print report

Save

# Project Information (“Project” tab)

- Project Location
  - State and City (climate zone)
  - Web version allows county input
- Project Type
  - New Construction
  - Addition
  - Alteration
- Building Characteristics
  - One- and Two-Family Detached
  - Multifamily three stories or fewer above grade
  - Check boxes (ducts, sunroom, pool/spa, wood-burning fireplace). Some of these trigger additional inputs.



# Multifamily if. . .

Tip

- Residential
- Three stories or less in height above grade (ASHRAE 62.2-2016 uses different definition of multifamily – no height limit)
- Three or more attached dwelling units
- Examples
  - Apartments
  - Condominiums
  - Townhouses
  - Dormitories
  - Rowhouses

# REScheck Steps

1) Select “Preferences” at “Edit” dropdown

2) Enter project information

3) Enter envelope components

4) Enter mechanical equipment (optional)

5) Check “Requirements” tab

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Save

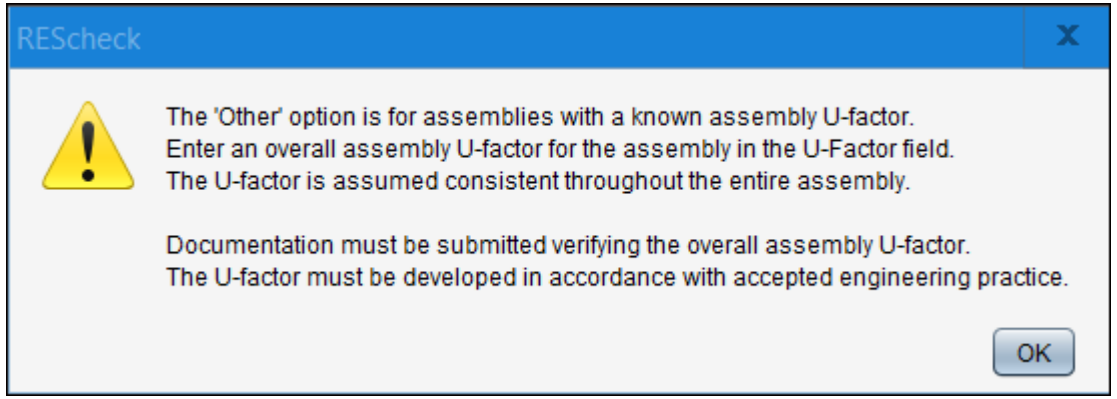
# The Envelope

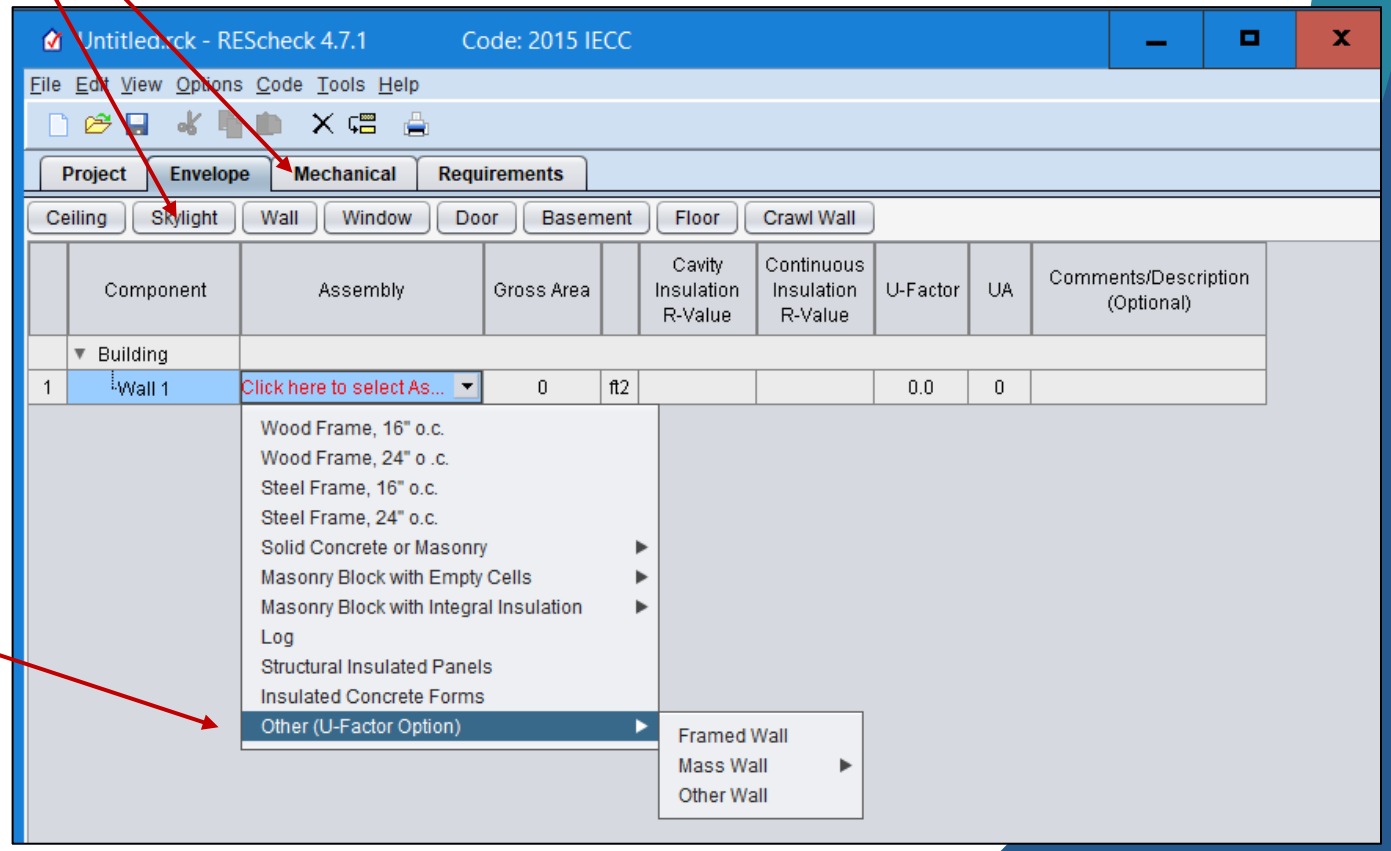
The designer determines the envelope boundaries

Make sure to include ONLY applicable components

# Envelope Components

- Don't need to use each tab or button
- Group similar components
- Include rim joists with walls
  - Should be same R-value as wall
- Use gross area, except slab on grade (linear feet)
  - Gross wall area should include exterior dimensions
- Use "Other" dropdown choice as needed
  - Must verify U-factor/R-value calculation with documentation



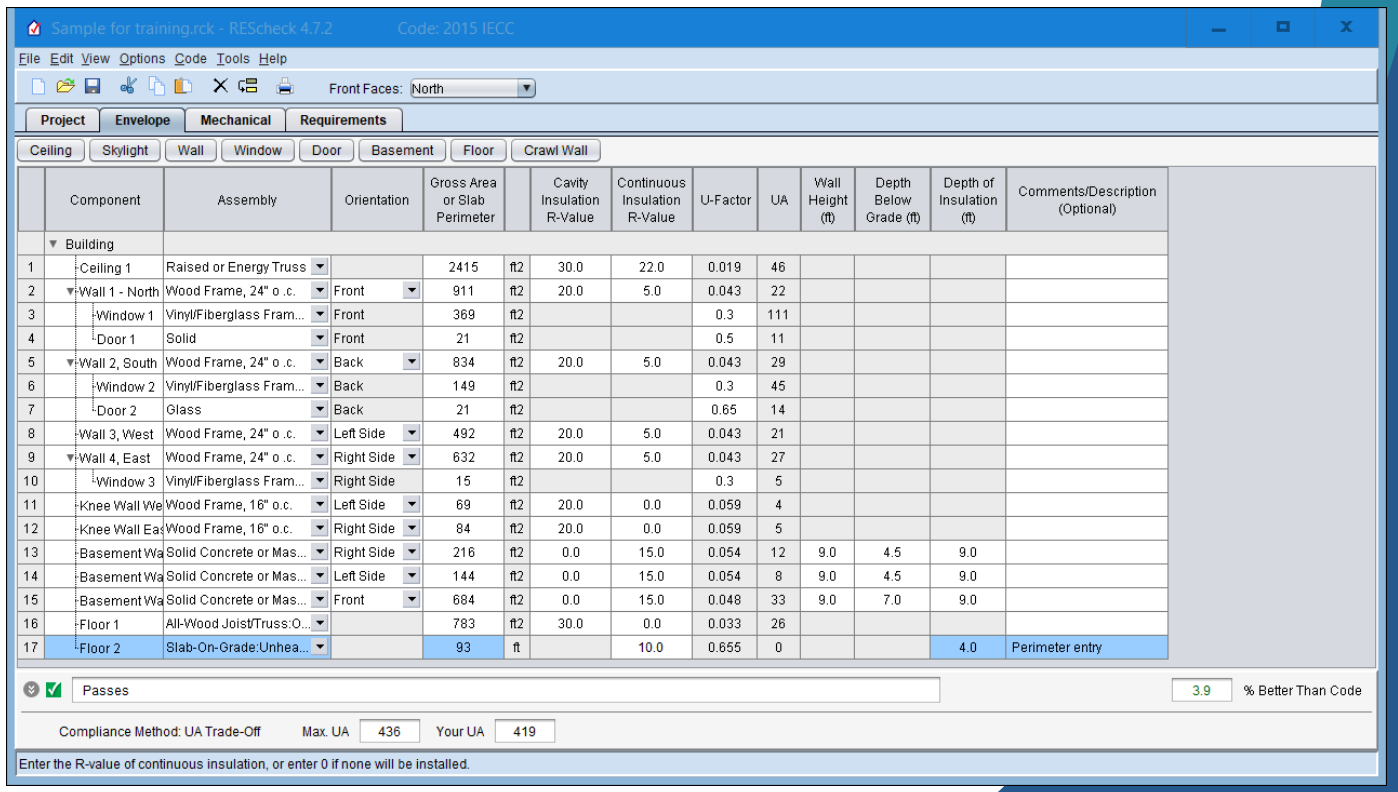



Click 2

# Envelope Components

Tip

- Window ratings: U-factor and SHGC (solar heat gain coefficient). Need NFRC specs (coming up)
- Cavity R-value: Insulation between framing members
- Continuous R-value: Insulation NOT broken by framing members




| | Component | Assembly | Orientation | Gross Area or Slab Perimeter | | Cavity Insulation R-Value | Continuous Insulation R-Value | U-Factor | UA | Wall Height (ft) | Depth Below Grade (ft) | Depth of Insulation (ft) | Comments/Description (Optional) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| 7 | Door 2 | Glass | Back | 21 | ft2 | | | 0.65 | 14 | | | | |
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# Envelope Components

Tip

- Slab-on-grade* insulation requirements may no longer be traded-off with other assemblies (as of software version 4.7.2)
  - For the Maine climate zones
    - Heated slabs must have R-15 insulation to a depth of 4 feet
    - Unheated slabs must have R-10 insulation to a depth of 4 feet
- There is no IECC code requirement for slabs more than 12 inches below grade, so no need to enter as a floor in REScheck

*A slab-on-grade is less than 12 inches below grade

# Windows - NFRC Label

National Fenestration Rating Council

NFRC
National Fenestration Rating Council®
CERTIFIED

**World's Best Window Co.**
Series "2000"
Casement
Vinyl Clad Wood Frame
Double Glazing•Argon Fill•Low E
XYZ-X-1-00001-00001

| ENERGY PERFORMANCE RATINGS | |
|---|---|
| U-Factor (U.S. / I-P) | Solar Heat Gain Coefficient |
| **0.35** | **0.32** |
| **ADDITIONAL PERFORMANCE RATINGS** | |
| Visible Transmittance | Air Leakage (U.S. / I-P) |
| **0.51** | **≤0.3** |
| Condensation Resistance | |
| **51** | **–** |

Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information.
www.nfrc.org

***U-factor:*** *This category measures how well a window prevents heat from escaping the inside. The range is 0.20 to 1.20, and you want to look for low numbers. (The lower the number, the better the window is at holding in heat.)*

***Solar heat gain coefficient:*** *This rating measures how well the window avoids gaining solar heat. The range for this rating is 0 to 1. Like the U-factor rating, you want to look for a low number*

***Visible transmittance:*** *This is a measure of how much light the window lets in. The range is 0 to 1. Unlike the previous two ratings, you want to look for a high number (for maximum natural light).*

***Air leakage:*** *As it sounds, this category measures how well the window protects against air leakage. The range is 0.1 to 0.3. You want to look for a low number: the lower the number, the less drafty the window will be.*

***Condensation:*** *This is an optional category that may or may not appear on the NFRC label. It measures how well a window resists condensation. For this rating, the higher the number, the better the window is.*

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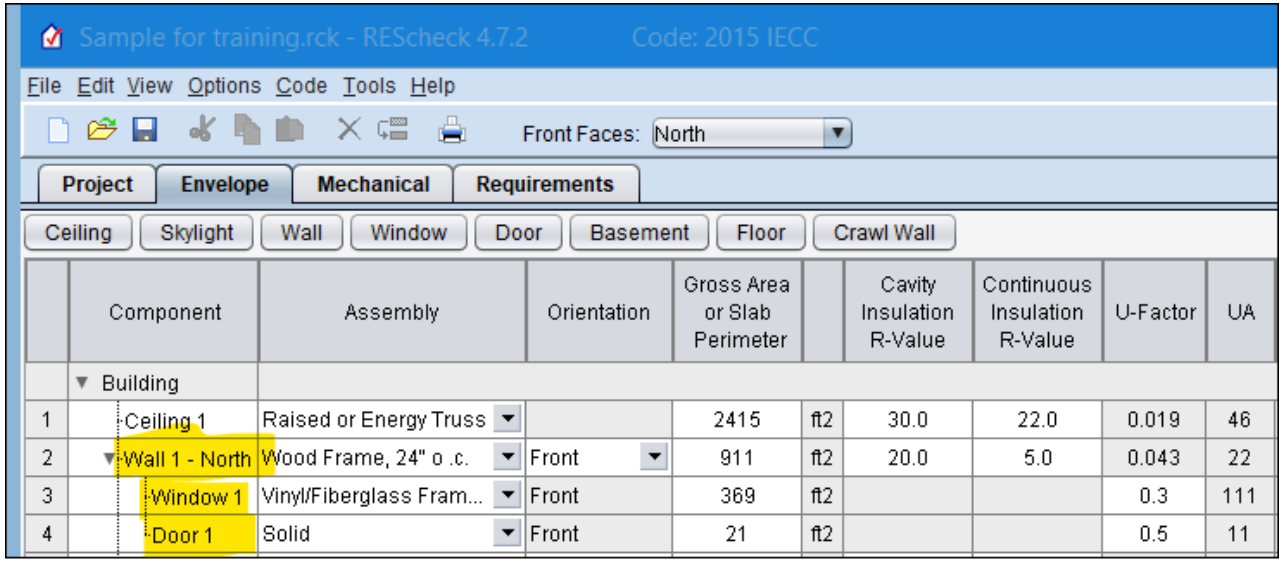
# Walls, Windows, and Doors

Tip

- Windows and doors are automatically subtracted from the wall area entered above, so enter *gross* wall area
- List appropriate windows and doors under their corresponding wall




| | Component | Assembly | Orientation | Gross Area or Slab Perimeter | | Cavity Insulation R-Value | Continuous Insulation R-Value | U-Factor | UA |
|---|---|---|---|---|---|---|---|---|---|
| | Building | | | | | | | | |
| 1 | Ceiling 1 | Raised or Energy Truss | | 2415 | ft2 | 30.0 | 22.0 | 0.019 | 46 |
| 2 | Wall 1 - North | Wood Frame, 24" o .c. | Front | 911 | ft2 | 20.0 | 5.0 | 0.043 | 22 |
| 3 | Window 1 | Vinyl/Fiberglass Fram... | Front | 369 | ft2 | | | 0.3 | 111 |
| 4 | Door 1 | Solid | Front | 21 | ft2 | | | 0.5 | 11 |

# Cavity and Continuous Insulation

# Foundations – Enter in REScheck if. . .

- Basement
  - Basement area is conditioned
  - It may be finished or unfinished inside
- Floor
  - The floor separates a conditioned from an unconditioned space
- Crawl Wall
  - This space is not vented to the outdoors and the crawl ceiling is NOT insulated

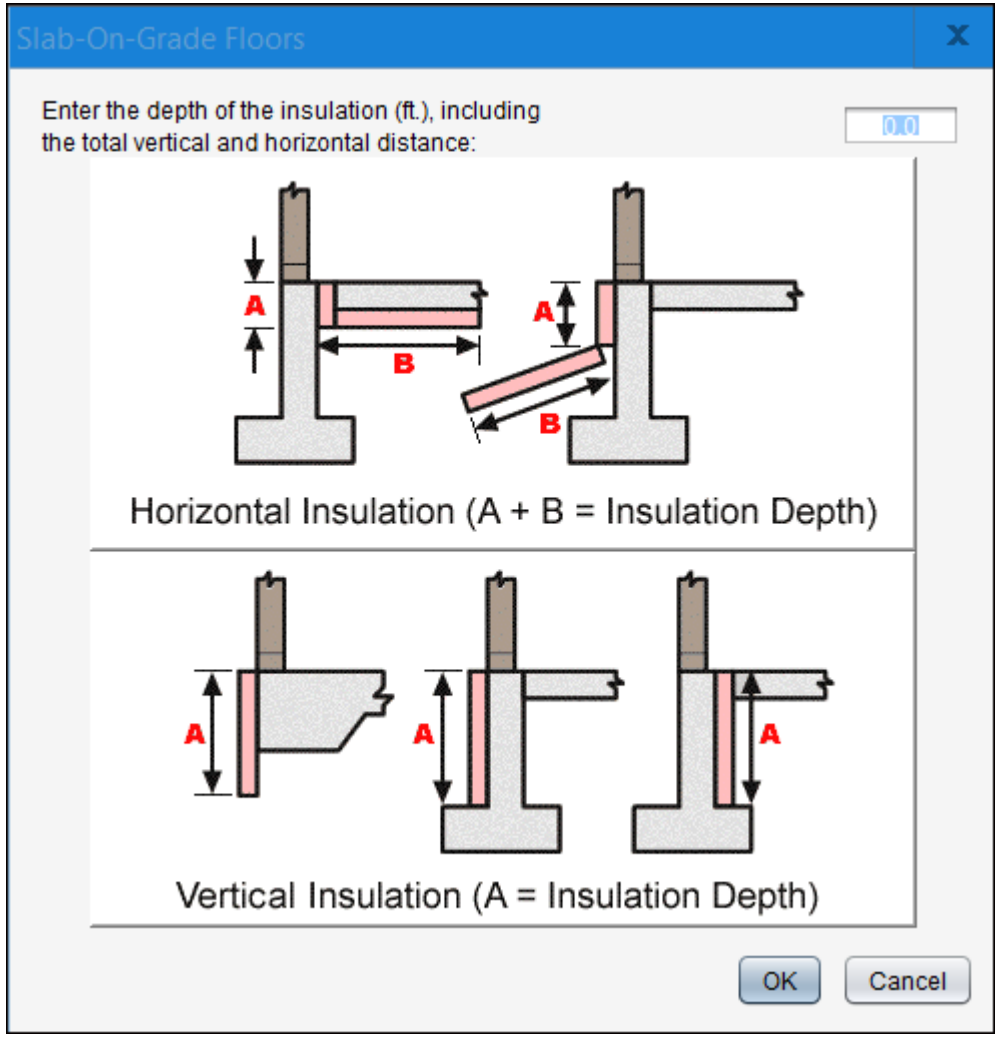
# Floor or Ceiling?

Tip

- If you are standing in a *conditioned* space and. . .
  - The unconditioned air is below you, such as a crawl space or a garage below, designate the building assembly as a floor.
  - The unconditioned air is above you, such as an attic, designate the building assembly as a ceiling.

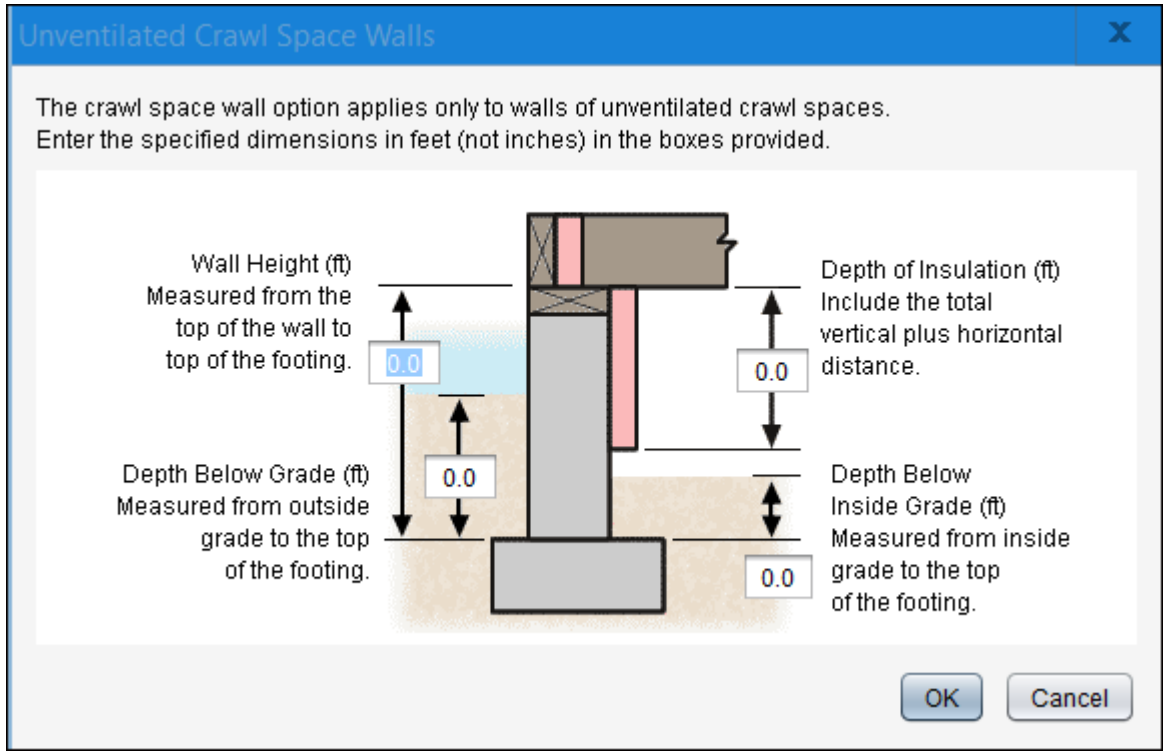
# Slab-on-Grade Floor

- Slab floor that is less than 12 inches below grade
- For heated slabs, must add R-5 to values in Table R402.1.2
- Slabs are entered as perimeter (linear feet), not as square feet

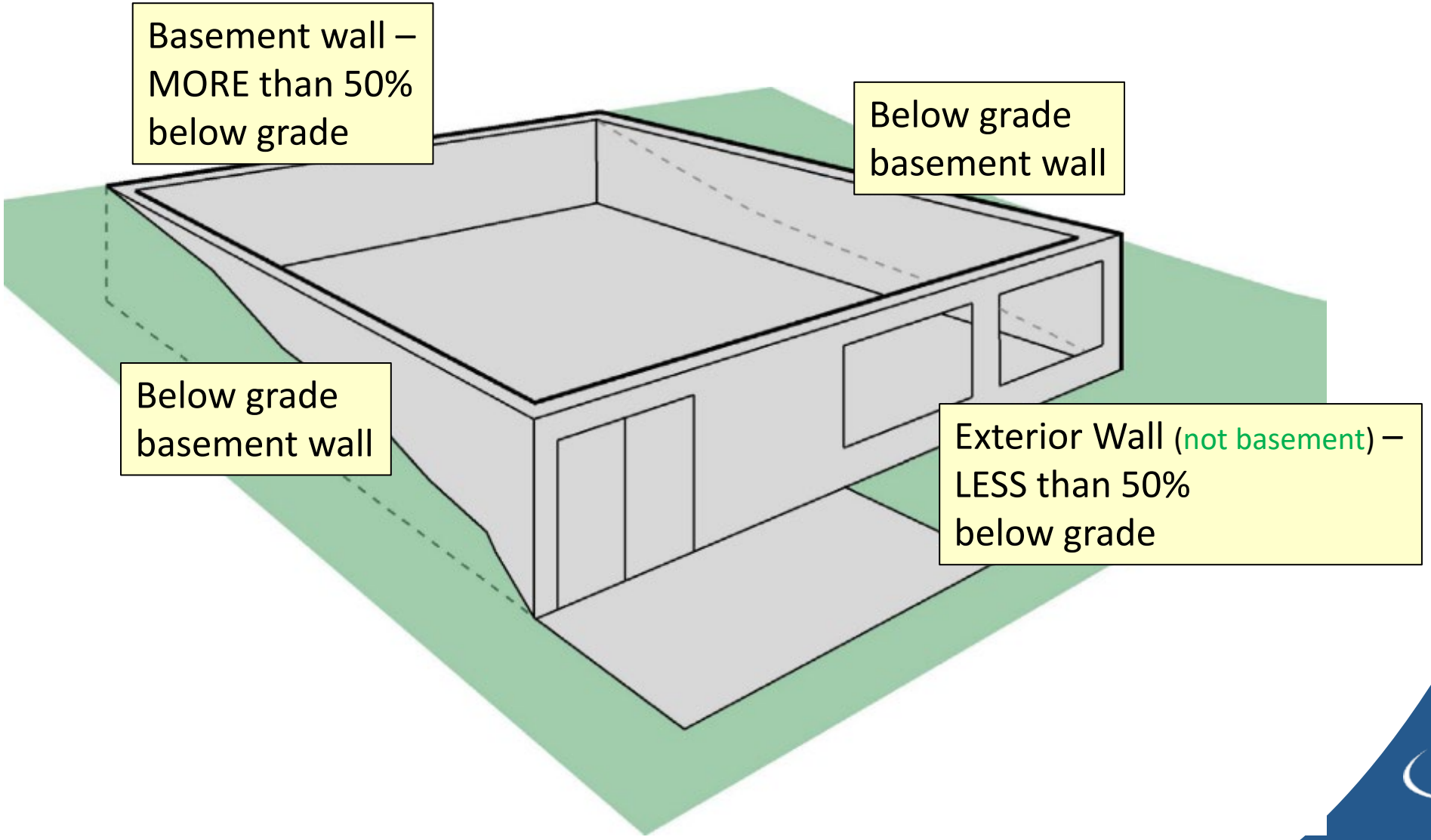


# Crawl Space Walls

- May insulate the wall instead of the floor
- “shall be permanently fasted to the wall and extend downward from the floor to the finished grade level and then vertically and/or horizontally for at least an additional 24 inches.” R402.2.11



# What's a Basement Wall?



# Basement Clarification - 1

Tip

- Wall height
  - From top of wall to basement floor
  - If not uniform height, use average height
- Depth below grade
  - Depth at wall extends from outside grade to basement floor
  - If sloped-grade basement wall, use average depth below grade
- Make sure to include conditioned basement in volume calculation for $ACH_{50}$; this make compliance easier

$$ACH_{50} = \frac{CFM_{50}}{Volume / 60}$$

$$CFM_{50} = ACH_{50} \times (Volume / 60)$$



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# Basement Clarification - 2

Tip

- Depth of insulation
  - Requirements are for full depth of basement wall (10 feet). REScheck allows for trade offs
  - Measure from top of wall to where insulation stops (for a fully insulated wall, depth of insulation is equal to height of wall)
  - If enter insulation depth of 0, REScheck assumes no insulation, *regardless of the values in the insulation fields*
  - For a vertical/horizontal insulation, depth includes sum of both
- Continuous insulation
  - REScheck assumes rigid insulation on exterior
- Cavity insulation
  - REScheck assumes interior framing with insulation



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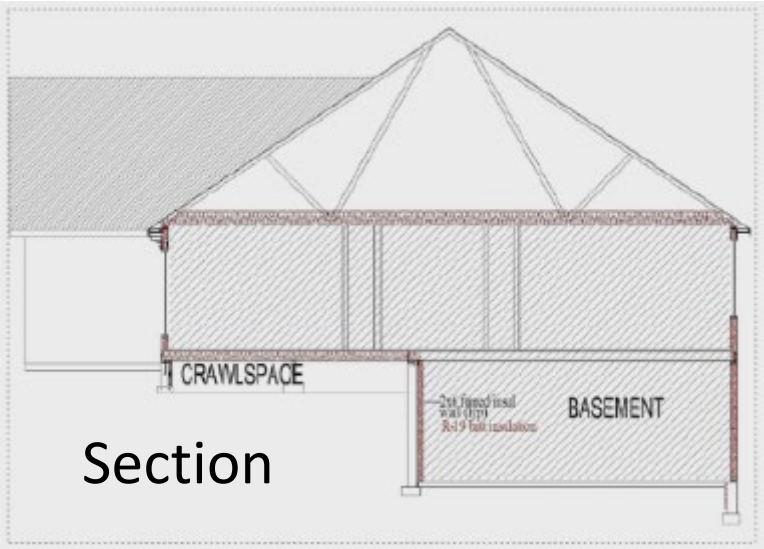
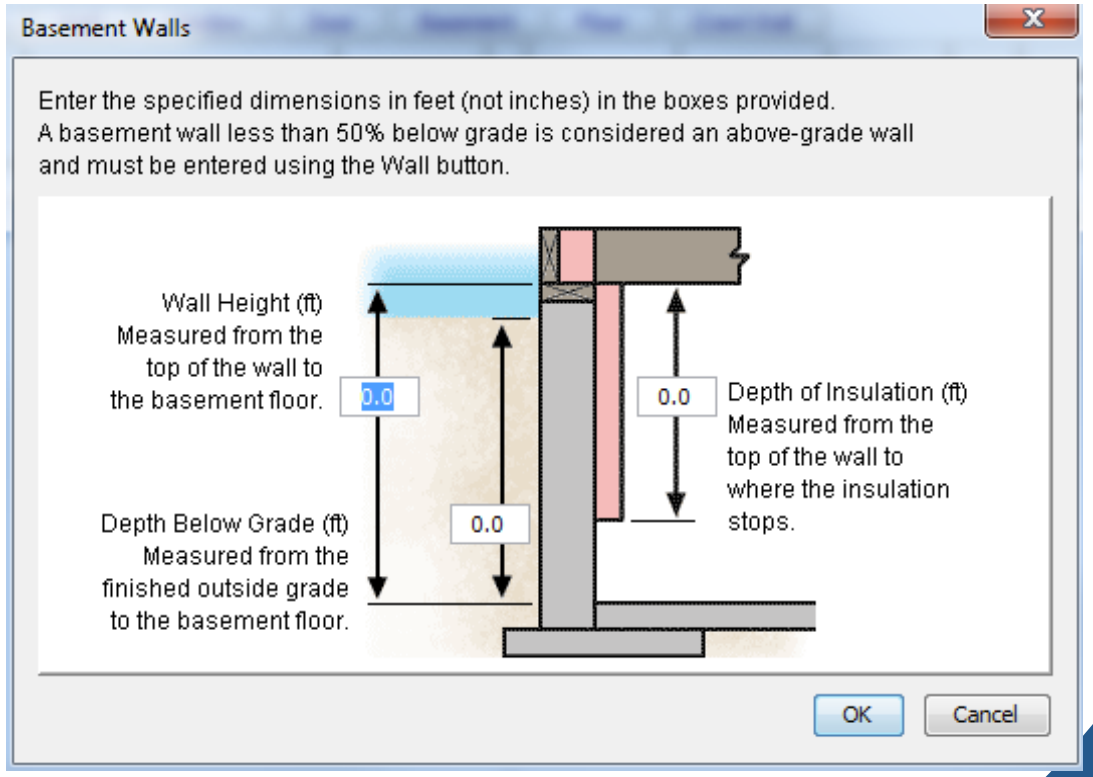
# REScheck Illustrated Dimension Box

Tip




Conditioned basement walls




Code minimum starts at insulating full height of wall; "from the top of the basement wall down to 10 feet below grade or to the basement floor, whichever is less." R402.2.9

# Example House

# Example House

- Window/ Door Area

**Window Area** - 533 sf

North – 369 sf
South – 149 sf
West – 15 sf

**U-factor** = 0.35

**U-factor** = 0.27
**SHGC** = .25

**Glass Doors <50% glass** - 40 sf; **U-factor** = 0.50

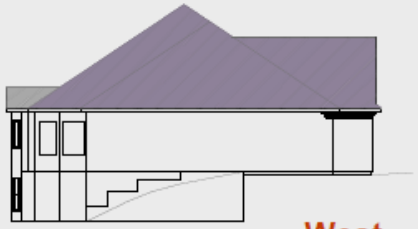
North – 40 sf

**Opaque Doors** - 40 sf; **U-factor** = 0.50

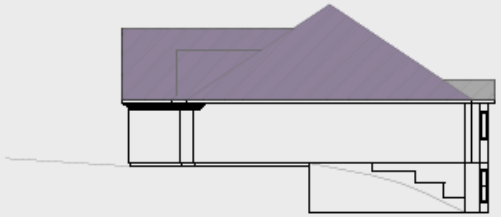
South – 40 sf

South

North

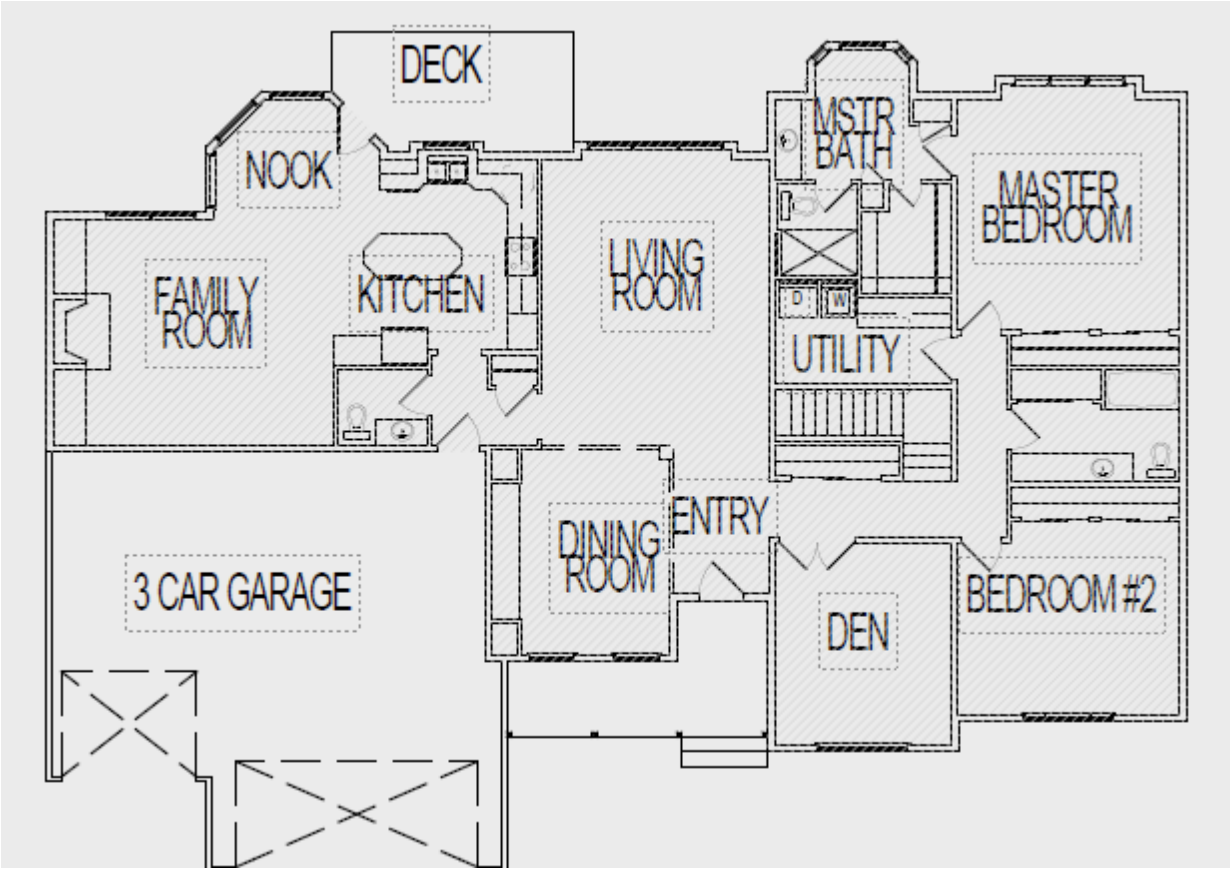


West



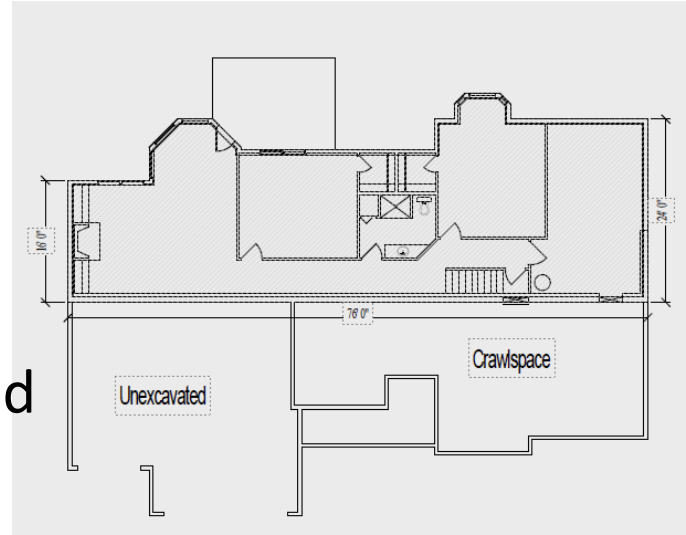
East

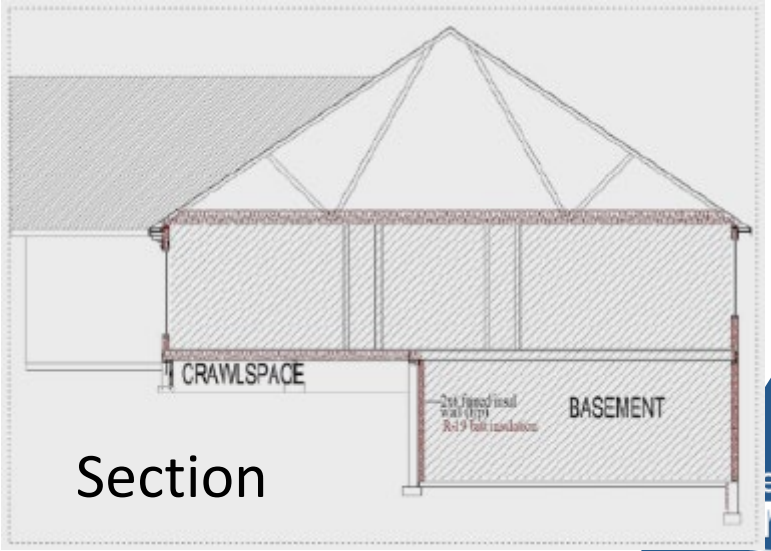
# Example House




Main Floor

Conditioned Basement




Section

# Example House

Sample for training.rck - REScheck 4.7.2 Code: 2015 IECC

File Edit View Options Code Tools Help

Front Faces: North

Project | Envelope | Mechanical | Requirements

Ceiling | Skylight | Wall | Window | Door | Basement | Floor | Crawl Wall

| | Component | Assembly | Orientation | Gross Area or Slab Perimeter | | Cavity Insulation R-Value | Continuous Insulation R-Value | U-Factor | UA | Wall Height (ft) | Depth Below Grade (ft) | Depth of Insulation (ft) | Comments/Description (Optional) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Building | | | | | | | | | | | | |
| 1 | Ceiling 1 | Raised or Energy Truss | | 2415 | ft2 | 30.0 | 22.0 | 0.019 | 46 | | | | |
| 2 | Wall 1 - North | Wood Frame, 24" o .c. | Front | 911 | ft2 | 20.0 | 5.0 | 0.043 | 22 | | | | |
| 3 | Window 1 | Vinyl/Fiberglass Fram... | Front | 369 | ft2 | | | 0.3 | 111 | | | | |
| 4 | Door 1 | Solid | Front | 21 | ft2 | | | 0.5 | 11 | | | | |
| 5 | Wall 2, South | Wood Frame, 24" o .c. | Back | 834 | ft2 | 20.0 | 5.0 | 0.043 | 29 | | | | |
| 6 | Window 2 | Vinyl/Fiberglass Fram... | Back | 149 | ft2 | | | 0.3 | 45 | | | | |
| 7 | Door 2 | Glass | Back | 21 | ft2 | | | 0.65 | 14 | | | | |
| 8 | Wall 3, West | Wood Frame, 24" o .c. | Left Side | 492 | ft2 | 20.0 | 5.0 | 0.043 | 21 | | | | |
| 9 | Wall 4, East | Wood Frame, 24" o .c. | Right Side | 632 | ft2 | 20.0 | 5.0 | 0.043 | 27 | | | | |
| 10 | Window 3 | Vinyl/Fiberglass Fram... | Right Side | 15 | ft2 | | | 0.3 | 5 | | | | |
| 11 | Knee Wall We | Wood Frame, 16" o.c. | Left Side | 69 | ft2 | 20.0 | 0.0 | 0.059 | 4 | | | | |
| 12 | Knee Wall Eas | Wood Frame, 16" o.c. | Right Side | 84 | ft2 | 20.0 | 0.0 | 0.059 | 5 | | | | |
| 13 | Basement Wa | Solid Concrete or Mas... | Right Side | 216 | ft2 | 0.0 | 15.0 | 0.054 | 12 | 9.0 | 4.5 | 9.0 | |
| 14 | Basement Wa | Solid Concrete or Mas... | Left Side | 144 | ft2 | 0.0 | 15.0 | 0.054 | 8 | 9.0 | 4.5 | 9.0 | |
| 15 | Basement Wa | Solid Concrete or Mas... | Front | 684 | ft2 | 0.0 | 15.0 | 0.048 | 33 | 9.0 | 7.0 | 9.0 | |
| 16 | Floor 1 | All-Wood Joist/Truss:O... | | 783 | ft2 | 30.0 | 0.0 | 0.033 | 26 | | | | |
| 17 | Floor 2 | Slab-On-Grade:Unhea... | | 93 | ft | | 10.0 | 0.655 | 0 | | | 4.0 | Perimeter entry |

Passes 3.9 % Better Than Code

Compliance Method: UA Trade-Off Max. UA 436 Your UA 419

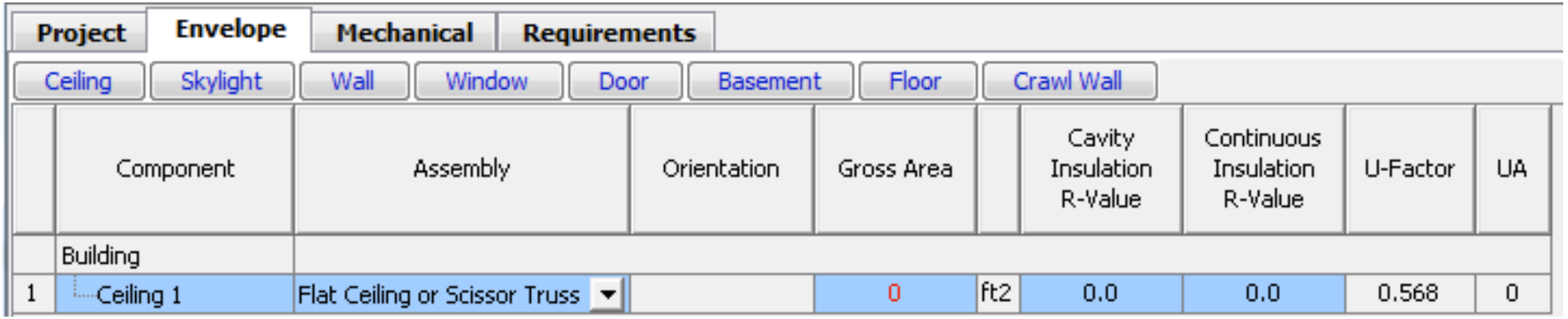
Enter the R-value of continuous insulation, or enter 0 if none will be installed.

Compliance bar

Status bar

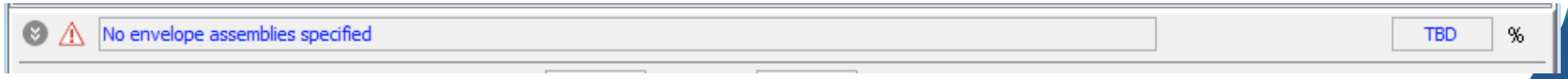
# REScheck Color Codes

RED




Green


Blue



# REScheck Compliance Failings

Tip

- Check for missing entries in software (red)
- Review plans for entry errors or missing information
- Confirm all areas and perimeters are correct
- Check insulation values
- Ponder high “UA” values in REScheck
- If all OK, increase insulation values

# Example House

Sample for training.rck - REScheck 4.7.2 Code: 2015 IECC

File Edit View Options Code Tools Help

Front Faces: North

Project | Envelope | Mechanical | Requirements

Ceiling | Skylight | Wall | Window | Door | Basement | Floor | Crawl Wall

| | Component | Assembly | Orientation | Gross Area or Slab Perimeter | | Cavity Insulation R-Value | Continuous Insulation R-Value | U-Factor | UA | Wall Height (ft) | Depth Below Grade (ft) | Depth of Insulation (ft) | Comments/Description (Optional) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Building | | | | | | | | | | | | |
| 1 | Ceiling 1 | Raised or Energy Truss | | 2415 | ft2 | 30.0 | 22.0 | 0.019 | 46 | | | | |
| 2 | Wall 1 - North | Wood Frame, 24" o.c. | Front | 911 | ft2 | 20.0 | 5.0 | 0.043 | 22 | | | | |
| 3 | Window 1 | Vinyl/Fiberglass Fram... | Front | 369 | ft2 | | | 0.3 | 111 | | | | |
| 4 | Door 1 | Solid | Front | 21 | ft2 | | | 0.5 | 11 | | | | |
| 5 | Wall 2, South | Wood Frame, 24" o.c. | Back | 834 | ft2 | 20.0 | 5.0 | 0.043 | 29 | | | | |
| 6 | Window 2 | Vinyl/Fiberglass Fram... | Back | 149 | ft2 | | | 0.3 | 45 | | | | |
| 7 | Door 2 | Glass | Back | 21 | ft2 | | | 0.65 | 14 | | | | |
| 8 | Wall 3, West | Wood Frame, 24" o.c. | Left Side | 492 | ft2 | 20.0 | 5.0 | 0.043 | 21 | | | | |
| 9 | Wall 4, East | Wood Frame, 24" o.c. | Right Side | 632 | ft2 | 20.0 | 5.0 | 0.043 | 27 | | | | |
| 10 | Window 3 | Vinyl/Fiberglass Fram... | Right Side | 15 | ft2 | | | 0.3 | 5 | | | | |
| 11 | Knee Wall We | Wood Frame, 16" o.c. | Left Side | 69 | ft2 | 20.0 | 0.0 | 0.059 | 4 | | | | |
| 12 | Knee Wall Ea | Wood Frame, 16" o.c. | Right Side | 84 | ft2 | 20.0 | 0.0 | 0.059 | 5 | | | | |
| 13 | Basement Wa | Solid Concrete or Mas... | Right Side | 216 | ft2 | 0.0 | 15.0 | 0.054 | 12 | 9.0 | 4.5 | 9.0 | |
| 14 | Basement Wa | Solid Concrete or Mas... | Left Side | 144 | ft2 | 0.0 | 15.0 | 0.054 | 8 | 9.0 | 4.5 | 9.0 | |
| 15 | Basement Wa | Solid Concrete or Mas... | Front | 684 | ft2 | 0.0 | 15.0 | 0.048 | 33 | 9.0 | 7.0 | 9.0 | |
| 16 | Floor 1 | All-Wood Joist/Truss:O... | | 783 | ft2 | 30.0 | 0.0 | 0.033 | 26 | | | | |
| 17 | Floor 2 | Slab-On-Grade:Unhea... | | 93 | ft | | 10.0 | 0.655 | 0 | | | 4.0 | Perimeter entry |

Passes 3.9 % Better Than Code

Compliance Method: UA Trade-Off Max. UA 436 Your UA 419

Enter the R-value of continuous insulation, or enter 0 if none will be installed.

# REScheck Steps

1) Select “Preferences” at “Edit” dropdown

2) Enter project information

3) Enter envelope components

4) Enter mechanical equipment (optional)

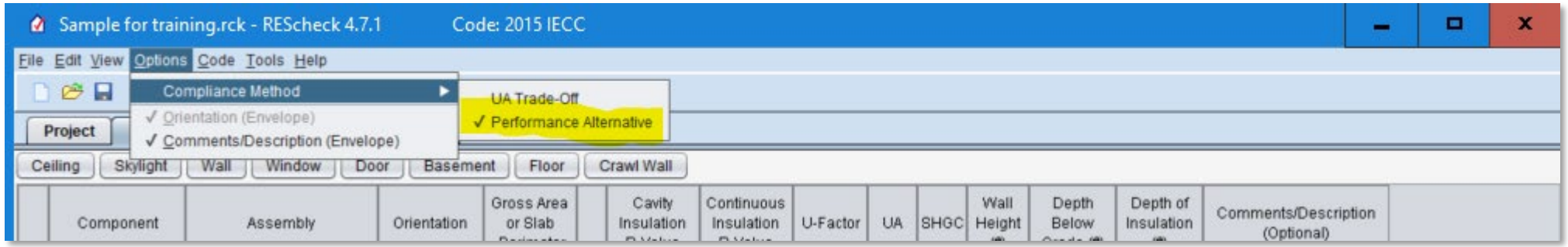
5) Check “Requirements” tab

6) View/print report

Save

# Mechanical Equipment

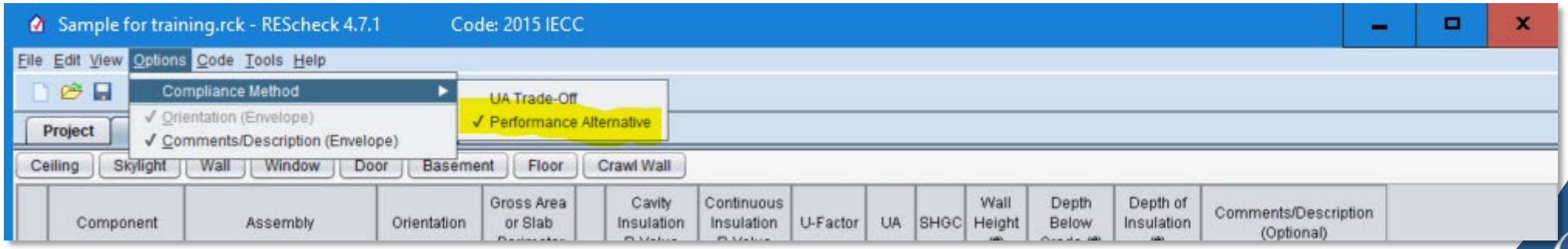
- This option is only available if you use the “Options” > “Compliance Method” > “Performance Alternative” found in the top menu of REScheck.



# Performance Alternative

- Performance Alternative
  - Based on simulated performance of your building compared to an equivalent code-compliant building
  - Requires additional inputs, including building orientation, a minimum of four walls with unique orientations, and a minimum of one roof and floor
  - Considers the whole building energy performance, whereas the UA trade-off approach considers only the thermal performance of envelop components

Don't choose Performance Alternative unless your dwelling fails. This is harder to use.



# REScheck Steps

1) Select “Preferences” at “Edit” dropdown

2) Enter project information

3) Enter envelope components

4) Enter mechanical equipment (optional)

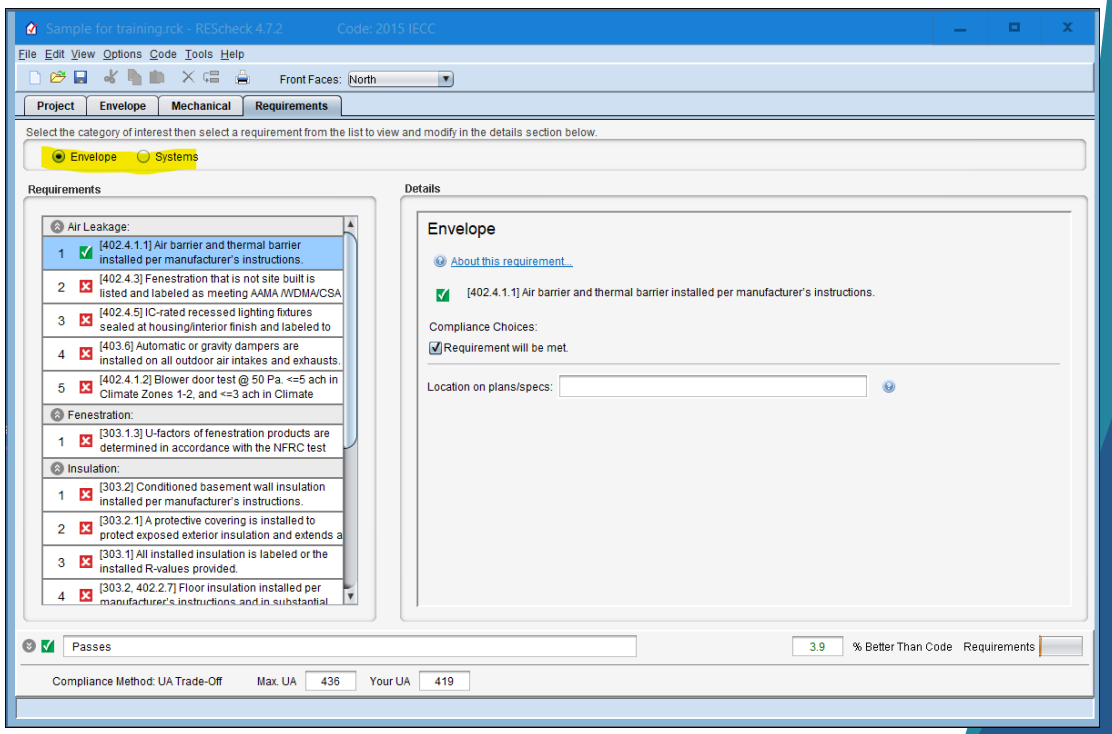
5) Check “Requirements” tab

6) View/print report

Save

# Requirements Tab

- Mandatory requirements
  - Air leakage: 3 $ACH_{50}$ or less
  - Building mechanical systems and equipment
  - Service water heating
  - Duct construction, insulation, and testing
- For each “requirement”, the user:
  - Confirms that a code requirement is:
    - Met,
    - Exempt, or
    - Does not apply
  - Notes how compliance for applicable requirements are documented
- This information is shown on the report in the “Comments/Assumptions” column of the Inspection Checklist



# REScheck Steps

1) Select “Preferences” at “Edit” dropdown

2) Enter project information

3) Enter envelope components

4) Enter mechanical equipment (optional)

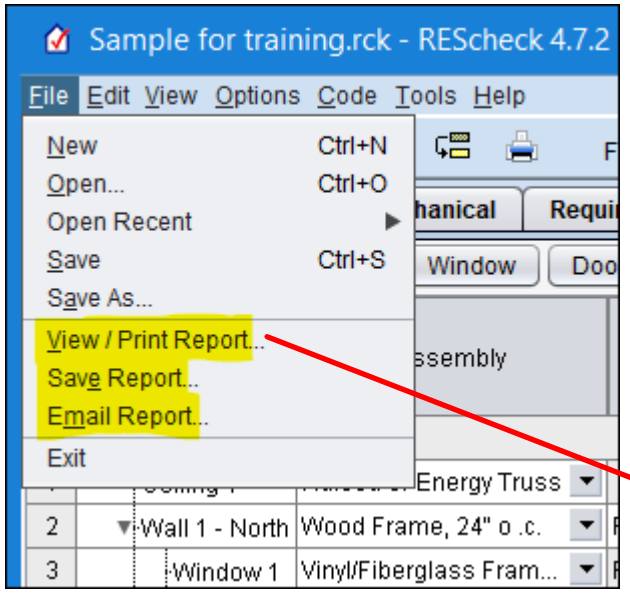
5) Check “Requirements” tab

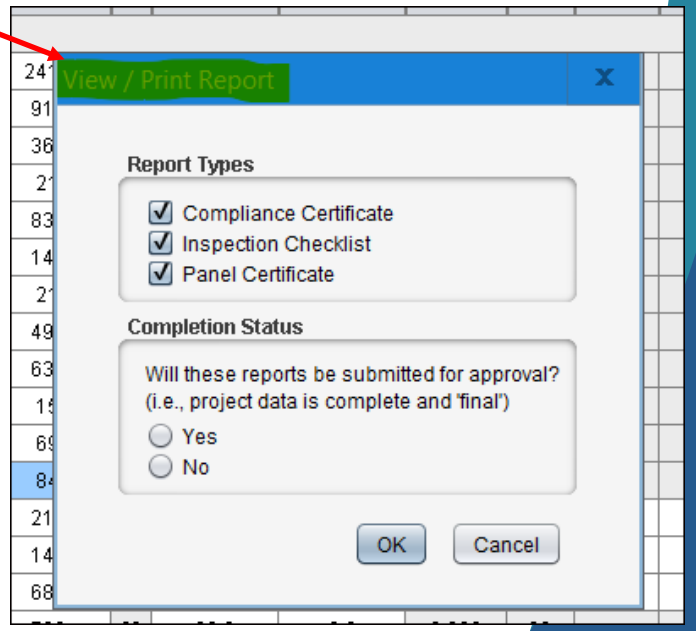
6) View/print report

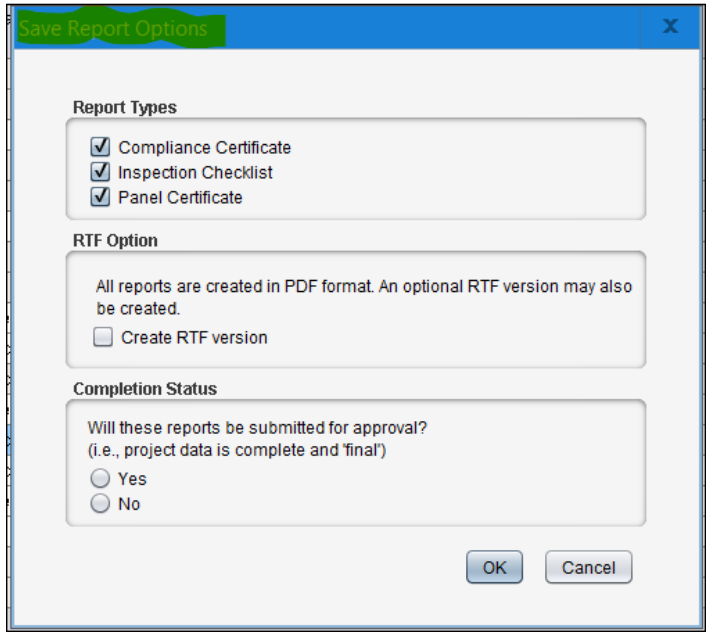
Save

# Reports - 1

- No tab, but File > View
- Choices (check one or more)
  - Compliance Certificate
  - Inspection Checklist
  - Panel Certificate
- "Will these reports be submitted for approval? (i.e., project data is complete and 'final')"
  - Yes
  - No



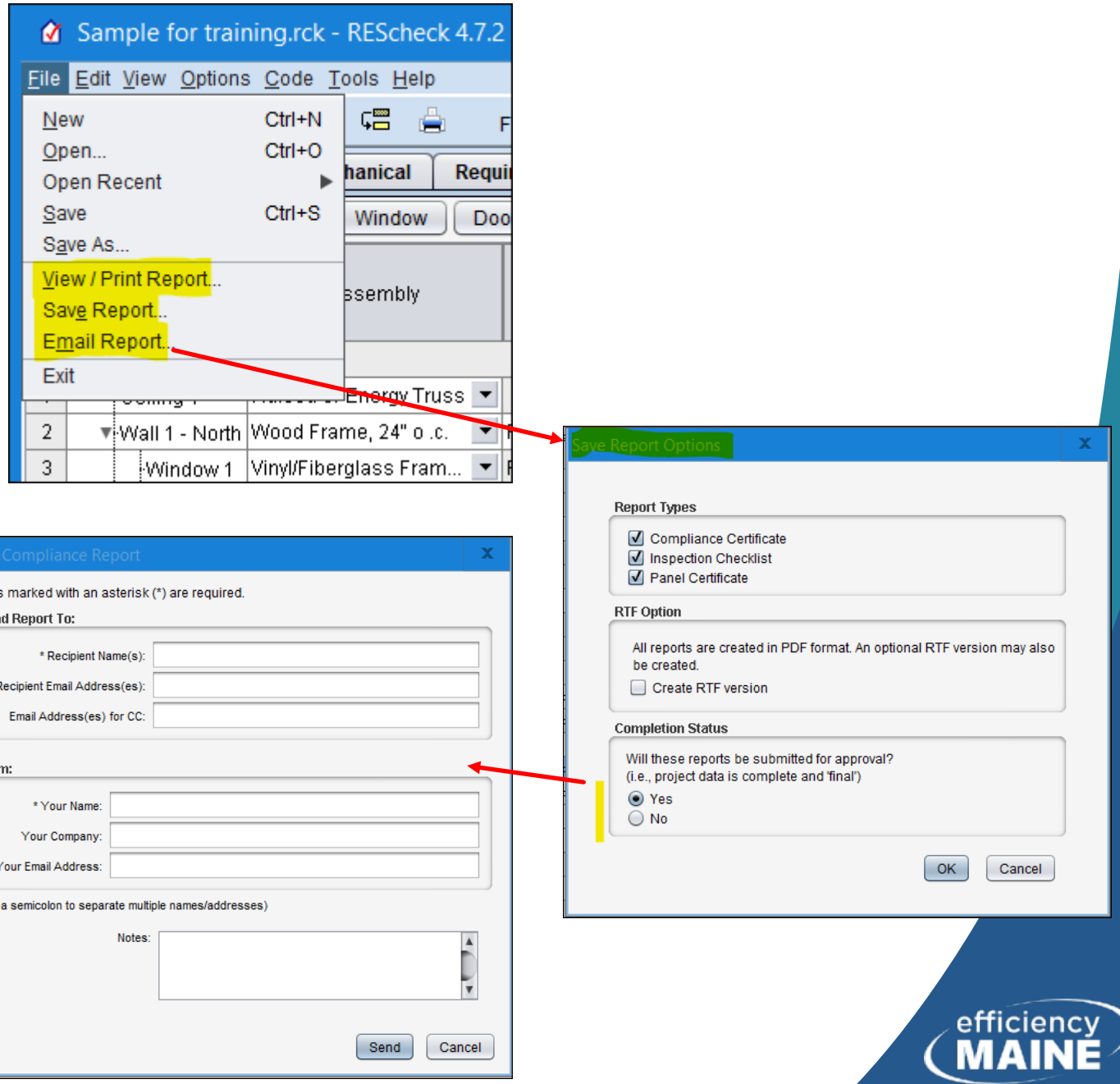
# Reports - 2

- Implement and complete Requirements tab
- Inspection checklists are listed by the phase of construction
  - “Pre-Inspection/Plan Review”
  - “Foundation Inspection”
  - “Framing/Rough-In Inspection”
  - “Insulation Inspection”
  - “Final Inspection Provisions”

Is this the order in which the CEO will inspect the project?

# Reports - 3

- Email Report to inspector, etc.
- Three report types are checked by default
- Check RTF version if needed, otherwise PDF
- Must select “Yes” or “No” for Completion Status
- Click “OK” for info box for email (confirm electronic submittal is allowed)



REScheck Software Version 4.7.1

# Compliance Certificate

Project Augusta House

| | |
|---|---|
| Energy Code: | **2015 IECC** |
| Location: | **Augusta, Maine** |
| Construction Type: | **Single-family** |
| Project Type: | **New Construction** |
| Orientation: | **Bldg. faces 0 deg. from North** |
| Conditioned Floor Area: | **2,415 ft2** |
| Glazing Area | **18%** |
| Climate Zone: | **6 (7550 HDD)** |
| Permit Date: | |
| Permit Number: | |

Verify code year, location, construction type, and conditioned floor area

Construction Site:

Owner/Agent:
Abby and Bill Carter

Designer/Contractor:
ABC Construction

**Compliance: Passes using UA trade-off**

Compliance: **2.8% Better Than Code** Maximum UA: **497** Your UA: **483**

The % Better or Worse Than Code Index reflects how close to compliance the house is based on code trade-off rules.
It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.

## Envelope Assemblies

| Assembly | Gross Area or Perimeter | Cavity R-Value | Cont. R-Value | U-Factor | UA |
|---|---|---|---|---|---|
| Ceiling 1: Raised or Energy Truss | 2,415 | 30.0 | 22.0 | 0.019 | 46 |
| Wall 1 - North: Wood Frame, 24" o .c.<br>Orientation: Front | 911 | 20.0 | 5.0 | 0.043 | 22 |
| Window 1: Vinyl/Fiberglass Frame:Double Pane with Low-E<br>Orientation: Front | 369 | | | 0.300 | 111 |
| Door 1: Solid<br>Orientation: Front | 21 | | | 0.500 | 11 |
| Wall 2, South: Wood Frame, 24" o .c. | 834 | 20.0 | 5.0 | 0.043 | 29 |

Confirm that these values match plans

Verify compliance statement is signed

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## RES*check* Software Version 4.7.1

# Inspection Checklist

Energy Code: 2015 IECC

Requirements: 5.0% were addressed directly in the RES*check* software

Text in the "Comments/Assumptions" column is provided by the user in the REScheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

| Section # & Req.ID | Pre-Inspection/Plan Review | Plans Verified Value | Field Verified Value | Complies? | Comments/Assumptions |
|---|---|---|---|---|---|
| 103.1, 103.2 [PR1][1] | Construction drawings and documentation demonstrate energy code compliance for the building envelope. Thermal envelope represented on construction documents. | | | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | Requirement will be met. |
| 103.1, 103.2, 403.7 [PR3][1] | Construction drawings and documentation demonstrate energy code compliance for lighting and mechanical systems. Systems serving multiple dwelling units must demonstrate compliance with the IECC Commercial Provisions. | | | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | |
| 302.1, 403.7 [PR2][2] | Heating and cooling equipment is sized per ACCA Manual S based on loads calculated per ACCA Manual J or other methods approved by the code official. | Heating: Btu/hr____<br>Cooling: Btu/hr____ | Heating: Btu/hr____<br>Cooling: Btu/hr____ | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | |

**Additional Comments/Assumptions:**

Checked in "Requirements" tab section

Additional info entered shows here, too

| Section # & Req.ID | Final Inspection Provisions | Plans Verified Value | Field Verified Value | Complies? | Comments/Assumptions |
|---|---|---|---|---|---|
| 402.1.1, 402.2.1, 402.2.2, 402.2.6 [FI1][1] | Ceiling insulation R-value. | R-____<br>☐ Wood<br>☐ Steel | R-____<br>☐ Wood<br>☐ Steel | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | *See the Envelope Assemblies table for values.* |
| 303.1.1.1, 303.2 [FI2][1] | Ceiling insulation installed per manufacturer's instructions. Blown insulation marked every 300 ft². | | | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | |
| 402.2.3 [FI22][2] | Vented attics with air permeable insulation include baffle adjacent to soffit and eave vents that extends over insulation. | | | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | |
| 402.2.4 [FI3][1] | Attic access hatch and door insulation ≥R-value of the adjacent assembly. | R-____ | R-____ | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | |
| 402.4.1.2 [FI17][1] | Blower door test @ 50 Pa. <=5 ach in Climate Zones 1-2, and <=3 ach in Climate Zones 3-8. | ACH 50 =____ | ACH 50 =____ | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | |
| 403.3.4 [FI4][1] | Duct tightness test result of <=4 cfm/100 ft2 across the system or <=3 cfm/100 ft2 without air handler @ 25 Pa. For rough-in tests, verification may need to occur during Framing Inspection. | ____ cfm/100 ft² | ____ cfm/100 ft² | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | |
| 403.3.3 [FI27][1] | Ducts are pressure tested to determine air leakage with either: Rough-in test: Total leakage measured with a | ____ cfm/100 ft² | ____ cfm/100 ft² | ☐Complies<br>☐Does Not<br>☐Not Observable | |

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)



efficiency MAINE

# 2015 IECC Energy Efficiency Certificate

| Insulation Rating | R-Value |
|---|---|
| Above-Grade Wall | 25.00 |
| Below-Grade Wall | 15.00 |
| Floor | 30.00 |
| Ceiling / Roof | 52.00 |
| Ductwork (unconditioned spaces): | _____ |

| Glass & Door Rating | U-Factor | SHGC |
|---|---|---|
| Window | 0.30 | 0.32 |
| Door | 0.50 | 0.03 |

| Heating & Cooling Equipment | Efficiency |
|---|---|
| Heating System:_____ | _____ |
| Cooling System:_____ | _____ |
| Water Heater:_____ | _____ |

Name: _____ Date: _____

Comments

# Panel Certificate

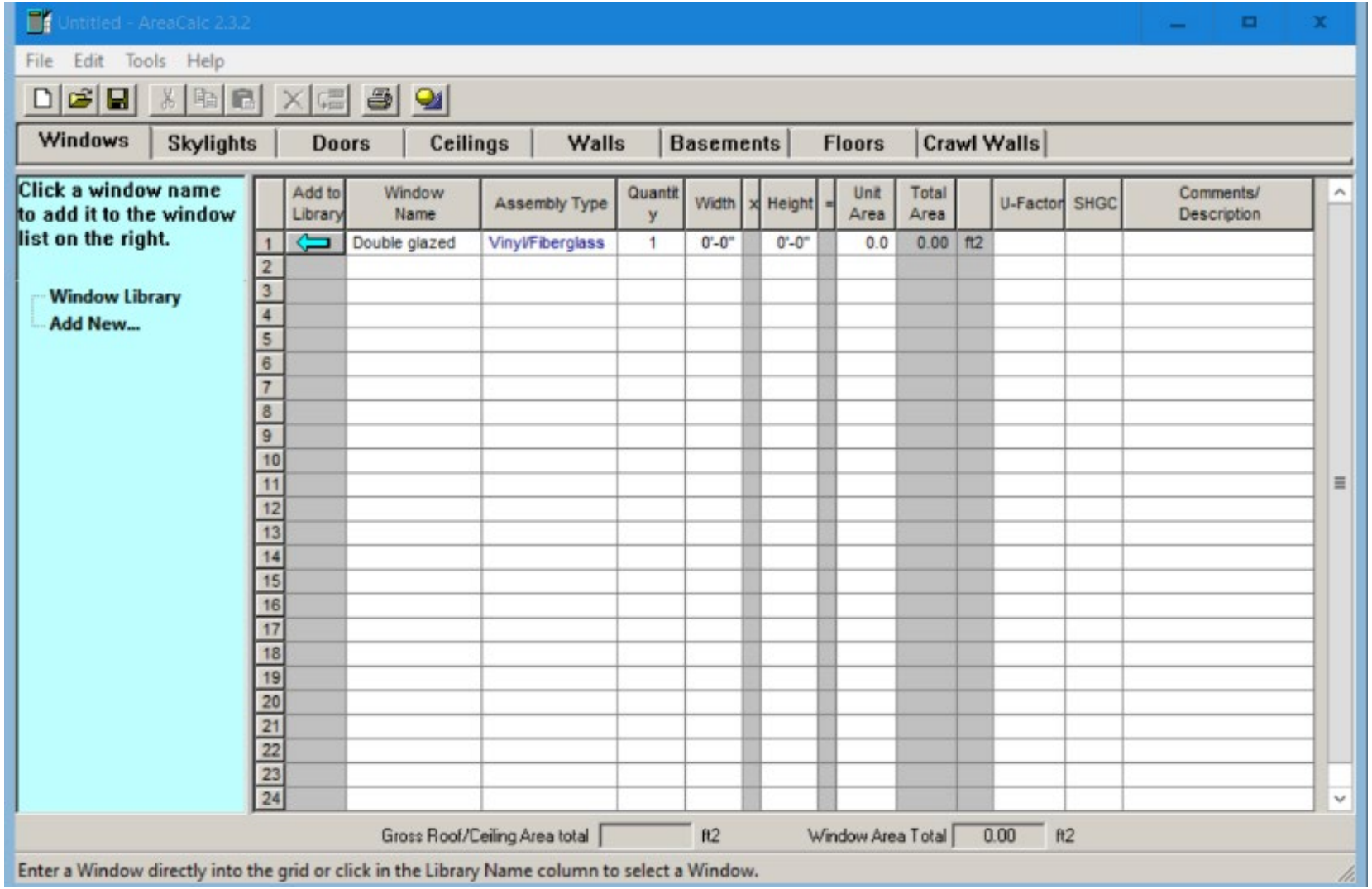
Average values calculated and shown here

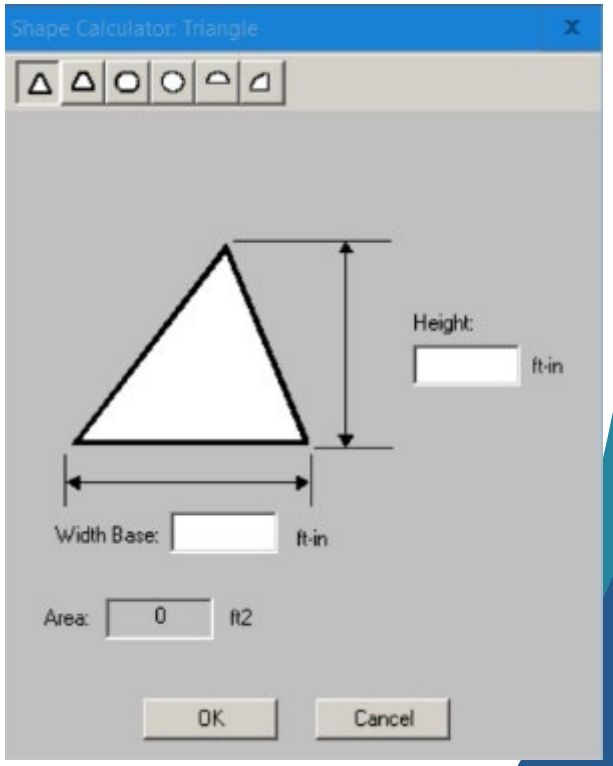
Equipment entered manually

# AreaCalc

- On desktop version of REScheck only, not a part of web version
- Calculates building areas
- Allows creation of building components library
- Saves calculations
- Includes “shape” calculator
- Items can be transferred to REScheck

# AreaCalc




Shape Calculator

# Learning More About REScheck

- Experiment with REScheck
- Use your dwelling as a learning example
- Have a thorough set of plans
- Watch REScheck Basics video by Pam Cole, DOE Building Energy Codes Program, PNNL, April 2016: https://www.youtube.com/watch?v=c-CtTjP4Y1Q
- Use it or lose it

# REScheck Examples

# Example House

Sample for training.rck - REScheck 4.7.2 Code: 2015 IECC

File Edit View Options Code Tools Help

Front Faces: North

Project | Envelope | Mechanical | Requirements

Ceiling | Skylight | Wall | Window | Door | Basement | Floor | Crawl Wall

| | Component | Assembly | Orientation | Gross Area or Slab Perimeter | | Cavity Insulation R-Value | Continuous Insulation R-Value | U-Factor | UA | Wall Height (ft) | Depth Below Grade (ft) | Depth of Insulation (ft) | Comments/Description (Optional) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Building | | | | | | | | | | | | |
| 1 | Ceiling 1 | Raised or Energy Truss | | 2415 | ft2 | 30.0 | 22.0 | 0.019 | 46 | | | | |
| 2 | Wall 1 - North | Wood Frame, 24" o .c. | Front | 911 | ft2 | 20.0 | 5.0 | 0.043 | 22 | | | | |
| 3 | Window 1 | Vinyl/Fiberglass Fram... | Front | 369 | ft2 | | | 0.3 | 111 | | | | |
| 4 | Door 1 | Solid | Front | 21 | ft2 | | | 0.5 | 11 | | | | |
| 5 | Wall 2, South | Wood Frame, 24" o .c. | Back | 834 | ft2 | 20.0 | 5.0 | 0.043 | 29 | | | | |
| 6 | Window 2 | Vinyl/Fiberglass Fram... | Back | 149 | ft2 | | | 0.3 | 45 | | | | |
| 7 | Door 2 | Glass | Back | 21 | ft2 | | | 0.65 | 14 | | | | |
| 8 | Wall 3, West | Wood Frame, 24" o .c. | Left Side | 492 | ft2 | 20.0 | 5.0 | 0.043 | 21 | | | | |
| 9 | Wall 4, East | Wood Frame, 24" o .c. | Right Side | 632 | ft2 | 20.0 | 5.0 | 0.043 | 27 | | | | |
| 10 | Window 3 | Vinyl/Fiberglass Fram... | Right Side | 15 | ft2 | | | 0.3 | 5 | | | | |
| 11 | Knee Wall We | Wood Frame, 16" o.c. | Left Side | 69 | ft2 | 20.0 | 0.0 | 0.059 | 4 | | | | |
| 12 | Knee Wall Eas | Wood Frame, 16" o.c. | Right Side | 84 | ft2 | 20.0 | 0.0 | 0.059 | 5 | | | | |
| 13 | Basement Wa | Solid Concrete or Mas... | Right Side | 216 | ft2 | 0.0 | 15.0 | 0.054 | 12 | 9.0 | 4.5 | 9.0 | |
| 14 | Basement Wa | Solid Concrete or Mas... | Left Side | 144 | ft2 | 0.0 | 15.0 | 0.054 | 8 | 9.0 | 4.5 | 9.0 | |
| 15 | Basement Wa | Solid Concrete or Mas... | Front | 684 | ft2 | 0.0 | 15.0 | 0.048 | 33 | 9.0 | 7.0 | 9.0 | |
| 16 | Floor 1 | All-Wood Joist/Truss:O... | | 783 | ft2 | 30.0 | 0.0 | 0.033 | 26 | | | | |
| 17 | Floor 2 | Slab-On-Grade:Unhea... | | 93 | ft | | 10.0 | 0.655 | 0 | | | 4.0 | Perimeter entry |

Passes 3.9 % Better Than Code

Compliance Method: UA Trade-Off Max. UA 436 Your UA 419

Enter the R-value of continuous insulation, or enter 0 if none will be installed.

Compliance bar

Status bar