REScheck™ Basics

March 2016 State Building Codes Conference

DALE HORTON, NCAT

2016 Department of Energy National Energy Codes Conference
Building Energy Codes Program
Energy Code Compliance Tools

Prescriptive

None

UA Tradeoff

REScheck

Simulated Performance

REM/Rate

REM/Design

Energy Gauge

REScheck?
REScheck Page

https://www.energycodes.gov/rescheck

See if your state or county can use REScheck to show compliance.

**REScheck™ Software**

**REScheck™ for Windows®**
Version 4.6.2 (Build Version: 4.6.2.1)
Runs on Vista or Windows 7 in either single, multi-user, or network environments

**Supported Codes:**
2009, 2012 and 2015 IECC; and various state and county energy codes.

**What’s New:**
REScheck version 4.6.2 includes support for 2014 Florida. Build version 4.6.2.1 fixes an issue with compliance index when project is "Additions" and discontinues support for Wisconsin Uniform Dwelling Code.

**UPDATES TO RESCHECK AND COMCHECK BUILDING ENERGY CODE COMPLIANCE SOFTWARE**

The U.S. Department of Energy (DOE) is directed to provide technical assistance to states to support the implementation of model residential and commercial building energy codes (42 USC 6833). As part of this assistance, the DOE Building Energy Codes Program provides ongoing support for REScheck and COMcheck compliance software, which are updated based on new editions of the model codes. DOE has published guidance surrounding its support for the software, including technical assistance requests for modified versions.
REScheck

Building Energy Codes Program
Data Exchange

- Can exchange files between desktop and web
  - Log in to web
  - My Projects
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Select Preferences</td>
</tr>
<tr>
<td>2.</td>
<td>Select Code</td>
</tr>
<tr>
<td>3.</td>
<td>Select Compliance Path</td>
</tr>
<tr>
<td>4.</td>
<td>Enter Project Info</td>
</tr>
<tr>
<td>5.</td>
<td>Enter Building Components</td>
</tr>
<tr>
<td>6.</td>
<td>Enter Mechanical Equipment</td>
</tr>
<tr>
<td>7.</td>
<td>Complete Requirements Tab</td>
</tr>
</tbody>
</table>

Optional Steps:
- Save and Print Report
Preferences

General
- File options
- Version update check
- Upload usage data

Project
- Code/location
- Envelope

Applicant
- Project details

Reports
- Signatures
- Email reports
Select the Appropriate Code

Applicable to your state/jurisdiction (Code menu)

Model building energy codes and standards have the potential to save U.S. consumers an estimated $330 billion by 2040. This equates to nearly 80 quads of cumulative full-fuel-cycle energy savings and over 6.2 billion metric tons of avoided carbon dioxide emissions. View the BECP’s national benefits assessment for more information on the benefits of building energy codes.

National Status At-A-Glance

The current status of energy codes and standards adoption is shown in the maps below. Status is displayed for both residential and commercial buildings for U.S. States and territories. Choose from the drop-down list to view the details for a particular state.

Select a state

Current Residential Building Energy Code Adoption Status

As of March 2016
Project Information

- Project Location
  - City/County

- Project Type
  - Single Family/Duplex
  - Multi Family

- Building Characteristics
  - New Construction
  - Addition
  - Alteration

- Project Details
  - Optional
  - Get printed on reports
Multifamily if

- All multifamily buildings three stories or less in height above grade and
- Contain three or more attached dwelling units

Examples
- Apartments
- Condominiums
- Townhouses
- Dormitories
- Rowhouses
Select New Construction, Addition or Alteration

Additions
- Addition only
- Addition plus existing home

Alterations
- Exemptions may apply

Alteration - would enter only portions of thermal envelop that you are touching
For example – only enter windows that you are changing, not other existing windows.
What is the Building Thermal Envelope?
Enter only applicable building components
Don’t have to use every button

Can group “like” components

Gross area (except slab-on-grade)

- Gross *wall* area to include peripheral edges of floors (area of band joist and subfloor between floors)

Use “Other” assembly as needed
Envelope Helpful Hints, con’t

- **Fenestration ratings** – U-factor and SHGC
- **Cavity R-value** – used for insulation placed between structural members
- **Continuous R-value** – used for insulation that is continuous across the structure (e.g., rigid insulation)

After you’ve entered all building thermal envelope components, **hit Check Compliance**

- Look for fields with red text
- If no compliance results, look for missing data and make sure you’ve made an entry for Building Use type
# SHGCs and U-Factors

![Window Rating](image-url)

**World's Best Window Co.**

**Millennium 2000+: Vinyl-Clad Wood Frame**

- Double Glazing + Argon Fill + Low E
- Product Type: Vertical Slider

**ENERGY PERFORMANCE RATINGS**

<table>
<thead>
<tr>
<th>U-Factor (U.S./I-P)</th>
<th>Solar Heat Gain Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.35</td>
<td>0.32</td>
</tr>
</tbody>
</table>

**ADDITIONAL PERFORMANCE RATINGS**

<table>
<thead>
<tr>
<th>Visible Transmittance</th>
<th>Air Leakage (U.S./I-P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.51</td>
<td>0.2</td>
</tr>
</tbody>
</table>

**Condensation Resistance**

- 51

Manufacturer stipulates that these ratings conform to applicable NFRIC procedures for determining whole-product performance. NFRIC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRIC 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.nfric.org](http://www.nfric.org)
Cavity vs. Continuous

Building Energy Codes Program
Foundations – what button to use

- Basement
  - Basement is conditioned

- Floor
  - Separates conditioned from unconditioned space

- Crawl Wall
  - Crawl space is not vented to the outside and floor above is NOT insulated
What's a Basement Wall?

Basement Wall
≥50% below grade

Above Grade Wall
<50% below grade

Basement Wall
≥50% below grade

Above Grade Wall
<50% below grade
Basements Helpful Hints

▶ Wall Height
- from top of wall to basement floor
- If not uniform, provide an average height

▶ Depth Below Grade
- Depth that the wall extends from finished, outside grade surface to basement floor
- If sloped or uneven, provide an average depth below grade
Depth of Insulation

- Measure from top of wall to where insulation stops
  - For a fully insulated wall, depth of insulation would be equal to height of the wall
- If you enter insulation depth of 0, program assumes no insulation, regardless of values in the insulation fields

Continuous Insulation

- Software assumes it’s exterior rigid

Cavity Insulation

- Software assumes you’re furring out on the interior
Basement Walls

Wall Height (ft) Measured from the top of the wall to the basement floor.

Depth Below Grade (ft) Measured from the finished outside grade to the basement floor.

Depth of Insulation (ft) Measured from the top of the wall to where the insulation stops.
Colors

Red

Green

Blue
Screen Operations

Compliance Bar

Status Bar
Compliance - UA

UA

U-factor x Area for each building assembly

UA from building conforming to code compared against your building UA
Compliance – Performance Alternative

► Simulated Performance alternative

- Based on simulated performance of your building compared to an equivalent code building
- Requires additional inputs (over UA approach): building orientation, minimum of four walls having unique orientations, and a minimum of one roof and floor
- Check Compliance button

► Performance alternative considers the whole building energy performance, whereas UA trade-off method considers only the thermal conductance of envelope components
Limited performance approach

Does not represent the true above code performance

Not to be used for home energy ratings, energy efficiency tax credit calculations or other incentive programs
REScheck Performance Approach

- Limited to building envelope
- No credit is provided for:
  - Overhang projection factor
  - Air tightness of the building envelope
  - Sun rooms/passive solar characteristics
  - Mechanical ventilation effectiveness
  - Duct leakage
  - Detailed equipment performance characteristics
## 2012 IECC Energy Cost Compliance

<table>
<thead>
<tr>
<th>Property</th>
<th>Organization</th>
<th>HERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dale Horton and Jody Miller</td>
<td>NCAT</td>
<td>Site Visit</td>
</tr>
<tr>
<td>3713 Creekwood Road Missoula, MT 59802</td>
<td>406/721-9908</td>
<td>2/1/16</td>
</tr>
<tr>
<td>Weather: Missoula, MT</td>
<td>Dale Horton</td>
<td>Rating No: NA</td>
</tr>
<tr>
<td>HortonMiller House</td>
<td>Builder</td>
<td>Rater ID: Pending</td>
</tr>
<tr>
<td>HortonMiller House Mar 2016.bgl</td>
<td>Southwall Builders</td>
<td></td>
</tr>
</tbody>
</table>

### Annual Energy Cost

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>2012 IECC</th>
<th>As Designed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td>502</td>
<td>461</td>
</tr>
<tr>
<td>Cooling</td>
<td>145</td>
<td>175</td>
</tr>
<tr>
<td>Water Heating</td>
<td>430</td>
<td>430</td>
</tr>
<tr>
<td>SubTotal - Used to Determine Compliance</td>
<td>1078</td>
<td>1066</td>
</tr>
<tr>
<td>Lights &amp; Appliances</td>
<td>768</td>
<td>748</td>
</tr>
<tr>
<td>Photovoltaics</td>
<td>-0</td>
<td>-0</td>
</tr>
<tr>
<td>Service Charge</td>
<td>142</td>
<td>142</td>
</tr>
<tr>
<td>Total</td>
<td>1988</td>
<td>1956</td>
</tr>
</tbody>
</table>

### Mandatory Requirements

- Annual Energy Cost Check: **PASSES**
- Duct Insulation R-Value Check (per Section 405.2): **PASSES**
- Window U-Value and SHGC Check (per Section 402.5): **PASSES**
- Home Infiltration (Section 402.4.1.2): **PASSES**
- Duct Leakage (Section 403.2.2): **PASSES**
- Mechanical Ventilation (Section 403.6): **PASSES**
- Mechanical Ventilation Fan Efficacy (Section 403.5.1): **PASSES**
- Mandatory Requirements Check Box (2012 IECC): **PASSES**

This home **MEETS** the annual energy cost requirements of Section 405 of the 2012 International Energy Conservation Code based on a climate zone of 6B. In fact, this home surpasses the requirements by 1.1%.

<table>
<thead>
<tr>
<th>Name</th>
<th>Dale Horton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td>NCAT</td>
</tr>
<tr>
<td>Signature Date</td>
<td>25 March 2016</td>
</tr>
</tbody>
</table>
# 2012 IECC Energy Cost Compliance

## Annual Energy Cost

<table>
<thead>
<tr>
<th></th>
<th>2012 IECC</th>
<th>As Designed</th>
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<tr>
<td><strong>SubTotal</strong> - Used to Determine Compliance</td>
<td><strong>1078</strong></td>
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</tr>
<tr>
<td>Lights &amp; Appliances</td>
<td>768</td>
<td>748</td>
</tr>
<tr>
<td>Photovoltaics</td>
<td>-9</td>
<td>-9</td>
</tr>
<tr>
<td>Service Charge</td>
<td>142</td>
<td>142</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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- Mandatory Requirements Check Box (2012 IECC): **PASSES**
Compliance Failing – Helpful Hints

- Review building plans to ensure all components are entered correctly
- Confirm takeoffs (areas) are correct
- Confirm insulation values
  - Double check cavity vs. continuous entries
- Look at UA column (*next slide*)
### Compliance Failing – Helpful Hints, con’t

<table>
<thead>
<tr>
<th>Component</th>
<th>Assembly</th>
<th>Gross Area or Slab Perimeter</th>
<th>Cavity Insulation R-Value</th>
<th>Continuous Insulation R-Value</th>
<th>U-Factor</th>
<th>UA</th>
<th>SHGC</th>
<th>Wall Height (ft)</th>
<th>Depth Below Grade (ft)</th>
<th>Depth of Insulation (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Door 2</td>
<td>Solid</td>
<td>40 ft²</td>
<td></td>
<td></td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Wall 3</td>
<td>Wood Frame, 16&quot; o.c.</td>
<td>492 ft²</td>
<td>20.0</td>
<td></td>
<td>0.059</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Wall 4</td>
<td>Wood Frame, 16&quot; o.c.</td>
<td>632 ft²</td>
<td>20.0</td>
<td></td>
<td>0.059</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Window</td>
<td>Vinyl Frame:Double Pa...</td>
<td>15 ft²</td>
<td></td>
<td></td>
<td>0.35</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>0.25</td>
</tr>
<tr>
<td>11 Knee Wall West</td>
<td>Wood Frame, 16&quot; o.c.</td>
<td>69 ft²</td>
<td>20.0</td>
<td></td>
<td>0.059</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Knee Wall East</td>
<td>Wood Frame, 16&quot; o.c.</td>
<td>84 ft²</td>
<td>20.0</td>
<td></td>
<td>0.059</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Basement Wall</td>
<td>Solid Concrete or Mas...</td>
<td>144 ft²</td>
<td>0.0</td>
<td></td>
<td>0.418</td>
<td></td>
<td></td>
<td>9.0</td>
<td>4.5</td>
<td>0.0</td>
</tr>
<tr>
<td>14 Basement Wall</td>
<td>Solid Concrete or Mas...</td>
<td>216 ft²</td>
<td>0.0</td>
<td></td>
<td>0.418</td>
<td></td>
<td></td>
<td>9.0</td>
<td>4.5</td>
<td>0.0</td>
</tr>
<tr>
<td>15 Basement Wall</td>
<td>Solid Concrete or Mas...</td>
<td>684 ft²</td>
<td>0.0</td>
<td></td>
<td>0.267</td>
<td></td>
<td></td>
<td>9.0</td>
<td>7.0</td>
<td>0.0</td>
</tr>
<tr>
<td>16 Floor 1</td>
<td>All-Wood Joist/Truss:O...</td>
<td>783 ft²</td>
<td>19.0</td>
<td></td>
<td>0.047</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Floor 2</td>
<td>Slab-On-Grade:Unhea...</td>
<td>93 ft</td>
<td>0.0</td>
<td></td>
<td>1.042</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fails**

**Compliance Method: UA Trade-Off**
- Max. UA: 591
- Your UA: 891

Select the building assembly buttons above the column headers to create a list of envelope components for the building.
Requirements Tab

- Mandatory requirements
  - Air leakage
  - Building mechanical systems and equipment
  - Service water heating
  - Duct construction, insulation, testing

- For each requirement, the user
  - Notes that a code requirement is
    - Met
    - Exempt
    - 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
Reports

- File ➔ View / Print Report
- Choices, choose any or all
  - Compliance Certificate
  - Inspection Checklist
  - Panel Certificate
Implement Requirements tab

Inspection checklists set up by phase of construction

- Plan Review
- Footing/Foundation
- Rough-in
- Final
Verify energy code, location, construction type, and conditioned floor area

### Compliance Certificate

**Project:** Jones Residence - Plan 3677

- **Energy Code:** 2015 IECC
- **Location:** Tucson, Arizona
- **Construction Type:** Single-family
- **Project Type:** New Construction
- **Conditioned Floor Area:** 6,780 ft²
- **Glazing Area:** 18%
- **Climate Zone:** 2 (1447 HDD)
- **Permit Date:** March 15, 2016

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

- **Compliance:** 14.6% Better Than Code
- **Maximum UA:** 1043
- **Your UA:** 891
- **Maximum SHGC:** 0.25
- **Your SHGC:** 0.25

*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

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Gross Area or Perimeter</th>
<th>Cavity R-Value</th>
<th>Cont. R-Value</th>
<th>U-Factor</th>
<th>UA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling 1: Flat Ceiling or Scissor Truss</td>
<td>2.415</td>
<td>30.0</td>
<td>0.0</td>
<td>0.035</td>
<td>85</td>
</tr>
<tr>
<td>Wall 1: Wood Frame, 16” o.c.</td>
<td>911</td>
<td>20.0</td>
<td>0.0</td>
<td>0.059</td>
<td>30</td>
</tr>
<tr>
<td>Window 1: Vinyl Frame:Double Pane SHGC: 0.25</td>
<td>369</td>
<td>20.0</td>
<td>0.0</td>
<td>0.270</td>
<td>100</td>
</tr>
<tr>
<td>Door 1: Solid</td>
<td>40</td>
<td>0.500</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wall 2: Wood Frame, 16” o.c.</td>
<td>834</td>
<td>20.0</td>
<td>0.0</td>
<td>0.059</td>
<td>38</td>
</tr>
</tbody>
</table>
Reports – Sample Compliance Certificate, con’t

Verify Values are Consistent with Plans

Verify Compliance Statement is Signed
## Envelope Sample Inspection Checklist

<table>
<thead>
<tr>
<th>2009 IECC</th>
<th>Foundation Inspection</th>
<th>Plans Verified Value</th>
<th>Field Verified Value</th>
<th>Complies?</th>
<th>Comments/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>402.1.1</td>
<td>Slab edge insulation R-value.</td>
<td>R-_______</td>
<td>R-_______</td>
<td>☐ Complies</td>
<td>See the <a href="#">Envelope Assemblies table for values</a>.</td>
</tr>
<tr>
<td>FO1I</td>
<td>☐ Unheated</td>
<td>☐ Heated</td>
<td></td>
<td>☐ Does Not Comply</td>
<td></td>
</tr>
<tr>
<td>303.2</td>
<td>Slab edge insulation installed per manufacturer's instructions.</td>
<td></td>
<td></td>
<td>☐ Not Comply</td>
<td>Requirement will be met.</td>
</tr>
<tr>
<td>402.2.8</td>
<td>☐ Unheated</td>
<td>☐ Heated</td>
<td></td>
<td>☐ Not Observable</td>
<td></td>
</tr>
<tr>
<td>FO2I</td>
<td>☐ Not Applicable</td>
<td></td>
<td></td>
<td>☐ Not Applicable</td>
<td></td>
</tr>
<tr>
<td>402.1.1</td>
<td>Slab edge insulation depth/length.</td>
<td>____ ft</td>
<td>____ ft</td>
<td>☐ Complies</td>
<td>See the <a href="#">Envelope Assemblies table for values</a>.</td>
</tr>
<tr>
<td>FO3I</td>
<td>☐ Does Not Comply</td>
<td></td>
<td></td>
<td>☐ Does Not Comply</td>
<td></td>
</tr>
<tr>
<td>402.1.1</td>
<td>Conditioned basement wall insulation R-value. Where internal insulation is used, verification may need to occur during Insulation Inspection. Not required in warm-humid locations in Climate Zone 3.</td>
<td>R-_______</td>
<td>R-_______</td>
<td>☐ Not Observable</td>
<td></td>
</tr>
<tr>
<td>FO4I</td>
<td>☐ Not Applicable</td>
<td></td>
<td></td>
<td>☐ Not Observable</td>
<td>See the <a href="#">Envelope Assemblies table for values</a>.</td>
</tr>
<tr>
<td>303.2</td>
<td>Conditioned basement wall insulation installed per manufacturer’s instructions.</td>
<td></td>
<td></td>
<td>☐ Not Applicable</td>
<td>Requirement will be met.</td>
</tr>
<tr>
<td>FO5I</td>
<td>☐ Not Applicable</td>
<td></td>
<td></td>
<td>☐ Not Applicable</td>
<td></td>
</tr>
<tr>
<td>402.2.7</td>
<td>Conditioned basement wall insulation depth of burial or distance from top of wall.</td>
<td>____ ft</td>
<td>____ ft</td>
<td>☐ Complies</td>
<td>See the <a href="#">Envelope Assemblies table for values</a>.</td>
</tr>
<tr>
<td>FO8I</td>
<td>☐ Does Not Comply</td>
<td></td>
<td></td>
<td>☐ Does Not Comply</td>
<td></td>
</tr>
<tr>
<td>303.2.1</td>
<td>A protective covering is installed to protect exposed exterior insulation and extends a minimum of 6 in. below grade.</td>
<td></td>
<td></td>
<td>☐ Not Observable</td>
<td>Requirement will be met.</td>
</tr>
<tr>
<td>FO11I</td>
<td>☐ Not Applicable</td>
<td></td>
<td></td>
<td>☐ Not Observable</td>
<td></td>
</tr>
<tr>
<td>403.8</td>
<td>Snow- and ice-melting system controls installed.</td>
<td></td>
<td></td>
<td>☐ Not Applicable</td>
<td></td>
</tr>
<tr>
<td>FO12I</td>
<td>☐ Not Applicable</td>
<td></td>
<td></td>
<td>☐ Not Applicable</td>
<td></td>
</tr>
</tbody>
</table>
## Code Section #

<table>
<thead>
<tr>
<th>2009 IECC</th>
<th>Foundation Inspection</th>
<th>Plans Verified Value</th>
<th>Field Verified Value</th>
<th>Complies?</th>
</tr>
</thead>
<tbody>
<tr>
<td>402.1.1 [FO1]</td>
<td>Slab edge insulation R-value.</td>
<td>R-____</td>
<td>R-____</td>
<td>☐ Complies</td>
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<td>Foundation Inspection</td>
<td>Plans Verified Value</td>
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<td>Complies?</td>
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<td>2.1.1</td>
<td>Slab edge insulation R-value.</td>
<td>R-_____</td>
<td>R-_____</td>
<td>☐ Complies</td>
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<tr>
<td></td>
<td></td>
<td>☐ Unheated</td>
<td>☐ Unheated</td>
<td>☐ Does Not Comply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Heated</td>
<td>☐ Heated</td>
<td>☐ Not Observable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>☐ Not Applicable</td>
</tr>
</tbody>
</table>
| 2009 IECC | Foundation Inspection | Plans Verified Value | Field Verified Value | Complies?
|-----------|-----------------------|----------------------|----------------------|-----------
| 402.1.1 [FO1] | Slab edge insulation R-value. | R-____ | R-____ | □ Complies
|           |                       | Unheated              | Unheated            | □ Does Not Comply
|           |                       | Heated                | Heated              | □ Not Observable
|           |                       |                      |                     | □ Not Applicable
|           |                       |                      |                     | See value
<table>
<thead>
<tr>
<th>2009 IECC</th>
<th>Foundation Inspection</th>
<th>Plans Verified Value</th>
<th>Field Verified Value</th>
<th>Complies?</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>402.1.1</td>
<td>Slab edge insulation R-value.</td>
<td>R-____</td>
<td>R-____</td>
<td>□ Complies</td>
<td>Value from Field</td>
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<tr>
<td>[FO1]</td>
<td></td>
<td>□ Unheated</td>
<td>□ Unheated</td>
<td>□ Does Not Comply</td>
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<td></td>
<td></td>
<td>□ Heated</td>
<td>□ Heated</td>
<td>□ Not Observable</td>
<td></td>
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<td>□ Not Applicable</td>
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</table>

*Notes:* See value field for further details.
<table>
<thead>
<tr>
<th>Code Section #</th>
<th>Value from Plans</th>
<th>Compliance</th>
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<tbody>
<tr>
<td>302.1, 403.7 [PR2]</td>
<td>Heating: Btu/hr ___</td>
<td>Heating: Btu/hr ___</td>
</tr>
<tr>
<td></td>
<td>Cooling: Btu/hr ___</td>
<td>Cooling: Btu/hr ___</td>
</tr>
<tr>
<td></td>
<td>[Note: 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.]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Inspection Type**

**Value from Field**
Panel Certificate

2015 IECC Energy Efficiency Certificate

<table>
<thead>
<tr>
<th>Insulation Rating</th>
<th>R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above-Grade Wall</td>
<td>10.00</td>
</tr>
<tr>
<td>Below-Grade Wall</td>
<td>0.00</td>
</tr>
<tr>
<td>Floor</td>
<td>19.00</td>
</tr>
<tr>
<td>Ceiling / Roof</td>
<td>30.00</td>
</tr>
<tr>
<td>Ductwork (unconditioned spaces):</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Glass &amp; Door Rating</th>
<th>U-Factor</th>
<th>SHGC</th>
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</thead>
<tbody>
<tr>
<td>Window</td>
<td>0.27</td>
<td>0.25</td>
</tr>
<tr>
<td>Door</td>
<td>0.50</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Heating &amp; Cooling Equipment</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating System:</td>
<td></td>
</tr>
<tr>
<td>Cooling System:</td>
<td></td>
</tr>
<tr>
<td>Water Heater:</td>
<td></td>
</tr>
</tbody>
</table>

Name: __________________________ Date: _______________
Comments

45
Applying REScheck Software

Jones Residence
Define Building Thermal Envelope

- Conditioned Main Floor
- Unexcavated
- Crawlspace
- Conditioned Basement
- Building Section
Ceiling Area (adjusted for vaulted ceilings)

Ceiling Area - 2415 sf
Exterior Wall Areas

12' Exterior Walls – **689 sf**
  - North – 221 sf
  - South – 234 sf
  - East – 52 sf
  - West – 182 sf

9' Exterior Walls – **2180 sf**
  - North – 690 sf
  - South – 600 sf
  - East – 440 sf
  - West – 450 sf

3' knee walls (between 9’&12’ sections) – **153 sf**
  - West – 69 sf
  - East – 84 sf

North – 690 sf
South – 600 sf
East – 440 sf
West – 450 sf
Knee Wall Insulation

No, No… Never cut the batts too short
Basement Walls – below grade

>50% below grade = below grade concrete basement wall
Ways to Insulate Basement Walls

- Interior Studs w/batts
- Exterior Rigid Foam
Including Rim Joists in the Exterior Wall Area

Typ. Exterior Wall:
- Stucco
- Tyvek infiltration barrier
- 7/16" OSB sub sheathing
- 2x6 @ 16" o.c. framing
- R-19 batt insulation
- 1/2" gyp. wallboard (GWB)

Typ. Floor:
- 1/2" part. board underlay
- 3/4" T&G plywd. subfloor
- 2x12 floor joists @ 16" o.c.
- R-19 batt insulation
- 1/2" gypsum wall board ceiling
Above Grade Bsmt Walls (exterior wood) = 837 sf (93’ x 9’)  
(entered as wood frame wall, not a basement wall)

Below Grade Bsmt Walls = 1044 sf

Side basement walls = 360 sf

West Wall – 144 sf

East Wall – 216 sf

Back basement wall = 684 sf (76’x9’)

Above Grade Bsmt Walls (exterior wood) – 837 sf  
(93 in. ft x 9’ height)
Crawlspace Area – 783 sf
Slab Perimeter – 93 linear feet

Line represents the slab edge to be calculated in linear feet
## Slabs in REScheck

![REScheck Slabs Menu](image)

<table>
<thead>
<tr>
<th>Component</th>
<th>Assembly</th>
<th>Gross Area</th>
<th>Cavity Insulation R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Floor 1</td>
<td>Click here to select Assembly...</td>
<td>0</td>
<td>ft²</td>
</tr>
<tr>
<td></td>
<td>All-Wood Joist/Truss</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steel Frame, 16&quot; o.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steel Frame, 24&quot; o.c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slab-On-Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Structural Insulated Panels</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other (U-Factor Option)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Unheated**  
**Heated**
### Building Energy Codes Program

#### Project

<table>
<thead>
<tr>
<th>Component</th>
<th>Assembly</th>
<th>Orientation</th>
<th>Gross Area</th>
<th>Cavity Insulation R-Value</th>
<th>Continuous Insulation R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td>Cathedral Ceiling</td>
<td></td>
<td>1255 ft²</td>
<td>38.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Ceiling 1</td>
<td>Flat Ceiling or Scissor Truss</td>
<td></td>
<td>294 ft²</td>
<td>38.0</td>
<td>0.0</td>
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<tr>
<td></td>
<td>Cathedral Ceiling</td>
<td></td>
<td>2833 ft²</td>
<td>19.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Wall 1</td>
<td>Raised or Energy Truss</td>
<td></td>
<td>532 ft²</td>
<td></td>
<td></td>
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<tr>
<td>Window 1</td>
<td>Steel Truss</td>
<td></td>
<td>21 ft²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door 1</td>
<td>Steel Joist/Rafter, 16” o.c.</td>
<td></td>
<td>10 ft²</td>
<td></td>
<td></td>
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<tr>
<td>Door 2</td>
<td>Steel Joist/Rafter, 24” o.c.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basement Wall 1</td>
<td>Structural Insulated Panels (SIPs)</td>
<td></td>
<td>795 ft²</td>
<td>19.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Component</td>
<td>Assembly</td>
<td>Orientation</td>
<td>Gross Area</td>
<td>Cavity Insulation R-Value</td>
<td>Continuous Insulation R-Value</td>
</tr>
<tr>
<td>--------------------</td>
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<td>------------</td>
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<tr>
<td>Building</td>
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<td></td>
</tr>
<tr>
<td>1. Ceiling 1</td>
<td>Cathedral Ceiling</td>
<td>▼</td>
<td>1255 ft²</td>
<td>38.0</td>
<td>0.0</td>
</tr>
<tr>
<td>2. Ceiling 2</td>
<td>Flat Ceiling or Scissor</td>
<td>▼</td>
<td>294 ft²</td>
<td>38.0</td>
<td>0.0</td>
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<tr>
<td>3. Wall 1</td>
<td>Wood Frame, 16&quot; o.c.</td>
<td>▼ Unspecified</td>
<td>2833 ft²</td>
<td>19.0</td>
<td>7.0</td>
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<tr>
<td>4. Window 1</td>
<td>Wood Frame, 16&quot; o.c.</td>
<td></td>
<td>532 ft²</td>
<td></td>
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</tr>
<tr>
<td>5. Door 1</td>
<td>Wood Frame, 24&quot; o.c.</td>
<td></td>
<td>21 ft²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Door 2</td>
<td>Steel Frame, 16&quot; o.c.</td>
<td></td>
<td>10 ft²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Basement Wall</td>
<td>Steel Frame, 24&quot; o.c.</td>
<td></td>
<td>795 ft²</td>
<td>19.0</td>
<td>0.0</td>
</tr>
<tr>
<td>8. Basement Wall</td>
<td>Solid Concrete or Masonry</td>
<td></td>
<td>119 ft²</td>
<td>19.0</td>
<td>0.0</td>
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<td>9. Basement Wall</td>
<td>Masonry Block with Empty Cells</td>
<td></td>
<td>86 ft²</td>
<td>19.0</td>
<td>0.0</td>
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<tr>
<td></td>
<td>Masonry Block with Integral Insulation</td>
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<td></td>
<td>Log</td>
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<td>Structural Insulated Panels</td>
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<td></td>
<td>Insulated Concrete Forms</td>
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<tr>
<td></td>
<td>Other (U-Factor Option)</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The log thickness is the area of the log profile divided by its stack height, rounded to the nearest inch. The inscribed rectangle may be used to establish dimensions of non-rectangular log profiles.
Slab Input Dimensions

Vertical Insulation (A = Insulation Depth)

Horizontal Insulation (A + B = Insulation Depth)
Crawlspace Walls

Wall Height (ft)
Measured from the top of the wall to the basement floor.

0.0

Depth of Insulation (ft)
Measured from the top of the crawl to where the insulation stops.

0.0

Depth Below Grade (ft)
Measured from the finished outside grade to the basement floor.

0.0

Depth Below Inside Grade (ft)
Measured from inside grade to the top of the footing.

0.0
Create Two Basement Components:

<table>
<thead>
<tr>
<th>Wall</th>
<th>Depth Below Grade</th>
<th>Depth of Insul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kneewall</td>
<td>3’</td>
<td>0’</td>
</tr>
<tr>
<td>Concrete</td>
<td>5’</td>
<td>4’</td>
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</table>

April 5, 2016
Example 2:

Walk-out Basement Wall – Example 2

Assume an 8-ft. basement is to be built on a slope so that the front wall is 7 ft. below grade and the rear wall is totally above grade. The ground level along both side walls is sloped so that approximately 50% of each wall is below grade.

The rear basement wall will be wood-frame construction with R-19 cavity insulation. The other three walls will be concrete walls with R-10 rigid insulation. All four walls will be fully insulated.

Create one basement component for the front wall and enter the following information:

- Wall Height: 8 ft.
- Depth Below Grade: 7 ft.
- Depth of Insulation: 8 ft.

The two side walls are at least 50% below grade, so they are entered as a basement wall component. If they were less than 50% below grade, they would be entered as an above-grade wall component. Therefore, create a second basement wall component for the two side walls and enter the following information:

- Wall Height: 8 ft.
- Depth Below Grade: 4 ft.
- Depth of Insulation: 8 ft.

The rear wall is fully above grade and should be entered as an above-grade wall using the Wall button. Note that the basement floor along this wall should be considered a slab-on-grade component. Create a slab component using the Floor button and enter the length of the basement floor along this wall in the Gross Area or Slab Perimeter field.
Walk-out Basement Wall - Example 2

Create Two Basement Components:

<table>
<thead>
<tr>
<th>Wall</th>
<th>Depth Below Grade</th>
<th>Depth of Insul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Wall</td>
<td>8'</td>
<td>7'</td>
</tr>
<tr>
<td>Side Walls</td>
<td>8'</td>
<td>4'</td>
</tr>
</tbody>
</table>

- Create one above grade wall for back (walk-out) wall.
- Create one slab-on-grade component with length of back wall as linear feet.
Example 3:

An 8-ft. high by 21-ft. wide foundation wall is 7 ft. below grade and is to be insulated using R-5 exterior rigid foam. The insulation will start at grade level and run down to the bottom of the foundation wall. There is 1 foot of uninsulated exposed above-grade wall. The wall has no openings.

This wall is entered by creating two basement wall components. The first component will be used for entering the uninsulated above-grade portion of the wall. Click the Basement button and enter the following information:

- Wall Height: 1’
- Depth Below Grade: 0’
- Depth of Insul: 0’

The second component will be used for entering the insulated below-grade portion of the wall. Click the Basement button again and enter the following information:

- Wall Height: 7’
- Depth Below Grade: 7’
- Depth of Insul: 7’

After these components have been created, enter the gross area of each component and the R-value of the insulation used on the below-grade component.

Create Two Basement Components:

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Depth Below Grade</th>
<th>Depth of Insul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uninsulated</td>
<td>1’</td>
<td>0’</td>
</tr>
<tr>
<td>Insulated</td>
<td>7’</td>
<td>7’</td>
</tr>
</tbody>
</table>

Areas and R-Values must also be entered.
Insulation Levels

Roof/Ceiling

Walls (above and below grade)

Floor over vented crawl space

Slab-on-grade
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
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