Building Modifications & Enforcing the 2012 IECC

Residential Workshop 2
Introductions

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Project email:
energycodeworkshop@shawgrp.com

Code officials:
Name
Municipality
Status of Residential Codes
Overview

Project funded by the Missouri Department of Natural Resources (MDNR) with American Recovery and Reinvestment Act of 2009 (ARRA) funding.

4 Locations and Webinars:

- St. Louis (December 1st – 2nd)
- Springfield (December 5th – 6th)
- Kansas City (January 24th – 25th)
- Columbia (February 27th)

Objective of the Workshop: Work with municipalities and counties across the state to identify opportunities to adopt or enhance compliance with the 2009 or 2012 International Energy Conservation Code (IECC) at a local level.
## Agenda

<table>
<thead>
<tr>
<th>Topic</th>
<th>Approx. Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>15 minutes</td>
</tr>
<tr>
<td>Residential Remodels and Additions for 2012 IECC</td>
<td>50 minutes</td>
</tr>
<tr>
<td>Tools to Enhance Compliance</td>
<td>50 minutes</td>
</tr>
<tr>
<td>Summary</td>
<td>5 minutes</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2 hours</strong></td>
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</tbody>
</table>
Some Important Points

Overall
• Discussion-based
What can you expect?
• Can follow code citations in [ ]
Before we get started...
• Cell phones
Overview

- The International Code Council® (ICC) develops codes
- The IECC looks at energy consumption and cost savings in buildings
- Three year cycle for updates
- Several codes by the ICC
  - International Building Code®
  - International Residential Code®
  - International Fire Code®
  - International Mechanical Code®
  - International Property Maintenance Code®
Overview

2012 IECC – Residential Section

1. Administration
2. Definitions
3. General Requirements
4. Residential Energy Efficiency
5. Referenced Standards
Overview

**R101.3 Intent.** This code shall regulate the design and construction of buildings for the effective use and conservation of energy over the useful life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.
Overview

Residential provisions of the IECC attempts to regulate energy use:

• [R402] Building thermal envelope
• [R403] Systems
• [R404] Lighting

IECC does NOT regulate:

• Mechanical system efficiencies
• Appliances
• Water consumption
Topic 1

Residential Remodels and Additions for 2012 IECC
Topic 1 Objectives

- Identify how additions/alterations/repairs trigger the 2012 IECC
- Identify the compliance paths for residential modifications
What Triggers the 2012 IECC?

Remodels and additions

• What activity triggers the code?
• Definitions
• Exceptions
What Triggers the 2012 IECC?

What’s an addition?

**ADDITION.** An extension or increase in the conditioned floor area or height of a building or structure.

What’s conditioned space?

**CONDITIONED SPACE.** An area or room within a building being heated or cooled, containing uninsulated ducts, or with a fixed opening directly into an adjacent conditioned space.
What Triggers the 2012 IECC?

101.4.5 Change in space conditioning. Any nonconditioned space that is altered to become conditioned space shall be required to be brought into full compliance with this code.
What Triggers the 2012 IECC?

What’s an alteration?

**ALTERATION.** Any construction or renovation to an existing structure other than repair or addition that requires a permit. Also, a change in a mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

What’s a repair?

**REPAIR.** The reconstruction or renewal of any part of an existing building.
What Triggers the 2012 IECC?

What’s building thermal envelope?

**BUILDING THERMAL ENVELOPE.** The basement walls, exterior walls, floor, roof, and any other building element that enclose *conditioned space*. This boundary also includes the boundary between *conditioned space* and any exempt or unconditioned space.
What Triggers the 2012 IECC?

101.4.3 Additions, alterations, renovations or repairs. Additions, alterations, renovations or repairs to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with this code. Additions, alterations, renovations or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.

Exception: The following need not comply provided the energy use of the building is not increased:
What Triggers the 2012 IECC?

Applicability
- Code applies to residential buildings
- New construction, additions, alterations, renovations or repairs
- Additions can comply alone or in combination with existing building

Exempted Buildings
- Existing buildings
- Historic buildings
- Buildings (or portions of) that are neither heated or cooled (e.g. garage)

Exempted Alterations
- Eight exceptions for alterations
What Triggers the 2012 IECC?

8 Exceptions

1. Storm windows installed over (E) window.
2. Glass only replacements in an (E) window.
3. (E) cavities are filled with insulation.
4. (E) cavity is not exposed.
5. Reroofing for roofs where neither the sheathing nor the insulation is exposed.

(E)=Existing Exceptions 6-8 are more relevant to commercial buildings

The IECC “is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.”
What Triggers the 2012 IECC?

What’s a sunroom?

**SUNROOM.** A one-story structure attached to a dwelling with a glazing area in excess of 40 percent of the gross area of the structure’s exterior walls and roof.
What Triggers the 2012 IECC?

R402.2.12 Sunroom insulation.

1. The minimum ceiling insulation $R$-values shall be R-19 in Climate Zones 1 through 4 and R-24 in Climate Zones 5 through 8; and

2. The minimum wall $R$-value shall be R-13 in all climate zones. Wall(s) separating a sunroom with a thermal isolation from conditioned space shall meet the building thermal envelope requirements of this code.

<table>
<thead>
<tr>
<th>CLIMATE ZONE</th>
<th>FENESTRATION U-FACTOR</th>
<th>SKYLIGHT U-FACTOR</th>
<th>GLAZED FENESTRATION SHGC</th>
<th>CEILING R-VALUE</th>
<th>WOOD FRAME WALL R-VALUE</th>
<th>MASS WALL R-VALUE</th>
<th>FLOOR R-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 except Marine</td>
<td>0.35</td>
<td>0.55</td>
<td>0.40</td>
<td>49</td>
<td>20 or 13+5h</td>
<td>8/13</td>
<td>19</td>
</tr>
<tr>
<td>5 and Marine 4</td>
<td>0.32</td>
<td>0.55</td>
<td>NR</td>
<td>49</td>
<td>20 or 13+5h</td>
<td>13/17</td>
<td>30</td>
</tr>
</tbody>
</table>
What Triggers the 2012 IECC?

**R402.3.5 Sunroom U-factor.**
1. The maximum fenestration \( U \)-factor shall be 0.45; and
2. The maximum skylight \( U \)-factor shall be 0.70.

New fenestration separating the sunroom with thermal isolation from conditioned space shall meet the building thermal envelope requirements of this code.

<table>
<thead>
<tr>
<th>CLIMATE ZONE</th>
<th>FENESTRATION ( U )-FACTOR(^a)</th>
<th>SKYLIGHT ( U )-FACTOR(^b)</th>
<th>GLAZED FENESTRATION SHGC(^c)</th>
<th>CEILING ( R )-VALUE</th>
<th>WOOD FRAME WALL ( R )-VALUE</th>
<th>MASS WALL ( R )-VALUE(^d)</th>
<th>FLOOR ( R )-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 except Marine</td>
<td>0.35</td>
<td>0.55</td>
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<td>5 and Marine 4</td>
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<td>0.55</td>
<td>NR</td>
<td>49</td>
<td>20 or 13+5(^h)</td>
<td>13/17</td>
<td>30(^e)</td>
</tr>
</tbody>
</table>
What Triggers the 2012 IECC?

Which items trigger examination of the energy code?

- Home expansion
- Yard fence
- New skylight while re-roofing
- Detached garage
- Attached garage
- Bedroom addition
- New sunroom
- Window replacement
- New concrete driveway
- Furnace replacement
What Triggers the 2012 IECC?

Which items require a permit in your municipality?

- Home expansion
- Yard fence
- New skylight while re-roofing
- Detached garage
- Attached garage
- Bedroom addition
- New sunroom
- Window replacement
- New concrete driveway
- Furnace replacement
What Triggers the 2012 IECC?

Which of the following must comply with the residential provisions of the IECC?

A. unconditioned garage
B. thermally isolated sunroom
C. open-air, unconditioned backyard gazebo structure
D. unconditioned attic

Which of the following is exempt from the provisions of the IECC?
A. A 100 SF bathroom addition to your neighbor's home
B. My home which I plan to only heat to 64°F
C. A conditioned garage addition
D. A historic home located in a locally designated historic district
Topic 1 Objectives

• Identify how additions/alterations/repairs trigger the 2012 IECC
• Identify the compliance paths for residential additions
R101.4.3 Additions, alterations, renovations or repairs. Additions, alterations, renovations or repairs to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with this code. Additions, alterations, renovations or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.
Compliance Paths for Additions
Compliance Paths for Additions

Diagram of existing home with addition shown in plan and section views.
Compliance Paths for Additions

A. Prescriptive

B.1 U-Factor

B.2 UA Alternative

Prescriptive Approaches

C. Simulated Performance Alternative
REScheck Simulated Performance requires structure with four walls with unique orientation, and at least one roof and one floor.
## Compliance Path – Prescriptive

### TABLE R402.1.3
**EQUIVALENT U-FACTOR**

<table>
<thead>
<tr>
<th>CLIMATE ZONE</th>
<th>FENESTRATION U-FACTOR</th>
<th>SKYLIGHT U-FACTOR</th>
<th>CEILING U-FACTOR</th>
<th>FRAME WALL U-FACTOR</th>
<th>MASS WALL U-FACTOR</th>
<th>FLOOR U-FACTOR</th>
<th>BASEMENT WALL U-FACTOR</th>
<th>CRAWL SPACE WALL U-FACTOR</th>
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<tr>
<td>1</td>
<td>0.50</td>
<td>0.75</td>
<td>0.035</td>
<td>0.082</td>
<td>0.197</td>
<td>0.064</td>
<td>0.360</td>
<td>0.477</td>
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<tr>
<td>2</td>
<td>0.40</td>
<td>0.65</td>
<td>0.030</td>
<td>0.082</td>
<td>0.165</td>
<td>0.064</td>
<td>0.360</td>
<td>0.477</td>
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<td>0.55</td>
<td>0.030</td>
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<td>0.047</td>
<td>0.091</td>
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<td>0.55</td>
<td>0.026</td>
<td>0.057</td>
<td>0.098</td>
<td>0.047</td>
<td>0.059</td>
<td>0.065</td>
</tr>
<tr>
<td>5 and Marine 4</td>
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<td>0.55</td>
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<td>0.057</td>
<td>0.082</td>
<td>0.033</td>
<td>0.050</td>
<td>0.055</td>
</tr>
<tr>
<td>6</td>
<td>0.32</td>
<td>0.55</td>
<td>0.026</td>
<td>0.048</td>
<td>0.060</td>
<td>0.033</td>
<td>0.050</td>
<td>0.055</td>
</tr>
<tr>
<td>7 and 8</td>
<td>0.32</td>
<td>0.55</td>
<td>0.026</td>
<td>0.048</td>
<td>0.057</td>
<td>0.028</td>
<td>0.050</td>
<td>0.055</td>
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</table>

<table>
<thead>
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<th>CLIMATE ZONE</th>
<th>NR</th>
<th>0.75</th>
<th>0.25</th>
<th>30</th>
<th>13</th>
<th>3/4</th>
<th>13</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.40</td>
<td>0.65</td>
<td>0.25</td>
<td>38</td>
<td>13</td>
<td>4/6</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0.35</td>
<td>0.55</td>
<td>0.25</td>
<td>38</td>
<td>20 or 13+5</td>
<td>8/13</td>
<td>19</td>
<td>5/13</td>
<td>0</td>
<td>5/13</td>
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<td>8/13</td>
<td>19</td>
<td>10/13</td>
<td>10, 2 ft</td>
<td>10/13</td>
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<td>20+5 or 13+10</td>
<td>19/21</td>
<td>38</td>
<td>15/19</td>
<td>10, 4 ft</td>
<td>15/19</td>
</tr>
</tbody>
</table>
Compliance Path – UA Alternative

Vaulted Ceiling
U-Factor – 0.026
Eq. to R-49 cav

ABG Walls
U-Factor – 0.057
Eq. to R-20 cav

Basement Walls
U-Factor – 0.059
Eq. to R-13 cav

Vaulted Ceiling
2x12 w/ R-49 cav

AGW Walls
2x6 w/ R-21 cav

Basement Walls
2x4 w/ R-13 cav

Max UA

Design UA
Compliance Paths for Additions
Compliance Path – Simulated Performance [R405]

Heat + Cool + Hot Water = $917

Climate Zone 4

Heat + Cool + Hot Water = $770

Reference Design
2012 IECC

Proposed Design
2012 IECC Resource

Interpretation questions
• Website: http://www.iccsafe.org/cs/Pages/opinions.aspx
• Phone: 1-888-ICC-SAFE (422-7233) - ext. 338077

US Department of Energy
• Website: http://www.energycodes.gov/help/
Topic 2

Tools to Enhance Compliance throughout Permit Review Process and Inspection
Topic 2 Objectives

- Tools prior to submittal
- Review the plans review process
- Review the inspections required
Tools Prior to Submittal

Meet with concerned parties
• Discuss compliance paths, and review code requirements
• Point applicants to information
• Review common misconceptions

In lieu of meetings websites, presentations, or other sources can be used
Tools Prior to Submittal

Use of a “Determination Worksheet”

• Chicago Energy Conservation Code Compliance Determination Worksheet
  – Determine compliance requirements
  – General requirements for all projects

Use the check boxes below to determine the classification for the project.

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
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<tbody>
<tr>
<td>☐</td>
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</table>

Is the building **5 stories or more** above grade?
- If you checked “YES”, please complete the Commercial Compliance Form.

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
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<tr>
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</tbody>
</table>

Is the building **4 stories or less** above grade and contains any permanent residential occupancy, such as houses, apartments, condos, or dorms (hotel and temporary housing units are not included here)?
- If you checked “YES”, please complete the Residential Compliance Form.

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
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<tbody>
<tr>
<td>☐</td>
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</tbody>
</table>

Is the building **4 stories or less** above grade and does it contain any permanent residential occupancy and any other occupancy which occupies more than 15% of the total building area?
- If you checked “YES”, please complete the Commercial Compliance Form as well as the Residential Compliance Form.
Tools Prior to Submittal

- Use of a checklist for required documents needed for permit submittal

<table>
<thead>
<tr>
<th>APPLICANT'S INITIALS</th>
<th>VILLAGE VERIFICATION</th>
</tr>
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<tbody>
<tr>
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</tbody>
</table>

1. Two set of drawings
2. Site plan detail sheet
3. Foundation detail sheet
4. Floor plans
5. Wall construction detail sheet
6. Roof/ceiling construction detail sheet
7. Chimney/fireplace & chase detail sheet
8. Mechanical detail sheet
9. Plumbing detail sheet
10. Electrical detail sheet
11. Drainage Certificate Agreement
12. Site Development Permit/Erosion Control
13. Contractor Listing
14. Open Space Disclaimer or Open Space Checklist & Receipts
15. Energy Code Compliance

Signature of Applicant  
Date

Accepted: Village of New Lenox  
Date
Tools Prior to Submittal

• Might want a detailed description of what is required for the “Energy Code Compliance”

| 1. Two set of drawings          |
| 2. Site plan detail sheet      |
| 3. Foundation detail sheet     |
| 4. Floor plans                 |
| 5. Wall construction detail sheet |
| 6. Floor construction detail sheet |
| 7. Roof/ceiling construction detail sheet |
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| 14. Contractor Listing         |
| 15. Open Space Disclaimer or Open Space Checklist & Receipts |
| 16. Energy Code Compliance     |
Tools Prior to Submittal

Compliance forms

• Chicago, IL - Residential Compliance Form
• Fort Collins, CO - Residential Energy Code Compliance Form
• Jefferson County, CO - Residential Energy Code Submittal Requirements
Tools Prior to Submittal – Chicago, IL

A. Rescheck

RECOMMENDED METHOD

REScheck

Report, Check List, Certificate, Project Details, Permit Date

403: Systems
*Article 4
(403 is in addition to Rescheck)

Print and attach REScheck compliance certificate. (required)

OR

B. Prescriptive Method

Article 4

401: General

402: Air Leakage
402.5: Moisture Control
402.6: Fenestration U-factor/SHGC
403: Systems
402.1: Building Thermal Envelope
402.2: Insulation Requirements
402.3: Fenestration

OR

C. Performance Method

Article 4

401: General

402: Air Leakage
402.5: Moisture Control
402.6: Fenestration U-factor/SHGC
403: Systems
404: Simulated Performance Alternative
Tools Prior to Submittal – Chicago, IL

A. Rescheck

RECOMMENDED METHOD

Download REScheck free at www.energycodes.gov/rescheck

Print and attach REScheck compliance certificate. (required)
Tools Prior to Submittal – Chicago, IL

**B. Prescriptive Method**

- Article 4
- 401: General
- 402.4: Air Leakage
- 402.5: Moisture Control
- 402.6: Fenestration U-factor/SHGC
- 403: Systems
- 402.1: Building Thermal Envelope
- 402.2: Insulation Requirements
- 402.3: Fenestration

**C. Performance Method**

- Article 4
- 401: General
- 402.4: Air Leakage
- 402.5: Moisture Control
- 402.6: Fenestration U-factor/SHGC
- 403: Systems
- 404: Simulated Performance Alternative
Tools Prior to Submittal – Fort Collins, CO

### 2010 Fort Collins Residential Energy Code Compliance Form

**Planning, Development & Transportation Services**

**Community Development & Neighborhood Services**

<table>
<thead>
<tr>
<th>Permit Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address:</td>
</tr>
</tbody>
</table>

**DIRECTIONS:** Place a check next to Prescriptive, UA, or SIQA indicating the path chosen. Next, circle the method within that path you intend to follow. If choosing prescriptive or UA, the applicant must also choose between an Air sealing checklist or Blower Door Test.

(A) **Prescriptive Compliance for House, 2009 IRC, Section N1102.1.1, Climate Zone 5.**

<table>
<thead>
<tr>
<th>Building Envelope</th>
<th>Insulation R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood frame wall insul r-value</td>
<td>R-20 or 13+5d</td>
</tr>
<tr>
<td>Metal frame wall insul r-value</td>
<td>R-13 or R-19+8</td>
</tr>
<tr>
<td>Crawl space wall</td>
<td>R-13 or R-19d</td>
</tr>
<tr>
<td>Roof insulation attic</td>
<td>R-36</td>
</tr>
<tr>
<td>Roof rafter insulation</td>
<td>R-30</td>
</tr>
<tr>
<td>Walls below grade</td>
<td>R-13 / R-10d</td>
</tr>
<tr>
<td>Wood floor over un-cond</td>
<td>R-30</td>
</tr>
<tr>
<td>Slab on grade floor; unheated</td>
<td>R-10, 7&quot; DEEP</td>
</tr>
<tr>
<td>Windows</td>
<td>U-35</td>
</tr>
</tbody>
</table>

Circle one: Air Sealing Checklist Blower Door Test

(B) **TOTAL UA ALTERNATIVE (ResCheck), 2009 IRC, Section N1102.1.3**

Submit a passing UA calculation (i.e., ResCheck) using 2009 IRC/IECC. The report must be submitted at time of application and must include address of residence; name of individual completing the rating form; name & version of software tool (i.e., ResCheck). Air Sealing Checklist or Blower Door Test is required.

Circle one: Air Sealing Checklist Blower Door Test

(C) **Simulated Performance Alternative, 2009 IECC, Section 405**

Current accredited programs: E-star of Colorado or Energylinc.

HEPS accredited energy rating system. Must submit HERS Index of 50 or maximums. A preliminary rating must be submitted at time of application and must include address of residence; name of individual completing the rating/compliance form; name & version of software tool. Final rating requires a Blower Door Test.

| SIGN: | DATE: |
| CONTRACTOR: | PHONE: |
Tools Prior to Submittal – Fort Collins, CO

Option (A) - Prescriptive

- Simple - specific to the exact climate zone
- Could include the U-Factor values as an option
Tools Prior to Submittal – Fort Collins, CO

Option (B) – UA Alternative

Option (C) – Simulated Performance Alternative
Residential Energy Code Submittal Requirements

The Jefferson County Division of Building Safety has adopted the 2009 International Codes effective January 1, 2010. Included as part of this adoption are the International Residential Code (IRC), and the International Energy Conservation Code (IECC). The IECC contains specific design and submittal requirements. The submittal requirements for residential energy compliance are outlined below as determined by the Division.

Energy code submittals shall be required for all residential projects in accordance with the applicable provisions of the 2009 IRC and 2009 IECC. There are four design path options available to the designer:

- **Option #1:** Prescriptive path as outlined in IRC Chapter 11
- **Option #2:** Total UA Alternative path (trade-off) as outlined in IRC section N1102.1.3 & IECC 401.1.4
- **Option #3:** Simulated Performance Alternative (Performance) path as outlined in IECC section 405
- **Option #4:** A Professional Design

**Note:** All four options have similar requirements for submittal documents to meet the code requirements including:

- Building envelope information
- A Manual J equipment design in accordance with the IRC section M1401.3
- A Manual D duct design in accordance with the IRC section M1601.1
Tools Prior to Submittal – Jefferson County, CO

Option #1 Prescriptive Path

The Prescriptive Path requirements for the building envelope are found in Chapter 11 of the 2009 IRC. Unincorporated Jefferson County is located in Climate Zone 5, as shown in Figure & Table N1102.1. All prescriptive information shall be taken from the various tables using Zone 5 requirements.

The Prescriptive Building Envelope submittal shall include, at the minimum, the following information on the submitted plans:

- Address of the building (this is a site specific submittal)
- Define/Delineate your Building Thermal Envelope (this information is required to be on the plans rather than a separate document)
- Insulation materials; R values denoted for each individual area (wall, ceiling, floor over garage, etc.)
- Crawl space insulation for structural floors and other crawl space areas. (Specify whether the foundation wall or the structural floor system is to be insulated. See requirements of section N1102.2.9)
- Fenestration U factors 402.3
- Duct sealing and insulation. 403.2
- Manual J, specific to the site
- Manual D duct design, specific to the building
- Lighting equipment 404.1
- Specific insulation 402.2
Tools Prior to Submittal

All projects should include:

- Air sealing details to limit air infiltration
- Air barrier and insulation notes (air barriers at *all* installed insulation)
- Duct sealing notes, note that no stud cavity shall be used as a ducts, and possibly duct insulation notes
- Mechanical equipment details (type, efficiency, venting, location, etc.)
Tools Prior to Submittal

Example Building Sections

Foundation/floor connection

Wall/roof connection

http://www.greenbuildingadvisor.com
Tools Prior to Submittal – Prescriptive (R-Value)

Prescriptive Pathway
- Mandatory notes
- Wall Sections specifying insulation
- Insulation schedule
- High-efficacy lighting

### Efficiency Schedule

<table>
<thead>
<tr>
<th>Energy Details - Climate Zone 4</th>
<th>2012 IECC Compliance - Prescriptive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement Walls</td>
<td>2x4 with R-13 cav. (FB)</td>
</tr>
<tr>
<td>Above Grade Walls</td>
<td>2x6 with R-20 cav (BC)</td>
</tr>
<tr>
<td>Floor Over Garage</td>
<td>11.875&quot; TJ with R-43 cav (BC)</td>
</tr>
<tr>
<td>Ceiling - Attic</td>
<td>R-50 (BC)</td>
</tr>
<tr>
<td>Windows</td>
<td>All U-Factors equal or below 0.30</td>
</tr>
<tr>
<td>Lighting</td>
<td>75% or more to be CFL</td>
</tr>
</tbody>
</table>

FB - Fiberglass Batt (R-3.7/inch)
BC - Blown Cellulose (R-3.66/inch)
Tools Prior to Submittal – Prescriptive (U-Factor)

U-Factor Pathway
- Mandatory notes
- Wall Sections specifying insulation
- Insulation schedule
- High-efficacy lighting

### Efficiency Schedule

<table>
<thead>
<tr>
<th>Energy Details - Climate Zone 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012 IECC Compliance - Prescriptive/U-Factor</td>
</tr>
<tr>
<td>Basement Walls</td>
</tr>
<tr>
<td>Above Grade Walls</td>
</tr>
<tr>
<td>Floor Over Garage</td>
</tr>
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<td>Ceiling - Attic</td>
</tr>
<tr>
<td>Windows</td>
</tr>
<tr>
<td>Lighting</td>
</tr>
</tbody>
</table>

FB - Fiberglass Batt (R-3.7/inch)
BC - Blown Cellulose (R-3.66/inch)
PI - Polyisocyanurate Rigid Foam (R-6.5/inch)
Tools Prior to Submittal – Prescriptive (U-Factor)

Could use REScheck as a template also

- Automatically calculates the U-Factor of an assembly
Tools Prior to Submittal – UA Alternative

Vaulted Ceiling
U-Factor – 0.026
Eq. to R-49 cav

ABG Walls
U-Factor – 0.057
Eq. to R-20 cav

Basement Walls
U-Factor – 0.059
Eq. to R-13 cav

Max UA

Design UA

Vaulted Ceiling
2x12 w/ R-49 cav

AGW Walls
2x6 w/ R-21 cav

Basement Walls
2x4 w/ R-13 cav

Max UA

423

Your UA

410
REScheck is to have 2012 capability sometime in February. REMRate or REMDesign already has capability.
Tools Prior to Submittal – UA Alternative

[Software Interface Image]

- Compliance Method: UA Trade-Off
- Location: Missouri, Jefferson City
- Project Type: New Construction
- Building Characteristics: 1- and 2-Family, Detached
- Conditioned Floor Area: 3508 ft²
- All ducts and air handlers located within conditioned spaces

This information will appear on the compliance certificate.

Title/Site/Permit
Jefferson City Home
1234 ABC Lane
Jefferson City, MO 65101

Owner/Agent

Designer/Contractor

Notes
Tools Prior to Submittal – UA Alternative

<table>
<thead>
<tr>
<th>Component</th>
<th>Assembly</th>
<th>Gross Area</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>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>1 Ceiling 1</td>
<td>Cathedral Ceiling</td>
<td>779 ft²</td>
<td>30.0</td>
<td>5.0</td>
<td>0.029</td>
<td>23</td>
<td></td>
<td></td>
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<tr>
<td>2 Ceiling 2</td>
<td>Flat Ceiling or Scissor Truss</td>
<td>385 ft²</td>
<td>25.0</td>
<td>13.0</td>
<td>0.026</td>
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<tr>
<td>3 Wall 1</td>
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<td>2571 ft²</td>
<td>20.0</td>
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<td>124</td>
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<tr>
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<td>271 ft²</td>
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<td></td>
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<td>81</td>
<td>0.40</td>
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<tr>
<td>5 Window 2</td>
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<td>146 ft²</td>
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<td>0.6</td>
<td>88</td>
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<tr>
<td>6 Door 1</td>
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<td>27</td>
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<td>0</td>
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<tr>
<td>8 Window 3</td>
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<td></td>
<td>0.3</td>
<td>14</td>
<td>0.40</td>
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<tr>
<td>9 Basement Wall 1</td>
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<td>573 ft²</td>
<td>13.0</td>
<td>0.0</td>
<td>0.075</td>
<td>43</td>
<td></td>
<td>7.0</td>
</tr>
</tbody>
</table>
Tools Prior to Submittal – UA Alternative

CONDITIONED SPACE. An area or room within a building being heated or cooled, containing uninsulated ducts, or with a fixed opening directly into an adjacent conditioned space.
Tools Prior to Submittal – UA Alternative

[Image of REScheck software interface showing compliance with UA Trade-Off method, where Max. UA is 423 and Your UA is 410, resulting in 3.1% better than code.]
Tools Prior to Submittal – UA Alternative

<table>
<thead>
<tr>
<th>Component</th>
<th>Assembly</th>
<th>Gross Area</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>Ceiling 1</td>
<td>Cathedral Ceiling</td>
<td>779 ft²</td>
<td>30.0</td>
<td>5.0</td>
<td>0.029</td>
<td>23</td>
<td></td>
<td></td>
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<tr>
<td>Ceiling 2</td>
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<td>365 ft²</td>
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<tr>
<td>Wall 1</td>
<td>Wood Frame, 16” o.c.</td>
<td>2571 ft²</td>
<td>20.0</td>
<td>0.0</td>
<td>0.059</td>
<td>124</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Window 1</td>
<td>Wood Frame:Double Pan...</td>
<td>271 ft²</td>
<td>0.3</td>
<td>0.0</td>
<td>0.3</td>
<td>31</td>
<td>0.40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Window 2</td>
<td>Wood Frame:Double Pan...</td>
<td>146 ft²</td>
<td>0.6</td>
<td>0.0</td>
<td>0.6</td>
<td>80</td>
<td>0.50</td>
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<td></td>
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<tr>
<td>Door 1</td>
<td>Solid</td>
<td>54 ft²</td>
<td>0.5</td>
<td>0.0</td>
<td>0.5</td>
<td>27</td>
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</tr>
<tr>
<td>Wall 2</td>
<td>Wood Frame, 16” o.c.</td>
<td>50 ft²</td>
<td>0.0</td>
<td>0.0</td>
<td>0.238</td>
<td>0</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Window 3</td>
<td>Wood Frame:Double Pan...</td>
<td>48 ft²</td>
<td>0.3</td>
<td>0.0</td>
<td>0.3</td>
<td>14</td>
<td>0.40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basement Wall 1</td>
<td>Solid Concrete or Masonry</td>
<td>573 ft²</td>
<td>13.0</td>
<td>0.0</td>
<td>0.075</td>
<td>43</td>
<td></td>
<td>7.0</td>
<td>3.5</td>
<td>7.0</td>
</tr>
</tbody>
</table>
Tools Prior to Submittal – UA Alternative

Compliance with the 2009 IECC can be demonstrated using the Total UA (Transfer-OFF) Alternative or the Performance Alternative. The UA Alternative is currently selected. The compliance method can be changed in the Options menu.

The UA Alternative does not consider mechanical systems so mechanical inputs are not available. Under the Performance Alternative, mechanical systems can be specified and may impact the results, however no trade-off credits for high efficiency mechanical equipment are allowed.

Press F1 for more information.
Tools Prior to Submittal – UA Alternative
Tools Prior to Submittal – UA Alternative

<table>
<thead>
<tr>
<th>Component</th>
<th>Post Alteration Assembly</th>
<th>Alteration Details</th>
<th>Gross Area</th>
<th>Cavity Insulation R-Value</th>
<th>Continuous Insulation R-Value</th>
<th>Proposed U-Factor</th>
<th>UA</th>
<th>Wall Height (ft)</th>
<th>Depth Below Grade (ft)</th>
<th>Depth of Insulation (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling 1</td>
<td>Cathedral Ceiling</td>
<td>No exemptions apply</td>
<td>779 R2</td>
<td>30.0</td>
<td>5.0</td>
<td>0.029</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ceiling 2</td>
<td>Flat Ceiling or Scissor Truss</td>
<td>No exemptions apply</td>
<td>395 R2</td>
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<td>13.0</td>
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<tr>
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<td>Wood Frame, 16” o.c.</td>
<td>No exemptions apply</td>
<td>2571 R2</td>
<td>20.0</td>
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<td>0.059</td>
<td>124</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Window 1</td>
<td>Wood Frame:Double Pan...</td>
<td>No exemptions apply</td>
<td>271 R2</td>
<td></td>
<td></td>
<td>0.3</td>
<td>81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Window 2</td>
<td>Wood Frame:Double Pan...</td>
<td>No exemptions apply</td>
<td>146 R2</td>
<td></td>
<td></td>
<td>0.6</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door 1</td>
<td>Solid</td>
<td>No exemptions available</td>
<td>54 R2</td>
<td></td>
<td></td>
<td>0.5</td>
<td>27</td>
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<tr>
<td>Wall 2</td>
<td>Wood Frame, 16” o.c.</td>
<td>No exemptions apply</td>
<td>50 R2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.238</td>
<td>0</td>
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<tr>
<td>Window 3</td>
<td>Wood Frame:Double Pan...</td>
<td>No exemptions apply</td>
<td>48 R2</td>
<td></td>
<td></td>
<td>0.3</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basement Wall 1</td>
<td>Solid Concrete or Masonry</td>
<td>No exemptions apply</td>
<td>573 R2</td>
<td>13.0</td>
<td>0.0</td>
<td>0.075</td>
<td>43</td>
<td>7.0</td>
<td>3.5</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Compliance | Passes | Max. UA | 423 | Your UA | 410 | % Better Than Code | 3.1 |
Tools Prior to Submittal – UA Alternative
Tools Prior to Submittal – UA Alternative

---

**REScheck Software Version 4.4.2**

**Compliance Certificate**

**Project Title:** Jefferson City Home

**Energy Code:** 2009 IECC

**Location:** Jefferson City, Missouri

**Construction Type:** Single Family

**Glazing Area Percentage:** 16%

**Heating Degree Days:** 6300

**Climate Zone:** 4

**Construction Site:**

1234 ABC Lane

Jefferson City, MO 65101

**Owner/Agent:**

**Design/Contractor:**

---

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

**Minimum UA:** 423

**Your UA:** 419

---

### Compliance Statement

The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed building has been designed to meet the 2009 IECC requirements in REScheck Version 4.4.2 and to comply with the mandatory requirements listed in the REScheck Inspection Checklist.
Tools Prior to Submittal – UA Alternative
Tools Prior to Submittal – UA Alternative

<table>
<thead>
<tr>
<th>Insulation Rating</th>
<th>R-Value</th>
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</thead>
<tbody>
<tr>
<td>Ceiling / Roof</td>
<td>35.00</td>
</tr>
<tr>
<td>Wall</td>
<td>20.00</td>
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<tr>
<td>Floor / Foundation</td>
<td>13.00</td>
</tr>
<tr>
<td>Ductwork (unconditioned spaces):</td>
<td>_______</td>
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</table>

<table>
<thead>
<tr>
<th>Glass &amp; Door Rating</th>
<th>U-Factor</th>
<th>SHGC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window</td>
<td>0.30</td>
<td>0.40</td>
</tr>
<tr>
<td>Door</td>
<td>0.50</td>
<td>NA</td>
</tr>
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</table>

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

Name: ___________________________ Date: __________

Comments:
Tools Prior to Submittal – Simulated Performance

- REScheck
- REM/Design or REM/Rate
Tools Prior to Submittal – Simulated Performance
Tools Prior to Submittal – Simulated Performance

<table>
<thead>
<tr>
<th>Building</th>
<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>
<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>Ceiling</td>
<td>Ceiling 1</td>
<td>Cathedral Ceiling</td>
<td>Left Side</td>
<td>779 ft²</td>
<td>3.0</td>
<td>0.030</td>
<td>23</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ceiling 2</td>
<td>Ceiling 2</td>
<td>Flat Ceiling and Slant Truss</td>
<td>Left Side</td>
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<td>Wall 1</td>
<td>Wood Frame, 10' x 10'</td>
<td>Left Side</td>
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<td>Window 3</td>
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<td>Window 1</td>
<td>Wood Frame, Double Pane</td>
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<td>Door 1</td>
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<td>0.30</td>
<td>4</td>
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<tr>
<td>Wall 1</td>
<td>Wall 1</td>
<td>Wood Frame, 10' x 10'</td>
<td>Left Side</td>
<td>106 ft²</td>
<td>2.0</td>
<td>0.019</td>
<td>18</td>
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<tr>
<td>Door 1</td>
<td>Door 1</td>
<td>Solid</td>
<td>Left Side</td>
<td>20 ft²</td>
<td>0.3</td>
<td>0.30</td>
<td>4</td>
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</tbody>
</table>

Check Compliance

Overall Compliance Percentage: **100%**
Tools Prior to Submittal – Simulated Performance
Tools Prior to Submittal – Simulated Performance

REScheck Software Version 4.4.2
Compliance Certificate

Project Title: Jefferson City Home

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Gross Area or Perimeter</th>
<th>Cavity R-Value</th>
<th>Cont. R-Value</th>
<th>Glazing or Door U-Factor</th>
<th>UA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling 1: Cathedral Ceiling</td>
<td>779</td>
<td>30.0</td>
<td>5.0</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Ceiling 2: Flat Ceiling or Scissor Truss</td>
<td>385</td>
<td>25.0</td>
<td>13.0</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Compliance Passes using performance alternative
Compliance: 5.4% Better Than Code
Tools Prior to Submittal – Simulated Performance

- REScheck [405.6.1] minimum capabilities of the software
- REM/Design or REM/Rate

BEST PRACTICE: HERS rating - standard for:
- ENERGY STAR
- LEED
- Tax rebates
Tools Prior to Submittal – Simulated Performance
Tools Prior to Submittal – Simulated Performance
# Tools Prior to Submittal – Simulated Performance

## 2009 IECC Annual Energy Cost Compliance

<table>
<thead>
<tr>
<th>Building Name:</th>
<th>Jefferson City Home</th>
<th>Date:</th>
<th>November 18, 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner’s Name:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property</td>
<td>1234 ABC Lane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td>Jefferson City, MO 65101</td>
<td></td>
<td>Missouri_Home_REM.blg</td>
</tr>
<tr>
<td>Builder’s Name:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weather Site:</td>
<td>Columbia, MO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>File Name:</td>
<td>Missouri_Home_REM.blg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Annual Energy Cost ($)

<table>
<thead>
<tr>
<th></th>
<th>2009 IECC</th>
<th>As Designed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td>583</td>
<td>483</td>
</tr>
<tr>
<td>Cooling</td>
<td>239</td>
<td>208</td>
</tr>
<tr>
<td>Water Heating</td>
<td>95</td>
<td>70</td>
</tr>
<tr>
<td><strong>SubTotal - Used to Determine Compliance:</strong></td>
<td><strong>917</strong></td>
<td><strong>770</strong></td>
</tr>
<tr>
<td>Lights &amp; Appliances</td>
<td>751</td>
<td>751</td>
</tr>
<tr>
<td>Photovoltaics</td>
<td>-0</td>
<td>-0</td>
</tr>
<tr>
<td>Service Charge</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>1798</strong></td>
<td><strong>1641</strong></td>
</tr>
</tbody>
</table>

### Window U-Factor Check (Section 402.6)
- Window U-Factor (Design must be equal or lower): 0.460 / 0.330
  - **PASSES**

### Home Infiltration (Section 402.4.2): **PASSES**

### Duct Leakage (Section 403.2.2): **PASSES**

This home **MEETS** the annual energy cost requirements and verifications of Section 405 of the 2009 International Energy Conservation Code based on a climate zone of 4A. In fact, this home surpasses the requirements by 16.0%.
Topic 2 Objectives

• Review examples of tools to enhance compliance with the code prior to submittal
• Review the plans review process
• Review the inspections required
Plans Review

Phoenix, AZ has an 10 page review and on the last page is a requirement for the home to meet the energy code – it could be more helpful

**ENERGY CODE COMPLIANCE:**

1) IRC Chapter 11 or
2) IECC (Prescriptive or Performance).
   a) Prescriptive IECC 401, 402, and 403
   b) Performance based IECC 404
Plans Review

Checklist:

• Defined pathway of compliance
• Mandatory notes included on the plans
• Compliance is accurate/no inconsistencies
• Standard fiberglass batts used in 2x6 to meet wall requirements
Topic 2 Objectives

- Review examples of tools to enhance compliance with the code prior to submittal
- Review the plans review process
- Review the inspections required
Inspections

Inspection checklists

- REScheck inspection checklist
- REM/Design inspection checklist
- Georgia Residential Energy Code Inspection checklist
- Department of Energy 2009 IECC checklist:
  http://www.energycodes.gov/arra/compliance_evaluation.stm
Inspections

- Insulation
- Final
Inspections

Thermal Bypass -
“Exterior thermal envelope insulation for framed walls is not installed in substantial contact and continuous alignment with building envelope air barrier.”
Inspections

Common air barrier/insulation mistakes

Inspections

No rigid air barrier is installed behind fireplace.

http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_v2_v3_training_resources
Inspections

Insulation is misaligned with floor above.

http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_v2_v3_training_resources
Inspections

Insulation is misaligned with floor above.

Garage Ceiling

http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_v2_v3_training_resources
Inspections

Insulation has misalignment, compression, and gaps.

http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_v2_v3_training_resources
Inspections

Compression and misalignment because insulation is not split around wires.

http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_v2_v3_training_resources
Inspections

Improperly installed insulation and no rigid backing.

http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_v2_v3_training_resources
Inspections

Hole has not been air sealed.

http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_v2_v3_training_resources
R401.3 Certificate (Mandatory). A permanent certificate shall be posted on or in the electrical distribution panel... shall be completed by the builder or registered design professional... shall list the predominant $R$-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace wall and/or floor) and ducts outside conditioned spaces; $U$-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration, and the results from any required duct system and building envelope air leakage testing... shall list the types and efficiencies of heating, cooling and service water heating equipment.
Inspections

APPENDIX D
SAMPLE COMPLIANCE CERTIFICATE

Georgia Residential Energy Code Compliance Certificate*

Builder/Design Professional: ____________________________ Phone: ____________________________

Envelope Summary:
- List the R-Value for the following components:
  - Flat ceiling/roof: __________
  - Exterior wall: __________
  - Attic kneewall: __________
  - Basement stud wall: __________
  - Crawlspace stud wall: __________
  - Foundation slab: __________
  - Cantilevered Floor: __________
- Other insulation: __________

Fenestration Components:
- Window U-factor: __________
- Window SHGC: __________
- Skylight SHGC: __________
- Glazed Door U-factor: __________
- Opaque Door U-factor: __________
- (<50% glazed)

Building Envelope Tightness (BET):
BET test conducted by: ____________________________ Phone: ____________________________

Fan Flow at 50 Pascals = \( \text{CFM}_{50} \) Total Conditioned Volume = \( \text{ACH}_50 \) \( \text{ACH}_{50} \) must be less than 7 \( \text{ACH}_{50} \)

Low Rise Multifamily Visual Inspection Option
(The visual inspection option may be conducted by a third-party instead of the BET test for R-2 buildings only)
Visual inspection conducted by: ____________________________ Phone: ____________________________

Mechanical Summary:
Water Heater Energy Factor: ____________ Ef Fuel type: □ Gas □ Electric □ Other
Number of Heating and Cooling Systems: ____________
Heating System Type (choose one):
□ Gas: ____________ AFUE □ Air-Source Heat Pump: ____________ HSPF
□ Other: ____________ Efficiency: ____________
Cooling System Type (Standard DX, Heat Pump, Geothermal, etc.): ____________
Cooling System Efficiency: ____________
Heating/Cooling Load Calculations Performed by: ____________________________ Phone: ____________________________
Total Heating Load (based on ACCA Han. or other approved methodology): ____________ Btu/h
Total Cooling Load (based on ACCA Han. or other approved methodology): ____________ Btu/h
Cooling Sensible Load: ____________ Btu/h Cooling Latent Load: ____________ Btu/h
Total Air Handler CFM (based on design calculations): ____________ CFM
Duct Tightness Test Conducted by: ____________________________ Phone: ____________________________
CFM\(_{25}\) per 100 ft\(^2\) of conditioned floor area = CFM\(_{25}\) x 100 / Conditioned floor area served
If all ducts are not located within conditioned space, builder must verify that either the postconstruction duct leakage to outdoors (PCO) in ≤ 8 cfm/100 ft\(^2\), the post construction total duct leakage (PCT) is ≤ 13 cfm/100 ft\(^2\), or the rough-in test (RIT) with air handler installed is ≤ 6 cfm/100 ft\(^2\).
State which method was used to conduct the duct tightness test:
duct blower (DB), modified blower door subtraction method (MBDS), or automated multizone blower door (AMBD)

<table>
<thead>
<tr>
<th>System</th>
<th>Method (DB, MBDS, AMBD)</th>
<th>Test (PCO, PCT, RIT)</th>
<th>CFM(_{25})</th>
<th>Area served (ft(^2))</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: This permanent certificate shall be posted on or on the electrical distribution panel. Certificate shall be completed by the builder or registered design professional. Where there is more than one value for each component, certificate shall list the value covering the largest area.
Topic 2 Summary

- Tools prior to submittal
  - Determination worksheet
  - Compliance forms
  - Permit submittal checklists
  - Certificates
- Tools for plan review and inspection
  - Plans review checklist
  - Inspection checklist
Next Steps

Adoption of the IECC

• How are current practices different?
• Obstacles to implementing the code?
• Solutions?
Thank You – comment card

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