Measuring State Energy Code Compliance

April 2011
Measuring State Energy Code Compliance

• 74 pages

• Contents
  – Code Adoption and Equivalency
  – Annual Measurement
  – Planning for Compliance Evaluation
  – Onsite Compliance Evaluation Processes
  – Evaluation Checklists

• [Link](http://www.energycodes.gov/arra/compliance_evaluation.stm)
• Evaluate a statistically valid sample of 44± buildings in the state in each of the following 4 populations:
  – New residential
  – New commercial
  – Residential renovations
  – Commercial renovations
Generating Samples

• Estimates future construction based on 1-3 years of recent data
  – RS Means FW Dodge building starts data
  – Census permitting information
• Commercial renovation data available for sample generation
• Residential renovation data not available – use new residential sample for both
• Samples distributed by county – states allocate county samples to jurisdictions
New Commercial Buildings

Extra samples may be required for X-Large and XX-Large buildings.
Compliance Evaluation Procedures
Generating Individual Building Metrics

Evaluated buildings are each assigned a compliance rating of 0–100% based on the proportion of code requirements that each has met, and the evaluated buildings’ scores within a state are averaged to derive an overall compliance metric with an associated confidence.
Using the Evaluation Checklists

Commercial Building Data Collection Checklist

Building ID: ____________________ Climate Zone: _________________________________
Date: ____________________ Name of Evaluator(s): ______________________________
Building Contact: Name: ____________________ Phone: ____________________ Email: ________________________________
Building Name & Address: ____________________ Conditioned Floor Area: ___________ ft²
State: ____________________ County: ____________________ Jurisdiction: ____________________
Compliance Approach (check all that apply): [ ] Prescriptive [ ] Trade-Off [ ] Performance
Compliance Software Used: ____________________ Green Building/Above-Code Program? [ ] Yes [ ] No
Building Use: [ ] Office [ ] Retail/Merchantile [ ] Warehouse/Storage [ ] Education/School [ ] Lodging/Hotel/Motel
[ ] Restaurant/Dining/Fast Food [ ] Public Assembly/Religious [ ] Healthcare [ ] High-Rise Residential [ ] Other
Building Ownership: [ ] State-owned [ ] Locally-owned [ ] National account [ ] Speculative [ ] Other
Project Type: [ ] New Building [ ] Existing Building Addition [ ] Existing Building Renovation
Valuation (if Renovation): $ __________________________

<table>
<thead>
<tr>
<th>2009 IECC Section #</th>
<th>Plan Review</th>
<th>Complies</th>
<th>Comments/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>103.2 [P91]</td>
<td>Plans and specifications provide all information with which compliance can be determined for the building envelope and delineate and document where exceptions to the standard are claimed.</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>103.2 [P92]</td>
<td>Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and delineate and document where exceptions to the standard are claimed.</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>103.2 [P93]</td>
<td>Plans, specifications, and/or calculations provide all information with which compliance can be determined for the service water heating systems and equipment and delineate and document where exceptions to the standard are claimed.</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>103.2 [P94]</td>
<td>Plans, specifications, and/or calculations provide all information with which compliance can be determined for the lighting and electrical systems and equipment and delineate and document where exceptions to the standard are claimed. Information provided should include interior and exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
</tbody>
</table>
Using the Evaluation Checklists

### Commercial Checklist Data Gathering Stages

- **Plan Review**
- **Footing and Foundation**
- **Framing/Rough-In**
- **Plumbing Rough-In**
- **Mechanical Rough-In**
- **Rough-In Electrical**
- **Insulation**
- **Final**

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**Commercial Building Data Collection Checklist**

<table>
<thead>
<tr>
<th>2009 IECC Section #</th>
<th>Plan Review</th>
<th>Complies</th>
<th>N/A</th>
<th>Comments/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>103.2 P.3.a</td>
<td>Plans and/or specifications provide all information on which compliance can be determined for the building envelope and delineate and document where exceptions to the standard are claimed.</td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>103.2 P.3.a</td>
<td>Plans, specifications, and/or calculations for information with which compliance can be determined for the mechanical systems and equipment and delineate and document where exceptions to the standard are claimed.</td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>103.2 P.3.a</td>
<td>Plans, specifications, and/or calculations for information with which compliance can be determined for the service water heating systems and delineate and document where exceptions to the standard are claimed.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Analyze the Data

Score + Store

Score and Store is an application for gathering compliance checklists from states in an effort to gauge the 90% compliance effort.

Log in below to complete checklists for your state. If you don’t have an account, you should contact linda.connell@aml.gov.
Analyze the Data

### Framing / Rough-In Inspection

For Building: 123-XT-3T, 123 Main St.
Evaluated by Kyle Mon on 01/29/2011

#### Code Values

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Verified Value</th>
<th>Complies</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>S02.1.1</td>
<td>Fenestration meets maximum air leakage requirements.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S02.1.2</td>
<td>Doors meet maximum air leakage requirements.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S02.1.4</td>
<td>Fenestration and doors labeled for air leakage.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S02.4.3</td>
<td>Vestibules installed per approved plans.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S02.2.2</td>
<td>Roof insulation R-value.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S02.3.1</td>
<td>Roof insulation R-value installed per manufacturer’s instructions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S02.3.2</td>
<td>Performance compliance approach submitted for vertical fenestration area &gt;4% or skylight area &gt;3%.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S02.3.3</td>
<td>Vertical fenestration U-Factor.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S02.3.4</td>
<td>Skylight fenestration U-Factor.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S02.3.5</td>
<td>Vertical fenestration SHGC value.</td>
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</tr>
<tr>
<td>S02.3.6</td>
<td>Skylight SHGC value.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>S02.3.7</td>
<td>Fenestration products meet in accordance with</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Analyze the Data

### My Checklists

Showing 2 checklists.

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>JURISDICTION</th>
<th>BUILDING CLASS</th>
<th>EVALUATORS</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>King</td>
<td>Hunts Point Town</td>
<td>Commercial</td>
<td>Kate Mon</td>
<td>100.0%</td>
</tr>
<tr>
<td>Walla Walla</td>
<td>Walla Walla</td>
<td>Residential</td>
<td>Gary Mod</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Contact: [Technical Support](#) [Security & Privacy](#)
Analyze the Data

Store + Score
Sample
Results

**Checklist Metrics**

**Code Requirements with Highest Compliance Rate (Top 3)**
- PR6 - [6.4.1.1] Feeder connectors sized in accordance with approved plans.
- PR7 - [6.4.1.2] Branch circuits sized for maximum drop of 3%.
- ME8 - [6.4.4.1.2] HVAC ducts and plenums insulated.

**Code Requirements with Lowest Compliance Rate (Top 3)**
- PR1 - [4.2.2] Plans and/or specifications provide all information with which compliance can be determined for the building envelope and delineate and document where exceptions to the standard are claimed.
- FR3 - [5.4.3.2] Fenestration and doors labeled for air leakage.
- FR2 - [5.4.3.2] Doors meet maximum air leakage requirements.

**Code Requirements Most Frequently Not Observed (Top 3)**
- FR14 - [5.8.2.3,5.5.3.8] U-factor of opaque doors associated with the building thermal envelope meets requirements.
- FR12 - [5.8.2.1] Fenestration products rated in accordance with NFRC.
- FR13 - [5.8.2.2] Fenestration products are certified as to performance labels or certificates provided.

**Compliance Approach Breakdown**

- Trade-Off (9%)
- Performance (5%)
- Prescriptive (86%)
Contact Us

BECP Website:  
www.energycodes.gov

BECP Solutions & Help Center:  
www.energycodes.gov/help/