Recommended Amendments to the 2015 International Energy Conservation Code (IECC)

The 2015 International Code Council (ICC) model building codes were completed in June 2014 and are now available for adoption at the state and local level. For the first time, the National Multifamily Housing Council (NMHC), National Apartment Association (NAA), Building Owners and Managers Association (BOMA) and National Association of Home Builders (NAHB) generally recommend the ICC codes be adopted without amendments, with two exceptions. The first is the International Green Construction Code (IgCC) which has not been published. The second is the International Energy Conservation Code (IECC), which we suggest be amended in some key areas. This document provides the suggested amendments developers and builders should make when the IECC is adopted at the local level.
This Backgrounder This document outlines the key changes between the 2012 and 2015 International Energy Conservation Code (IECC). It also documents the changes that NMHC/NAA, NAHB and BOMA recommend be made when the IECC is adopted by local jurisdictions. We identify five specific amendments.

Specifically, we recommend that the R-value and U-factor tables from the Commercial and Residential portions of the 2015 IECC be replaced by the 2009 IECC versions of those tables. The R-value and U-factor tables in the 2012 IECC were based on an analysis completed when ASHRAE 90.1 was updated that was later shown to not be cost-effective. This resulted in higher R-values and lower U-factors being incorporated into the 2012 IECC. The 2015 IECC uses the same flawed tables as the 2012 IECC that, based on the revised analysis by ASHRAE, are not cost-effective. Therefore, when local jurisdictions are adopting the 2015 IECC, developers and builders should advocate that the 2015 tables below be replaced with the earlier 2009 versions. The 2009 IECC tables are considered cost-effective based on calculations supporting the values when they were incorporated into the code.

We also propose a change to allow apartments construction under the residential portion (three stories or less in height) to use the air-barrier requirements contained in the commercial portion of the code. The 2015 IECC requires apartments conduct the blower-door, air-barrier testing that is standard in one- and two-family dwellings. No such standard procedure exists for multifamily construction. Our proposed change does not eliminate the requirement for an air-barrier, it simply cross references to the commercial provisions which require the air-barrier, but set the testing requirement as an option.
<table>
<thead>
<tr>
<th>Section(s) &amp; Issue(s)</th>
<th>Type of Change</th>
<th>Cost Implication</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>IECC Tables C402.1.3, C402.1.4, R402.1.2 and R402.1.4 – R-values and U-values</td>
<td>Delete these Tables in the 2015 IECC and replace with the corresponding Tables from the 2009 IECC which are considered to be cost effective. (See Proposed Local Amendments #1 - #4 on pages 2-5.)</td>
<td>Savings if locally amended as shown below.</td>
<td>The R-value and corresponding U-value tables for the commercial and residential requirements have not been changed and are the same as those in the 2012 versions of the IECC which are not cost effective.</td>
</tr>
<tr>
<td>IECC R402.4.1.2 – Thermal Envelope Air Barrier Testing</td>
<td>Section R402.4.1.2 should be revised to allow air barrier compliance with Section C402.5 from the commercial section which requires an air barrier but allows pressure testing as an option. There is no test procedure for blower door testing of R-2 occupancies (See Proposed Local Amendment #5 on page 5 adding an Exception to Section R402.1.2.)</td>
<td>Savings if locally amended as shown below.</td>
<td>2015 IECC Section R402.4.1.2 requires that the air barrier be pressure tested in accordance with a test method for one- and two-family dwellings that is not appropriate for R-2 occupancies.</td>
</tr>
</tbody>
</table>
Proposed Local Amendment #1:
Replace 2015 IECC R-value Table C402.1.3 with this 2009 IECC R-value Table 502.2(1) and renumber it Table C402.1.3.

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 EXCEPT MARINE</th>
<th>5 AND MARINE 4</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation entirely above deck</td>
<td>R-15CI</td>
<td>R-20CI</td>
<td>R-20CI</td>
<td>R-20CI</td>
<td>R-20CI</td>
<td>R-20CI</td>
<td>R-20CI</td>
<td>R-20CI</td>
</tr>
</tbody>
</table>

**Table 502.2(1)**

**BUILDING ENVELOPE REQUIREMENTS–OPAQUE ASSEMBLIES**

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 EXCEPT MARINE</th>
<th>5 AND MARINE 4</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal buildinga</td>
<td>R-16</td>
<td>R-16</td>
<td>R-16</td>
<td>R-16</td>
<td>R-16</td>
<td>R-16</td>
<td>R-16</td>
<td>R-16</td>
</tr>
<tr>
<td>Below grade walla</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
</tr>
</tbody>
</table>
a. When using R-value compliance method, a thermal spacer block is required; otherwise, use the U-factor compliance method.

b. Assembly descriptions can be found in ANSI/ASHRAE/IESA Appendix A.

c. R-5.7 is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with material having a maximum thermal conductivity of 0.44 Btu-in/h·f°F.

d. When heated slabs are placed below grade, below-grade walls must meet the exterior insulation requirements for perimeter insulation according to the heated-slab-on-grade construction.

e. Steel floor joist systems shall be R-38.
Proposed Local Amendment #2
Replace 2015 IECC U-value Table C402.1.4 with this 2009 IECC U-value Table 502.1.2 and renumber it Table C402.1.4

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 EXCEPT MARINE</th>
<th>5 AND MARINE</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All other</td>
<td>Group R</td>
<td>All other</td>
<td>Group R</td>
<td>All other</td>
<td>Group R</td>
<td>All other</td>
<td>Group R</td>
</tr>
<tr>
<td>Insulation entirely above deck</td>
<td>U-0.063</td>
<td>U-0.048</td>
<td>U-0.048</td>
<td>U-0.048</td>
<td>U-0.048</td>
<td>U-0.048</td>
<td>U-0.048</td>
<td>U-0.048</td>
</tr>
<tr>
<td>Metal buildings</td>
<td>U-0.065</td>
<td>U-0.065</td>
<td>U-0.055</td>
<td>U-0.055</td>
<td>U-0.055</td>
<td>U-0.055</td>
<td>U-0.049</td>
<td>U-0.049</td>
</tr>
<tr>
<td>Attic and other</td>
<td>U-0.034</td>
<td>U-0.027</td>
<td>U-0.027</td>
<td>U-0.027</td>
<td>U-0.027</td>
<td>U-0.027</td>
<td>U-0.027</td>
<td>U-0.027</td>
</tr>
</tbody>
</table>

### Walls, Above Grade

<table>
<thead>
<tr>
<th></th>
<th>U-0.058</th>
<th>U-0.151</th>
<th>U-0.151</th>
<th>U-0.123</th>
<th>U-0.104</th>
<th>U-0.104</th>
<th>U-0.090</th>
<th>U-0.080</th>
<th>U-0.071</th>
<th>U-0.071</th>
<th>U-0.071</th>
<th>U-0.052</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal building</td>
<td>U-0.093</td>
<td>U-0.093</td>
<td>U-0.093</td>
<td>U-0.084</td>
<td>U-0.084</td>
<td>U-0.084</td>
<td>U-0.069</td>
<td>U-0.069</td>
<td>U-0.057</td>
<td>U-0.057</td>
<td>U-0.057</td>
<td>U-0.057</td>
</tr>
<tr>
<td>Metal framed</td>
<td>U-0.124</td>
<td>U-0.024</td>
<td>U-0.024</td>
<td>U-0.064</td>
<td>U-0.064</td>
<td>U-0.064</td>
<td>U-0.064</td>
<td>U-0.064</td>
<td>U-0.064</td>
<td>U-0.064</td>
<td>U-0.064</td>
<td>U-0.037</td>
</tr>
<tr>
<td>Wood framed and other</td>
<td>U-0.089</td>
<td>U-0.089</td>
<td>U-0.089</td>
<td>U-0.089</td>
<td>U-0.089</td>
<td>U-0.064</td>
<td>U-0.051</td>
<td>U-0.051</td>
<td>U-0.051</td>
<td>U-0.051</td>
<td>U-0.036</td>
<td>U-0.036</td>
</tr>
</tbody>
</table>
When heated slabs are placed below grade, below-grade walls must meet the F-factor requirements for perimeter insulation according to the heated slab-on-grade construction.

### Table 502.1.2 (Continued)

**BUILDING ENVELOPE REQUIREMENTS-OPAQUE ELEMENT, MAXIMUM U-FACTORS**

<table>
<thead>
<tr>
<th>All other</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 EXCEPT MARINE</th>
<th>5 AND MARINE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group R</td>
<td>All other</td>
<td>Group R</td>
<td>All other</td>
<td>Group R</td>
</tr>
<tr>
<td>Walls, Below Grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below grade wall&lt;sup&gt;a&lt;/sup&gt;</td>
<td>C-1.140</td>
<td>C-1.140</td>
<td>C-1.140</td>
<td>C-1.140</td>
<td>C-1.140</td>
</tr>
<tr>
<td>Floors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>U-0.322</td>
<td>U-0.322</td>
<td>U-0.107</td>
<td>U-0.087</td>
<td>U-0.107</td>
</tr>
<tr>
<td>Joist/Framing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slab-on-Grade Floors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unheated slabs</td>
<td>F-0.730</td>
<td>F-0.730</td>
<td>F-0.730</td>
<td>F-0.730</td>
<td>F-0.730</td>
</tr>
<tr>
<td>Heated slabs</td>
<td>F-1.020</td>
<td>F-1.020</td>
<td>F-1.020</td>
<td>F-1.020</td>
<td>F-0.900</td>
</tr>
</tbody>
</table>

<sup>a</sup> When heated slabs are placed below grade, below-grade walls must meet the F-factor requirements for perimeter insulation according to the heated slab-on-grade construction.
**Proposed Local Amendment #3:**
Replace 2015 IECC R-value Table R402.1.2 with this 2009 IECC R-value Table 402.1.1 in the residential section of the 2015 IECC and renumber it Table R402.1.2.

### TABLE 402.1.1
**INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT**

<table>
<thead>
<tr>
<th>CLIMATE ZONE</th>
<th>FENESTRATION U-FACTOR</th>
<th>SKY-LIGHT U-FACTOR</th>
<th>GLAZED FENESTRATION SHGC</th>
<th>CEILING R-VALUE</th>
<th>WOODFRAME WALL R-VALUE</th>
<th>MASS WALL R-VALUE</th>
<th>FLOOR R-VALUE</th>
<th>BASEMENT WALL R-VALUE</th>
<th>SLAB R-VALUE &amp; DEPTH</th>
<th>CRAWL SPACE WALL R-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.20</td>
<td>0.75</td>
<td>0.30</td>
<td>30</td>
<td>13</td>
<td>3 / 4</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0.65j</td>
<td>0.75</td>
<td>0.30</td>
<td>30</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>0.50j</td>
<td>0.60</td>
<td>0.30</td>
<td>30</td>
<td>13</td>
<td>5 / 8</td>
<td>19</td>
<td>5/13f</td>
<td>0</td>
<td>5/13</td>
</tr>
<tr>
<td>4 except Marine</td>
<td>0.35</td>
<td>0.60</td>
<td>NR</td>
<td>38</td>
<td>13</td>
<td>5 / 10</td>
<td>19</td>
<td>10/13</td>
<td>10, 2ft</td>
<td>10/13</td>
</tr>
<tr>
<td>5 and Marine 4</td>
<td>0.35</td>
<td>0.60</td>
<td>NR</td>
<td>38</td>
<td>20 or 13/5h</td>
<td>13 / 17</td>
<td>30f</td>
<td>10/13</td>
<td>10, 2ft</td>
<td>10/13</td>
</tr>
<tr>
<td>6</td>
<td>0.35</td>
<td>0.60</td>
<td>NR</td>
<td>49</td>
<td>20 or 13/5h</td>
<td>15 / 19</td>
<td>30f</td>
<td>15/19</td>
<td>10, 4ft</td>
<td>10/13</td>
</tr>
<tr>
<td>7 and 8</td>
<td>0.35</td>
<td>0.60</td>
<td>NR</td>
<td>49</td>
<td>21</td>
<td>19 / 21</td>
<td>38f</td>
<td>15/19</td>
<td>10, 4ft</td>
<td>10/13</td>
</tr>
</tbody>
</table>

- **a.** R-values are minimums. U-factor and SHGC are maximums. R-19 batts compressed into a nominal 2x6 framing cavity such that the R-value is reduced by R-1 or more shall be marked with the compressed batt R-value in addition to the full thickness R-value.
- **b.** The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
- **c.** “15/19” means R-15 continuous insulated sheathing on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. “15/19” shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-13 cavity insulation at the interior of the basement wall.
- **d.** R-5 shall be added to the required slab edge R-values for heated slab. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.
- **e.** There are no SHGC requirements in Marine Zone.
- **f.** Basement wall insulation is not required in warm-humid locations.
- **g.** Or insulation sufficient to fill the framing cavity, R-19.
h. “13+5” means R-13 cavity insulation plus R-5 insulation sheathing. If structural sheathing covers 25 percent or less of the exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.

i. The second R-value applies when more than half the insulation is on the interior of the mass wall.

j. For impact rated fenestration complying with Section R-301.2.1.2 of the International Residential Code or Section 1608.1.2 of the International Building Code, the maximum U-factor shall be 0.75 in Zone 2 and 0.65 in Zone 3.

Proposed Local Amendment #4:
Replace 2015 IECC U-value Table R402.1.4 with this 2009 IECC U-value Table 402.1.3 in the residential section of the 2015 IECC and renumber it Table R402.1.4.

<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>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.20</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>
</tr>
<tr>
<td>2</td>
<td>0.75</td>
<td>0.75</td>
<td>0.035</td>
<td>0.082</td>
<td>0.165</td>
<td>0.064</td>
<td>0.360</td>
<td>0.477</td>
</tr>
<tr>
<td>3</td>
<td>0.65</td>
<td>0.65</td>
<td>0.035</td>
<td>0.082</td>
<td>0.141</td>
<td>0.047</td>
<td>0.360</td>
<td>0.136</td>
</tr>
<tr>
<td>4 except Marine</td>
<td>0.40</td>
<td>0.60</td>
<td>0.030</td>
<td>0.082</td>
<td>0.141</td>
<td>0.047</td>
<td>0.059</td>
<td>0.065</td>
</tr>
<tr>
<td>5 and Marine 4</td>
<td>0.35</td>
<td>0.60</td>
<td>0.030</td>
<td>0.057</td>
<td>0.082</td>
<td>0.033</td>
<td>0.059</td>
<td>0.065</td>
</tr>
<tr>
<td>6</td>
<td>0.35</td>
<td>0.60</td>
<td>0.026</td>
<td>0.057</td>
<td>0.060</td>
<td>0.033</td>
<td>0.050</td>
<td>0.065</td>
</tr>
<tr>
<td>7 and 8</td>
<td>0.35</td>
<td>0.60</td>
<td>0.026</td>
<td>0.057</td>
<td>0.057</td>
<td>0.033</td>
<td>0.050</td>
<td>0.065</td>
</tr>
</tbody>
</table>

a. Nonfenestration U-factor shall be obtained from measurement, calculation or an approved source.
b. When more than half the insulation is on the interior, the mass wall U-factors shall be a maximum of 0.17 in Zone 1, 0.14 in Zone 2, 0.12 in Zone 3, 0.10 in Zone 4 except Marine, and the same as the frame wall U-factor in Marine 4 and Zones 5 through 8.

Proposed Local Amendment #5:
Add the following Exception to R402.4.1.2, “Testing,” in the residential section of the 2015 IECC as follows:

Exception: R-2 Occupancies that comply with Section C402.5.