Code Amendment Proposal Form
For public amendments proposed to the 2018 editions of the International Codes

Instructions: Upload this form and all accompanying documentation at www.denvergov.org/BuildingCode. If you are submitting your proposal on a separate sheet, make sure it includes all information requested below.

All proposals must be received by April 26, 2019.

CONTACT INFORMATION

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Organization: New Buildings Institute

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Signature: [signature]

Co-proposed by: Amber Wood, Denver Department of Public Health and Environment
Jim Meyers, Southwest Energy Efficiency Project
Bill Geisheker, Lightly Treading

AMENDMENT PROPOSAL

Please use a separate form for each proposal.

1) Code(s) associated with this proposal. Please use acronym: IECC
If you submitted a separate coordination change to another code, please indicate which code: [ ]

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Code Name</th>
<th>Acronym</th>
<th>Code Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBC-xxxx</td>
<td>Denver Building Code–xxxx (code) amendments (e.g., DBC-IBC, DBC-IEBC)</td>
<td>IFGC</td>
<td>International Fuel Gas Code</td>
</tr>
<tr>
<td>IEBC</td>
<td>International Existing Building Code</td>
<td>IMC</td>
<td>International Mechanical Code</td>
</tr>
<tr>
<td>IECC</td>
<td>International Energy Conservation Code</td>
<td>IPC</td>
<td>International Plumbing Code</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IRC</td>
<td>International Residential Code</td>
</tr>
</tbody>
</table>

2) Please check here if a separate graphic file is provided: [ ]
Graphics may also be embedded within your proposal below.

3) Use this template to submit your proposal or attach a separate file, but please include all items requested below in your proposal. The only formatting needed is BOLDING, STRIKEOUT AND UNDERLINING. Please do not provide additional formatting such as tabs, columns, etc., as this will be done by CPD.

Code Sections/Tables/ Figures Proposed for Revision:
IECC - Table R402.1.2
Proposal:
Update Table R402.1.2 as follows:

**TABLE R402.1.2**

<table>
<thead>
<tr>
<th>CLIMATE ZONE</th>
<th>FENESTRATION U-FACTOR b</th>
<th>SKYLIGHT U-FACTOR</th>
<th>GLAZED FENESTRATION SHGC b, e</th>
<th>CEILING R-VALUE</th>
<th>WOOD FRAME WALL R-VALUE</th>
<th>MASS WALL R-VALUE i</th>
<th>FLOOR R-VALUE</th>
<th>BASEMENT WALL R-VALUE</th>
<th>SLAB R-VALUE &amp; DEPTH</th>
<th>CRAWL SPACE R-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NR</td>
<td>0.75</td>
<td>0.95</td>
<td>24</td>
<td>1.5</td>
<td>1.4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0.40</td>
<td>0.65</td>
<td>0.45</td>
<td>26</td>
<td>1.3</td>
<td>0.4</td>
<td>1.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0.23</td>
<td>0.44</td>
<td>0.26</td>
<td>26</td>
<td>2.0 - 3.5</td>
<td>0.44</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4 except Marine</td>
<td>0.22</td>
<td>0.55</td>
<td>0.40</td>
<td>40</td>
<td>2.0 or 3.5</td>
<td>0.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5 and Marine</td>
<td>0.20 0.27</td>
<td>0.55 0.50</td>
<td>NR 0.40</td>
<td>49</td>
<td>20 or 13+5</td>
<td>13/17</td>
<td>10</td>
<td>11</td>
<td>10.2 ft</td>
<td>10/11</td>
</tr>
<tr>
<td>6</td>
<td>0.30</td>
<td>0.55</td>
<td>NR</td>
<td>49</td>
<td>20 or 13+5</td>
<td>13/17</td>
<td>10</td>
<td>14</td>
<td>13/19</td>
<td>10/13</td>
</tr>
<tr>
<td>7 and 8</td>
<td>0.30</td>
<td>0.55</td>
<td>NR</td>
<td>49</td>
<td>20 or 13+5</td>
<td>13/17</td>
<td>10</td>
<td>14</td>
<td>13/19</td>
<td>10/13</td>
</tr>
</tbody>
</table>

NR = Not Required.

For SI: 1 foot = 304.8 mm.

a. R-values are minimums. U-factors and SHGC are maximums. Where insulation is installed in a cavity that is less than the label or design thickness of the insulation, the installed R-value of the insulation shall be not less than the R-value specified in the table.

b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

**Exception:** In Climate Zones 1 through 3, skylights shall be permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed 0.30.

c. “10/13” means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation on the interior of the basement wall.

“15/19” means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. Alternatively, compliance with “15/19” shall be R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home.

d. R-5 insulation shall be provided under the full slab area of a heated slab in addition to the required slab edge insulation R-value for slabs, as indicated in the table. The slab edge insulation for heated slabs shall not be required to extend below the slab.

e. There are no SHGC requirements in the Marine Zone.

f. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

g. Alternatively, insulation sufficient to fill the framing cavity and providing not less than an R-value of R-19.

h. The first value is cavity insulation, the second value is continuous insulation. Therefore, as an example, “13+5” means R-13 cavity insulation plus R-5 continuous insulation.

i. Mass walls shall be in accordance with Section R402.2.5. The second R-value applies where more than half of the insulation is on the interior of the mass wall.

**Supporting Information:**

**Purpose:**

The purpose of this proposal is to increase the performance of windows installed in residential construction.

**Reason:**

This proposed change to the fenestration U-factor aligns the IECC with the ENERGY STAR Version 6.0 specification. The ENERGY STAR specification for windows in climate zones 5-8 has been in place since January 1, 2016. Products that meet the ENERGY STAR standard are widely available and have been for some time. In 2016 – the first year the ENERGY STAR Version 6.0 specification was in effect for all climate zones – ENERGY STAR windows already had an 83% market share.
Replacing old windows with ENERGY STAR certified windows lowers household energy bills by an average of 12 percent nationwide. The Environmental Protection Agency performed a cost-effectiveness analysis of Version 6.0 and found it to be cost-effective. That analysis can be found here: [http://www.energystar.gov/sites/default/files/ESWDS-ReviewOfCost_EffectivenessAnalysis.pdf](http://www.energystar.gov/sites/default/files/ESWDS-ReviewOfCost_EffectivenessAnalysis.pdf)

EPA notes that manufacturers can meet the proposed specification for climate zones 5-8 using either double- or triple-pane windows. In general, EPA’s data show that double-pane windows that meet the northern climate zone specification are cost effective for consumers. Feedback that EPA has received from stakeholders confirms that new glass technologies, improvements in frame performance, and/or better spacer performance can help many product lines meet the proposed Northern Zone criteria with double-pane windows.

A similar proposal has been submitted to the IECC-2021 by the National Resource Defense Council, who is the source of information in this reason statement. The SHGC requirement was introduced into this proposal at the recommendation of Denver Stakeholders.

**Bibliography:**


**Referenced Standards:**

NA

**Impact:**

The effect of the proposal on the cost of construction: ☒ Increase ☐ Reduce ☐ No Effect

- The code change proposal may increase the cost of construction. Given the level of market penetration of ENERGY STAR products, by the time the 2021 code is adopted many builders will already be meeting the improved requirements. In some limited cases, builders may incur increased costs. EPA estimates that there is a cost of $20 per window to go from the 2009 code requirements to ENERGY STAR Version 6.0. However, the U-factor requirements in the 2018 code are already significantly more stringent than the 2009 code requirements, so we would expect the marginal cost per window to be less.

The effect of the proposal on the cost of design: ☐ Increase ☐ Reduce ☒ No Effect

Is the proposal more or less restrictive than the I-codes: ☒ More ☐ Less ☐ Same

**Departmental Impact:** (To be filled out by CPD staff)

**Note:** CITY STAFF ONLY. Discuss the impact of this proposal in this section AND indicate the impact of this amendment proposal for each of the following:

- The effect of the proposal on the cost of review: ☐ Increase ☐ Reduce ☐ No Effect
- The effect of the proposal on the cost of enforcement/inspection: ☐ Increase ☐ Reduce ☐ No Effect