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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Date: April 26, 2019

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Signature: Ron Nuttall

AMENDMENT PROPOSAL

Please use a separate form for each proposal.

1) Code(s) associated with this proposal. Please use acronym: IECC or IgCC

If you submitted a separate coordination change to another code, please indicate which code: _________________________

<table>
<thead>
<tr>
<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>
</tr>
<tr>
<td>IBC</td>
<td>International Building Code</td>
</tr>
<tr>
<td>IEBC</td>
<td>International Existing Building Code</td>
</tr>
<tr>
<td>IECC</td>
<td>International Energy Conservation 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.

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>Fenestration U-value b</th>
<th>Skylight U-Factor b</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</th>
<th>Floor R-value</th>
<th>Basement d Wall R-Value</th>
<th>Slab d R-Value &amp; depth</th>
<th>Crawl Space Wall R-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 option 1</td>
<td>0.30</td>
<td>0.55</td>
<td>NR</td>
<td>49</td>
<td>20+5 or 13 +10 b</td>
<td>15/20</td>
<td>30 b</td>
<td>15/19</td>
<td>10, 4ft</td>
<td>15/19</td>
</tr>
</tbody>
</table>

Code Sections/Tables/Figures Proposed for Revision: Table R402.1.2 of the 2018 IECC
j. Use of option 2 wood frame wall R-value requires option 2 fenestration U-factor for building thermal envelope walls.

Note: If the proposal is for a new section, indicate (new).

Proposal: This proposal provides a prescriptive wall insulation option for the vast majority of builders who insulate walls using cavity insulation of various types. It corresponds with the wood wall insulation requirements in Table R402.1.2 of the 2018 IECC for Climate Zone 6. As such, it is proposed to be used by Denver as part of any stretch code that may reference the higher requirements of Climate Zone 6.

It requires a minimum wood frame wall R-value of R23, combined with an increase in the ceiling insulation R-value from R49 to R-60, as well as a slightly more efficient window U-value of 0.28, versus the 0.30 U-value found in the 2018 IECC.

Note: Show the proposal using strikeout, underline format. At the start of each section, give one of the following instructions:
• Revise as follows:
• Add new text as follows:
• Delete and substitute as follows:
• Delete without substitution:

Supporting Information:
Reason Statement:
It is important to maintain a prescriptive wall cavity-only insulation option in the city of Denver so that all builders continue to have a wall insulation alternative to use with wood structural panel wall sheathing. The State of New York recognized this fact when they modified their adoption of the 2015 IECC to add a similar prescriptive option for their Climate Zone 6 builders. While not yet final, New York is also considering these proposed cavity-only insulation values for their update to the 2018 IECC.

It is customary practice in Denver to rely on wood structural panel wall sheathing for both performance reasons and to meet the structural requirements of the building codes. The energy code should not prescriptively require the use of continuous insulation when other options are available that provide equivalent energy performance.

As can be seen in the energy efficiency analysis, proposed Option 2 in the prescriptive table provides overall better energy efficiency than the 2018 International Energy Conservation Code (Option 1). The proposed change provides flexibility and potential improved cost-effectiveness to those builders and owners who prefer to use the prescriptive table without having to use continuous insulation. The Option 2 values provide a wall cavity insulation option that is compatible with 2x6 framing, works with a variety of wall insulation types and, when combined with the better performing windows and a higher minimum ceiling R-value, provides improved energy efficiency compared to the Climate Zone 6 requirements in the 2018 IECC.

The proposed change provides better energy efficiency performance than the 2018 IECC as shown by both an energy simulation analysis and a Total UA analysis. Both analyses used the U.S. Department of Energy Single Family Prototype for Determining the Cost Effectiveness of the 2018 IECC for house characteristics and square footage, in addition the simulated performance analysis uses U-factors and modeling guidelines in Sections R405.5.2(1) and R405.5.2(2) of the 2018 IECC for modeling the base or reference home.

1. Table R402.1.2 - Simulated Energy Performance Analysis:

<table>
<thead>
<tr>
<th>Option:</th>
<th>Description:</th>
<th>MMBTU/Y R¹</th>
<th>Energy Cost YR²</th>
<th>% Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>Base 2018 IECC³</td>
<td>87.4</td>
<td>$1309.00</td>
<td>0.0%</td>
</tr>
</tbody>
</table>
### Option 2

<table>
<thead>
<tr>
<th>Description:</th>
<th>Overall U-Factor</th>
<th>% Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-23 wood frame wall, U-.028 vertical fenestration, R-60 attic</td>
<td>85.9</td>
<td>$1292.00</td>
</tr>
</tbody>
</table>

1. Whole Home MMBTU/YR
2. Whole Home Energy Cost/YR
3. Square footages and attributes taken from the US DOE Single Family Prototype for Determining the Cost Effectiveness of the 2018 IECC and modeling guidelines in R405.5.2(1) and R405.5.2(2) of the 2018 IECC.

### Table R402.1.2 -Total Building UA Analysis (REScheck):

<table>
<thead>
<tr>
<th>Option:</th>
<th>Description:</th>
<th>Overall U-Factor</th>
<th>% Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>Base 2018 IECC</td>
<td>313</td>
<td>0.0%</td>
</tr>
<tr>
<td>Option 2</td>
<td>R-23 wood frame wall, U-.28 vertical fenestration, R-60 attic</td>
<td>309</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

1. Square footages and attributes taken from the US DOE Single Family Prototype for Determining the Cost Effectiveness of the 2018 IECC.
2. Component U-factors calculated in accordance with the 2015 ASHRAE Handbook of Fundamentals.

**Note:** This section MUST include these items:

- **Purpose:** State the purpose of the proposed amendment to physical, environmental and customary characteristics that are specific to the City and County of Denver (e.g., clarify the code; revise outdated material; substitute new or revised material for physical, environmental and customary characteristics; add new requirements to the code; delete current requirements, etc. to reflect physical, environmental and customary characteristics that are specific to the City and County of Denver).
- **Reasons:** Clearly justify the change to current code provisions, stating why the proposal is necessary to reflect physical, environmental and customary characteristics that are specific to the City and County of Denver. Proposals that add or delete requirements shall be supported by a logical explanation that clearly shows why the current code does not reflect physical, environmental and customary characteristics that are specific to the City and County of Denver and explains how such proposal will improve the code.
- **Substantiation:** Substantiate the proposed amendment based on technical information and substantiation. Substantiation provided which is reviewed and determined as not germane to the technical issues addressed in the proposed amendment shall be identified as such.
- **Bibliography:** Include a bibliography when substantiating material is associated with the amendment proposal. The proponent shall make the substantiating materials available for review.

**Referenced Standards:**

No new referenced standards are proposed. The US DOE Single Family Prototype for Determining the Cost Effectiveness of the 2018 IECC is available at [https://www.energycodes.gov/development/residential/methodology](https://www.energycodes.gov/development/residential/methodology).

**Note:** List any new referenced standards that are proposed to be referenced in the code.

**Impact:**

This will not raise the cost of construction, as compared to the other two Climate Zone 6 wall insulation options. It also has equivalent or better energy performance as shown by the supporting calculations.

**Note:** 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 construction: ☐ Increase ☒ Reduce ☐ No Effect
- 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