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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By signing below, I hereby grant and assign to City and County of Denver all rights in copyright I may have in any authorship contributions I make to City and County of Denver in connection with this proposal. I understand that I will have no rights in any City and County of Denver publications that use such contributions in the form submitted by me or another similar form and certify that such contributions are not protected by the copyright of any other person or entity. Signature:

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:

Acronym Code Name DBC-AP Denver Building Code–Administrative Provisions DBC-xxxx Denver Building Code–xxxx (code) amendments (e.g., DBC-IBC, DBC-IEBC)
IMC International Mechanical Code IPC International Plumbing Code IRC International Residential Code


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: C406.2.5 (new)
Proposal: Revise as follows: **C406.1 Additional energy efficiency credit requirements.** Buildings shall comply

New buildings shall achieve a total of 10 credits from credit calculations as specified in relevant subsections of C406 and from Tables C406.1(1) through C406.1(5) where the table is selected based on the use group of the building. Where a building contains multiple use groups, credits from each use group shall be weighted by the floor area of each group to determine the weighted average building credit. Alternatively, credits shall be calculated in accordance with the relevant subsection of C406. Credits from the tables or calculation shall be achieved where a building complies with one or more of the following:

1. More efficient HVAC performance in accordance with Section C406.2.
2. Reduced lighting power in accordance with Section C406.3.
3. Enhanced lighting controls in accordance with Section C406.4.
4. On-site supply of renewable energy in accordance with Section C406.5.
5. Provision of a dedicated outdoor air system for certain HVAC equipment in accordance with Section C406.6.
6. High-efficiency service water heating in accordance with Section C406.7.
7. Enhanced envelope performance in accordance with Section C406.8.
8. Reduced air infiltration in accordance with Section C406.9.

### Table C406.1(1) Additional Energy Efficiency Credits for Group B Occupancies

<table>
<thead>
<tr>
<th>Sub-section / Climate Zone: 5B</th>
</tr>
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<tbody>
<tr>
<td>C406.2.4: 10% Cooling 5</td>
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</tbody>
</table>

### Table C406.1(2) Additional Energy Efficiency Credits for Group R and I Occupancies

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<tbody>
<tr>
<td>C406.2.4: 10% Cooling 1</td>
</tr>
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### Table C406.1(3) Additional Energy Efficiency Credits for Group E Occupancies

<table>
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<tr>
<td>C406.2.4: 10% Cooling 2</td>
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</tbody>
</table>

### Table C406.1(4) Additional Energy Efficiency Credits for Group M Occupancies

<table>
<thead>
<tr>
<th>Sub-section / Climate Zone: 5B</th>
</tr>
</thead>
<tbody>
<tr>
<td>C406.2.4: 10% Cooling 3</td>
</tr>
</tbody>
</table>
Table C406.1(5) Additional Energy Efficiency Credits for Other Occupancies

Sub-section / Climate Zone: 5B

C406.2.4: 10% Cooling  

Other occupancy groups include all Groups except for Groups B, R, I, E, and M.

C406.2 More efficient HVAC equipment performance. Equipment shall exceed the minimum efficiency requirements listed in Tables C403.3.2(1) through C403.3.2(97) by 10 percent, in addition to the requirements of Section C403. Where multiple performance requirements are provided, the equipment shall exceed all requirements by 10 percent. and Variable refrigerant flow systems shall exceed listed in the energy efficiency provisions of ANSI/ASHRAE/IESNA 90.1 by 10 percent. in accordance with Sections C406.2.1, C406.2, C406.2.3 or C406.2.4. Equipment shall also meet applicable requirements of Section C403. Energy efficiency credits for heating shall be selected from C406.2.1 or C406.2.3 and energy efficiency credits for cooling shall be selected from C406.2.2, C406.2.4 or C406.2.5. Selected credits shall include a heating or cooling energy efficiency credit or both. Equipment not listed in Tables C403.3.2(1) through C403.3.2(97) and Variable refrigerant flow systems not listed in the energy efficiency provisions of ANSI/ASHRAE/IES 90.1 shall be limited to 10 percent of the total building system capacity for heating equipment where selecting C406.2.1 or C406.2.3 and cooling equipment where selecting C406.2.2, C406.2.4 or C406.2.5.

C406.2.1 More efficient HVAC heating performance. Equipment shall exceed the minimum heating efficiency requirements by 5 percent. C406.2.2 More efficient HVAC cooling performance. Equipment shall exceed the minimum cooling and heat rejection efficiency requirements by 5 percent. Where multiple cooling performance requirements are provided, the equipment shall exceed the annual energy requirement, including IEER, SEER, and IPLV. C406.2.3 High efficiency HVAC heating performance. Equipment shall exceed the minimum heating efficiency requirements by 10 percent. C406.2.4 High efficiency HVAC cooling performance. Equipment shall exceed the minimum cooling and heat rejection efficiency requirements by 10 percent. Where multiple cooling performance requirements are provided, the equipment shall exceed the annual energy requirement, including IEER, SEER, and IPLV. C406.2.5 High efficiency HVAC cooling performance above 10 percent. Where equipment exceeds the minimum annual cooling and heat rejection efficiency requirements by more than 10 percent, energy efficiency credits for High efficiency HVAC cooling performance may be determined using Equation 4-1, rounded to the nearest whole number. EEC_{HEC} = EEC_{10} \times [1 + ((CEI - 10 \text{ percent}) + 10 \text{ percent})] (Equation 4-1)

Where: EEC_{HEC} = energy efficiency credits for HVAC cooling performance EEC_{10} = C406.2.4 credits from Tables C406.1(1) through C406.1(5) CEI = equipment annual cooling efficiency improvement above the requirements listed in Tables C403.2(1) through C403.2(9), or 20 percent, whichever is less

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: This proposal is intended as an "add-on" to the New Buildings Institute (NBI) proposal which revises C406 into an “additional energy efficiency credits” format. The NBI proposal allows the building designer to take credits for high efficiency HVAC cooling performance, but only for improvements in cooling efficiency of up to 10% above the energy efficiency requirements in C403. This presents a significant gap, as there are high efficiency HVAC systems commercially available today that go well beyond a 10% improvement in cooling performance over the minimum requirements.

Our code change proposal simply adds an additional subsection, C406.2.5, to address this gap. With this additional language, if a building designer selects an HVAC system with a cooling performance that exceeds minimum requirements by more than 10%, they would be able to get additional energy efficiency credits proportional to the improvement of the cooling performance. For example, if equipment is selected that exceeds minimum cooling efficiency requirements by 15%, she would be able to multiply credits taken in C06.2.4 by 1.5.

This proposal ensures that next-generation, high efficiency HVAC systems can receive appropriate credit under the revised C406 format. This will give designers additional flexibility under C406, while achieving the same level of energy savings, and help pull through premium efficiency equipment into the Denver market.

Credit for performance is capped at 20% above minimum cooling performance requirements, or a "points multiplier" of 2.0, in order to prevent a designer from selecting a system with an extremely high efficiency rating that may be inappropriate for the given application.

Examples: (1) Group B Building with High Efficiency HVAC Cooling Performance improvement of 12% = 6 energy efficiency credits: \[ \text{EEC}_{\text{HEC}} = 5 \text{ credits} \times [1 + \frac{(12\% - 10\%)}{10\%}] = 5 \text{ credits} \times 1.2 = 6 \text{ credits} \]

(2) Group R Building with High Efficiency HVAC Cooling Performance improvement of 15% = 2 energy efficiency credits: \[ \text{EEC}_{\text{HEC}} = 1 \text{ credit} \times [1 + \frac{(15\% - 10\%)}{10\%}] = 1 \text{ credit} \times 1.5 = 1.5 \text{ credits (round to 2 credits)} \]

(3) Group E Building with High Efficiency HVAC Cooling Performance improvement of 25% = 4 energy efficiency credits: \[ \text{EEC}_{\text{HEC}} = 2 \text{ credits} \times [1 + \frac{(20\% - 10\%)}{10\%}] = 2 \text{ credits} \times 2.0 = 4 \text{ credits (capped at performance improvement of 20%)} \]

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:**

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

**Impact:** If the NBI “additional energy efficiency credits” proposal is approved, building designers will need as many options as possible to achieve credits toward compliance. This proposal creates the opportunity for additional points through cooling efficiency, thereby increasing flexibility without sacrificing efficiency, and allowing designers to choose a more optimal path forward. As such, it will decrease the cost of design and construction. It also makes raising the number of additional energy efficiency credits required under C406 more feasible.

**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