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:  Ingersoll Rand

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:

<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>IEBCC</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.

Code Sections/Tables/Figures Proposed for Revision:
C403.9.6 (new)

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

Proposal:
C403.9.6  Cooling Tower Selection
Open-circuit cooling towers and closed-circuit cooling towers shall be selected to provide a 15°F or higher temperature difference between leaving and entering condenser water temperatures at design conditions.

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:
**Supporting Information:**

The purpose of this code change proposal is to encourage optimized ΔT for water-chilling package system designs by requiring the selection of a cooling tower capable of providing a 15°F or higher ΔT at design conditions. The proposal relies on findings published in *ASHRAE Journal* by Taylor, 2011: Optimizing Design & Control of Chilled Water Plants, Part 3: Pipe Sizing and Optimizing ΔT. Analysis in this article demonstrates that as condenser water ΔT increases from 9°F to 15°F, chilled-water system pipe, pump, pump motor, and pump VFD decrease. This results in lower life cycle costs for the system and lower system energy consumption, however these savings are offset somewhat by increased chiller energy consumption. Today chillers can be optimized to provide 15°F ΔT, meaning water-chilling solutions optimized for energy efficiency are within reach.


This article is also the basis for an ASHRAE Self Directed Learning course on chiller plant design.

**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:**

This proposal will add to the cost of the design by requiring additional time and resources of the system designer in order to optimize the system design. However, it will decrease the cost of construction by allowing for smaller-sized water-chilling package pipe, pump, pump motor, pump VSD, cooling tower motor and cooling tower VSD. The physical size and cost of the cooling tower may also be reduced in some cases. This proposal is more stringent than the 2018 IECC, as the requirement does not exist in the code.

**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