



DENVER AMENDMENT PROPOSAL FORM FOR PROPOSALS TO THE 2019 DENVER BUILDING CODE AMENDMENTS AND THE 2021 INTERNATIONAL CODES

DENVER
THE MILE HIGH CITY

2021 CODE DEVELOPMENT CYCLE

1) Name: **Kristen Salinas** Date: **1/24/2022**
Email: **Ksalinas@noresco.com** Representing (organization or self): **Denver City Staff Proposal (check box):**

2) One proposal per this document is to be provided with clear and concise information.

Is a separate graphic file provided (“X” to answer): ___ Yes or X No

3) Highlight the code and acronym that applies to the proposal

<u>Acronym</u>	<u>Code Name</u>	<u>Acronym</u>	<u>Code Name</u>
DBC-AP	Denver Building Code–Administrative Provisions	IPC	International Plumbing Code
IBC	International Building Code	IRC	International Residential Code
IECC	International Energy Conservation Code	IFGC	International Fuel Gas Code
IEBC	International Existing Building Code	IMC	International Mechanical Code
IFC	International Fire Code	DGC	Denver Green Code

AMENDMENT PROPOSAL

Please provide all the following items in your amendment proposal.

Code Sections/Tables/Figures Proposed for Revision:

DGC Chapter 10 Construction and Plans for Operation
Functional and Performance Testing (FPT) and commissioning

Proposal:

Delete/Substitute

Modify 1001.3 as follows:

1001.3 (10.3) Mandatory and Elective Provisions.

1001.3.1 (10.3.1) Construction.

1001.3.1.1 (10.3.1.1) Building Systems FPT (Mandatory). Functional and performance testing and commissioning. ~~Functional and performance testing shall be performed on all building systems specifically referenced in this section using generally accepted engineering standards acceptable to the authority having jurisdiction (AHJ).~~

~~Building projects with not greater than 10,000 ft² (1000 m²) of gross floor area shall comply with the functional performance testing requirements of Sections 10.3.1.1.1 through 1001.3.1.1.3. Building projects with greater than 10,000 ft² (1000 m²) of gross floor area, shall comply with the functional performance testing and the commissioning requirements of Sections 1001.3.1.1.1 (10.3.1.1.1) through 1001.3.4.5 (10.3.4.5). An FPT process and system performance requirements shall be incorporated into construction documents and construction schedule of the building project to verify system performance.~~

1001.3.1.1.1 (10.3.1.1.1) FPT requirements.

An FPT process shall be performed for the following:

- a. Heating, ventilating, air conditioning, and refrigeration systems (mechanical and passive) and associated controls that exceed total system capacities of 180,000 Btu/h (53,000 W) for cooling, 300,000 Btu/h (88,000 W) for heating, or 10,000 cfm (5000 L/s) for ventilation.

- b. Lighting systems over 5 kW in total capacity, including *automatic* and daylighting controls, manual daylighting controls, occupancy-sensing devices, time switching, and *automatic shut-off controls*.
- c. Domestic water-heating systems rated at over 50,000 Btu/h (15,000 W).
- d. Water pumping and mixing systems over 5 hp (4 kW).
- e. Irrigation systems that use more than 250 gal (946 L) per day.

1001.3.1.1.1.1 (10.3.1.1.1.1) Activities prior to building permit for facilities using the FPT process.

The following activities shall be completed before a permit is issued for any system requiring FPT:

- a. Designate *FPT providers*. For systems that are required to comply with C408.1, *FPT providers* shall be *owner's* qualified employees, independent *commissioning (Cx) providers*, or qualified designers experienced with *FPT* on the designated systems. *FPT providers* shall be independent of the building system design and construction function *FPT providers* shall review the *construction documents* to verify that the relevant sensor locations, devices, and control sequences are properly specified; performance and testing criteria are included; and equipment to be tested is accessible for testing and maintenance.

1001.3.1.1.1.2 (10.3.1.1.1.2) Activities prior to building occupancy for facilities using the FPT process.

Before issuance of a certificate of occupancy (or Temporary Certificate of Occupancy), the *FPT providers* shall complete the following activities:

- a. Installation and startup of the specified systems shall be verified.
- b. *FPT* of systems shall be verified.

Exception: Systems for which operation is seasonally dependent, and which cannot be fully commissioned in accordance with the *commissioning (Cx) plan* at the time of occupancy, shall be commissioned at the earliest operation time, post occupancy, as determined by the *FPT providers*, but not more than nine (9) months later.

- c. The preparation of operation and maintenance (O&M) documentation and warranty information shall be verified. O&M documentation, including the information needed to understand, operate, and maintain the building systems, shall be provided to the building *owner* and facility manager, and transferred to any subsequent owner(s) upon sale or lease of the building.

1001.3.1.1.1.3 (10.3.1.1.1.3) Documentation.

The completed project design and *FPT* documentation shall be provided to the *owner* and AHJ and shall be retained with the project records.

Section 1001.3.1.1.2 (10.3.1.1.2 Acoustical Control remains unchanged.

1001.3.1.2 (10.3.1.2) Building project commissioning (Cx) Process.

The *Cx process* shall be performed in accordance with this section using ANSI/ASHRAE/IES Standard 202 or other generally accepted engineering standards where such standards are approved. The *Cx provider* shall verify that a *Cx process* has been incorporated into the design phases of the project and that commissioning shall be called out on the *construction documents*. The *Cx process* documents that the building and its commissioned components, assemblies, and systems comply with the *owner's project requirements (OPR)*. The project requirements, including *OPR*, *BoD*, design and construction record documentation, training plans and records, O&M plans and procedures, and *Cx* reports shall be assembled in a systems manual that provides information for building operation and maintenance staff.

1001.3.1.2.1 (10.3.1.2.1) Systems to be commissioned.

The *Cx process* shall be included in the design and construction of the *building project*. The following systems and associated controls, where included in the *building project*, shall be commissioned:

- a. Heating, ventilating, air-conditioning, and refrigeration systems (mechanical and/or passive) and associated controls.
- b. Air-curtain systems.
- c. Lighting systems: automatic and manual daylighting controls, occupancy sensing devices, automatic shut-off controls, time switching, and other lighting control devices.
- d. Domestic hot-water systems and controls.
- e. Water pumping and mixing systems over 5 hp (4kW) and purification systems.
- f. Irrigation system performance that uses more than 250 gal (946 L) per day.
- g. Renewable energy systems and energy storage systems.
- h. Energy and building management and demand-control systems.

1001.3.1.2.2(10.3.1.2.2) Cx activities prior to building permit.

The following activities shall be completed prior to issuance of a building permit:

- a. A copy of the Cx plan in accordance with ANSI/ASHRAE/IES Standard 202 shall be submitted for review with the building permit application.
- b. An approved Cx provider shall be designated by the owner to manage Cx process activities prior to completion of construction documents. The Cx provider shall have the necessary training, experience, and equipment and be independent from the design team and the contractor responsible for the work being commissioned. The Cx provider shall disclose possible conflicts of interest so that objectivity can be confirmed. The Cx team shall include an FPT provider who may also be the Cx provider.
- c. Construction phase Cx requirements shall be incorporated into project specifications and other construction documents developed by the design team.

1001.3.1.2.3 (10.3.1.2.3) Cx activities prior to building occupancy.

The following activities shall be completed prior to issuance of a Certificate of Occupancy (or Temporary Certificate of Occupancy):

- a. For the systems being commissioned, verify that commissioning has been completed, installation has been verified, FPT has been performed, and that reporting includes documentation of test results.
Exception: Systems for which operation is seasonally dependent and which cannot be fully commissioned in accordance with the Cx plan at the time of occupancy shall be commissioned at the earliest operation time, post occupancy, as determined by the Cx provider, but not more than nine (9) months later.
- b. The owner shall be provided with a preliminary Cx report per compliance with Section C408.2.3. .
- c. The Cx provider shall verify that the owner has been provided with a systems manual that includes the information needed to understand and operate the commissioned systems as designed, including warranty information for the commissioned systems. The systems manual with design and operational information shall be available for building operator and maintenance training.

1001.3.1.2.4 (10.3.1.2.4) Post occupancy Cx activities.

The Cx plan shall contain post occupancy Cx requirements in accordance with ANSI/ASHRAE/IES Standard 202. The Cx provider shall provide the owner with a complete system manual, all record documents, and a complete final Cx report in accordance with Standard 202.

1001.3.1.3 (10.3.1.3) Project Cx documents.

1001.3.1.3.1 (10.3.1.3.1) Cx plan.

A Cx plan shall be developed by a Cx provider in accordance with ANSI/ASHRAE/IES Standard 202 for all systems to be commissioned and/or tested.

1001.3.1.3.2 (10.3.1.3.2) Design review report.

The Cx provider shall provide to the owner and design teams a Cx design review report that complies with ANSI/ASHRAE/IES Standard 202 and details compliance with the OPR. This Cx design review shall not be considered a design peer review or a code or regulatory review.

1001.3.1.3.3 (10.3.1.3.3) Preliminary Cx report.

The Cx provider shall provide a preliminary Cx report that includes the following information:

- a. Performance of commissioned equipment, systems, and assemblies.
- b. Issue and resolution logs, including itemization of deficiencies found during testing and commissioning that have not been corrected at the time of report preparation.
- c. Deferred tests that cannot be performed at the time of report preparation.
- d. Documentation of the training of operating personnel and building occupants on commissioned systems and a plan for the completion of any deferred trainings that were unable to be fully commissioned at the time of report preparation.
- e. A plan for the completion of commissioning, including climatic and other conditions required for performance of the deferred tests.

1001.3.1.3.4 (10.3.1.3.4) Final Cx report.

The Cx provider shall provide to the owner, and AHJ prior to the issuance of a Certificate of Occupancy or Temporary Certificate of Occupancy, a final Cx report that complies with ANSI/ASHRAE/IES Standard 202.

1001.3.1.3.5 (10.3.1.3.5) Reserved Documentation.

Owner shall retain the systems manual and final Cx report.

~~**1001.3.1.3.6 (10.3.1.3.6) Documentation.** Owner shall retain the systems manual and final Cx report.~~

Supporting Information (Required):

The purpose of this proposal is to bring current 2021 IgCC requirements into the Denver Green Code (DGC). This language was cut and paste directly from the 2021 IgCC with the appropriate code sections referenced for the DGC.

This revision delineates separate requirements for buildings that are $\leq 10,000$ Gross Square Feet versus those $> 10,000$ Gross Square Feet. Doing so provides alignment with base codes because they are delineated in the same size categories. This alignment will ease adoption into base code in future code cycles.

Other Regulations Proposed to be Affected

***For proposals to delete content from the 2019 Denver Green Code in conjunction with adding it to other mandatory Denver codes and/or regulations, only.**

N/A

Referenced Standards:

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

ASHRAE

ASHRAE
180 Technology Parkway NW
Peachtree Corners GA 30092

ASHRAE Standard 202, including:

ASHRAE Guideline 0—2013: The Commissioning Process

1001.3.3

ASHRAE Guideline 1.1—2007: HVAC&R Technical Requirements for the Commissioning Process

1001.3.3.2 and 1001.3.3.4

ASHRAE Guideline 4—2008 (RA 2013): Preparation of Operating and Maintenance Documentation for Building Systems

1001.3.4

Impact:

How will this proposal impact cost and restrictiveness of code? ("X" answer for each item below)

Cost of construction: Increase ___ Decrease ___ No Impact

Cost of design: Increase ___ Decrease ___ No Impact

Restrictiveness: Increase ___ Decrease ___ No Impact

Departmental Impact (City use only):

This amendment proposal increases/decreases/is neutral to the cost of plans review.

This amendment increases/decreases/is neutral to the cost of inspections.