

FUNCTIONAL PERFORMANCE TESTING, COMMISSIONING AND FINAL INSPECTION REQUIREMENTS FOR MONTGOMERY COUNTY ENERGY AND GREEN CODES (2022-ASHRAE 90.1, 2021-IgCC)

NOTE: All applicable documentation must be provided to DPS reviewers prior to receiving building final and occupancy approvals. See Section 4.2.2, ASHRAE 90.1, Compliance Documentation, and below section 2.

1 CURRENT ENERGY AND GREEN CODES AND STANDARDS

The Montgomery County Energy and Green Codes were adopted in January, 2025. They are based on ASHRAE 90.1-2022, including Appendix H, ASHRAE 202-2018, IgCC-2021, and Montgomery County 2021 amendments. All submittals shall conform to these codes and standards.

2 REQUIREMENTS FOR ALL PROJECTS

Note: Documents referenced below are on the DPS Commercial Building website in the **Energy and Green Building** section: <https://www.montgomerycountymd.gov/DPS/divisions/commercial/index.html>

VERIFICATION AND FUNCTIONAL PERFORMANCE TESTING (FPT)

Required for all applicable systems, regardless of whether commissioning (Cx) is required.

The verification and testing (V&T) providers shall be the owner's qualified employees, commissioning providers, design professionals, qualified designers, or qualified technicians experienced with verification or FPT of the designated systems. V&T providers shall not be individuals who performed design or installation of the systems or assemblies being verified or tested.

ENERGY FINAL INSPECTION (550)

Prior to the final building inspection (251), the owner/owner representative shall provide to DPS the following:

1. The V&T and FPT documentation (ASHRAE 90.1-2022 Section 4.2.5.1).
2. The Testing, Adjusting and Balancing (TAB) Report.
3. If applicable, testing of onsite renewable energy systems, and an interconnection application submitted to the electric utility (for connecting to the electric grid). (ASHRAE 90.1-2022 Section 10.5.1).
4. *Cx-FPT Compliance Checklist* (see DPS website under Commissioning)
5. **For projects that require commissioning (see requirements on page 3):**
 - a. Preliminary Commissioning Report (ASHRAE 90.1-2022 Section 4.2.5.2, ASHRAE 202 and the Montgomery County amendments).



- b. A letter of transmittal acknowledging that the building owner or owner's authorized agent has received and accepted all required verification documentation, FPT documentation, and required preliminary commissioning report.
- c. Renewable energy (if applicable based on compliance path, e.g. Montgomery County amendment to ASHRAE 90.1-2022 Section 4.2.1 Compliance Paths, PNNL-35193 Technical Brief):
 - i. Renewable energy purchase agreement, and/or
 - ii. For onsite renewable energy systems (e.g. solar) an interconnection application submitted to the electric utility (for connecting to the electric grid).
- d. Submittals for final Green Building or U&O Inspection (081) (if applicable)
 - i. Final Cx Plan
 - ii. Final Construction Cx Report

All submissions must be sent to the original permit plan reviewer and/or the general DPS Commissioning email. Include the original permit number in the subject line for faster processing.

General DPS: DPS.commissioning@montgomerycountymd.gov

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3 COMMISSIONING

Commissioning is an essential part of making sure that the building envelope, HVAC, domestic hot water systems, and lighting systems operate the way they were intended and that all the smart controls operate appropriately.

When is Commissioning Required?

Based on characteristics like work type, mechanical system capacity and gross floor area, a project may be required to comply with: a) ASHRAE 90.1, b) IgCC, or c) both ASHRAE 90.1 and IgCC. See below and **Requirement Flowcharts** at the end of this document.

❖ ASHRAE 90.1 Commissioning

- New Construction/Additions/Alterations/Change of Use:
 - Exceptions that don't require Cx:
 - Mechanical systems and service water heater systems in buildings where the total mechanical equipment capacity is both less than 480,000 Btu/h cooling capacity and less than 600,000 Btu/h combined service water-heating and space-heating capacity (Montgomery County amendment).
 - Buildings or portions of buildings that use the simplified approach building compliance path for HVAC systems in Section 6.3.
 - Dwelling units as defined in ASHRAE 90.1 2022.
- Core & shell new construction (based on anticipated whole building energy use and above capacity thresholds)
- First-time tenant fit-out (regardless of tenant space size), if the core & shell base building required Cx.

❖ IgCC Commissioning

Full Cx is to be completed under the Montgomery County Energy Code. ASHRAE and IgCC 1001.3 require the same Cx, as such, IgCC 1001.3 has been replaced by the Montgomery County Energy Code.

- New Construction/Additions:
 - Over 5,000 ft² Cx is required. (Montgomery County green building amendment)
- First-time tenant fit-out (regardless of tenant space size), in a core & shell base building greater than 5,000 ft²

Commissioning Submittal Requirements by Phase

Pre-Design and Design Phases

Building owner or tenant hires a Commissioning Provider that meets the following:

The commissioning provider shall be (a) a third-party entity not associated with the building project, (b) owner's qualified employees, or (c) an individual associated with the design firm or contractor but not directly associated with design or installation of the building systems, controls, or building envelope being commissioned.

The provider may either be selected from the following list or have the required credentials listed in the document: *Cx Approved Providers* (see DPS website under Commissioning).

Obtain Owner's Project Requirements (OPR) and Basis of Design (BoD).

Form Commissioning team: Owner, commissioning provider, design team, contractors, operations and maintenance (O&M), etc.

Commissioning team shall prepare the Commissioning Plan concurrently with the design of the project.

Permit Submission

Project Team shall submit the following to DPS for Permit Application:

- Commissioning Provider Information. Provide credentials for vetting by DPS if provider is not on the approved list. *(Note: Notify DPS if provider changes)*
- Commissioning Plan *(see next page)*: The plan shall clearly indicate provisions for commissioning and completion requirements in accordance with ASHRAE 90.1-2022, Section 4.2.5, Appendix H, ASHRAE 202 (ASHRAE 0), and IgCC-2021.

Construction

Project Team shall perform the following major tasks (this is not a complete list):

- Ensure the construction team collaborates with the Commissioning Provider.
- Update the Commissioning Plan, Cx Progress Reports, Test Procedures, Cx Coordination Meetings, Training Plans & System Manual, Issues and Resolution Log, etc.
- Develop the Preliminary Commissioning Report *(see next page)* and compile results of the FPT.
- Submit the required documents for the Energy Final Inspection *(see above section 2)*.

Occupancy and Post Occupancy

Project Team shall:

- Prepare documentation for obtaining U&O *(see above section 2)*.
- Deliver Project Systems Manual *(see section 5)* to Owner within 90 days after systems/envelope acceptance, including the Operating and Maintenance Manual and the Training Plan.
- Perform Outstanding commissioning tasks and deliver Final Commissioning Report to Owner.

ALL DOCUMENTS ARE EXPECTED TO BE AVAILABLE TO DPS AS REQUESTED.

Commissioning Plan

The plan shall clearly indicate provisions for commissioning or testing requirements and completion requirements in accordance with ASHRAE 90.1-2022 Section 4.2.5, Appendix H, ASHRAE 202 (ASHRAE 0) and IgCC-2021.

Commonly missing items - the plan should include, but is not limited to having:

1. Acknowledgment that OPR and BoD have been obtained.
2. Building owner's role and responsibilities.
3. Detailed list of all equipment and systems to be commissioned.
4. Climate conditions for testing.
5. Testing modes.

Commissioning Report

ASHRAE 90.1-2022 4.2.5, Appendix H, ASHRAE 202-2018, IgCC-2021

Commissioning shall be completed prior to final building inspection (ASHRAE 90.1-2022, 4.2.5.3)

Exception: Systems for which operation is seasonally dependent, and which cannot be fully verified or tested at the time of occupancy, shall be functionally tested or commissioned when allowed for by post-occupancy operating conditions as determined by the commissioning or V&T providers.

Preliminary Commissioning Report The preliminary commissioning report shall include the following:

1. Required performance of commissioned equipment, systems, and assemblies, and results of FPT and verification. All test reports must be signed by the commissioning provider. Depending on scope of work, reports may include for example:
 - a. Air curtain, air leakage and/or continuous air barrier systems
 - b. Functional performance testing for HVAC, SWH and lighting systems
 - c. Power
 - d. Other equipment and renewable energy systems
 - e. Green building (IAQ, acoustical verification, etc.)
2. Summary of compliance of the building and its components, assemblies, controls, and systems with required provisions of this standard.
3. Issues and resolution logs, including itemization of deficiencies found during verification, testing, and commissioning that have not been corrected at the time of report preparation.
4. Deferred tests that cannot be performed at the time of report preparation.
5. Documentation of the training of operating personnel and building occupants on commissioned systems, and a plan for the completion of any deferred trainings not completed at the time of report preparation.
6. A plan for the completion of commissioning and training, including climatic and other conditions required for performance of the deferred tests.

Final Commissioning Report (may be required before U&O is issued)

1. Copy of Final Cx Plan.
2. Completed copy of the approved supplier, contractor, and CxP evaluations, and Cx start-up and test forms, including those used during the occupancy and operations activity.
3. Copy of all Cx Progress Reports.
4. Copy of all issues and resolution logs, including the descriptions of the issues and the measures taken to correct them, and a discussion of systems or assemblies that do not perform in accordance with the OPR.
5. For all incomplete issues, delayed or seasonal tests including a resolution plan approved by the Owner identifying who is responsible for resolution.

4 INTERNATIONAL GREEN CONSTRUCTION CODE 2021 (IgCC)

Additional Commissioning (Cx) Requirements for IgCC Projects

Full Cx is to be completed under the Montgomery County Energy Code. ASHRAE and IgCC 1001.3 require the same Cx, as such, IgCC 1001.3 has been replaced by the Montgomery County Energy Code. Montgomery County has additional requirements for IgCC projects:

1. Indoor Air Quality (IAQ) Construction Management (1001.4.2).
2. Acoustical Field Measurement (1001.5).
3. Postconstruction Building Flush-Out and Air Monitoring (1001.7).
4. Plan for High-Performance Building Operation (1001.9, if applicable).

5 DEFINITIONS AND REFERENCES

Project System Manual

Project System Manual (Portions taken from ASHRAE 90.1-2022, 4.2.5.2.2 and ASHRAE 202 Section 14): Project commissioning documents shall comply with ASHRAE/IES Standard 202. The commissioning provider shall certify completion of the required commissioning process and provide the following documents to the owner and design teams:

- a) **Owner's Project Requirements (OPR).** Identify project goals, measurable performance criteria, cost considerations, benchmarks, and success criteria.
- b) **Basis of Design (BoD).** Document and record the concepts, calculations, decisions, and product selections used to meet both the Owners Project Requirements and applicable regulatory requirements, standards and guidelines.
- c) **Commissioning Plan.** Identify FPT or verification procedures for all systems to be verified, commissioned, or tested.
- d) **Design Review Report.** Detail compliance of the design with the Owner's Project Requirements and provisions of this standard. This commissioning design review shall not be considered a design peer review or a code or regulatory review.
- e) **Preliminary Commissioning Report.** (See above)
- f) **Final Commissioning Report.** The construction documents shall require the commissioning provider to provide a final commissioning report to the owner before completion of the contractor's general warranty period.
- g) **Operation and Maintenance Manuals.** Operating and maintenance information shall be provided in accordance with Section ASHRAE 90.1-2022, 4.2.2.3 of this Standard.
- h) **Training Plan.** A written document that details the expectations, schedule, duration, and deliverables for CX Activities related to training of project operations and maintenance personnel, users and occupants. The construction documents shall require the commissioning provider to provide a Training Plan to the owner prior to occupancy.

Definitions from ASHRAE 90.1-2022 and 2021 IgCC

Commissioning: a quality-focused process for enhancing the delivery of a project for verifying and documenting that the building and its systems, controls, and building envelope are planned, designed, installed, tested, and include plans for operation and maintenance to meet specified requirements.

Commissioning (Cx) plan: a document that outlines the organization, schedule, allocation of resources, and documentation of the building commissioning process.

Commissioning (Cx) process: a quality-focused process for enhancing the delivery of a project. The process focuses on verifying and documenting that the facility and all of its systems and assemblies are planned designed, installed, tested, operated, and maintained to meet the owner's project requirements.

Commissioning (Cx) provider: an approved entity, identified by the owner, who manages the commissioning team to implement the building commissioning process. (Note: This entity is sometimes known as a "commissioning authority," "CxA," or approved agency – see the Montgomery County list of approved providers).

Functional Performance Testing (FPT): a systematic process to verify that controls and other elements of the building project are capable of and configured to operate or perform as required.

Functional and Performance Testing Provider (FPT provider): an entity identified by the owner who manages the activities needed to implement the building functional and performance testing (FPT) activities.

Owner: the party in responsible control of development, construction, or operation of a project at any given time.

Owner's project requirements (OPR): a document that specifies the functional requirements of a project and the expectations of how it will be used and operated, including project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, training requirements, documentation requirements, and supporting information.

References

- ANSI/ASHRAE/IES Standard 90.1-2022 Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings (I-P Edition).
- ANSI/ASHRAE/IES Standard 202-2018 Commissioning Process for Buildings and Systems
- ASHRAE Guidelines 0-2019 The Commissioning Process
- International Green Construction Code 2021 (IgCC)
- Montgomery County 2021 Code Amendments: [Executive Regulation 13-24](#)
- PNNL-35193 Technical Brief, Commercial Zero Code Plug-In: Zero Energy and Operational Emissions Overlay for Model Energy Codes, October 2023, <https://www.energycodes.gov/sites/default/files/2024-04/Commercial Zero Code Plug In v1A.pdf>

For more information, please refer to the Montgomery County, Department of Permitting Site: [Commercial Division Home Page - Department of Permitting Services - Montgomery County, Maryland \(montgomerycountymd.gov\)](#). For additional comments or questions, please reach out to the Commercial, Energy and Sustainability Department. Contact information can be found in the DPS Directory: [Contact Us - Department of Permitting Services - Montgomery County Government, MD \(montgomerycountymd.gov\)](#)

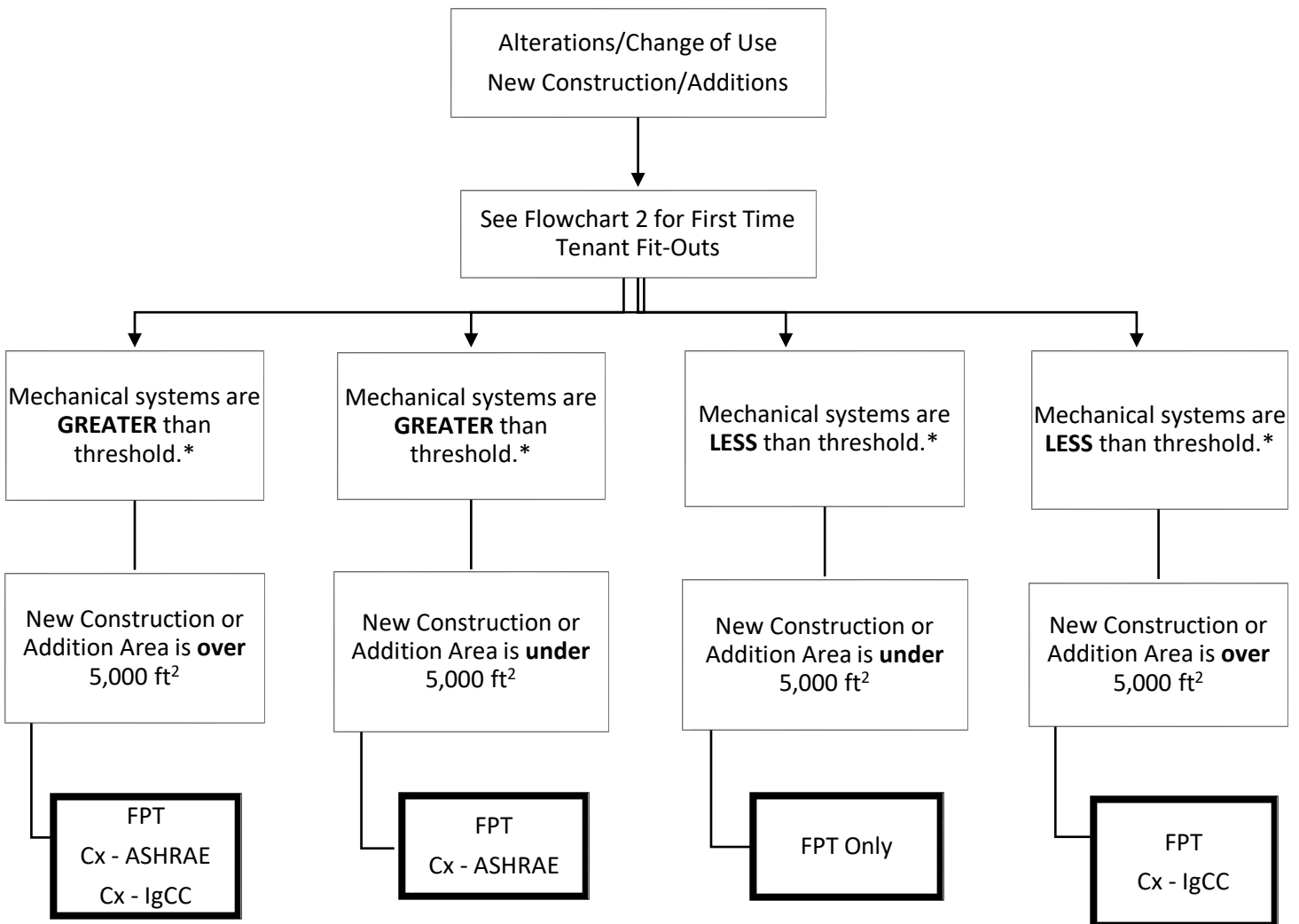
6 REQUIREMENT FLOWCHARTS

Flowchart 1: Determining Commissioning Requirements - General

*Mechanical Systems Capacity Threshold

Total mechanical equipment capacity is both
GREATER than 480,000 Btu/h cooling capacity and
GREATER than 600,000 Btu/h combined service
water-heating and space-heating capacity

Alterations/Change of Use projects
are not required to comply with
IgCC regardless of square footage.



Key:

FPT = Functional Performance Testing

Cx - ASHRAE = ASHRAE 90.1 Commissioning

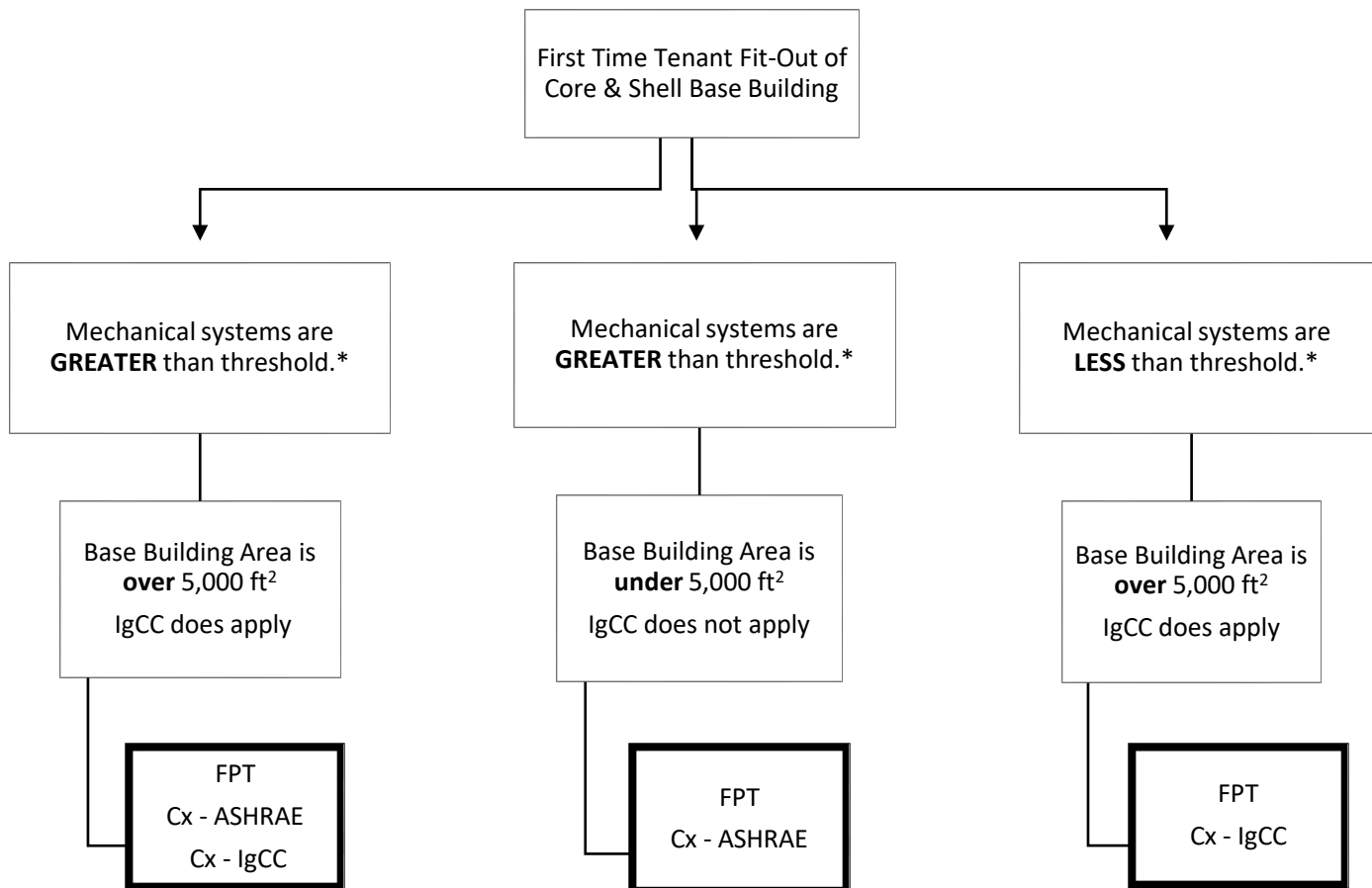
Cx - IgCC = Amended International Green Construction Code Commissioning, Chapter 10

Flowchart 2: Determining Commissioning Requirements - First Time Tenant Fit-Outs

*Mechanical Systems Capacity Threshold For Tenant Spaces

Total mechanical equipment capacity is both
GREATER than 480,000 Btu/h cooling capacity and
GREATER than 600,000 Btu/h combined service
water-heating and space-heating capacity

First time tenant base building includes
both new construction and additions.



Key:

FPT = Functional Performance Testing

Cx - ASHRAE = ASHRAE 90.1 Commissioning

Cx - IgCC = Amended International Green Construction Code Commissioning, Chapter 10