



Montgomery County Department of Permitting Services

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Commissioning - IECC

A commissioning plan shall be developed by a registered design professional or *approved* agency and shall include the following items:

1. A narrative description of the activities that will be accomplished during each phase of *commissioning*, including the personnel intended to accomplish each of the activities.
2. A listing of the specific equipment, appliances or systems to be tested and a description of the tests to be performed.
3. Functions to be tested including, but not limited to, calibrations and economizer controls.
4. Conditions under which the test will be performed. Testing shall affirm winter and summer design conditions and full outside air conditions.
5. Measurable criteria for performance.

The following systems are exempt:

1. Mechanical systems and service water heater systems in buildings where the total mechanical equipment capacity is less than 480,000 Btu/h (140.7 kW) cooling capacity and 600,000 Btu/h (175.8 kW) combined service water-heating and space-heating capacity.
2. Systems that serve individual *dwelling units and sleeping units*.

Prior to the final mechanical and plumbing inspections, a preliminary report of *commissioning test procedures and results* shall be completed and certified by the registered design professional or *approved agency* and provided to the building owner or owner's authorized agent. The report shall be organized with mechanical and service hot water findings in separate sections to allow independent review. The report shall be identified as "Preliminary Commissioning Report" and shall identify:

1. Itemization of deficiencies found during testing required by this section that have not been corrected at the time of report preparation.
2. Deferred tests that cannot be performed at the time of report preparation because of climatic conditions.
3. Climatic conditions required for performance of the deferred tests.

Buildings, or portions thereof, shall not be considered acceptable for a final inspection until DPS has received a letter of transmittal from the building owner acknowledging that the building owner or owner's authorized agent has received the *Preliminary Commissioning Report*. Letters of transmittal can be sent by email directly to:

mark.nauman@montgomerycountymd.gov or ye.jiang@montgomerycountymd.gov.

DPS may require that a copy of the *Preliminary Commissioning Report* be made available for review.

The construction documents (plans/specifications) shall specify that the documents described as follows be provided to the building owner or owner's authorized agent within 90 days of the date of receipt of the certificate of occupancy.

Drawings. *Construction documents* shall include the location and performance data on each piece of equipment.

Manuals. An operating and maintenance manual shall be provided and include all of the following:

1. Submittal data stating equipment size and selected options for each piece of equipment requiring maintenance.
2. Manufacturer's operation manuals and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions shall be clearly identified.
3. Name and address of at least one service agency.
4. HVAC and service hot water controls system maintenance and calibration information, including wiring diagrams, schematics and control sequence descriptions. Desired or field-determined set points shall be permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.
5. Submittal data indicating all selected options for each piece of lighting equipment and lighting controls.
6. Operation and maintenance manuals for each piece of lighting equipment. Required routine maintenance actions, cleaning and recommended re-lamping shall be clearly identified.
7. A schedule for inspecting and recalibrating all lighting controls.
8. A narrative of how each system is intended to operate, including recommended set points.

Final commissioning report. A report of test procedures and results identified as "*Final Commissioning Report*" shall be delivered to the building owner or owner's authorized agent within 90 days of occupancy. The report shall be organized with mechanical system and service hot water system findings in separate sections to allow independent review. The report shall include the following:

1. Results of functional performance tests.
2. Disposition of deficiencies found during testing, including details of corrective measures used or proposed.
3. Functional performance test procedures used during the commissioning process including measurable criteria for test acceptance, provided herein for repeatability.

Exception: Deferred tests that cannot be performed at the time of report preparation due to climatic conditions.

Functional performance testing shall be conducted. For all systems exempted from requiring a Commissioning Plan, functional performance testing shall be performed and completed prior to final plumbing, electrical and mechanical inspections the *registered design professional or approved agency shall provide evidence of mechanical systems balancing and completion in accordance with the following:*

Equipment functional performance testing shall demonstrate the installation and operation of components, systems, and system-to-system interfacing relationships in accordance with approved plans and specifications such that operation, function, and maintenance serviceability for each of the systems is confirmed. Testing shall include all modes and sequence of operation, including under full-load, part-load and the following emergency conditions:

1. All modes as described in the sequence of operation.
2. Redundant or automatic back-up mode.

3. Performance of alarms.
4. Mode of operation upon a loss of power and restoration of power.

Exception: Unitary or packaged HVAC equipment that do not require supply air economizers.

HVAC and service water-heating control systems shall be tested to document that control devices, components, equipment and systems are calibrated and adjusted and operate in accordance with approved plans and specifications. Sequences of operation shall be functionally tested to document they operate in accordance with approved plans and specifications.

Air economizers shall undergo a functional test to determine that they operate in accordance with manufacturer's specifications.

Prior to passing final inspection, the registered design professional shall provide evidence that the lighting control systems have been tested to ensure that control hardware and software are calibrated, adjusted, programmed and in proper working condition in accordance with the construction documents and manufacturer's instructions.

Where occupant sensor controls are provided, the following procedures shall be performed:

1. Certify that the *occupant sensor has been located and aimed in accordance with manufacturer recommendations*.
2. For projects with seven or fewer occupant sensors, each sensor shall be tested.
3. For projects with more than seven occupant sensors, testing shall be done for each unique combination of sensor type and space geometry. Where multiples of each unique combination of sensor type and space geometry are provided, not less than 10 percent, but in no case less than one, of each combination shall be tested unless the *registered design professional requires a higher percentage to be tested. Where 30 percent or more of the tested controls fail, all remaining identical combinations shall be tested.*

For occupant sensor controls to be tested, verify the following:

- Where occupant sensor controls include status indicators, verify correct operation.
- The controlled lights turn off or down to the permitted level within the required time.
- For auto-on occupant sensor controls, the lights turn on to the permitted level when an occupant enters the space.
- For manual-on occupant sensor controls, the lights turn on only when manually activated.
- The lights are not incorrectly turned on by movement in adjacent areas or by HVAC operation.

Where *time-switch controls* are provided, the following procedures shall be performed:

1. Confirm that the *time-switch control is programmed with accurate weekday, weekend and holiday schedules*.
2. Provide documentation to the owner of *time-switch controls programming including weekday, weekend, holiday schedules, and set-up and preference program settings*.
3. Verify the correct time and date in the time switch.
4. Verify that any battery back-up is installed and energized.
5. Verify that the override time limit is set to not more than 2 hours.
6. Simulate occupied condition. Verify and document the following:
 - All lights can be turned on and off by their respective area control switch.

- The switch only operates lighting in the enclosed space in which the switch is located.
7. Simulate unoccupied condition. Verify and document the following:
- Nonexempt lighting turns off.
 - Manual override switch allows only the lights in the enclosed space where the override switch is located to turn on or remain on until the next scheduled shutoff occurs.
8. Additional testing as specified by the registered design professional.

Where *daylight responsive controls are provided, the following shall be verified:*

1. Control devices have been properly located, field calibrated and set for accurate setpoints and threshold light levels.
2. Daylight controlled lighting loads adjust to light level set points in response to available daylight.
3. The locations of calibration adjustment equipment are readily accessible only to authorized personnel.

A functional testing report shall be provided to DPS prior to final electrical, mechanical and plumbing inspection. This can be emailed directly to: mark.nauman@montgomerycountymd.gov or ye.jiang@montgomerycountymd.gov