



An Energy Code Plan Review from an Energy Inspectors perspective

- 1. What is the Energy Code and Energy Code version that this property will be built and inspected under?**
 - a. Numerous cities are changing code versions over the rest of this year. The 2021 IECC is the latest version. All code excepts included below are from the 2021 IECC

- 2. Does Project Municipality enforce any Commissioning provisions in this Energy Code?**
 - a. Preliminary Commissioning Plan & Checklist requirements
 - b. TAB requirement
 - c. Functional test of HVAC system, system controls and Economizer
 - d. Functional test of Lighting control system
 - e. Functional test of water heater system
 - f. OEM and System Manual required to be provided by Builder
 - g. Final Commissioning Plan provided to Building Owner with schedule

- 3. Does the Project Municipality enforce Blower Door testing or Duct testing requirements?**
 - a. Blower Door testing required
 - i. 0.3 CFM/sqft for sleeping units @ 50 Pa or,
 - ii. 0.4 CFM/sqft for all other building @ 75 Pa
 1. Buildings between 5,000 square feet and 50,000 square feet floor area in Climate Zones 0A, 3A and 5B
 2. Buildings larger than 5,000 square feet floor area in Climate Zones 0B, 1, 2A, 4B and 4C.
 3. Buildings exempt in Climate Zones 2B, 3B, 3C and 5C

4. Is the required information located on the set of plans?

a. C103.2 Information on construction documents.

Construction documents shall be drawn to scale on suitable material. Electronic media documents are permitted to be submitted where *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment as herein governed. Details shall include, but are not limited to, the following as applicable:

1. Energy compliance path. **(New requirement)**
2. Insulation materials and their *R*-values. **(ComCheck)**
3. Fenestration *U*-factors and solar heat gain coefficients (SHGCs). **(ComCheck)**
4. Area-weighted *U*-factor and solar heat gain coefficient (SHGC) calculations. **(ComCheck)**
5. Mechanical system design criteria. **(ComCheck)**
6. Mechanical and service water-heating systems and equipment types, sizes and efficiencies. **(ComCheck)**
7. Economizer description. **(ComCheck)**
8. Equipment and system controls.
9. Fan motor horsepower (hp) and controls. **(ComCheck)**
10. Duct sealing, duct and pipe insulation and location.
11. Lighting fixture schedule with wattage and control narrative. **(ComCheck)**
12. Location of *daylight* zones on floor plans.
13. Air barrier and air sealing details, including the location of the air barrier.

5. Is the Building Envelope depicted on the plans?

a. C103.2.1 Building thermal envelope depiction.

The *building thermal envelope* shall be represented on the construction drawings.

6. Are the Occupant Sensors depicted on the plans?

a. C405.2.1 Occupant sensor controls. Occupant *sensor controls* shall be installed to control lights in the following space types:

1. Classrooms/lecture/training rooms.

2. Conference/meeting/multipurpose rooms.
3. Copy/print rooms.
4. Lounges/breakrooms.
5. Enclosed offices.
6. Open plan office areas.
7. Restrooms.
8. Storage rooms.
9. Locker rooms.
10. Corridors.
11. Warehouse storage areas.
12. Other spaces 300 square feet (28 m²) or less that are enclosed by floor-to-ceiling height partitions.

Exception: Luminaires that are required to have specific application controls in accordance with Section C405.2.5.

7. Are the Daylight Zones depicted on the plans?

- a. **C405.2.4 Daylight-responsive controls.** *Daylight responsive controls* complying with Section C405.2.4.1 shall be provided to control the general lighting within *daylight zones* in the following spaces:
 1. Spaces with a total of more than 150 watts of *general lighting* within primary sidelit daylight zones complying with Section C405.2.4.2.
 2. Spaces with a total of more than 300 watts of *general lighting* within sidelit daylight zones complying with Section C405.2.4.2.
 3. Spaces with a total of more than 150 watts of *general lighting* within toplit daylight zones complying with Section C405.2.4.3.

Exceptions: Daylight responsive controls are not required for the following:

1. Spaces in health care facilities where patient care is directly provided.
2. Sidelit daylight zones on the first floor above grade in Group A-2 and Group M occupancies.
3. New buildings where the total connected lighting power calculated in accordance with Section C405.3.1 is not greater than the adjusted interior lighting power allowance (*LPA_{adj}*) calculated in accordance with Equation 4-9.

8. Are the Automatic receptacle controls depicted on the plans?

- a. C405.11 Automatic receptacle control.** The following shall have automatic receptacle control complying with Section C405.11.1:
1. At least 50 percent of all 125V, 15- and 20-amp receptacles installed in enclosed offices, conference rooms, rooms used primarily for copy or print functions, breakrooms, classrooms and individual workstations, including those installed in modular partitions and module office workstation systems.
 2. At least 25 percent of branch circuit feeders installed for modular furniture not shown on the construction documents.
- b. C405.11.1 Automatic receptacle control function.** Automatic receptacle controls shall comply with the following:
1. Either split controlled receptacles shall be provided with the top receptacle controlled, or a controlled receptacle shall be located within 12 inches (304.8 mm) of each uncontrolled receptacle.
 2. One of the following methods shall be used to provide control:
 - 2.1. A scheduled basis using a time-of-day operated control device that turns receptacle power off at specific programmed times and can be programmed separately for each day of the week. The control device shall be configured to provide an independent schedule for each portion of the building of not more than 5,000 square feet (464.5 m²) and not more than one floor. The occupant shall be able to manually override an area for not more than 2 hours. Any individual override switch shall control the receptacles of not more than 5,000 feet (1524 m).
 - 2.2. An occupant sensor control that shall turn off receptacles within 20 minutes of all occupants leaving a space.
 - 2.3. An automated signal from another control or alarm system that shall turn off receptacles within 20 minutes after determining that the area is unoccupied.
 3. All controlled receptacles shall be permanently marked in accordance with NFPA 70 and be uniformly distributed throughout the space.
 4. Plug-in devices shall not comply.
- Exceptions:** Automatic receptacle controls are not required for the following:
1. Receptacles specifically designated for equipment requiring continuous operation (24 hours per day, 365 days per year).

2. Spaces where an automatic control would endanger the safety or security of the room or building occupants.
3. Within a single modular office workstation, noncontrolled receptacles are permitted to be located more than 12 inches (304.8 mm), but not more than 72 inches (1828 mm) from the controlled receptacles serving that workstation.

9. Start collecting system specifications information that goes into the Training and OEM Manual that will be delivered to the Building Owner at the end of the project.

a. **C103.6.2 Compliance documentation.** Energy code compliance documentation and supporting calculations shall be delivered in one document to the building owner as part of the project record documents or manuals, or as a standalone document. This document shall include the specific energy code edition utilized for compliance determination for each system, documentation demonstrating compliance with Section C303.1.3 for each fenestration product installed, and the interior lighting power compliance path, building area or space-by-space, used to calculate the lighting power allowance. For projects complying with Item 2 of Section C401.2, the documentation shall include:

i. The envelope insulation compliance path.

b. **C103.6.3 Systems operation control.** Training shall be provided to those responsible for maintaining and operating equipment included in the manuals required by Section C103.6.2. The training shall include:

1. Review of manuals and permanent certificate.
2. Hands-on demonstration of all normal maintenance procedures, normal operating modes, and all emergency shutdown and startup procedures. Training completion report.

c. Commissioning Requirements for Documentation

C408.3.2 Documentation requirements. The *construction documents* shall specify that the documents described in this section be provided to the building owner or owner's authorized agent within 90 days of the date of receipt of the *certificate of occupancy*.

C408.3.2.1 Drawings. Construction documents shall include the location and catalogue number of each piece of equipment.

C408.3.2.2 Manuals. An operating and maintenance manual shall be provided and include the following:

1. Name and address of not less than one service agency for installed equipment.
2. A narrative of how each system is intended to operate, including recommended setpoints.
3. Submittal data indicating all selected options for each piece of lighting equipment and lighting controls.
4. Operation and maintenance manuals for each piece of lighting equipment. Required routine maintenance actions, cleaning and recommended relamping shall be clearly identified.
5. A schedule for inspecting and recalibrating all lighting controls.

10. The 2018 and 2021 IECC requires extra efficiency requirements on the property. These points are tabulated in a “Combined ComCheck Energy Report”. Getting a ComCheck from the Architect for the Building Envelope, another ComCheck from the Electrician for the lighting and another ComCheck from the HVAC contractor for the HVAC system will not tabulate the points. The lack of these additional Energy code requirements could trip you up at the Final Energy Inspection.

SECTION C406 ADDITIONAL EFFICIENCY REQUIREMENTS

C406.1 Additional energy efficiency credit requirements.

New buildings shall achieve a total of 10 credits from Tables C406.1(1) through C406.1(5) where the table is selected based on the use group of the building and from credit calculations as specified in relevant subsections of Section C406. Where a building contains multiple-use groups, credits from each use group shall be weighted by floor area of each group to determine the weighted average building credit. 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
9. Where not required by Section C405.12, include an energy monitoring system in accordance with Section C406.10.
10. Where not required by Section C403.2.3, include a fault detection and diagnostics (FDD) system in accordance with Section C406.11.
11. Efficient kitchen equipment in accordance with Section C406.12.

11. The 2015, 2018 and 2021 IECC have maintenance and Commissioning requirements. Most municipalities did not adopt the Commissioning requirements in the 2015 because they were not ready for these inspections. The Commissioning requirements in the 2018 and 2021 IECC are essentially the same requirements, but the scope and detail of the Commissioning has grown exponentially with the development and use of control systems for each category of components;

SECTION C408 MAINTENANCE INFORMATION AND SYSTEM COMMISSIONING

C408.1 General. This section covers the provision of maintenance information and the commissioning of, and the functional testing requirements for, building systems.

C408.1.1 Building operations and maintenance information.

The building operations and maintenance documents shall be provided to the owner and shall consist of manufacturers' information, specifications and recommendations; programming procedures and data points; narratives; and other means of illustrating to the owner how the building, equipment and systems are intended to be installed, maintained and operated. Required regular maintenance actions for

equipment and systems shall be clearly stated on a readily visible label. The label shall include the title or publication number for the operation and maintenance manual for that particular model and type of product.

C408.2 Mechanical systems and service water-heating systems commissioning and completion requirements.

Prior to the final mechanical and plumbing inspections, the *registered design professional or approved agency* shall provide evidence of mechanical systems *commissioning* and completion in accordance with the provisions of this section. *Construction document* notes shall clearly indicate provisions for *commissioning* and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner or owner's authorized agent and made available to the *code official* upon request in accordance with Sections C408.2.4 and C408.2.5.

Exceptions: The following systems are exempt:

1. Mechanical systems and service water-heating 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 included in Section C403.5 that serve individual *dwelling units* and *sleeping units*.

C408.2.1 Commissioning plan. 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.

C408.2.2 Systems adjusting and balancing.

HVAC systems shall be balanced in accordance with generally accepted engineering standards. Air and water flow rates shall be measured and adjusted to deliver final flow rates within the tolerances provided in the product specifications. Test and balance activities shall include air system and hydronic system balancing.

C408.2.2.1 Air systems balancing.

Each supply air outlet and *zone* terminal device shall be equipped with means for air balancing in accordance with the requirements of Chapter 6 of the *International Mechanical Code*. Discharge dampers used for air-system balancing are prohibited on constant-volume fans and variable volume fans with motors 10 hp (18.6 kW) and larger. Air systems shall be balanced in a manner to first minimize throttling losses then, for fans with system power of greater than 1 hp (0.746 kW), fan speed shall be adjusted to meet design flow conditions.

Exception: Fans with fan motors of 1 hp (0.74 kW) or less are not required to be provided with a means for air balancing.