

# **Broward County Board of Rules and Appeals: Energy Conservation Committee Meeting Agenda**

July 26, 2023

1:30 PM

West Regional Library – 2<sup>nd</sup> Floor Conference Room  
8601 W. Broward Boulevard  
Plantation, FL 33324

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1. Roll Call
2. Approval of Minutes – June 21, 2023
3. Chairman’s Opening Remarks
4. Item #1: BORA Commercial Energy Guidelines (Performance).....(Dated 07-26-2023)
5. General Discussion
6. Schedule the Next Meeting
7. Adjournment

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***Sunshine Law Reminder:*** *Advisory Board members cannot communicate with each other on a possible committee or Board topic outside of a public meeting, per State statute.*

**Energy Conservation Committee Meeting Minutes –  
June 21, 2023**



**DRAFT**

# **BROWARD COUNTY BOARD OF RULES AND APPEALS**

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## **MEETING OF THE ENERGY CONSERVATION COMMITTEE**

**Minutes  
June 21, 2023**

### **Call to Order:**

Chair David Rice, P.E. called the Broward County Board of Rules and Appeals (BORA) Energy Conservation Committee to order at 1:30 PM.

The roll was called, and the following members were present:

### **Present:**

Mike Charnin  
Brock Donnelly  
Tim Fallon  
Wyatt T. Haygood

Eric Jenison  
R. Art Kamm, P.E.  
Brian Lomel, P.E.  
David Rice, P.E.

John Travers  
Dennis Ulmer  
Bob Volin

Staff: Timothy de Carion, Chief Energy Code Compliance Officer  
Dr. Ana Barbosa, Administrative Director  
Brianna Curry, Administrative Specialist

Guest: Daniel Lavrich, P.E., Board Chair

A motion was made by Mr. Haygood and seconded by Mr. Volin to approve the August 22, 2022, Energy Conservation Committee meeting minutes. The motion passed by unanimous vote.

David Rice shared that he and Timothy de Carion shared the current BORA Commercial Energy Guidelines document at an Electrical Chiefs meeting. At the meeting, electrical chiefs and building officials provided feedback about the document.

Brock Donnelly introduced himself as the newest member of the Energy Conservation Committee.

Rice reminded the group that the Energy Conservation Committee must keep the code the same. The proposed guidelines are intended to assist in how to interpret the code to aid in uniform code compliance throughout Broward County. He also shared that his goal for the meeting was to identify the changes that were made to the

current draft of the guidelines document and determine additional changes. He added that the energy guidelines will aid in uniform code enforcement throughout Broward County.

John Travers shared that he has concerns about the implementation of the Commercial Energy Guidelines. For example, a building official is responsible for signing off on Certificates of Occupancy. Part of the packet that is submitted to a building official includes the completed energy display card. At times, designers will receive credits for ceiling fans which leads to electrical inspectors verifying ceiling fan installation at the final inspection. An electrical inspection must note if there is a ceiling fan installed or simply ceiling outlets with blank plates on them. The process could be more convenient and creates a reason for inspectors to visit the same sites more often rather than moving on to the next project.

Chair Rice introduced Daniel Lavrich, P.E., the Board Chair of BORA, and Ana Barbosa, the Administrative Director of BORA.

Rice added that his goal for this meeting is to identify the recent changes that were made to the guidelines. The electrical and plumbing sections are new. Also, if the changes are approved by the committee next month, he would like to pass the Commercial Energy Guidelines along to the Board.

### **Item #1: BORA Commercial Energy Guidelines (Performance)**

Mr. de Carion read through the BORA Commercial Energy Guidelines (Performance) document. There were minor changes made to the title page, table of contents, overview, and building code administrators checklist sections.

Eric Jenison asked de Carion about the preliminary commissioning report that was mentioned in the code. The preliminary commissioning report is typically provided for the CO, but the commissioning process is completed further into the process. All of the controls can be completed, as well as the analytics, but it remains incomplete.

de Carion said that there was a debate at the Energy Technical Advisory Committee (TAC) meeting earlier this year. There was a proposition to alter the wording in the 2023 code to require the code official to review the preliminary commissioning report before a final inspection.

de Carion continued to comb through the BORA Commercial Energy Guidelines document with the committee members present. The following sections were reviewed and revised: the Administrative Checklist (all disciplines), the BORA Structural Checklist (Performance Pathway Only), the BORA Mechanical Checklist (Performance Pathway Only), the BORA Electrical Checklist (Performance Pathway Only), and the BORA Plumbing Checklist (Performance Pathway Only).

While discussing thermal imaging in the BORA Plumbing Checklist, Wyatt T. Haygood mentioned that his department found that the thermal imaging provided a very clear picture of all of the fill cells throughout the house. He added that the only issue that comes to mind is the learning curve of people who already know how to read the thermal imaging reports.

Rice said that he intends to schedule the next Energy Conservation Committee meeting for mid-July. He asked the committee members to review the next draft closely.

Rice asked Brian Lomel, P.E., and R. Art Kamm, P.E., to provide feedback from an engineer's perspective.

Rice estimates that the July meeting will probably be the last Energy Conservation Committee meeting for a while.

A motion was made by Mr. Volin and seconded by Mr. Ulmer to adjourn the Energy Conservation Committee meeting. The motion passed by unanimous vote.

**Adjournment**

Having no further business to go before the Committee, the meeting adjourned at 2:29 PM.

**Item #1: BORA Commercial Energy Guidelines  
(Performance) – (Dated 07-26-2023)**

# BORA Commercial Energy Guidelines

C401.2 (3): FBC Total Building Performance Compliance Option

Compliance with Sections C402.5, C403.2, C404, C405.2, C405.5, C407, and C408

## Broward County Board of Rules and Appeals

### Energy Conservation Seventh Edition (2020)

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FBC Seventh Edition (2020)

Effective: \_\_\_\_\_



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## Overview

To obtain uniform energy code enforcement in commercial buildings in Broward County, the Energy Conservation Committee has developed guidelines to aid jurisdictions in determining which discipline-specific code official enforces certain sections of the 2020 Florida Building Code Energy Conservation.

The following code sections regarding enforcement duties are as stated:

### **R103.3 & C103.3 Examination of documents.**

*The code official shall examine or cause to be examined the accompanying construction documents and shall ascertain whether the construction indicated and described is in accordance with the requirements of this code and other pertinent laws or ordinances.*

### **R103.3.1 & C103.3.1 Approval of construction documents.**

*When the code official issues a permit where construction documents are required, the construction documents shall be endorsed in writing and stamped "Reviewed for Code Compliance."*

### **R104.1 & C104.1 General**

*Construction or work for which a permit is required shall be subject to inspection by the code official or his or her designated agent, and such construction or work shall remain accessible and exposed for inspection purposes until approved.*

## **The Basis for the Guidelines:**

The Florida Building Code Seventh Edition (2020) Energy Conservation for new and existing buildings has designated that the code official is responsible for both the construction document approval and construction inspection approval.

Unfortunately, the Florida Building Code Energy Conservation administrative chapters do not designate which discipline-specific code official will review compliance documents and building plans and inspect specific items for code compliance found in the Energy Conservation Code.

The "building official" or "code official" for energy code purposes shall be defined as: "The officer or other designated authority having jurisdiction charged with the administration and enforcement of this standard or a duly authorized representative."

Broward County is unique in that we have individual certified plan review and inspection personnel for each discipline and that a multi-discipline code official is not the norm. Subsequently, uniformity needs to be improved in enforcing the energy code, which created confusion among code officials over which specific disciplines will enforce certain code provisions.

This guide can be used as a tool for the Building Official to determine which discipline-specific code official will review and inspect specific sections of the Energy Code for code compliance to address those issues. This guide shall not prevent any certified code official from issuing a correction notice for any Energy Code deficiency found in another discipline if they notify the Chief Inspector of that discipline of the correction notice.

*This is a minimum checklist. The local AHJ may have additional checklist items.*

## Building Code Administrators Checklist

### Performance Pathway Only

#### Plan Review

##### **Scope and Administrative**

1. The building official or his or her designated agent shall verify that the building envelope, HVAC, Service Water Heating, Power, Lighting, and other equipment shown on the plans have been reviewed for energy code compliance and match the energy compliance report. The building official or his or her designated agent shall sign the code compliance report stating that the plans have been reviewed for all disciplines and the plans will be inspected according to the Florida Building Code Energy Conservation. The building department may use "**Appendix A**" as a compliance tool.

#### Code Section

##### **Chapter 1**

C103.3  
C103.3.1  
CH-1 107.3  
C101.5.1  
FS 553.908

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#### Certificate of Occupancy

1. Buildings that require commissioning according to section C408.2, shall not be considered acceptable for final inspection pursuant to Section C104.2.6 until the code official 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**" The code official may require a review of the "**Preliminary Commissioning Report**" before final inspection to identify deficiencies found during testing that violate the code. Form "**Appendix E**" (**Commissioning Compliance Checklist**) may be used as a cover page to insure a complete "**Preliminary Commissioning Report.**"

#### Code Section

C408.2.4  
C408.2.4.1  
C408.2.4.2  
CH-1 110.3.7.2

## Administrative Checklist

### All Disciplines

<u>Plan Review</u>	<u>Code Section</u>
<b>Scope and Administrative</b>	
<input type="checkbox"/> 1. New Commercial buildings shall comply with the Florida Building Code 7th Edition (2020) Energy Conservation. Additions to buildings shall be considered new construction.	C101.2 C502
<input type="checkbox"/> 2. Existing buildings shall be classified as exempt, except those buildings defined as <b>“renovated buildings”</b> , in which the total work exceeds 30% of the value of the structure. Buildings which have a change of occupancy type or unconditioned buildings to which comfort cooling is added are not exempt. Buildings specified in Sections C101.4.2.1 thru C101.4.2.4 are exempt.	C101.4.2
<input type="checkbox"/> 3. An existing building or portion thereof shall not be altered to become less energy efficient.	EBC701.2
<input type="checkbox"/> 4. The complete energy compliance report (Energy Calcs) shall be provided. Forms generated from computer software approved by the Florida Building Commission shall show <b>“PASS”</b> for <b>all</b> calculated disciplines.	C101.5.1
<input type="checkbox"/> 5. The <b>“design professional”</b> responsible for the <b>“design of the building lighting, electrical, mechanical, plumbing systems, and the building shell”</b> shall certify compliance with the code by signing the energy code compliance form. <b>Note:</b> The signature date shall be dated after the plan date to ensure compliance with current plans.	C103.1.1.1.2
<input type="checkbox"/> 6. The <b>“code official”</b> shall have the authority to approve a permit for part of the entire energy conservation system ( <b>such as a shell permit</b> ). Adequate information and detailed statements listing all code requirements must be submitted with this permit. The permit holder shall proceed at their own risk without assurance that the permit to complete will be granted. <b>Note:</b> All spaces inside of a shell building shall be considered as <b>“conditioned space”</b> at time of construction regardless of whether the a/c equipment is installed unless approved by the building official.	C103.3.3
<input type="checkbox"/> 7. Changes to specified equipment made during the construction process that does not match the plans and energy compliance report shall be resubmitted and approved as amended.	C103.4
<b>Commissioning</b>	
<input type="checkbox"/> 8. Plans shall clearly indicate provisions for commissioning and completion requirements when required according to section C408.2.	<b>C408</b> C408
<input type="checkbox"/> 9. Construction documents shall have a note on the plans that the building owner or owners authorized agent shall receive within 90 days of the day of receipt of the certificate of occupancy the following items: <b>1.) Equipment Drawings 2.) Maintenance Manuals 3.) Testing Report</b>	C408.2.5 C408.2.5.3 C408.2.5.4 C408.3.2
<input type="checkbox"/> 10. The building shall not be occupied until documentation and verification of the installation and proper operation of all controls when commissioning is required. A letter signed by the owner or owners representative acknowledging receipt of the <b>“Preliminary Commissioning Report”</b> is required. <b>“Appendix E” cover page checklist may be used.</b>	C408 C104.2.6
<input type="checkbox"/> 11. The code official is authorized to accept inspection reports in whole or in part from either individual as defined in Section 553.993(5) or (7) of the Florida Statutes (Energy Auditor or Energy Rater); or third-party inspection agencies not affiliated with the building design or construction for energy code compliance.	C104.4
<input type="checkbox"/> 12. The code official shall be permitted to require a copy of the <b>“Preliminary Commissioning Report”</b> be reviewed by a code official. The <b>“Itemization of Deficiencies”</b> found during testing shall be included in the report, and corrective measures used or proposed. <b>“Appendix E” cover page checklist may be used.</b>	C408.2.4. C408.2.4.2

**BORA Structural Checklist**  
**Performance Pathway Only**

<b><u>Plan Review</u></b>	<b><u>Code Section</u></b>
<b>Scope and Administrative</b>	<b>Chapter 1</b>
<input type="checkbox"/> 1. The administrative checklist on page #5 has been completed.	
<input type="checkbox"/> 2. The plans shall show in detail all the pertinent energy data and features of the building including but not limited to:	C103.2
<input type="checkbox"/> a) Insulation materials and their R-values. <b>(S-1)</b>	
<input type="checkbox"/> b) Fenestration U-factor, solar heat gain coefficient (SHGC), and visible transmittance (VT) shall be shown. <b>"Appendix B"</b> may be used for compliance. <b>(S-2)</b>	
<input type="checkbox"/> c) Air leakage sealing details.	
<b>General Requirements</b>	<b>Chapter 3</b>
<input type="checkbox"/> 3. The U-factor, SHGC, VT, and air leakage rate for all manufactured fenestration products shall be determined by an accredited, independent laboratory and certified and labeled by the manufacturer or given default values in the tables. <b>(S-2)</b> <b>"See Appendix C"</b>	C303.1.3
<b>Building Thermal Envelope</b>	<b>C402</b>
<input type="checkbox"/> 4. Roof insulation (as part of the envelope) shall not be located on a suspended ceiling with removable ceiling panels. (Insulation installed for sound and not part of the thermal envelope is allowed.)	C402.2.
<input type="checkbox"/> 5. The entire building <b>"thermal envelope"</b> shall be designed and constructed with a continuous air barrier and shall be <b>"clearly identified"</b> on the construction documents.	C103.2.1 C402.5.1
<input type="checkbox"/> 6. Weatherseals shall be installed on all loading dock/cargo doors for separating conditioned space from unconditioned space. <b>"See Table C402.5.2"</b>	C402.5.4 C402.5.6
<input type="checkbox"/> 7. Where unsealed or vented cavities occur over conditioned spaces, the ceiling shall be considered the pressure envelope of the building. Ceilings with drywall may be an air barrier but dropped acoustical tile ceilings (T-bar) may not. (See air barrier definition in C202)	C402.5.9
<b>Total Building Performance</b>	<b>C407</b>
<input type="checkbox"/> 8. The roof or ceiling that functions as the thermal envelope shall be insulated to at least R-10. Multifamily Residential roof/ceilings shall be insulated to a minimum R-19, space permitting.	C407.2.1
<input type="checkbox"/> 9. The code official shall be permitted to require thermal zone diagrams consisting of floor plans showing each zone.	C407.4.2 (1)
<input type="checkbox"/> 10. The <b>"input data report"</b> from the approved software shall be generated simultaneously with the compliance report to verify each entry into the software.	C407.4.2 (2)
<input type="checkbox"/> 11. Building types and thermal blocks shall be accurately identified on the compliance report and shall not be combined unless they share the same features.	C407.5.2
<hr/> <b><u>Structural Rough Inspection</u></b>	<hr/> <b>C104.2.2</b>
<input type="checkbox"/> 12. A label shall be affixed to the window showing the tested U-Value, SHGC, and VT. Products lacking such a label shall be given the default values in Tables C303.1.3. Installed vertical fenestration values shall be consistent with the specifications submitted with the plans. <b>(S-1)</b>	C303.1.3
<input type="checkbox"/> 13. Insulation shall be installed to manufacturer's recommendations in a manner as to achieve the rated R-value. Insulation shall be labeled with R-value or a certificate providing R-value.	C303.2
<input type="checkbox"/> 14. The entire building thermal envelope shall be constructed with a continuous air barrier. Penetrations in the thermal envelope shall be sealed in an approved manner.	C402.5.1
<hr/> <b><u>Structural Final Inspection</u></b>	<hr/> <b>C104.2.6</b>
<input type="checkbox"/> 15. The building envelope components and assemblies shall be inspected for air leakage. When testing is specified, an independent third party shall test air leakage to $\geq 0.40$ cfm/ft <sup>2</sup> .	C402.5

**BORA Mechanical Checklist**  
**Performance Pathway Only**

<b><u>Plan Review</u></b>	<b><u>Code Section</u></b>
<b>Scope and Administrative</b>	<b>Chapter 1</b>
<input type="checkbox"/> 1. The administrative checklist on page #5 has been completed.	
<input type="checkbox"/> 2. The plans shall show in detail all the pertinent energy data and features of the mechanical systems and equipment. Details shall include but not limited to:	C103.2
<input type="checkbox"/> Mechanical system design criteria	
<input type="checkbox"/> Mechanical system and equipment types, sizes, and efficiencies	
<input type="checkbox"/> Economizer description	
<input type="checkbox"/> Equipment and system controls	
<input type="checkbox"/> Fan motor horsepower (hp) and controls	
<input type="checkbox"/> Duct sealing, duct and pipe insulation and location	
<hr/>	
<b>Building Mechanical Systems</b>	<b>C403</b>
<input type="checkbox"/> 3. Design heating and cooling loads shall be in accordance with ANSI/ASHRAE/ACCA Std. 183 or ACCA Manual N or an approved equivalent and shall be attached to the compliance form. A signed and sealed summary sheet designed by a registered engineer may be submitted in lieu of the complete calculation but must show the required information.	C403.2.1
<input type="checkbox"/> 4. The output capacity of the cooling and heating equipment shall not be greater than the loads calculated. Equipment selected shall be as small as possible within available equipment options. Stand-by/Backup equipment and duplicate sequenced load systems are exempt from this section.	C403.2.2
<input type="checkbox"/> 5. HVAC equipment shall meet the minimum efficiency requirements and shall be verified through certification by an approved program or equivalent. <b>(AHRI or Manufacturer)</b>	C403.2.3
<input type="checkbox"/> 6. Cooling towers shall meet the minimum performance requirements in Tables.	C403.2.3
<input type="checkbox"/> 7. Specific HVAC <b>“system controls”</b> shall be provided for temperature, setpoint overlap, off hour controls, shutoff dampers, fan control, economizers, VAV systems.	C403.2.4
<input type="checkbox"/> 8. AMCA-500D tested, labeled, and approved motorized or gravity shutoff dampers shall be provided on outdoor air intakes and exhaust openings.	C403.2.4.3
<input type="checkbox"/> 9. Group R-1 <b>(Hotels)</b> having over 50 Guest rooms shall have controls (such as a card key system) to control temperature and ventilation in unoccupied rooms.	C403.2.4.8
<input type="checkbox"/> 10. <b>“Demand control ventilation”</b> (DCV) (such as “Carbon Dioxide” monitors) are required in spaces over 500 sq./ft. and an average occupancy of 25 or greater per 1000 sq./ft. of floor area. See system requirements and exceptions.	C403.2.6.1
<input type="checkbox"/> 11. Enclosed automobile parking garages shall have detection controls (such as carbon monoxide detectors) to reduce ventilation to at least 50% capacity or intermittently operate fans 20% of the occupied time. Detection controls and alarms shall override reductions. Exhaust systems under 25,500 cfm and power ratios exceeding 1125 cfm/hp are exempt.	C403.2.6.2
<input type="checkbox"/> 12. Where the total of all kitchen hoods exhaust is greater than 5,000 cfm, each hood shall be a factory built commercial exhaust hood listed in accordance with UL 710. One make-up air requirement option (like DCV) shall be selected. See exceptions.	C403.2.8
<input type="checkbox"/> 13. Duct insulation shall meet the minimum R-Value.	C403.2.9.1
<input type="checkbox"/> 14. Space shall be provided adjacent to all mechanical components that form the air distribution system, including air handling units. <i>(a minimum of (4) four inches is sufficient).</i>	C403.2.9.3.3

**BORA Mechanical Checklist**  
**Performance Pathway Only**  
**Continued**

<b><u>Plan Review</u></b>	<b><u>Code Section</u></b>
<input type="checkbox"/> 15. Cavities of a building shall not be used as a return air <i>“plenum”</i> unless the roof deck is insulated to a minimum of R-19. Roof insulation values shall be verified by the designer.	C403.2.9.4
<input type="checkbox"/> 16. Ductwork shall be sized and designed with engineering standards. Sizing shall be room by room based on loads, static pressure, length, and friction loss. <i>“Manual-D”</i> or Equiv.	C403.2.9.5
<input type="checkbox"/> 17. Air-Handling units shall not be allowed in attics as defined in commercial buildings. Air handlers must be located within the thermal envelope of the building and cannot be located immediately below an uninsulated roof. <b>(M-1)</b>	C403.2.9.6
<input type="checkbox"/> 18. Heating and Cooling piping shall be insulated with values listed in Table C403.2.10 except where listed in this code section.	C403.2.10
<input type="checkbox"/> 19. Refrigeration systems shall meet the minimum performance requirements.	C403.2.14
<b>Total Building Performance</b>	<b>C407</b>
<input type="checkbox"/> 20. The <i>“input data report”</i> from the approved software shall be generated simultaneously with the compliance report to verify each entry into the software and match the plan.	C407.4.2 (2)
<b>System Commissioning</b>	<b>C408</b>
<input type="checkbox"/> 21. Construction documents shall clearly indicate provisions for commissioning and completion when the total cooling equipment capacity exceeds 480,000 btu’s (40 tons). The HVAC units for dwelling units or sleeping units are to be excluded from total btu’s.	C408.2
<input type="checkbox"/> 22. Construction documents shall require that a written test and balance report be provided to the owner or his representative for conditioned buildings with a total area exceeding 5,000 sq/ft. Buildings with cooling systems of 65,000 btu’s or less per system are exempt from these requirements . (See building definition) <b>(M-2)</b>	C408.2.2
<input type="checkbox"/> 23. Total building envelope pressurization shall be either neutral or positive to prevent excess infiltration of latent load. Kitchen hood exhaust shall be sized to prevent excessive depressurization. An <i>“air balance schedule”</i> totaling all airflow is needed to show compliance.	C408.2.2.1
<hr/> <b><u>Mechanical Rough Inspection</u></b>	<hr/> <b>C104.2.4</b>
<input type="checkbox"/> 24. Duct and Piping insulation shall be installed according to manufactures instructions.	C303.2
<input type="checkbox"/> 25. Duct insulation shall meet the minimum R-Value specified. (See exceptions).	C403.2.9.1.1
<input type="checkbox"/> 26. Duct insulation shall be protected from damage and shall be sealed. Additional insulation shall be provided when the minimum insulation is insufficient to prevent condensation. <b>(M-3)</b>	C403.2.9.1.2
<input type="checkbox"/> 27. High-pressure duct systems designed to operate at pressures greater than 3-inch water gauge (4-inch water gauge pressure class) shall be tested for leakage per Table C403.2.9.2	C403.2.9.2
<input type="checkbox"/> 28. All ducts and building cavities that are part of the air distribution system shall be sealed.	C403.2.9.3
<input type="checkbox"/> 29. All air distribution system components shall be mechanically fastened to secure the sections in addition to a seal. A clinching strap used on flex duct systems is not a sealing method.	C403.2.9.3.1 C403.2.9.3.6
<input type="checkbox"/> 30. Terminal fittings (such as boot cans) and intermediate fittings shall be sealed with an approved closure system to provide an air barrier. Closure systems shall use manufacturers instructions or industry installation standards where more restrictive.	C403.2.9.3 C403.2.9.3.2 C403.2.9.3.4
<input type="checkbox"/> 31. Air distribution systems and hydronic systems shall have means to balance air and water systems to NEBB, AABC or equivalent standards. Buildings with cooling systems of 65,000 btu’s or less per system are exempt. (See building definition) <b>(M-2)</b>	C408.2.2.1 C408.2.2.2

**BORA Mechanical Checklist**

**Performance Pathway Only**

**Continued**

	<b><u>Code Section</u></b>
<b><u>Mechanical Final Inspection</u></b>	<b>C104.2.4</b>
<input type="checkbox"/> <b>32.</b> Equipment model numbers and efficiency ratings of HVAC equipment shall be verified thru certification under an approved certification program. <b>(AHRI)</b>	C403.2.3
<input type="checkbox"/> <b>33.</b> Motorized or gravity shutoff dampers shall be installed on outdoor air intakes and exhaust openings. Dampers shall close when system or space is not in use. <b>(M-4)</b>	C403.2.4.3
<input type="checkbox"/> <b>34.</b> Mechanical closets/equipment rooms shall be sealed. All penetrations shall be sealed with an approved closure system. Wall and ceiling passageways shall be framed and sealed.	C403.2.9.2
<input type="checkbox"/> <b>35.</b> Insulation exposed to weather shall be protected from damage by sunlight, moisture, maintenance and wind. Adhesive tape shall not be used on pipe insulation.	C403.2.9.1.2 C403.2.10.1
<input type="checkbox"/> <b>36.</b> Refrigeration systems, commercial refrigerator/freezers, and walk-in coolers/freezers, shall meet the performance requirements in Tables C403.2.14.1(1) thru C403.2.12.2(3)	C403.2.14
<hr/>	
<b><u>System Commissioning</u></b>	<b>C408</b>
<input type="checkbox"/> <b>37.</b> Systems serving zones exceeding 5000 sq/ft. shall have the air distribution system tested adjusted, and balanced by a licensed engineer or a company or individual holding a current certification from a recognized testing and balancing agency. Buildings with cooling systems of 15 tons or less per system may be tested and balanced by the mechanical contractor.	C408.2.2
<input type="checkbox"/> <b>38.</b> Air distribution systems shall be tested, adjusted, and balanced to be at least within 10% or less as specified by the designer of record per NEBB, AABC or equivalent procedures.	C408.2.2.1
<input type="checkbox"/> <b>39.</b> Hydronic systems shall have a means to balance and shall be balanced for pumps (>5 HP).	C408.2.2.2
<input type="checkbox"/> <b>40.</b> Access to air balancing dampers and hydronic balancing/flow valves shall be provided.	M306.1

**BORA Electrical Checklist**  
**Performance Pathway Only**

**Plan Review**

**Code Section**

**Scope and Administration**

**Chapter 1**

- 1. The administrative checklist on page #5 has been completed.
- 2. The plans shall show in detail all the pertinent energy data and features of the electrical systems and equipment. Details shall include but not limited to:
  - Lighting Fixture Schedule with Wattage
  - Control Narrative
  - Location of "Daylight Zones" on floor plans

**Building Envelope Requirements**

**C402**

**Air Leakage**

**C402.5**

- 3. Air barriers shall be maintained and sealed for all light fixtures and other electrical equipment, junction boxes, conduits, cables, etc., when they penetrate the thermal envelope. **C402.5.1.1(4)**
- 4. Recessed lighting installed in the thermal envelope shall be: **C402.5.8**
  - 1.) IC Rated
  - 2.) Labeled < 2.0 CFM leakage
  - 3.) Sealed with an approved method

**Electrical Power and Lighting Systems**

**C405**

- 5. Lighting for dwelling units in multifamily buildings shall comply with residential Section R404.1 (% and efficacy requirements). **C405.1**

**Lighting Controls**

**C405.2**

- 6. The lighting control narrative shall be shown on the plans. The design professional, not the plan reviewer shall declare one of the two compliance options of lighting control specified in Section C405.2(1) or C405.2(2). **C405.2**
- 7. The light fixtures shall be compatible with the control devices. **C303.2**

**Occupant Sensor Controls**

**C405.2.1**

- 8. The floor plans shall show the location of each occupancy sensor in the following areas: **C405.2.1**
  - Conf./Mtg,  Copy/Print,  Lounges/Break,  Enclosed offices,  Open plan offices
  - Restrooms,  Storage,  Locker,  Enclosed spaces < 300 sq/ft,  Warehouse Storage
- 9. Warehouses shall be provided with "occupant sensors" in each aiseways and separately in open areas. **C405.2.1.2**
- 10. Open plan office areas greater than 300 sq/ft. shall have separate "control zones" not not greater than 600 sq./ft. **C405.2.1.3**

**Time Switch Controls**

**C405.2.2**

- 11. Each area not provided with occupancy sensor controls mentioned in C405.2.1 shall be provided with "time switch controls" and "manual controls." **C405.2.2**  
Except for: Specific areas listed in C405.2 and C405.2.2 and when (LLLC) is provided.

**Light Reduction Controls**

**C405.2.2.2**

- 12. Manual light reduction controls are required in spaces without occupancy sensors and controlled by "time switch controls". as specified in accordance with C405.2.2.1 thru C405.2.2.2 (see exceptions) **C405.2.2.1**  
**C405.2.2.2**

**Daylight Responsive Controls**

**C405.2.3**

- 13. "Daylight responsive controls" shall be provided to control electric lighting within shown daylight zones when required by C405.2.3 **C405.2.3**

**Special Application Controls**

- 14. Specific application lighting shall have an occupancy sensor or time switch controls for: **C405.2.4(1)**
  - Display/Accent,  Display cases,  Task,  Lighting for sale
- 15. Sleeping units in hotels shall have a control device (such as a card key system) to turn off lights and switched receptacles within 20 minutes after all occupants have left. **C405.2.4(2)**



**BORA Electrical Checklist**  
**Performance Pathway Only**  
Continued

	<u>Code Section</u>
<b>Exterior Lighting Controls</b>	<b>C405.2.6</b>
<input type="checkbox"/> 16. Exterior lighting shall have daylight shutoff controls.	C405.2.6.1
<input type="checkbox"/> 17. Decorative lighting shall have an automatic time switch control shutoff.	C405.2.6.2
<b>Exterior Lighting Power Requirements</b>	<b>C405.4</b>
<input type="checkbox"/> 18. Total connected exterior lighting power shall be calculated using Tables C405 .4.2 (1) & (2) from the software and all lighting calculated on the “input data report” shall match the plans.	C405.4.1
<b>Electric Power</b>	<b>C405.5</b>
<input type="checkbox"/> 19. Commercial buildings with individual dwelling units shall have each unit separately metered.	C405.5.2
<input type="checkbox"/> 20. Conductors for feeders and branch circuits combined shall be sized for a maximum of 5% drop total.	C405.5.3
<input type="checkbox"/> 21. Construction documents shall have a note to require the building owner to receive:	C405.5.4.1
1.) Record drawings within 30 days 2.) Manuals	C405.5.4.2
<input type="checkbox"/> 22. Dry-type distribution transformers shall comply with C404.6	C405.6
<input type="checkbox"/> 23. Electric motors shall comply with C405.7	C405.7
<input type="checkbox"/> 24. Vertical and horizontal transportation systems and equipment shall comply with C405.8	C405.8
<b>Total Building Performance</b>	<b>C407</b>
<input type="checkbox"/> 25. Compliance Report (Energy Calculations Software) shall be provided and the input report shall list all the interior and exterior lighting for calculations to match the plans.	C407.4.1 C407.6.2
<hr/>	
<b>Electrical Rough Inspection</b>	<b>C104.2.5</b>
<input type="checkbox"/> 26. Inspection shall verify that the installed lighting systems, components, controls, and meters are in compliance with the Energy Code and the approved plans.	C104.2.5
<input type="checkbox"/> 27. Air barriers shall be maintained and sealed for all light fixtures and other electrical, equipment, Junction boxes, conduits, cables, etc. when penetrating the thermal envelope.	C402.5.1
<hr/>	
<b>Electrical Final Inspection</b>	<b>C104.2.6</b>
<input type="checkbox"/> 28. Air barriers shall be maintained and sealed for all light fixtures and other electrical Equipment, junction boxes, conduits, cables, etc., when they penetrate the thermal envelope.	C402.5.1
<hr/>	
<b>Maintenance Information and System Commissioning:</b>	<b>C408</b>
<input type="checkbox"/> 29. Prior to passing final Inspection, the registered design professional shall provide evidence that the lighting control system has been tested and working per the plans and manufacturer’s instructions. The report shall include the results and contain a list of the disposition of deficiencies found, and corrective measures proposed. (Appendix E may be used)	C408.3 C408.3.1 C408.3.2
<b>Note:</b> The plans may require that the contractor provide written evidence that the lighting control systems have been tested by either the electrical contractor, the lighting fixture manufacturer’s representative, and/or the control system representative.	
<input type="checkbox"/> 30. Building operation and maintenance documents shall be provided to the owner for all electrical power, lighting control systems, etc. as per C408.1. (Appendix E may be used)	C408.1

**BORA Plumbing Checklist**  
**Performance Pathway Only**

<b><u>Plan Review Administration</u></b>	<b><u>Code Section</u></b>
<input type="checkbox"/> 1. The administrative checklist on page #5 has been completed.	
<input type="checkbox"/> 2. The plans shall show in detail all the pertinent energy data and features of the service water heating systems and equipment. Details shall include but not limited to:	C103.2
<input type="checkbox"/> Insulation Materials and their R-Values	
<input type="checkbox"/> Service water heating system and equipment types, sizes, and efficiencies	
<input type="checkbox"/> Equipment and system controls	
<b>Definitions</b>	<b>Chapter 2</b>
<b>Circulating Hot Water System</b>	<b>C202</b>
• A hot water distribution system where pumps are used to circulate heated water from the water-heating equipment to the fixture and back. (System has a dedicated return pipe)	
<b>Demand Recirculating System</b>	
• A hot water distribution system where pumps prime the hot water supply piping with heated water upon demand for hot water. (Uses cold-water supply pipe to prime HW pipe)	C202
<b>Service Water Heating</b>	<b>C404</b>
<input type="checkbox"/> 3. Water-Heating equipment and hot water tanks shall meet the minimum efficiency requirements of Table C404.2 and be verified through either data from the manufacturer or by an approved program or equivalent. (AHRI)	C404.2
<input type="checkbox"/> 4. All supply and return recirculating hot water piping shall be insulated with the required thickness found in Table C403.2.10. The first 8 feet of branch piping shall be insulated.	C404.4
<input type="checkbox"/> 5. Heated water supply piping shall be limited in length or water volume according to Table C404.5.1. When maximum lengths differ from plumbing code, the more stringent applies.	C404.5 CH#1-102.1
<input type="checkbox"/> 6. Heated water circulating systems shall have <i>accessible</i> controls, sensors, and pump. Manual controls shall be “readily accessible” without requiring removal of any obstruction.	C404.6
<input type="checkbox"/> 7. Heated Water Circulation Systems shall have controls that start the pump based on a demand for hot water. The controls shall also turn off the pump when the temperature of the hot water is at the desired temperature and there is no demand for hot water.	C404.6.1
<input type="checkbox"/> 8. “Demand Circulation Systems” shall have controls with one of the following:	C404.6.1
<input type="checkbox"/> Start the pump upon receiving a signal from the user of a fixture.	
<input type="checkbox"/> Start the pump with a device sensing the presence of the user.	
<input type="checkbox"/> Start the pump with a device that senses the presence of flow to a fixture or appliance. A separate control is also required to limit the water entering the cold-water supply to 104°	
<b>Total Building Performance</b>	<b>C407</b>
<input type="checkbox"/> 9. The “input data report” from the approved software shall be generated simultaneously with the compliance report to verify each service water heating entry into the software.	C407.4.2.2
<hr/>	
<b><u>Plumbing Rough Inspection</u></b>	<b>C104.2.3</b>
<input type="checkbox"/> 10. The rough inspection shall verify the type and R-value of the pipe insulation.	C404.4
<input type="checkbox"/> 11. Heated water supply piping shall comply with length (C404.5.1) or water volume (C404.5.2).	C404.5
<hr/>	
<b><u>Plumbing Final Inspection</u></b>	<b><u>Code Section</u></b>
<input type="checkbox"/> 12. Water Heating Equipment model numbers shall match the approved plans.	C404.2
<input type="checkbox"/> 13. Required pipe insulation and insulation protection shall be installed.	C404.4
<input type="checkbox"/> 14. Required hot water pump controls shall be installed and be accessible.	C404.6
<b><u>Maintenance Information and System Commissioning:</u></b>	<b>C408</b>
<input type="checkbox"/> 15. The Service Water Heating control system shall be tested that control devices, components, equipment and systems are calibrated and adjusted and working according to plans and specs.	C408.2.3.2



**APPENDIX A**

**COMMERCIAL ENERGY CODE COMPLIANCE REVIEW FORM**

PERMIT # \_\_\_\_\_ ADDRESS \_\_\_\_\_

*A review of the plans and specifications covered by this compliance report indicates compliance with the \_\_\_\_\_ Florida Energy Conservation Code.*

<u>DISCIPLINE</u>	<u>NAME</u>	<u>SIGNATURE</u>	<u>DATE</u>
STRUCTURAL			
MECHANICAL			
PLUMBING			
ELECTRICAL			

**APPENDIX B**

**Commercial Fenestration Product Rating Submittal Form**

*In accordance with the Florida Energy Conservation Code C303.1.3, this form can be used as a tool for the submittal process to document the proposed energy product rating for windows, doors, and skylights.*

**Recommended for Review:**

- Copy of the approved input report from the Energy Calculations showing each fenestration design rating (U-value, SHGC and VT) for all fenestration in the entire building.
- A list of the NFRC “Certified Product Directory” number of each window showing the U-Value, SHGC and VT on the attached form. These numbers may be found on the NFRC website:  
<https://search.nfrc.org/search/searchDefault.aspx>

**Notes:**

- *Products not listed in the NFRC directory shall be tested by an accredited, independent laboratory in accordance with FBCEC C303.1.3. Products not tested and lacking certification and labeling shall be assigned a default rating from the energy tables.*
- *Products submitted that do not match the approved Energy Calculations shall require a revised energy compliance report or window submittal per FBCEC C103.4*

<u>Window #</u>	<u>*NFRC Directory Number</u>	<u>Description</u>	<u>U-Value</u>	<u>SHGC</u>	<u>VT</u>
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

<u>Window #</u>	<u>*NFRC Directory Number</u>	<u>Description</u>	<u>U-Value</u>	<u>SHGC</u>	<u>VT</u>
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
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28					
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36					
37					
38					

**\*Products not tested and "labeled" use the "Default Tables in C303.1.3**

APPENDIX C

**TABLE C303.1.3(1)**  
**DEFAULT GLAZED FENESTRATION U-FACTORS**

FRAME TYPE	SINGLE PANE	DOUBLE PANE	SKYLIGHT	
			SINGLE	DOUBLE
<u>Metal</u>	<u>1.20</u>	<u>0.80</u>	<u>2.00</u>	<u>1.30</u>
<u>Metal with Thermal Break</u>	<u>1.10</u>	<u>0.65</u>	<u>1.90</u>	<u>1.10</u>
<u>Nonmetal or Metal Clad</u>	<u>0.95</u>	<u>0.55</u>	<u>1.75</u>	<u>1.05</u>
<u>Glazed Block</u>	<u>0.60</u>			

**TABLE C303.1.3.(2)**  
**DEFAULT OPAQUE DOOR U-FACTORS**

DOOR TYPE	U-FACTOR
<u>Uninsulated Metal</u>	<u>1.20</u>
<u>Insulated Metal (Rolling)</u>	<u>0.90</u>
<u>Insulated Metal (Other)</u>	<u>0.60</u>
<u>Wood (Other)</u>	<u>0.50</u>
<u>Insulated, nonmetal edge, max 45% glazing.</u> <u>Any glazing double pane</u>	<u>0.35</u>

**TABLE C303.1.3 (3)**  
**DEFAULT WINDOW, GLASS DOOR, AND SKYLIGHT SHGC AND VT**


	SINGLE GLAZED		DOUBLE GLAZED		GLAZED BLOCK
	CLEAR	TINTED	CLEAR	TINTED	
SHGC	0.8	0.7	0.7	0.6	0.6
VT	0.6	0.3	0.6	0.3	0.6

## Appendix D

### STRUCTURAL NOTES

**S-1** The plans shall specify as to what type and R-value of insulation are to be installed. It is unacceptable to have comments on the plan details that indicate: “see energy calculations”. Baffles are required for blown-in insulation to keep the vents from becoming blocked upon installation and drift.

**S-2** Windows must be tested for energy efficiency if the compliance report does not use default values in Tables C303.1.3. U-factors shall be determined in accordance with standard NFRC 100. The VT (Visual Transmittance) and the SHGC (Solar Heat Gain Coefficient) shall be determined in accordance with standard NFRC 200. Testing must be done by an accredited independent laboratory and then labeled and certified by the manufacturer. NFRC standards require both computer simulation and physical test results to be validated by an independent agency (IA). Energy values validated by an independent agency (IA) shall match the product’s label per Florida Building Code Energy Conservation C303.1.3.

	<b>World's Best Window Co.</b> Series "2000" Casement Vinyl Clad Wood Frame Double Glazing • Argon Fill • Low E XYZ-X-1-00001-00001	
	<b>ENERGY PERFORMANCE RATINGS</b>	
U-Factor (U.S. / I-P)	Solar Heat Gain Coefficient	
<b>0.35</b>	<b>0.32</b>	
<b>ADDITIONAL PERFORMANCE RATINGS</b>		
Visible Transmittance	Air Leakage (U.S. / I-P)	
<b>0.51</b>	<b>≤ 0.3</b>	
Condensation Resistance		
<b>51</b>	<b>—</b>	
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information.  <a href="http://www.nfrc.org">www.nfrc.org</a></small>		

### MECHANICAL NOTES

**M-1** The air inside the attic can reach temperatures to over 150 degrees, far hotter than it gets outdoors. Air handler cabinets are typically insulated with R-4.2 insulation below the minimum requirements for ductwork located outdoors. Condensation problems are common on air handlers due to South Florida’s humidity. Locating the air handlers outside the thermal envelope wastes energy and is prohibited by this section. The minimum envelope roof/ceiling insulation using the performance method of compliance is R-19 for multifamily buildings and R-10 for all other commercial buildings.

## **MECHANICAL NOTES CONT.**

**M-2** A building containing multiple tenants and occupancy types with fire walls between them may be considered multiple buildings for energy code analysis during phased construction. If each tenant has its own air conditioning system and are divided by fire walls, that tenant may be considered one building and have its own energy compliance report. Each building or tenant may be evaluated separately for energy code compliance. For example, an individual tenant in a shopping/strip mall exceeding 5000 sq/ft shall be required to have a test and balance report of the air distribution system unless that tenant has units 65,000 or less. This requirement does not exempt systems from balancing requirements if requested by the designer of record.

**M-3** Outside air ducts passing thru conditioned space have the potential to sweat and condensate inside the duct due to humid conditions in Florida. The design professional should be made aware of this potential problem to prevent moisture damage to ceilings.

**M-4** Failure to install and test the operation of the outside air and exhaust shutoff dampers can increase the latent load of the building, increase energy use, and affect comfort in conditioned spaces. Dampers are not required for ventilation or exhaust of unconditioned spaces or Type 1 kitchen hood exhausts.



**COMMISSIONING COMPLIANCE CHECKLIST**

Project Information: \_\_\_\_\_ Project Name: \_\_\_\_\_

Project Address: \_\_\_\_\_

Commissioning Authority: \_\_\_\_\_

Commissioning Plan (Section C408.2.1)

- Commissioning Plan was used during construction and includes all items required by Section C408.2.1
- Systems Adjusting and Balancing has been completed.
- HVAC Equipment Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: \_\_\_\_\_
- HVAC Controls Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: \_\_\_\_\_
- Economizer Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: \_\_\_\_\_
- Lighting Controls Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: \_\_\_\_\_
- Service Water Heating System Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: \_\_\_\_\_
- Manual, record documents and training have been completed or scheduled
- Preliminary Commissioning Report submitted to owner and included "Itemization of Deficiencies Not Corrected"

I hereby certify that the commissioning provider has provided me with evidence of mechanical, service water heating and lighting systems commissioning in accordance with the 2020 FBCEC.

Signature of Building Owner or Owner's Representative \_\_\_\_\_ Date \_\_\_\_\_