BROWARD COUNTY
BOARD OF RULES AND APPEALS

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To: Members of the Ad Hoc Energy Conservation Committee

D. Rice, P.E.	M. Charnin	T. Fallon	W. Haygood
E. Jenison	A. Kamm, P.E.	C. Kirby	B. Lomel, P.E.
J. Travers	D. Ulmer	B. Volin	A. Zackria, CSI

From: Timothy G. de Carion, Chief Energy Code Compliance Officer

Date: June 20, 2022

Subj: Energy Conservation Committee to Discuss Agenda Items

The Chairman of Energy Committee, Mr. Dave Rice P.E. called for a meeting of the Energy Committee for the items listed.

AGENDA

Roll Call

Approval of Minutes – May 16, 2022

Chairman's Opening Remarks

Chief Energy Code Compliance Officer Opening Remarks

Regular Meeting

Item 1: BORA Commercial Energy Guidelines ..... 6 (Dated 05-16-2022)
Mechanical Checklist ..... 13 (Dated 05-16-2022)

General Discussion

Schedule Next Meeting

Adjournment

Reference Documents for Committee Use

1) BORA Commercial Energy Guidelines (pg. 6)

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.*

BORA Energy Conservation Committee – May 16, 2022 Meeting Minutes

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DRAFT

MEETING OF THE ENERGY CONSERVATION COMMITTEE

Minutes
May 16, 2022

Call to Order:

Chair David Rice, P.E., R.C. Engineering, Inc., called a published meeting of the Broward County Board of Rules and Appeals Energy Conservation Committee to order at 1:30 PM.

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

Present:

Mike Charnin	Carlton Kirby	Dennis Ulmer
Tim Fallon	Brian Lomel, P.E.	Bob Volin
Wyatt T. Haygood	David Rice, P.E.	Abbas Zackria, CSI
Art Kamm, P.E.	John Travers	

Staff: Timothy de Carion, Chief Energy Code Compliance Officer

Mr. Zackria arrived shortly after the roll was called at 1:32 PM.

A MOTION WAS MADE BY MR. VOLIN AND SECONDED BY MR. HAYGOOD TO APPROVE THE APRIL 18, 2022, ENERGY CONSERVATION COMMITTEE MEETING MINUTES. THE MOTION PASSED BY UNANIMOUS VOTE.

Item 1: BORA Commercial Energy Guidelines Schedule

Mr. Timothy de Carion, Broward County Board of Rules and Appeals, announced that this meeting will serve as a continuation of the discussion about the BORA Commercial Energy Guidelines document.

Mr. de Carion informed the committee that Chair Rice suggested that he create a schedule the revisions. He shared his screen and showed the current Commercial Energy Provisions Schedule. Mr. de Carion informed everyone that the dates are subject to change, but he intends to stick to the schedule as much as possible.

The current schedule suggests that the Commercial Energy Guidelines should be complete by January 2023.

NO MOTION.

Item 2: Energy Code Modifications for TAC Committee Meeting in Lake Mary, Florida

Mr. de Carion began the discussion by reminding the committee that during last month's meeting, Mr. Travers mentioned that he wished to discuss the topic of cool roofs.

A cool roof modification was submitted by Miami-Dade County. Mr. de Carion shared that the code modification was created as a joint effort of Miami-Dade and Broward Counties. He worked with Mr. Pete Quintela, Miami-Dade County Department of Regulations and Economic Resources. Mr. de Carion will be in attendance at the TAC Committee Meetings in Lake Mary, Fla., discussing energy and mechanical code compliance on June 24, 2022.

Mr. de Carion announced that the energy code modifications received a number of endorsements, some of which were from The Smart Surfaces Coalition (SSC), the Chair of the South Florida Chapter of the US Green Building Council and the American Institute of Architects (AIA) Florida.

An analysis by Autocase titled "Triple Bottom Line Analysis of a Cool Roof Policy Proposal" was produced by Miami-Dade County and is included in the code modifications. The analysis displays how much money could be saved over the lifespan of a roof. The submission also includes endorsement letters from the City of Miami, the Broward County Board of Rules and Appeals, the City of Hollywood and the City of Fort Lauderdale.

Mr. John Travers, City of Fort Lauderdale, explained that in the City of Fort Lauderdale endorsement letter, he included Figure A-2 from ASHRAE 169-2020 ("Climatic Data for Building Design Standards"). The figure displays south Florida included in the climate zone one that is affected by year-round costs for cooling.

Mr. de Carion stated that the proposed code modification received a lot of regional support.

Mr. Daniel Lavrich, Broward County Board of Rules and Appeals, mentioned that the modifications received a lot of support from the energy compliance community. He asked Mr. de Carion what the roofers' response was.

Mr. Abbas Zackria, CSI, WZA Architects, said that in a retrofit application, a white elastomeric-type coating or silver coatings can be applied. From the factory, there are built-up membranes with a white cover on it. The gravel is white coded, so it meets the requirements and additional coatings don't have to be added to the system.

Mr. Lavrich asked if this information was shared with the State roofing committee.

Chair Rice said that it has not, but he has no problem sending them information to the roofing committee.

Mr. Lavrich expressed his concern. He stated that he is curious because the single ply systems have a number of drawbacks concerning durability, relating to hurricane impact resistance in particular.

Mr. de Carion affirmed that he received questions from one of the roofing associations in regard to why the modifications were place in Chapter three. He responded that because it is considered material, it will not be new to the code. Many retail chains based in other parts of the country, expanded into Broward County in recent years. The locations come into Broward County with prescriptive mandate methods. The cool roofs are being used nationally.

Mr. Mike Charnin, City of Plantation, asked if the method can be used for residential spaces, or on shingle roofs.

Mr. de Carion responded that new shingle roofs with cool roof ratings can be purchased.

Mr. Charnin clarified that he was asking about purchasing the coating. Mr. de Carion was not sure about purchasing coating for an existing residential roof.

Mr. James DiPietro, Broward County Board of Rules and Appeals, reminded the committee that Mr. Quintela was in the audience. He asked Mr. Quintela if he had any insight because he believes that Miami-Dade County will have more information about how the roofers are reacting. Mr. DiPietro also mentioned the discussion of state tax, it was the decision of the Florida Building Commission to send this to the Energy Committee.

Mr. Quintela shared that Miami-Dade County did not consult roofing associations since there will be no additional expenses created. He spoke with the Cool Roof Rating Council. They have plans to introduce an updated standard. Mr. Quintela mentioned that he asked them to wait until this period passes before updating and sharing the new standard.

NO MOTION.

Item 3: BORA Commercial Energy Guidelines

Mr. de Carion began sharing the latest draft of the BORA Commercial Energy Guidelines. He shared that Mr. Zackria recommended adding the fenestration form to the commercial energy guidelines. Mr. de Carion said that he added Appendix C (Fenestration Submittal Form) and Appendix D (Fenestration Chard for Untested Windows) to the index.

Mr. Lomel arrived at 1:55 PM.

Mr. de Carion went on to share the current draft of the BORA Commercial Energy Guidelines. The current draft cites the Appendix C and Appendix D, for reference, in the *BORA Energy Guidelines – BORA Structural Checklists*.

Mr. de Carion acknowledged Item 9 of the Plan Review (Prescriptive) section of the structural checklist. Item 9 states: "Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mandatory selection of **one** (1) of the ***efficiency package options***." He asked the committee if the item should be left in the structural checklist or should it be left to electrical.

Mr. Quintela added that before anything is revised, a note should be included to explain that if solar panels are chosen, a plan review is required.

Mr. de Carion responded that he could reword the item to include the structural review requirement.

Mr. Wyatt T. Haygood, City of Parkland, said that if the item is reworded, he does not see an issue with keeping Item 9 in the Plan Review (Prescriptive) Section of the structural checklist.

Mr. de Carion asked the committee to send him notifications for anything that is missing from the current draft of the structural checklist.

Mr. Art Kamm, P.E., Kamm Consulting, asked Mr. de Carion to clarify if blower door testing could be considered structural. Mr. de Carion explained that blower door testing is listed under the envelope section.

Mr. de Carion moved on to review the *BORA Energy Guidelines – BORA Mechanical Checklist*.

Chair Rice suggested that Mr. de Carion review the mechanical checklist revisions with Mr. Brian Lomel, P.E., TLC Engineering, and Mr. Kamm. Chair Rice asked them to find out the most clear and concise way to interpret this section of the code.

NO MOTION.

Chair Rice announced that he intends to schedule another Energy Conservation Committee meeting in four weeks.

A MOTION WAS MADE BY MR. VOLIN AND SECONDED BY MR. CHARNIN TO ADJOURN THE MEETING. THE MOTION PASSED BY UNANIMOUS VOTE.

Chair Rice recommended that committee members submit their comments and questions to Mr. de Carion while he is working on the next draft

Adjournment

Having no further business to go before the Committee, the meeting adjourned at 3:18 PM.

Item 1: BORA Commercial Energy Guidelines

BORA Commercial Energy Guidelines

Broward County Board of Rules and Appeals

Energy Conservation
Seventh Edition (2020)

FBC Seventh Edition (2020),
Effective xxxxxxxxxxxxxxxx
For Energy Conservation
Committee approval
Draft #3

Table of Contents

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.

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 has been lacking in the enforcement of the energy code which created confusion by code officials over which specific disciplines will enforce certain provisions of the code.

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. ***

BORA ENERGY GUIDELINES

Building Code Administrators Checklist

Plan Review	**Code Section**
☐ **1.** The building official shall appoint a code official to verify that all disciplines have reviewed the plans and the code compliance report for energy code compliance. This code official shall sign the code compliance report stating that the plans have been reviewed by all disciplines and the plans will be inspected according to the FBCEC. The building department may use "***Appendix B"*** as a compliance tool.	C103.3 C103.3.1 FS. 553.908 *4.2.2
☐ **2.** The building official shall ascertain the commercial energy compliance pathway chosen by the designer and the energy credits taken upon application for permit. The ***"BORA Energy Compliance Pathway Form"*** found in "***Appendix A"*** may be used for compliance.	C401.2 *4.2.1.1
☐ **3.** The building official shall provide all plan reviewers access to "***ASHRAE Standard 90.1-2016"*** if the designer chooses the ASHRAE 90.1 pathway for code compliance. Code references with an *asterisk correspond with like code references in ASHRAE 90.1-2016.	C401.2 #1

Certificate of Occupancy	**Code Section**
☐ **1.** Buildings which require commissioning according to section C408.2 shall not be considered acceptable for final inspection pursuant to Section C104.3 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 F" "Commissioning Compliance Checklist"*** may be used as a cover page to insure a complete "Preliminary Commissioning Report"	C408.2.4 *4.2.5 *4.2.5.1 C408.2.4.1 C408.2.4.2
☐ **2.** Construction documents shall specify that documents required by Section C408 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 C408.2.5 *6.7 *9.7

BORA ENERGY GUIDELINES

BORA Structural Checklist

Plan Review (General)	**Code Section**
☐ **1.** Existing buildings shall be classified as exempt, except those buildings defined as ***"renovated buildings",*** in which the total work exceeds 30% of the value of 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 *4.2.1.3 *4.4.1.5
☐ **2.** An existing building or portion thereof shall not be altered to become less energy efficient.	EBC701.2
☐ **3.** The complete energy compliance report (Energy Calcs) shall be provided. Forms generated from specific computer software approved by the Florida Building Commission shall show "Pass" for the thermal envelope, interior lighting, exterior lighting, mechanical and plumbing.	C101.5.1 *4.2.2
☐ **4.** The ***input data report*** from the approved software shall be generated simultaneously. with the compliance report to verify each entry into the software.	C407.4.2.2 *4.2.2
☐ **5.** The ***code official*** shall have the authority to approve a permit for part of the entire energy conservation system ***(such as a shell permit).*** 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.	C103.3.3 *4.2.2
All spaces inside buildings shall be considered as "***conditioned spaces"*** at time of construction regardless of equipment installed unless approved by building official.	*5.1.2.3
☐ **6.** The designer of record shall specify the compliance pathways. ***"Appendix A"*** may be utilized.	C103.2 *4.2.1
☐ **7**. The ***design professional*** responsible for the design of the building "***thermal envelope/shell"*** shall certify compliance with the code by signing the energy code compliance form.	C103.1.1.1.2
☐ **10.** The plans shall show in detail all the pertinent energy data and features of the building including but not limited to:	C103.2 *4.2.2.1
a) Insulation materials and their R-values ***(S-2)***	*5.4.1
b) Fenestration U-factor, solar heat gain coefficient, (SHGC) and visible transmittance (VT) shall be shown. ***"Appendix C"*** may be used for compliance. ***(S-1)***	*5.4.2
c) Air leakage sealing details	*5.4.3
☐ **11.** The entire ***building thermal envelope*** shall be designed and constructed with a continuous air barrier and shall be ***clearly identified*** on the construction documents.	C402.5.1 *5.4.3
☐ **12.** 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. ***(S-1)*** "***See Appendix C"***	C303.1.3 *5.4.2
☐ **13.** ***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 envelope is allowed.)	C402.2.3 *5.8.1.8
☐ **14.** 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)	C402.5.9 C202 *5.4.3
☐ **15.** Blown or loose fill insulation shall not be used in attic roof ***(ceiling slope)*** spaces in slopes greater than three in twelve. Baffling of eave vents are required to deflect incoming air.	*5.8.1.3 *5.8.1.4
☐ **16**. Weatherseals shall be installed on all loading dock/cargo doors for separating conditioned space from unconditioned space. "***See Table C402.5.2"***	C402.5.4 C402.5.6

BORA ENERGY GUIDELINES
BORA Structural Checklist

Plan Review (Prescriptive)	**Code Section**
☐ **1.** ***"Cool Roofs"*** Low-sloped roofs directly above cooled conditioned spaces in Climate Zones 1a shall have a minimum three-year solar reflectance of .55 and thermal emittance of 0.75 or a three-year solar-reflectance index (SRI) of 64.	C402.3 *5.5.3.1.1
☐ **2**. The maximum ***U-factor*** and solar heat gain coefficient ***(SHGC)*** for fenestration shall be as specified in Table C402.4. The Projection Factors ***(Overhangs)*** shall be calculated.	C402.4 *Table 5.5-1
☐ **3**. The vertical fenestration area shall not be greater than ***30%*** of the gross above grade wall. area. Vertical fenestration may be increased to ***40%*** per requirements of C402.4.1.1	C402.4.1 *5.5.4.2
☐ **4.** ***Maximum*** skylight areas shall be ***3%*** of the gross roof area and can increase to ***6%*** when daylight responsive controls are provided in daylight zones that are under skylights that comply with C405.2.3.1	C402.4.1 C402.4.1.2. *5.5.4.2.2
☐ **5.** ***Minimum*** skylight areas shall apply to specified conditioned and unconditioned spaces greater than 2500 sq. ft. when ceiling heights are greater than 15ft. (See exceptions)	C402.4.2 *5.5.4.2.
☐ **6.** Skylight curbs shall be insulated to the level of roofs with insulation above deck or **R-5** except when tested per NFRC 100	C402.2.2 *5.5.3.1
☐ **7.** The ***minimum R-value*** of the insulating material installed either between the roof framing or continuously on the roof assembly shall be as specified in Table C402.1.3	C402.2.2 *5.5.3.1
☐ **8.** ***Opaque doors*** shall meet the thermal requirements specified in the tables.	*5.5.3.6 or C402.4.5

Plan Review (Performance)	**Code Section**
☐ **1**. 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
☐ **2**. Building types and thermal blocks shall be accurately identified on the compliance report and shall not be combined unless they share the same features. The code official shall be permitted to require thermal zone diagrams consisting of floor plans showing each zone.	C407.5.2 C407.4.2.1

Rough Inspection	**Code Section**
☐ **1.** Insulation shall be installed to manufacturers recommendations in a manner as to achieve the rated R-value. Insulation shall be labeled with R-value or a certificate providing R-value shall be provided.	C303.2 *5.8.1.2
☐ **2**. 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.	C104.2.2 C303.1.3 *5.9.1.4
☐ **3**. The entire building thermal envelope shall be constructed with a continuous air barrier.	C402.5.1 ***5.9.1**

Final Inspection	**Code Section**
☐ **1**. 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 <=0.40 cfm/ft2.	C402.5 *5.4.3.1.3
☐ **2**. Changes to insulation values or window efficiencies made during the construction process that do not match the plans and energy compliance report shall be resubmitted and approved as amended.	C103.4

BORA ENERGY GUIDELINES

BORA Mechanical Checklist

Plan Review (General)	**Code Section**
☐ **1.** Existing buildings shall be classified as exempt, except those buildings defined as ***"renovated buildings",*** in which the total work exceeds 30% of the value of 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 *4.2.1.3 *4.1.1.5
☐ **2.** An existing building or portion thereof shall not be altered to become less energy efficient.	EBC701.2
☐ **3.** The complete energy compliance report (Energy Calcs) shall be provided. Forms generated from specific computer software approved by the Florida Building Commission shall show "Pass" for ***mechanical*** items.	C101.5.1 *4.2.2
☐ **4.** The ***input data report*** from the approved software shall be generated simultaneously. with the compliance report to verify each entry into the software.	C407.4.2.2 *4.2.2
☐ **5.** The ***code official*** shall have the authority to approve a permit for part of the entire energy conservation system ***(such as a shell permit).*** 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. All spaces inside buildings shall be considered as "***conditioned spaces"*** at time of construction regardless of equipment installed unless approved by building official.	C103.3.3 *4.2.2 *5.1.2.3
☐ **6**. The ***design professional*** responsible under Florida law for the design of "***mechanical systems"*** shall certify compliance with the code by signing the energy code compliance form.	C103.1.1.1.2
☐ **7.** 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: a) Mechanical system design criteria b) Mechanical system and equipment types, sizes, and efficiencies c) Economizer description d) Equipment and system controls e) Fan motor horsepower (hp) and controls f) Duct sealing, duct and pipe insulation and location	C103.2 *4.2.2.1 *4.2.2.2
☒ **8**. 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 *6.4.2.1
☐ **9**. 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 *6.4.2.1
☐ **10**. HVAC equipment shall meet the minimum efficiency requirements and shall be verified through certification by an approved program or equivalent. (AHRI)	C403.2.3 *6.4.1
☐ **11**. Cooling towers shall meet the ***minimum performance requirements.*** in Tables C403.2.3 (8)	*6.5.5.3
☐ **12**. Refrigeration systems shall meet the ***minimum performance requirements.***	C403.2.14
☐ **13**. Specific ***HVAC system controls*** shall be provided for temperature, setpoint overlap, off hour controls, shutoff dampers, fan control, economizers, VAV systems.	C403.2.4 *6.4.3

BORA ENERGY GUIDELINES
BORA Mechanical Checklist

Plan Review (General Cont.)	**Code Section**
☐ **14**. 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 *6.4.3.4.2
☐ **15.** Group R-1 ***(Hotels)*** having over 50 Guest rooms shall have controls (such as a card key system) to control temperature and ventilation in unoccupied rooms. *6.4.3.3.5	C403.2.4.8.1 C403.2.4.8.2
☐ **16**. ***Demand control ventilation*** (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 *6.4.3.8
☐ **17**. 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 shall override reductions. Exhaust systems under 25,500 cfm and power ratios exceeding 1125 cfm/hp are exempt.	C403.2.6.2 *6.4.3.4.5
☐ **18**. 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 *6.5.7.2.2 *6.5.7.2.3
☐ **19.** 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. A ***balance schedule*** showing this calculation shall meet this requirement.	C408.2.2.1 *6.5.7 *6.7.2.3.1
☐ **20.** Duct insulation shall meet the minimum R-Value. *6.4.4.1.2;	C403.2.9.1
☐ **21.** Cavities of a building shall not be used as a ***return air plenum*** 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 Table *6.8.2a
☐ **22.** Space shall be provided adjacent to all mechanical components that form the air distribution system including air handling units. (a minimum of (4) four inches is sufficient).	C403.2.9.3.3
☐ **23.** Ductwork shall be sized and designed with engineering standards. Sizing shall be room by room based on loads, static pressure, length, and friction loss. (***Manual "D" or Equiv.)***	C403.2.9.5
☐ **24.** Air-Handling units shall not be allowed in ***attics*** of commercial buildings. Attics shall be defined as below an uninsulated roof. A minimum roof value of R-10 shall be required.	C403.2.9.6 C407.2.1
☐ **25.** 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 *6.4.4.1.3
☐ **26.** ***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 using FBCEC. (See building definition ***M-1)***	C408.2.2 *6.7.2.3.1
☐ **28.** ***Construction documents*** shall clearly indicate provisions for ***commissioning and completion*** when the ***total cooling equipment capacity*** exceeds 480,000 btu's (50 tons). The HVAC units for dwelling units or sleeping units are excluded from total. (>50,000 sq./ft. for ASHRAE 90.1)	C408.2 *6.7.2.4

Plan Review (Prescriptive)	**Code Section**
☐ **1**. When the option of more efficient HVAC equipment is selected, the equipment shall exceed the efficiency requirements by (10%) ten percent.	C406.2

BORA ENERGY GUIDELINES

BORA Mechanical Checklist

Rough Inspection	**Code Section**
☐ **1.** Duct insulation shall meet the minimum R-Value specified (See exceptions) *6.4.4.1.2;	C403.2.9.1.1
☐ **2**. All ducts and building cavities that are part of the air distribution system shall be sealed.	C403.2.9.3
☐ **3**. 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
☐ **4**. Duct insulation shall be protected from damage. Vapor barriers covering cooling ducts shall be sealed to prevent condensation. Additional insulation and a vapor barrier shall be provided when the minimum insulation is insufficient to prevent condensation. ***(M-2)***	C403.2.9.1.2 C403.2.9.1.3
☐ **5**. 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
☐ **6**. 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 *6.4.4.2.2
☐ **7**. Piping insulation shall be installed as specified according to manufactures instructions.	C303.2
☐ **8**. 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 of 65,000 btu's or less per system are exempt. (See building definition ***M-1)***	C408.2.2.1 C408.2.2.2 6.7.2.3

Final Inspection	**Code Section**
☐ **1.** The code official shall be permitted to require that a copy of the preliminary commissioning report be reviewed by a code official. The ***"Itemization of Deficiencies"*** found during testing shall be included in the report and corrective measures used or proposed.	C408.2.4. C408.2.4.2 *6.7.1
☐ **2.** Air distribution systems shall be ***tested, adjusted, and balanced*** by a licensed engineer or a company or individual holding a current certification from a recognized testing and balancing agency. Hydronic systems shall be balanced for pumps (>5 HP). Buildings with cooling systems of 15 tons or less per system may be tested by the mechanical contractor.	C408.2.2 C408.2.2.2 *6.7.2.3
☐ **3.** Air distribution systems shall be ***tested, adjusted, and balanced*** for buildings exceeding 5000 sq/ft. and be at least within 10% or less as specified by the designer of record. Buildings with cooling capacities of 65,000btu/h or less "per system" are exempt.	C408.2.2.1 *6.7.2.3
☐ **4.** Access to air balancing dampers and hydronic balancing/flow valves shall be provided.	M306.1
☐ **5**. Equipment model numbers and efficiency ratings of HVAC equipment shall be verified thru certification under an approved certification program. ***(AHRI)***	C403.2.3 *6.4.1
☐ **6**.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. ***(M-3)***	*C403.2.4.3 *6.4.3.4.2
☐ **7**. 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	Table C403.2.9.2 *6.4.4.2
☐ **8**. Insulation exposed to weather ***shall be protected*** from damage by sunlight, moisture, maintenance and wind. Adhesive tape shall not be used on pipe insulation. *6.4.4.1	C403.2.9.1.2 C403.2.10.1
☐ **9**. 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
☐ **10**. Changes to specified equipment made during the construction process that do not match the plans and energy compliance report shall be resubmitted and approved as amended.	C103.4

BORA ENERGY GUIDELINES

BORA Electrical Checklist

Plan Review (General)	**Code Section**
☐ **1.** Existing buildings shall be classified as exempt, except those buildings defined as ***"renovated buildings",*** in which the total work exceeds 30% of the value of 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 *4.2.1.3 *4.1.1.5
☐ **2.** An existing building or portion thereof shall not be altered to become less energy efficient.	EBC701.2
☐ **3.** The complete energy compliance report (Energy Calcs) shall be provided. Forms generated from specific computer software approved by the Florida Building Commission shall show "Pass" for the ***electrical power, lighting controls, interior lighting, and exterior lighting.***	C101.5.1 *4.2.2
☐ **4.** The ***input data report*** from the approved software shall be generated simultaneously. with the compliance report to verify each entry into the software.	C407.4.2.2 *4.2.2
☐ **5.** The ***code official*** shall have the authority to approve a permit for part of the entire energy conservation system ***(such as a shell permit).*** 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. All spaces inside buildings shall be considered as "***conditioned spaces"*** at time of construction regardless of equipment installed unless approved by building official.	C103.3.3 *4.2.2 *5.1.2.3
☐ **6**. The ***design professional*** responsible under Florida law for the design of the ***electrical power, lighting controls, interior lighting, and exterior lighting,*** shall certify compliance with the code by signing the energy code compliance form.	C103.1.1.1.2
☐ **7.** 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: a) Lighting fixture schedule with wattage and control narrative. b) Locations of daylight zones on floor plans.	C103.2 *4.2.2.1 *4.2.2.2

BORA ENERGY GUIDELINES

BORA Plumbing Checklist

APPENDIX A

PROJECT ADDRESS _____ **PERMIT NUMBER** _____

TYPE OF CONST. ☐ **NEW CONST.** ☐ ***ADDITION** ☐ ***RENOVATED BLDG.** ☐ ***CHANGE OF OCCUPANCY**

**Additions, alterations, repairs, and changes in occupancy to existing buildings shall comply with Chapter 5*

Florida Energy Conservation Code Compliance Options	**Code Section**
Select One pathway below:	C401.2
☐ **Option 1)** ***ANSI/ASHRAE/IESNA 90.1*** excluding Section 9.4.1(g), 8.4.2, & 8.4.3 (2016 Version)	C401.2 #1
☐ **Option 2)** ***Prescriptive Method*** complying with Sections C402 thru C406 & C408. Tenant spaces shall also comply with C406.1.1	C401.2 #2
☐ **Option 3)** ***Performance Method*** complying with Section C407 and the mandatory provisions listed in C407.2 including C402.5, C403.2, C404, C405.2, C405.4, C405.5, and C408.	C401.2 #3

Option #1 ANSI/ASHRAE/IESNA 90.1 (2016 Version)	**Code Section**
Select One pathway below:	4.2.1
☐ **1)** ****Prescriptive Method*** complying with Section 5 thru Section 9	4.2.1.1a
☐ ***2) Energy Cost Budget Method*** complying with Section 11	4.2.1.1b
☐ ***3) Performance Rating Method*** complying with Appendix G	4.2.1.1c
****Envelope Path*** ☐ **1)** ***Prescriptive Building Envelope Option*** ☐ **2)** ***Building Envelope Trade-Off Option***	*5.2.1 a or b*

Option #2 Prescriptive Method	**Code Section**
Select One from each section below:	
Envelope Select One	C402.1 #1
☐ **1.** ***Insulation Component R-Value method***. (Table C402.1.3)	C402.1.3
☐ **2.** ***Assembly U-Factor, C-Factor, or F factor-based method*** (Table C402.1.4)	C402.1.4
☐ **3.** ***Component performance alternative*** in leu of Table C402.1.4 above.	C402.1.5
Mandatory Lighting Controls Select One	C405.2
☐ **1.** ***Lighting Controls*** per C405.2.1 through C405.2.6	C405.2 #1
☐ **2.** ***Luminaire Level Lighting Controls*** and compliance with C405.2.1; C405.2.4 and C405.2.5	C405.2 #2
Interior Power Lighting Allowance Select One	C405.3.2
☐ **1.** ***Building Area Method*** per C405.3.2.1 ☐ **2.** ***Space by Space Method*** per C405.3.2.2	
Exterior Lighting Zone Area Type Select One	C405.4.2
☐ **#1 Park & Rural** ☐ **#2 Residential** ☐ **#3 Other than 1, 2, 4** ☐ **#4 High Activity Commercial**	
Efficiency Package Select One	C406.1
☐ More efficient HVAC performance	C406.2
☐ Reduced lighting power density	C406.3
☐ Enhanced digital lighting controls	C406.4
☐ Onsite renewable energy	C406.5
☐ Dedicated outdoor air system	C406.6
☐ Reduced energy use in service water heating	C406.7

Option #3 Performance Method*	**Code Section**
Mandatory Lighting Controls Select One	C405.2
☐ **1.** ***Lighting Controls*** per C405.2.1 through C405.2.6	C405.2 #1
☐ **2.** ***Luminaire Level Lighting Controls*** and compliance with C405.2.1; C405.2.4 and C405.2.5	C405.2 #2
Optional Credits	C407.5.2.4
☐ Vegetative Roofs	C407.5.2.4.1
☐ Enthalpy Recovery Ventilation	C407.5.2.4.2

**The building energy cost shall be equal to or less than 85% of the standard reference design of the building.*

DESIGN PROFESSIONAL NAME _____

SIGNATURE _____

APPENDIX B

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.

DISCIPLINE	NAME	SIGNATURE	DATE
STRUCTURAL			
MECHANICAL			
PLUMBING			
ELECTRICAL			

APPENDIX C

Commercial Fenestration Product Rating Submittal Form

In accordance with of 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 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*

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

Window #	*NFRC Directory Number	Description	U-Value	SHGC	VT
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
31					
33					
34					
35					
36					
37					
38					

*Products not certified by NFRC must submit **"Thermal Simulation Report"** or use **"Default Table"** below.

APPENDIX D

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

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

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

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

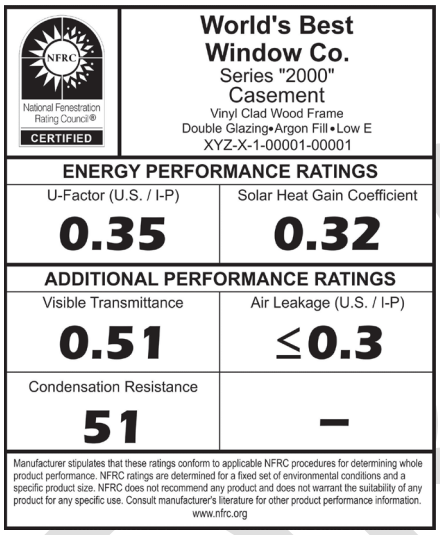
TABLE C303.1.3 (3)
DEFAULT WINDOW, GLASS DOOR, AND SKYLIGHT SHGC AND VT

	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 E

STRUCTURAL NOTES

S-1 Windows are required to be tested for energy efficiency. U-factors shall be determined in accordance with NFRC 100. The VT (Visual Transmittance) and the SHGC (Solar Heat Gain Coefficient) and the shall be determined in accordance with NFRC 200. Testing is required to be done by an accredited independent laboratory and then labeled and certified by the manufacturer. The code does require certification by an independent agency. The code also does not require certification by NFRC. Some manufactures have chosen to "Self-Certify" their product after testing by an accredited independent laboratory. These products are not certified by NFRC and will not be listed in the NFRC's "Certified Products Directory." Products not certified by NFRC will need to provide a "Thermal Simulation Report" from an accredited independent laboratory. Testing values from the "Simulated Data" shall match the label on the product in accordance with FBCEC C303.1.3.



S-2 The plans shall be specific as to what that type and R-value of insulation is 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.

MECHANICAL NOTES

M-1 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.

Appendix E

MECHANICAL NOTES CONT.

M-2 Outside air ducts passing thru conditioned space have the potential to sweat and condensate inside the duct due to the humid Florida climate. The design professional should be made aware of this potential to prevent moisture damage to ceilings.

M-3 Failure to install and test operation of the outside air and exhaust shut-off dampers can increase the latent load of the building, increase energy use, and effect comfort in conditioned spaces. Dampers are not required for ventilation or exhaust of unconditioned spaces or Type 1 kitchen hood exhausts.

Appendix E

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 _____