

# 8th Edition(2023) Florida Building Code

Proposed Code Modifications



This document created by the Florida Department of Business and Professional Regulation -

850-487-1824

# TAC: Energy

Total Mods for **Energy** in **Approved as Modified** : 1

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10457

1

Date Submitted	02/15/2022	Section	1	Proponent	Jeff Sonne for FSEC
Chapter	10	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Approved as Modified				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language Yes**

**Related Modifications**

### Summary of Modification

Update Form R402 and resolve inconsistencies.

### Rationale

The proposed mod updates Form R402 to include new SEER2 and HSPF2 efficiency ratings, adds space cooling and heating system entry fields and details, and resolves water heating UEF inconsistencies. No changes to code stringency (just shows new federal equipment efficiency requirements).

### Fiscal Impact Statement

**Impact to local entity relative to enforcement of code**

None; only updates and improves Form R402.

**Impact to building and property owners relative to cost of compliance with code**

None; only updates and improves Form R402.

**Impact to industry relative to the cost of compliance with code**

None; only updates and improves Form R402.

**Impact to small business relative to the cost of compliance with code**

### Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

Yes; benefits public by updating and improving Form R402.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

Improves code by updating and improving Form R402.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

Does not discriminate; updates and improves Form R402.

**Does not degrade the effectiveness of the code**

Increases code effectiveness by updating and improving Form R402.

## Alternate Language

### 2nd Comment Period

EN10457-A3	<b>Proponent</b>	Jeff Sonne for FSEC	<b>Submitted</b>	8/25/2022 1:25:38 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> This A3 mod starts from the A2 mod which was approved by the Energy TAC in June, and now also addresses SEER2 labeled heat pumps and includes Section R404.1 lighting requirement changes that were approved by the Energy TAC in June via Mod 10517-A1. June TAC meeting approved A2 mod changes are kept in underline and cross-out format in black font, and new A3 mod changes are in underline and cross-out format in blue font.					

#### Fiscal Impact Statement

**Impact to local entity relative to enforcement of code**

None; only updates Form R402.

**Impact to building and property owners relative to cost of compliance with code**

None; only updates Form R402.

**Impact to industry relative to the cost of compliance with code**

None; only updates Form R402.

**Impact to small business relative to the cost of compliance with code**

#### Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

Yes; benefits public by updating Form R402.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

Improves the code by updating Form R402.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

Does not discriminate; just updates Form R402.

**Does not degrade the effectiveness of the code**

Increases code effectiveness by updating Form R402.

### 1st Comment Period History

EN10457-A2	<b>Proponent</b>	Jeff Sonne for FSEC	<b>Submitted</b>	4/16/2022 2:36:00 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> This alternative keeps the original 10457 mod except as follows: - In response to alt. language comment A1, and instead of the A1 change, recommend the table title clarification provided here in A2. Since this table is in Form R402 which is prescriptive, it does not create a requirement for performance compliance, but the table name change should help reduce confusion. - In response to general comment G1, the proponent agrees and adds signature spaces to Form R402.					

#### Fiscal Impact Statement

**Impact to local entity relative to enforcement of code**

No impact; clarification only.

**Impact to building and property owners relative to cost of compliance with code**

No impact; clarification only.

**Impact to industry relative to the cost of compliance with code**

No impact; clarification only.

**Impact to small business relative to the cost of compliance with code**

#### Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

Yes; clarifies code.



**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

Yes; clarifies code.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

No; only clarifies code.

**Does not degrade the effectiveness of the code**

No; only clarifies code.

## 1st Comment Period History

EN10457-A1	<b>Proponent</b>	Gary Kozan	<b>Submitted</b>	4/11/2022 9:46:29 AM	<b>Attachments</b>	Yes
	Rationale: EN10457 is proposing updates to Appendix D, Form R402. We agree with these updates, but this would be a good time to make other needed corrections to the form. The hot water piping insulation locations described in R403.5.3 are PRESCRIPTIVE, not MANDATORY. Therefore this section would not apply when taking the performance-based approach outlined in R401.2, and should not appear on Form R402.					

### Fiscal Impact Statement

**Impact to local entity relative to enforcement of code**

No enforcement cost impact to local entities

**Impact to building and property owners relative to cost of compliance with code**

no compliance cost impact to building and property owners

**Impact to industry relative to the cost of compliance with code**

no compliance cost impact to industry

**Impact to small business relative to the cost of compliance with code**

### Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

Corrects errors in current form

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

Improves the code by making needed corrections for a more consistent application

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

Does not discriminate against materials, products, or systems

**Does not degrade the effectiveness of the code**

Does not degrade the effectiveness of the code

## 1st Comment Period History

EN10457-G1	<b>Proponent</b>	Timothy de Carion	<b>Submitted</b>	3/4/2022 2:47:32 PM	<b>Attachments</b>	No
	Comment: I agree and support this proposed code change. In addition to the modification proposed, I recommend that the Name and Signature Section for both the preparer and the owner agent have separate lines for a printed name and a signature. Signatures are normally not readable and a place for a printed name is needed for contact in addition to the line for the required signature for certification.					

## 1st Comment Period History

	<b>Proponent</b>	Amanda Hickman	<b>Submitted</b>	4/14/2022 11:15:20 AM	<b>Attachments</b>	No
	Comment: LBA does not support the modification, as it is not appropriate for Florida and/or is not cost justified.					

**Mod EN10363, Approved as Modified with A2**

(See attached)

**Mod EN10363, Approved as Modified with A2**

(See attached)

## Florida Building Code, Energy Conservation

FORM R402-20203

Residential Building Thermal Envelope Approach  
R-Value Computation Method

Florida Climate Zone

<b>PROJECT NAME AND ADDRESS:</b> <b>OWNER:</b> <b>PERMIT TYPE:</b> <b>WORST CASE?</b>	<b>BUILDER:</b> <b>PERMITTING OFFICE:</b> <b>JURISDICTION NUMBER:</b> <b>PERMIT NUMBER:</b> <b>NUMBER OF UNITS:</b> <b>CONDITIONED FLOOR AREA:</b>
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**Scope:** Compliance with Section R402.1.2 of the *Florida Building Code, Energy Conservation*, shall be demonstrated by the use of Form R402 for single- and multiple-family residences of three stories or less in height, additions to existing residential buildings, alterations, renovations, and building systems in existing buildings, as applicable. To comply, a building must meet or exceed all of the energy efficiency requirements and applicable mandatory requirements summarized on this form. If a building does not comply with this method, or by the UA Alternative method, it may still comply under Section R405 or R406 of the *Florida Building Code, Energy Conservation*.

### General Instructions:

1. Fill in all the applicable spaces of the "INSTALLED" row in the INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT table with the information requested. All "INSTALLED" values must be equal to or more efficient than the required levels. "AVG" indicates an area weighted average is allowed; "LOWEST" indicates the lowest R-value to be installed must be entered.
2. Complete the tables for air infiltration and installed equipment.
3. Read the MANDATORY REQUIREMENTS table and check each box to indicate your intent to comply with all applicable items.
4. Read, sign and date the "Prepared By" certification statement at the bottom of this form. The owner or owner's agent must also sign and date the form.

### INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>1</sup>

REQUIREMENT	FENESTRATION U-FACTOR <sup>2,3,4</sup>	SKYLIGHT <sup>2</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>2,3</sup>	CEILING R-VALUE	WOOD FRAME WALL R-VALUE <sup>5</sup>	MASS WALL R-VALUE <sup>5,6</sup>	FLOOR R-VALUE	BASEMENT WALL R-VALUE	SLAB <sup>7</sup> R-VALUE & DEPTH	CRAWL SPACE WALL R-VALUE
CLIMATE ZONE 1	NR	0.75	0.25	30	13	3/4	13	0	0	0
CLIMATE ZONE 2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
VALUE	AVG	AVG	AVG	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST
INSTALLED:										

R-Value Calculation Method - [PASS / FAIL]

For SI: 1 foot = 304.8 mm; NR = No requirement.

- (1) R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
- (2) The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- (3) For impact rated fenestration complying with Section R301.2.1.2 of the *Florida Building Code, Residential* or Section 1609.1.2 of the *Florida Building Code, Building*, the maximum U-factor shall be 0.65 in Climate Zone 2. An area-weighted average of U-factor and SHGC shall be accepted to meet the requirements, and up to 15 square feet of glazed fenestration area are exempted from the U-factor and SHGC requirement based on Section R402.3.1, R402.3.2 and R402.3.3.
- (4) One side-hinged opaque door assembly up to 24 square feet is exempted from this U-factor requirement based on Section R402.3.4.
- (5) R-values are for insulation material only as applied in accordance with manufacturer's installation instructions.
- (6) The second R-value applies when more than half the insulation is on the interior of the mass wall.
- (7) R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.

<b>Air infiltration:</b>	Blower door test is required on the building envelope to verify leakage $\leq 7$ ACH50; test report must be provided to code official before CO is issued. <i>Florida Building Code, Energy Conservation Section R402.4.1.2</i> testing exception may apply for additions, alterations, or renovations.
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### EQUIPMENT REQUIREMENTS AND INSTALLED VALUES

Fill in the "INSTALLED EFFICIENCY LEVEL" column with the information requested. For multiple systems of the same type, indicate the minimum efficient system. All "INSTALLED" values must be equal to or more efficient than the required level. If a listed "SYSTEM TYPE" is not to be installed, write in "N/A" for not applicable.

SYSTEM TYPE	MINIMUM EFFICIENCY LEVEL REQUIRED	INSTALLED EFFICIENCY LEVEL
Air distribution system <sup>1</sup> Air handling unit Duct R-Value  Air Leakage/Duct test  Duct testing	Not allowed in attic Factory Sealed = R-8 (Ducts in unconditioned attics, Diameter $\geq 3$ in.) = R-6 (Ducts in unconditioned non attics, Diam. $\geq 3$ in.) = R-6 (Ducts in unconditioned attics, Diameter $< 3$ in.) = R-4.2 (Ducts in uncond not attics, Diam. $< 3$ in.) All ducts are in conditioned space (No minimum)  Air handler installed: Total leakage = 4 cfm/100 s.f. Air handler not installed: Total leakage = 3 cfm/100 s.f.  Test not required if all ducts and AHU are within the building thermal envelope and for additions or alterations where ducts extended from existing heating and cooling system through unconditioned space are $< 40$ linear ft.	Location: Factory Sealed? Y/N R-Value (In unc. attic) = R-Value (In unc. non attics) = R-value (Small ducts in attic) = R-Value (Small ducts in unc) = All in conditioned space? Y/N  Total leakage (cfm/100 s.f.) = Air handler installed? Y/N  Test report required? Y/N
Air conditioning systems: Central system $< 645,000$ Btu/h Central system $\geq 45,000$ Btu/h  PTAC, PTHP, SPVAC, or SPVHP  Other:	Minimum federal standard required by NAECA <sup>2</sup> SEER <sub>2</sub> =14.93 SEER <sub>2</sub> =13.8  EER [from Table C403.2.3(3)]  See Tables C403.2.3(1)-(11)	Cap. (Btu/h)= SEER <sub>2</sub> (Min)=  Type= Cap. (Btu/h)= EER (Min)=  Type = Effic. (Min) =
Heating systems: Electric resistance Heat Pump $\leq 65,000$ Btu/h Gas Furnace, non-weatherized Oil Furnace, non-weatherized  PTHP or SPVHP  Other:	Minimum federal standard required by NAECA <sup>2</sup> Not allowed in Climate Zone 2 HSPF <sub>2</sub> $\geq 8.275$ HSPF <sub>AFUE</sub> $\geq 80\%$ HSPF <sub>AFUE</sub> $\geq 83\%$  COP <sub>H</sub> [from Table C403.2.3(3)]  See Tables C403.2.3(1)-(11)	HSPF <sub>2</sub> (Min) = AFUE (Min) = AFUE (Min) =  Type= Cap. (Btu/h)= COP <sub>H</sub> (Min)=  Type = Effic. (Min)=
Water heating system (storage type):  Electric <sup>3,6</sup> Gas fired <sup>4,6</sup>  Other (describe) <sup>5,6</sup> :	Minimum federal standard required by NAECA <sup>2</sup> UEF: 40 gal.: 0.9230, 931, 50 gal.: 0.9240, 930, 60 gal.: 2.0542, 176 UEF: 40 gal.: 0.5890, 64, 50 gal.: 0.5630, 627, 60 gal.: 0.7660, 789	Capacity =  UEF (Min) = UEF (Min) =  Type= Effic. (Min)=

#### Equipment Efficiency - [PASS / FAIL]

- (1) Ducts & AHU installed "substantially leak free" per Section R403.3.2. Test required by either individuals as defined in Section 553.993(5) or (7), *Florida Statutes*, or individuals licensed as set forth in Section 489.105(3)(f), (g), or (i), *Florida Statutes*. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope, and for additions where ducts from an existing heating and cooling system extended to the addition through unconditioned space are less than 40 linear ft.

- (2) Minimum efficiencies are those set by the *National Appliance Energy Conservation Act of 1987* for typical residential equipment and are subject to NAECA rules and regulations. For other types of equipment, see Tables C403.2.3 (1-11) of the Commercial Provisions of the *Florida Building Code, Energy Conservation*.
- (3) For electric storage volumes  $\leq 55$  gallons, minimum UEF =  $0.9349 - (0.0001 \times \text{volume})$ . For electric storage volumes  $> 55$  gallons, minimum UEF =  $2.2418 - (0.0011 \times \text{volume})$ .
- (4) For natural gas storage volumes  $\leq 55$  gallons, minimum UEF =  $0.692 - (0.0013 \times \text{volume})$ . For natural gas storage volumes  $> 55$  gallons, minimum UEF =  $0.8072 - (0.0003 \times \text{volume})$ .
- (5) For electric tankless, min. UEF = 0.92. For natural gas tankless, min. UEF = 0.81.
- (6) Referenced UEFs shown are for medium/high draw pattern value provided by manufacturer.

MANDATORY OTHER REQUIREMENTS			
Component	Section	Summary of Requirement(s)	Check
Air leakage	R402.4	To be caulked, gasketed, weatherstripped or otherwise sealed per Table R402.4.1.1. Recessed lighting IC-rated as having $\leq 2.0$ cfm tested to ASTM E 283. Windows and doors: 0.3 cfm/sq.ft. (swinging doors: 0.5 cfm/sf) when tested to NFRC 400 or AAMA/WDMA/CSA 101/I.S. 2/A440. Fireplaces: Tight-fitting flue dampers & outdoor combustion air.	
Programmable thermostat	R403.1.2	A programmable thermostat is required for the primary heating or cooling system.	
Air distribution system	R403.3.2 R403.3.4	Ducts shall be tested as per Section R403.3.2 by either individuals as defined in Section 553.993(5) or (7), <i>Florida Statutes</i> , or individuals licensed as set forth in Section 489.105(3) (f), (g) or (i), <i>Florida Statutes</i> . Air handling units are not allowed in attics.	
Water heaters	R403.5	Comply with efficiencies in Table C404.2. Hot water pipes insulated to $\geq R-3$ to kitchen outlets, other cases. Circulating systems to have an automatic or accessible manual OFF switch. Heat trap required for vertical pipe risers.	
Cooling/heating equipment	R403.7	Sizing calculation performed & attached. Special occasion cooling or heating capacity requires separate system or variable capacity system.	
Swimming pools & spas	R403.10	Spas and heated pools must have vapor-retardant covers or a liquid cover or other means proven to reduce heat loss except if 70% of heat from site-recovered energy. Off/timer switch required. Gas heaters minimum thermal efficiency is 82%. Heat pump pool heaters minimum COP is 4.0.	
Lighting equipment	R404.1	Not less than 90% of the lamps in permanently installed luminaires shall have an efficacy of at least 45 lumens-per-watt or shall utilize lamps with an efficacy of not less than 65 lumens-per-watt.	

<p>I hereby certify that the plans and specifications covered by this form are in compliance with the <i>Florida Building Code, Energy Conservation</i>.</p> <p>PREPARED BY: _____ Date: _____</p> <p>PREPARED BY SIGNATURE: _____</p> <p>I hereby certify that this building is in compliance with the <i>Florida Building Code, Energy Conservation</i>.</p> <p>OWNER/AGENT: _____ Date: _____</p> <p>OWNER/AGENT SIGNATURE: _____</p>	<p>Review of plans and specifications covered by this form indicate compliance with the <i>Florida Building Code, Energy Conservation</i> Before construction is complete, this building will be inspected for compliance in accordance with Section 553.908, F.S.</p> <p>CODE OFFICIAL: _____ Date: _____</p> <p>CODE OFFICIAL SIGNATURE: _____</p>
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## Florida Building Code, Energy Conservation

FORM R402-20203

Residential Building Thermal Envelope Approach  
R-Value Computation Method

Florida Climate Zone

<b>PROJECT NAME AND ADDRESS:</b> <b>OWNER:</b> <b>PERMIT TYPE:</b> <b>WORST CASE?</b>	<b>BUILDER:</b> <b>PERMITTING OFFICE:</b> <b>JURISDICTION NUMBER:</b> <b>PERMIT NUMBER:</b> <b>NUMBER OF UNITS:</b> <b>CONDITIONED FLOOR AREA:</b>
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**Scope:** Compliance with Section R402.1.2 of the *Florida Building Code, Energy Conservation*, shall be demonstrated by the use of Form R402 for single- and multiple-family residences of three stories or less in height, additions to existing residential buildings, alterations, renovations, and building systems in existing buildings, as applicable. To comply, a building must meet or exceed all of the energy efficiency requirements and applicable mandatory requirements summarized on this form. If a building does not comply with this method, or by the UA Alternative method, it may still comply under Section R405 or R406 of the *Florida Building Code, Energy Conservation*.

### General Instructions:

1. Fill in all the applicable spaces of the "INSTALLED" row in the INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT table with the information requested. All "INSTALLED" values must be equal to or more efficient than the required levels. "AVG" indicates an area weighted average is allowed; "LOWEST" indicates the lowest R-value to be installed must be entered.
2. Complete the tables for air infiltration and installed equipment.
3. Read the MANDATORY REQUIREMENTS table and check each box to indicate your intent to comply with all applicable items.
4. Read, sign and date the "Prepared By" certification statement at the bottom of this form. The owner or owner's agent must also sign and date the form.

### INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>1</sup>

REQUIREMENT	FENESTRATION U-FACTOR <sup>2,3,4</sup>	SKYLIGHT <sup>2</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>2,3</sup>	CEILING R-VALUE	WOOD FRAME WALL R-VALUE <sup>5</sup>	MASS WALL R-VALUE <sup>5,6</sup>	FLOOR R-VALUE	BASEMENT WALL R-VALUE	SLAB <sup>7</sup> R-VALUE & DEPTH	CRAWL SPACE WALL R-VALUE
CLIMATE ZONE 1	NR	0.75	0.25	30	13	3/4	13	0	0	0
CLIMATE ZONE 2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
VALUE	AVG	AVG	AVG	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST
INSTALLED:										

R-Value Calculation Method - [PASS / FAIL]

For SI: 1 foot = 304.8 mm; NR = No requirement.

- (1) R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
- (2) The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- (3) For impact rated fenestration complying with Section R301.2.1.2 of the *Florida Building Code, Residential* or Section 1609.1.2 of the *Florida Building Code, Building*, the maximum U-factor shall be 0.65 in Climate Zone 2. An area-weighted average of U-factor and SHGC shall be accepted to meet the requirements, and up to 15 square feet of glazed fenestration area are exempted from the U-factor and SHGC requirement based on Section R402.3.1, R402.3.2 and R402.3.3.
- (4) One side-hinged opaque door assembly up to 24 square feet is exempted from this U-factor requirement based on Section R402.3.4.
- (5) R-values are for insulation material only as applied in accordance with manufacturer's installation instructions.
- (6) The second R-value applies when more than half the insulation is on the interior of the mass wall.
- (7) R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.



<b>Air infiltration:</b>	Blower door test is required on the building envelope to verify leakage $\leq 7$ ACH50; test report must be provided to code official before CO is issued. <i>Florida Building Code, Energy Conservation Section R402.4.1.2</i> testing exception may apply for additions, alterations, or renovations.
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### EQUIPMENT REQUIREMENTS AND INSTALLED VALUES

Fill in the "INSTALLED EFFICIENCY LEVEL" column with the information requested. For multiple systems of the same type, indicate the minimum efficient system. All "INSTALLED" values must be equal to or more efficient than the required level. If a listed "SYSTEM TYPE" is not to be installed, write in "N/A" for not applicable.

SYSTEM TYPE	MINIMUM EFFICIENCY LEVEL REQUIRED	INSTALLED EFFICIENCY LEVEL
Air distribution system <sup>1</sup> Air handling unit Duct R-Value  Air Leakage/Duct test  Duct testing	Not allowed in attic Factory Sealed = R-8 (Ducts in unconditioned attics, Diameter $\geq 3$ in.) = R-6 (Ducts in unconditioned non attics, Diam. $\geq 3$ in.) = R-6 (Ducts in unconditioned attics, Diameter $< 3$ in.) = R-4.2 (Ducts in uncond not attics, Diam. $< 3$ in.) All ducts are in conditioned space (No minimum)  Air handler installed: Total leakage = 4 cfm/100 s.f. Air handler not installed: Total leakage = 3 cfm/100 s.f.  Test not required if all ducts and AHU are within the building thermal envelope and for additions or alterations where ducts extended from existing heating and cooling system through unconditioned space are $< 40$ linear ft.	Location: Factory Sealed? Y/N R-Value (In unc. attic) = R-Value (In unc. non attics) = R-value (Small ducts in attic) = R-Value (Small ducts in unc) = All in conditioned space? Y/N  Total leakage (cfm/100 s.f.) = Air handler installed? Y/N  Test report required? Y/N
Air conditioning systems: Central system $< 645,000$ Btu/h Central system $\geq 45,000$ Btu/h  PTAC, PTHP, SPVAC, or SPVHP  Other:	Minimum federal standard required by NAECA <sup>2</sup>  SEER <sub>2</sub> =14.93 SEER <sub>2</sub> =13.8  EER [from Table C403.2.3(3)]  See Tables C403.2.3(1)-(11)	Cap. (Btu/h)= SEER <sub>2</sub> (Min)=  Type= Cap. (Btu/h)= EER (Min)=  Type = Effic. (Min) =
Heating systems:  Electric resistance Heat Pump $\leq 65,000$ Btu/h Gas Furnace, non-weatherized Oil Furnace, non-weatherized  PTHP or SPVHP  Other:	Minimum federal standard required by NAECA <sup>2</sup>  Not allowed in Climate Zone 2 HSPF <sub>2</sub> $\geq 8.275$ HSPF <sub>AFUE</sub> $\geq 80\%$ HSPF <sub>AFUE</sub> $\geq 83\%$  COP <sub>H</sub> [from Table C403.2.3(3)]  See Tables C403.2.3(1)-(11)	HSPF <sub>2</sub> (Min) = AFUE (Min) = AFUE (Min) =  Type= Cap. (Btu/h)= COP <sub>H</sub> (Min)=  Type = Effic. (Min)=
Water heating system (storage type):  Electric <sup>3,6</sup> Gas fired <sup>4,6</sup>  Other (describe) <sup>5,6</sup> :	Minimum federal standard required by NAECA <sup>2</sup>  UEF: 40 gal.: 0.9230, 931, 50 gal.: 0.9240, 930, 60 gal.: 2.0542, 176 UEF: 40 gal.: 0.5890, 64, 50 gal.: 0.5630, 627, 60 gal.: 0.7660, 789  Other (describe) <sup>5,6</sup> :	Capacity =  UEF (Min) = UEF (Min) =  Type= Effic. (Min)=

#### Equipment Efficiency - [PASS / FAIL]

- (1) Ducts & AHU installed "substantially leak free" per Section R403.3.2. Test required by either individuals as defined in Section 553.993(5) or (7), *Florida Statutes*, or individuals licensed as set forth in Section 489.105(3)(f), (g), or (i), *Florida Statutes*. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope, and for additions where ducts from an existing heating and cooling system extended to the addition through unconditioned space are less than 40 linear ft.

- (2) Minimum efficiencies are those set by the *National Appliance Energy Conservation Act of 1987* for typical residential equipment and are subject to NAECA rules and regulations. For other types of equipment, see Tables C403.2.3 (1-11) of the Commercial Provisions of the *Florida Building Code, Energy Conservation*.
- (3) For electric storage volumes  $\leq 55$  gallons, minimum UEF =  $0.9349 - (0.0001 \times \text{volume})$ . For electric storage volumes  $> 55$  gallons, minimum UEF =  $2.2418 - (0.0011 \times \text{volume})$ .
- (4) For natural gas storage volumes  $\leq 55$  gallons, minimum UEF =  $0.692 - (0.0013 \times \text{volume})$ . For natural gas storage volumes  $> 55$  gallons, minimum UEF =  $0.8072 - (0.0003 \times \text{volume})$ .
- (5) For electric tankless, min. UEF = 0.92. For natural gas tankless, min. UEF = 0.81.
- (6) Referenced UEFs shown are for medium/high draw pattern value provided by manufacturer.

MANDATORY OTHER REQUIREMENTS			
Component	Section	Summary of Requirement(s)	Check
Air leakage	R402.4	To be caulked, gasketed, weatherstripped or otherwise sealed per Table R402.4.1.1. Recessed lighting IC-rated as having $\leq 2.0$ cfm tested to ASTM E 283. Windows and doors: 0.3 cfm/sq.ft. (swinging doors: 0.5 cfm/sf) when tested to NFRC 400 or AAMA/WDMA/CSA 101/I.S. 2/A440. Fireplaces: Tight-fitting flue dampers & outdoor combustion air.	
Programmable thermostat	R403.1.2	A programmable thermostat is required for the primary heating or cooling system.	
Air distribution system	R403.3.2 R403.3.4	Ducts shall be tested as per Section R403.3.2 by either individuals as defined in Section 553.993(5) or (7), <i>Florida Statutes</i> , or individuals licensed as set forth in Section 489.105(3) (f), (g) or (i), <i>Florida Statutes</i> . Air handling units are not allowed in attics.	
Water heaters	R403.5	Comply with efficiencies in Table C404.2. Hot water pipes insulated to $\geq R-3$ to kitchen outlets, other cases. Circulating systems to have an automatic or accessible manual OFF switch. Heat trap required for vertical pipe risers.	
Cooling/heating equipment	R403.7	Sizing calculation performed & attached. Special occasion cooling or heating capacity requires separate system or variable capacity system.	
Swimming pools & spas	R403.10	Spas and heated pools must have vapor-retardant covers or a liquid cover or other means proven to reduce heat loss except if 70% of heat from site-recovered energy. Off/timer switch required. Gas heaters minimum thermal efficiency is 82%. Heat pump pool heaters minimum COP is 4.0.	
Lighting equipment	R404.1	Not less than 90% of the lamps in permanently installed luminaires shall have an efficacy of at least 45 lumens-per-watt or shall utilize lamps with an efficacy of not less than 65 lumens-per-watt.	

<p>I hereby certify that the plans and specifications covered by this form are in compliance with the <i>Florida Building Code, Energy Conservation</i>.</p> <p>PREPARED BY: _____ Date: _____</p> <p>PREPARED BY SIGNATURE: _____</p> <p>I hereby certify that this building is in compliance with the <i>Florida Building Code, Energy Conservation</i>.</p> <p>OWNER/AGENT: _____ Date: _____</p> <p>OWNER/AGENT SIGNATURE: _____</p>	<p>Review of plans and specifications covered by this form indicate compliance with the <i>Florida Building Code, Energy Conservation</i> Before construction is complete, this building will be inspected for compliance in accordance with Section 553.908, F.S.</p> <p>CODE OFFICIAL: _____ Date: _____</p> <p>CODE OFFICIAL SIGNATURE: _____</p>
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See attached.

**Text of modification:** [Note: this A3 mod starts from the A2 mod which was approved by the Energy TAC in June, and now also addresses SEER2 labeled heat pumps and includes Section R404.1 lighting requirement changes that were approved by the Energy TAC in June via Mod 10517-A1. June TAC meeting approved A2 mod changes are kept in underline and cross-out format in black font, and new A3 mod changes are in underline and cross-out format in blue font.]

### **Florida Building Code, Energy Conservation**

FORM R402-20293

Residential Building Thermal Envelope Approach  
R-Value Computation Method

Florida Climate Zone

<b>PROJECT NAME AND ADDRESS:</b> <b>OWNER:</b> <b>PERMIT TYPE:</b> <b>WORST CASE?</b>	<b>BUILDER:</b> <b>PERMITTING OFFICE:</b> <b>JURISDICTION NUMBER:</b> <b>PERMIT NUMBER:</b> <b>NUMBER OF UNITS:</b> <b>CONDITIONED FLOOR AREA:</b>
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**Scope:** Compliance with Section R402.1.2 of the *Florida Building Code, Energy Conservation*, shall be demonstrated by the use of Form R402 for single- and multiple-family residences of three stories or less in height, additions to existing residential buildings, alterations, renovations, and building systems in existing buildings, as applicable. To comply, a building must meet or exceed all of the energy efficiency requirements and applicable mandatory requirements summarized on this form. If a building does not comply with this method, or by the UA Alternative method, it may still comply under Section R405 or R406 of the *Florida Building Code, Energy Conservation*.

#### **General Instructions:**

- Fill in all the applicable spaces of the "INSTALLED" row in the INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT table with the information requested. All "INSTALLED" values must be equal to or more efficient than the required levels. "AVG" indicates an area weighted average is allowed; "LOWEST" indicates the lowest R-value to be installed must be entered.
- Complete the tables for air infiltration and installed equipment.
- Read the MANDATORY REQUIREMENTS table and check each box to indicate your intent to comply with all applicable items.
- Read, sign and date the "Prepared By" certification statement at the bottom of this form. The owner or owner's agent must also sign and date the form.

#### **INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>1</sup>**

REQUIRE- MENT	FENESTRATION U-FACTOR <sup>2,3,4</sup>	SKYLIGHT <sup>2</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>2,3</sup>	CEILING R-VALUE	WOOD FRAME WALL R- VALUE <sup>5</sup>	MASS WALL R- VALUE <sup>5,6</sup>	FLOOR R-VALUE	BASEMENT WALL R- VALUE	SLAB <sup>7</sup> R- VALUE & DEPTH	CRAWL SPACE WALL R- VALUE
CLIMATE ZONE 1	NR	0.75	0.25	30	13	3/4	13	0	0	0
CLIMATE ZONE 2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
VALUE	AVG	AVG	AVG	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST
<b>INSTALLED:</b>										

R-Value Calculation Method - [PASS / FAIL]

For SI: 1 foot = 304.8 mm; NR = No requirement.

- (1) R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.

- (2) The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- (3) For impact rated fenestration complying with Section R301.2.1.2 of the *Florida Building Code, Residential* or Section 1609.1.2 of the *Florida Building Code, Building*, the maximum *U*-factor shall be 0.65 in Climate Zone 2. An area-weighted average of *U*-factor and SHGC shall be accepted to meet the requirements, and up to 15 square feet of glazed fenestration area are exempted from the *U*-factor and SHGC requirement based on Section R402.3.1, R402.3.2 and R402.3.3.
- (4) One side-hinged opaque door assembly up to 24 square feet is exempted from this *U*-factor requirement based on Section R402.3.4.
- (5) *R*-values are for insulation material only as applied in accordance with manufacturer's installation instructions.
- (6) The second *R*-value applies when more than half the insulation is on the interior of the mass wall.
- (7) *R*-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.

<b>Air infiltration:</b>	Blower door test is required on the building envelope to verify leakage $\leq 7$ ACH50; test report must be provided to code official before CO is issued. <i>Florida Building Code, Energy Conservation</i> Section R402.4.1.2 testing exception may apply for additions, alterations, or renovations.
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### EQUIPMENT REQUIREMENTS AND INSTALLED VALUES

Fill in the "INSTALLED EFFICIENCY LEVEL" column with the information requested. For multiple systems of the same type, indicate the minimum efficient system. All "INSTALLED" values must be equal to or more efficient than the required level. If a listed "SYSTEM TYPE" is not to be installed, write in "N/A" for not applicable.

SYSTEM TYPE	MINIMUM EFFICIENCY LEVEL REQUIRED	INSTALLED EFFICIENCY LEVEL
Air distribution system <sup>1</sup> Air handling unit Duct <i>R</i> -Value	Not allowed in attic Factory Sealed = R-8 (Ducts in unconditioned attics, Diameter $\geq$ 3 in.) = R-6 (Ducts in unconditioned non attics, Diam. $\geq$ 3 in.) = R-6 (Ducts in unconditioned attics, Diameter < 3 in.) = R-4.2 (Ducts in uncond not attics, Diam. < 3 in.) All ducts are in conditioned space (No minimum)	Location: Factory Sealed? Y/N <i>R</i> -Value (In unc. attic) = <i>R</i> -Value (In unc. non attics) = <i>R</i> -value (Small ducts in attic) = <i>R</i> -Value (Small ducts in unc) = All in conditioned space? Y/N
Air Leakage/Duct test  Duct testing	Air handler installed: Total leakage = 4 cfm/100 s.f. Air handler not installed: Total leakage = 3 cfm/100 s.f.  Test not required if all ducts and AHU are within the building thermal envelope and for additions or alterations where ducts extended from existing heating and cooling system through unconditioned space are < 40 linear ft.	Total leakage (cfm/100 s.f.) = Air handler installed? Y/N  Test report required? Y/N
Air conditioning systems:  Central system < 645,000 Btu/h <u>Central system <math>\geq</math> 45,000 Btu/h</u>  <u>Central heat pump</u>  PTAC, PTHP, SPVAC, or SPVHP  Other:	Minimum federal standard required by NAECA <sup>2</sup>  <u>SEER<sub>2</sub>=14.43</u> <u>SEER<sub>2</sub>=13.8</u>  <u>SEER<sub>2</sub> = 14.3</u>  EER [from Table C403.2.3(3)]  See Tables C403.2.3(1)-(11)	<u>Cap. (Btu/h)=</u> SEER <sub>2</sub> (Min)=  <u>SEER<sub>2</sub> (Min)=</u>  <u>Type=</u> <u>Cap. (Btu/h)=</u> EER (Min)=  Type = Effic.(Min) =
Heating systems:  <u>Electric resistance</u> Heat Pump $\leq$ 65,000-Btu/h Gas Furnace, non-weatherized Oil Furnace, non-weatherized  <u>PTHP or SPVHP</u>  Other:	Minimum federal standard required by NAECA <sup>2</sup>  <u>Not allowed in Climate Zone 2</u> HSPF <sub>2</sub> $\geq$ <u>8.27.5</u> <u>HSPF<sub>2</sub>AFUE <math>\geq</math> 80%</u> <u>HSPF<sub>2</sub>AFUE <math>\geq</math> 83%</u>  <u>COP<sub>H</sub> [from Table C403.2.3(3)]</u>  <u>See Tables C403.2.3(1)-(11)</u>	HSPF <sub>2</sub> (Min) = AFUE (Min) = AFUE (Min) =  <u>Type=</u> <u>Cap. (Btu/h)=</u> <u>COP<sub>H</sub> (Min)=</u>  Type =

Water heating system (storage type):	Minimum federal standard required by NAECA <sup>2</sup>	Effic.(Min)=
Electric <sup>3,6</sup>	UEF: 40 gal.: <del>0.8230.931</del> , 50 gal.: <del>0.8240.930</del> , 60 gal.: <del>2.0642.176</del>	Capacity =
Gas fired <sup>4,6</sup>	UEF: 40 gal.: <del>0.5890.64</del> , 50 gal.: <del>0.5630.627</del> , 60 gal.: <del>0.7660.789</del>	UEF (Min) =
Other (describe) <sup>5,6</sup> :		UEF (Min) =
		Type=
		Effic.(Min)=

## Equipment Efficiency - [PASS / FAIL]

- (1) Ducts & AHU installed "substantially leak free" per Section R403.3.2. Test required by either individuals as defined in Section 553.993(5) or (7), *Florida Statutes*, or individuals licensed as set forth in Section 489.105(3)(f), (g), or (i), *Florida Statutes*. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope, and for additions where ducts from an existing heating and cooling system extended to the addition through unconditioned space are less than 40 linear ft.
- (2) Minimum efficiencies are those set by the *National Appliance Energy Conservation Act* of 1987 for typical residential equipment and are subject to NAECA rules and regulations. For other types of equipment, see Tables C403.2.3 (1-11) of the Commercial Provisions of the *Florida Building Code, Energy Conservation*.
- (3) For electric storage volumes ≤ 55 gallons, minimum UEF = 0.9349 – (0.0001 \* volume). For electric storage volumes > 55 gallons, minimum UEF = 2.2418 – (0.0011 \* volume).
- (4) For natural gas storage volumes ≤ 55 gallons, minimum UEF = 0.692 – (0.0013 \* volume). For natural gas storage volumes > 55 gallons, minimum UEF = 0.8072 – (0.0003 \* volume).
- (5) For electric tankless, min. UEF = 0.92. For natural gas tankless, min. UEF = 0.81.
- (6) Referenced UEFs shown are for ~~medium~~<sup>high</sup> draw pattern value provided by manufacturer.

MANDATORY OTHER REQUIREMENTS			
Component	Section	Summary of Requirement(s)	Check
Air leakage	R402.4	To be caulked, gasketed, weatherstripped or otherwise sealed per Table R402.4.1.1. Recessed lighting IC-rated as having ≤ 2.0 cfm tested to ASTM E 283. Windows and doors: 0.3 cfm/sq.ft. (swinging doors: 0.5 cfm/sf) when tested to NFRC 400 or AAMA/WDMA/CSA 101/I.S. 2/A440. Fireplaces: Tight-fitting flue dampers & outdoor combustion air.	
Programmable thermostat	R403.1.2	A programmable thermostat is required for the primary heating or cooling system.	
Air distribution system	R403.3.2 R403.3.4	Ducts shall be tested as per Section R403.3.2 by either individuals as defined in Section 553.993(5) or (7), <i>Florida Statutes</i> , or individuals licensed as set forth in Section 489.105(3) (f), (g) or (i), <i>Florida Statutes</i> . Air handling units are not allowed in attics.	
Water heaters	R403.5	Comply with efficiencies in Table C404.2. Hot water pipes insulated to ≥ R-3 to kitchen outlets, other cases. Circulating systems to have an automatic or accessible manual OFF switch. Heat trap required for vertical pipe risers.	
Cooling/heating equipment	R403.7	Sizing calculation performed & attached. Special occasion cooling or heating capacity requires separate system or variable capacity system.	
Swimming pools & spas	R403.10	Spas and heated pools must have vapor-retardant covers or a liquid cover or other means proven to reduce heat loss except if 70% of heat from site-recovered energy. Off/timer switch required. Gas heaters minimum thermal efficiency is 82%. Heat pump pool heaters minimum COP is 4.0.	
Lighting equipment	R404.1	<del>Not less than 90% of the lamps in All permanently installed luminaires, excluding those in kitchen appliances, shall have an efficacy of at least 45 lumens-per-watt or shall utilize lamps with an efficacy of not less than 65 lumens-per-watt.</del>	

<p>I hereby certify that the plans and specifications covered by this form are in compliance with the <i>Florida Building Code, Energy Conservation</i>.</p> <p>PREPARED BY: _____ Date: _____</p> <p><u>PREPARED BY SIGNATURE:</u> _____</p> <p>I hereby certify that this building is in compliance with the <i>Florida Building Code, Energy Conservation</i>.</p>	<p>Review of plans and specifications covered by this form indicate compliance with the <i>Florida Building Code, Energy Conservation</i> Before construction is complete, this building will be inspected for compliance in accordance with Section 553.908, F.S.</p>
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OWNER/AGENT: _____ Date: _____	CODE OFFICIAL: _____ Date: _____
<u>OWNER/AGENT SIGNATURE:</u> _____	<u>CODE OFFICIAL SIGNATURE:</u> _____



See attached.

MANDATORY OTHER REQUIREMENTS			
Component	Section	Summary of Requirement(s)	Check
Air leakage	R402.4	To be caulked, gasketed, weatherstripped or otherwise sealed per Table R402.4.1.1. Recessed lighting IC-rated as having $\leq 2.0$ cfm tested to ASTM E 283. Windows and doors: 0.3 cfm/sq.ft. (swinging doors: 0.5 cfm/sf) when tested to NFRC 400 or AAMA/WDMA/CSA 101/I.S. 2/A440. Fireplaces: Tight-fitting flue dampers & outdoor combustion air.	
Programmable thermostat	R403.1.2	A programmable thermostat is required for the primary heating or cooling system.	
Air distribution system	R403.3.2 R403.3.4	Ducts shall be tested as per Section R403.3.2 by either individuals as defined in Section 553.993(5) or (7), <i>Florida Statutes</i> , or individuals licensed as set forth in Section 489.105(3) (f), (g) or (i), <i>Florida Statutes</i> . Air handling units are not allowed in attics.	
Water heaters	R403.5	Comply with efficiencies in Table C404.2. Hot water pipes insulated to $\geq$ R-3 to kitchen outlets, other cases. Circulating systems to have an automatic or accessible manual OFF switch. Heat trap required for vertical pipe risers.	
Cooling/heating equipment	R403.7	Sizing calculation performed & attached. Special occasion cooling or heating capacity requires separate system or variable capacity system.	
Swimming pools & spas	R403.10	Spas and heated pools must have vapor-retardant covers or a liquid cover or other means proven to reduce heat loss except if 70% of heat from site-recovered energy. Off/timer switch required. Gas heaters minimum thermal efficiency is 82%. Heat pump pool heaters minimum COP is 4.0.	
Lighting equipment	R404.1	At least 90% of permanently installed lighting fixtures shall be high-efficacy lamps.	

I hereby certify that the plans and specifications covered by this form are in compliance with the *Florida Building Code, Energy Conservation*.

PREPARED BY: \_\_\_\_\_ Date: \_\_\_\_\_

PREPARED BY SIGNATURE: \_\_\_\_\_

I hereby certify that this building is in compliance with the *Florida Building Code, Energy Conservation*.

OWNER/AGENT: \_\_\_\_\_ Date: \_\_\_\_\_

OWNER/AGENT SIGNATURE: \_\_\_\_\_

Review of plans and specifications covered by this form indicate compliance with the *Florida Building Code, Energy Conservation*. Before construction is complete, this building will be inspected for compliance in accordance with Section 553.908, F.S.

CODE OFFICIAL: \_\_\_\_\_ Date: \_\_\_\_\_

CODE OFFICIAL SIGNATURE: \_\_\_\_\_

Make additional corrections to Appendix D, Form R402 - MANDATORY REQUIREMENTS TABLE:

Water heaters R403.5 Comply with efficiencies in Table C404.2. ~~Hot water pipes insulated to  $\geq$  R-3 to kitchen outlets, other cases.~~ Circulating systems to have an automatic or accessible manual OFF switch. Heat trap required for vertical pipe risers.

See attached PDF. Additional Form R402 changes may be necessary to reflect other applicable 2023 code changes that are approved.

## Florida Building Code, Energy Conservation

FORM R402-20283

Residential Building Thermal Envelope Approach  
R-Value Computation Method

Florida Climate Zone

<b>PROJECT NAME AND ADDRESS:</b>		<b>BUILDER:</b>
		<b>PERMITTING OFFICE:</b>
		<b>JURISDICTION NUMBER:</b>
<b>OWNER:</b>		<b>PERMIT NUMBER:</b>
<b>PERMIT TYPE:</b>		<b>NUMBER OF UNITS:</b>
<b>WORST CASE?</b>		<b>CONDITIONED FLOOR AREA:</b>

**Scope:** Compliance with Section R402.1.2 of the *Florida Building Code, Energy Conservation*, shall be demonstrated by the use of Form R402 for single- and multiple-family residences of three stories or less in height, additions to existing residential buildings, alterations, renovations, and building systems in existing buildings, as applicable. To comply, a building must meet or exceed all of the energy efficiency requirements and applicable mandatory requirements summarized on this form. If a building does not comply with this method, or by the UA Alternative method, it may still comply under Section R405 or R406 of the *Florida Building Code, Energy Conservation*.

### General Instructions:

1. Fill in all the applicable spaces of the "INSTALLED" row in the INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT table with the information requested. All "INSTALLED" values must be equal to or more efficient than the required levels. "AVG" indicates an area weighted average is allowed; "LOWEST" indicates the lowest R-value to be installed must be entered.
2. Complete the tables for air infiltration and installed equipment.
3. Read the MANDATORY REQUIREMENTS table and check each box to indicate your intent to comply with all applicable items.
4. Read, sign and date the "Prepared By" certification statement at the bottom of this form. The owner or owner's agent must also sign and date the form.

### INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>1</sup>

REQUIREMENT	FENESTRATION U-FACTOR <sup>2,3,4</sup>	SKYLIGHT <sup>2</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>2,3</sup>	CEILING R-VALUE	WOOD FRAME WALL R-VALUE <sup>5</sup>	MASS WALL R-VALUE <sup>5,6</sup>	FLOOR R-VALUE	BASEMENT WALL R-VALUE	SLAB <sup>7</sup> R-VALUE & DEPTH	CRAWL SPACE WALL R-VALUE
CLIMATE ZONE 1	NR	0.75	0.25	30	13	3/4	13	0	0	0
CLIMATE ZONE 2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
VALUE	AVG	AVG	AVG	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST	LOWEST
INSTALLED:										

R-Value Calculation Method - [PASS / FAIL]

For SI: 1 foot = 304.8 mm; NR = No requirement.

- (1) R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
- (2) The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- (3) For impact rated fenestration complying with Section R301.2.1.2 of the *Florida Building Code, Residential* or Section 1609.1.2 of the *Florida Building Code, Building*, the maximum U-factor shall be 0.65 in Climate Zone 2. An area-weighted average of U-factor and SHGC shall be accepted to meet the requirements, and up to 15 square feet of glazed fenestration area are exempted from the U-factor and SHGC requirement based on Section R402.3.1, R402.3.2 and R402.3.3.
- (4) One side-hinged opaque door assembly up to 24 square feet is exempted from this U-factor requirement based on Section R402.3.4.
- (5) R-values are for insulation material only as applied in accordance with manufacturer's installation instructions.
- (6) The second R-value applies when more than half the insulation is on the interior of the mass wall.
- (7) R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.

<b>Air infiltration:</b>	Blower door test is required on the building envelope to verify leakage $\leq 7$ ACH50; test report must be provided to code official before CO is issued. <i>Florida Building Code, Energy Conservation</i> Section R402.4.1.2 testing exception may apply for additions, alterations, or renovations.
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### EQUIPMENT REQUIREMENTS AND INSTALLED VALUES

Fill in the "INSTALLED EFFICIENCY LEVEL" column with the information requested. For multiple systems of the same type, indicate the minimum efficient system. All "INSTALLED" values must be equal to or more efficient than the required level. If a listed "SYSTEM TYPE" is not to be installed, write in "N/A" for not applicable.

SYSTEM TYPE	MINIMUM EFFICIENCY LEVEL REQUIRED	INSTALLED EFFICIENCY LEVEL
Air distribution system <sup>1</sup> Air handling unit Duct R-Value  Air Leakage/Duct test  Duct testing	Not allowed in attic Factory Sealed = R-8 (Ducts in unconditioned attics, Diameter $\geq 3$ in.) = R-6 (Ducts in unconditioned non attics, Diam. $\geq 3$ in.) = R-6 (Ducts in unconditioned attics, Diameter $< 3$ in.) = R-4.2 (Ducts in uncond not attics, Diam. $< 3$ in.) All ducts are in conditioned space (No minimum)  Air handler installed: Total leakage = 4 cfm/100 s.f. Air handler not installed: Total leakage = 3 cfm/100 s.f.  Test not required if all ducts and AHU are within the building thermal envelope and for additions or alterations where ducts extended from existing heating and cooling system through unconditioned space are $< 40$ linear ft.	Location: Factory Sealed? Y/N R-Value (In unc. attic) = R-Value (In unc. non attics) = R-value (Small ducts in attic) = R-Value (Small ducts in unc) = All in conditioned space? Y/N  Total leakage (cfm/100 s.f.) = Air handler installed? Y/N  Test report required? Y/N
Air conditioning systems:  Central system $< 645,000$ Btu/h <u>Central system <math>\geq 45,000</math> Btu/h</u>  <u>PTAC, PTHP, SPVAC, or SPVHP</u>  Other:	Minimum federal standard required by NAECA <sup>2</sup>  SEER <sub>2</sub> = <u>14.03</u> SEER <sub>2</sub> = <u>13.8</u>  EER [from Table C403.2.3(3)]  See Tables C403.2.3(1)-(11)	<u>Cap. (Btu/h)=</u> SEER <sub>2</sub> (Min)=  <u>Type=</u> <u>Cap. (Btu/h)=</u> EER (Min)=  Type = Effic.(Min) =
Heating systems:  <u>Electric resistance</u> Heat Pump $\leq 65,000$ Btu/h Gas Furnace, non-weatherized Oil Furnace, non-weatherized  <u>PTHP or SPVHP</u>  Other:	Minimum federal standard required by NAECA <sup>2</sup>  <u>Not allowed in Climate Zone 2</u> HSPF <sub>2</sub> $\geq$ <u>8.27.5</u> HSPFAFUE $\geq 80\%$ HSPFAFUE $\geq 83\%$  <u>COP<sub>H</sub> [from Table C403.2.3(3)]</u>  See Tables C403.2.3(1)-(11)	HSPF <sub>2</sub> (Min) = AFUE (Min) = AFUE (Min) =  <u>Type=</u> <u>Cap. (Btu/h)=</u> <u>COP<sub>H</sub> (Min)=</u>  Type = Effic.(Min)=
Water heating system (storage type):  Electric <sup>3, 6</sup> Gas fired <sup>4, 6</sup>  Other (describe) <sup>5, 6</sup> :	Minimum federal standard required by NAECA <sup>2</sup>  UEF: 40 gal.: <u>0.9230.931</u> , 50 gal.: <u>0.9240.930</u> , 60 gal.: <u>2.0542.176</u> UEF: 40 gal.: <u>0.5890.64</u> , 50 gal.: <u>0.5630.627</u> , 60 gal.: <u>0.7660.789</u>	Capacity =  UEF (Min) = UEF (Min) =  Type= Effic.(Min)=

#### Equipment Efficiency - [PASS / FAIL]

- (1) Ducts & AHU installed "substantially leak free" per Section R403.3.2. Test required by either individuals as defined in Section 553.993(5) or (7), *Florida Statutes*, or individuals licensed as set forth in Section 489.105(3)(f), (g), or (i), *Florida Statutes*. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope, and for additions where ducts from an existing heating and cooling system extended to the addition through unconditioned space are less than 40 linear ft.

- (2) Minimum efficiencies are those set by the *National Appliance Energy Conservation Act of 1987* for typical residential equipment and are subject to NAECA rules and regulations. For other types of equipment, see Tables C403.2.3 (1-11) of the *Commercial Provisions of the Florida Building Code, Energy Conservation*.
- (3) For electric storage volumes  $\leq 55$  gallons, minimum UEF =  $0.9349 - (0.0001 \times \text{volume})$ . For electric storage volumes  $> 55$  gallons, minimum UEF =  $2.2418 - (0.0011 \times \text{volume})$ .
- (4) For natural gas storage volumes  $\leq 55$  gallons, minimum UEF =  $0.692 - (0.0013 \times \text{volume})$ . For natural gas storage volumes  $> 55$  gallons, minimum UEF =  $0.8072 - (0.0003 \times \text{volume})$ .
- (5) For electric tankless, min. UEF = 0.92. For natural gas tankless, min. UEF = 0.81.
- (6) Referenced UEFs shown are for medium/high draw pattern value provided by manufacturer.

MANDATORY REQUIREMENTS			
Component	Section	Summary of Requirement(s)	Check
Air leakage	R402.4	To be caulked, gasketed, weatherstripped or otherwise sealed per Table R402.4.1.1. Recessed lighting IC-rated as having $\leq 2.0$ cfm tested to ASTM E 283. Windows and doors: 0.3 cfm/sq.ft. (swinging doors: 0.5 cfm/sf) when tested to NFRC 400 or AAMA/WDMA/CSA 101/I.S. 2/A440. Fireplaces: Tight-fitting flue dampers & outdoor combustion air.	
Programmable thermostat	R403.1.2	A programmable thermostat is required for the primary heating or cooling system.	
Air distribution system	R403.3.2 R403.3.4	Ducts shall be tested as per Section R403.3.2 by either individuals as defined in Section 553.993(5) or (7), <i>Florida Statutes</i> , or individuals licensed as set forth in Section 489.105(3) (f), (g) or (i), <i>Florida Statutes</i> . Air handling units are not allowed in attics.	
Water heaters	R403.5	Comply with efficiencies in Table C404.2. Hot water pipes insulated to $\geq R-3$ to kitchen outlets, other cases. Circulating systems to have an automatic or accessible manual OFF switch. Heat trap required for vertical pipe risers.	
Cooling/heating equipment	R403.7	Sizing calculation performed & attached. Special occasion cooling or heating capacity requires separate system or variable capacity system.	
Swimming pools & spas	R403.10	Spas and heated pools must have vapor-retardant covers or a liquid cover or other means proven to reduce heat loss except if 70% of heat from site-recovered energy. Off/timer switch required. Gas heaters minimum thermal efficiency is 82%. Heat pump pool heaters minimum COP is 4.0.	
Lighting equipment	R404.1	Not less than 90% of the lamps in permanently installed luminaires shall have an efficacy of at least 45 lumens-per-watt or shall utilize lamps with an efficacy of not less than 65 lumens-per-watt.	

<p>I hereby certify that the plans and specifications covered by this form are in compliance with the <i>Florida Building Code, Energy Conservation</i>.</p> <p>PREPARED BY: _____ Date _____</p> <p>I hereby certify that this building is in compliance with the <i>Florida Building Code, Energy Conservation</i>.</p> <p>OWNER/AGENT: _____ Date _____</p>	<p>Review of plans and specifications covered by this form indicate compliance with the <i>Florida Building Code, Energy Conservation</i> Before construction is complete, this building will be inspected for compliance in accordance with Section 553.908, F.S.</p> <p>CODE OFFICIAL: _____ Date: _____</p>
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**R403.5.3 Hot water pipe insulation (Prescriptive).**

Insulation for hot water pipe with a minimum thermal resistance (R-value) of R-3 shall be applied to the following:

1. 1.Piping  $\frac{3}{4}$  inch (19.1 mm) and larger in nominal diameter.
2. 2.Piping serving more than one dwelling unit.
3. 3.Piping located outside the conditioned space.
4. 4.Piping from the water heater to a distribution manifold.
5. 5.Piping located under a floor slab.
6. 6.Buried in piping.
7. 7.Supply and return piping in recirculation systems other than demand recirculation systems.

# TAC: Energy

Total Mods for **Energy** in **Approved as Submitted** : 11

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10245

2

Date Submitted	02/11/2022	Section	104.4	Proponent	Douglas Baggett
Chapter	1	Affects HVHZ	No	Attachments	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language No**

### Related Modifications

10251 10445 10123 10446 10448 10459 10463

### Summary of Modification

This proposed modification is to clarify and provide a consistent requirement for all inspecting parties to be independent and objective from the project.

### Rationale

This modification would provide a consistent requirement for all inspecting parties to be independent and objective. The current code states the third-party certified agencies need to be independent and separate from the project, which implies the engineers and/or designers do not need to be independent. Making this requirement the same for all testing authorities would demonstrate fair business practice, as well as, go towards limiting conflicts of interest, biased testing and unqualified individuals from performing inspections and tests.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

This would have little to no financial impact on the local entity, aside from updating the verbiage on solicitations and policies.

#### Impact to building and property owners relative to cost of compliance with code

This would have little to no financial impact on building and property owners, aside from updating the verbiage on solicitations and policies.

#### Impact to industry relative to the cost of compliance with code

This would have little to no financial impact on the industry if implemented moving forward.

#### Impact to small business relative to the cost of compliance with code

### Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The public can be assured the testing agency has no vested interest in the design, construction or project as a whole, and therefore, is objective and can be trusted.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This modification will improve the code by allowing for clarifying and equalizing requirements of individuals or firms tasked with inspecting and/or testing building components

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This proposed modification does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

**Does not degrade the effectiveness of the code**

No, this proposed modification does not degrade the effectiveness of the code, it enhances it.

## 2nd Comment Period

EN10245-G1

Proponent Mo Madani Submitted 7/22/2022 4:55:45 PM Attachments No

Comment:

The proposed code change is in conflict with Section 553.9081(1)(b), Florida Statutes which authorize that commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer without additional professional qualification requirements.

## 2nd Comment Period

EN10245-G2

Proponent Douglas Baggett Submitted 8/15/2022 4:21:54 PM Attachments No

Comment:

With respect to Mr. Madani's comment about the proposed code change being "in conflict with Section 553.9081(1)(b), Florida Statutes which authorize that commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer without additional professional qualification requirements." This proposed modification does not change those qualification requirements. Instead, it is requiring ALL professionals that are authorized to provide a commissioning report be independent from the project in any other capacity. The current code states the third-party inspection agencies cannot be affiliated with the building design or construction. It is unclear if that requirement is limited only to the third-party agencies or if it is supposed to include all professionals already covered under Florida Statute Section 553.993(5) or (7). The proposed modification is stating clearly that all professionals authorized to commission a system shall be independent/not affiliated with the project in any other capacity.

**C104.4 Approved inspection agencies.** The *code official* is authorized to accept inspection reports in whole or in part from either individuals as defined in Section 553.993(5) or (7), *Florida Statutes* or third-party inspection agencies. None of the individuals, their organizations or third party agencies shall be ~~not~~ affiliated with the building design ~~or~~ construction, or installation provided such agencies are *approved* as to qualifications and reliability relevant to the building components and systems they are inspecting.

# TAC: Energy

Total Mods for **Energy** in **Approved as Submitted** : 11

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10251

3

Date Submitted	02/11/2022	Section	104.4.1	Proponent	Douglas Baggett
Chapter	1	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language Yes**

### Related Modifications

10245

### Summary of Modification

This proposed modification serves to define and set apart from all other testing agencies, what and who constitutes an authorized commissioning agent.

### Rationale

The process of commissioning buildings and their systems is very involved and requires more than simply inspecting and functionally testing equipment. Lumping the commissioning agencies' requirements into the same category as All Inspection Agencies leaves too much room for interpretation which can result in ineffective testing and inefficient systems. Studies have shown that commissioning, when done correctly, can net an energy savings of 9%-30% on average. In order to ensure commissioning is done correctly, it should be conducted by an independent, certified commissioning agent(s).

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

This modification will require the local entity to add specific verbiage and requirements when adding commissioning to a building project (whether it's renovation or new construction). In addition, the local entity may need to create a separate solicitation for a project.

#### Impact to building and property owners relative to cost of compliance with code

Commissioning is already required and, therefore, should already be part of the construction project's budget. There should not be any additional costs.

#### Impact to industry relative to the cost of compliance with code

The potential impact cannot be determined since it's unknown how often commissioning has been conducted by individuals associated or affiliated with the design, construction and/or installation of the systems. There could be an increase to some construction project costs.

#### Impact to small business relative to the cost of compliance with code

## Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

The health, safety and welfare of the general public will be improved by ensuring the mechanical, electrical and plumbing systems have been inspected and certified by a duly authorized, certified and objective third-party that is specifically trained in those systems.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This modification will improve the code to allow for clear, equal and fair requirements of individuals or firms tasked with inspecting and/or testing building components

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This proposed modification does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

**Does not degrade the effectiveness of the code**

No, this proposed modification does not degrade the effectiveness of the code, it enhances it.

## Alternate Language

### 2nd Comment Period

EN10251-A5	<b>Proponent</b>	Fallen Andria	<b>Submitted</b>	7/19/2022 3:46:34 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> Commissioning is about representing the Owner and validating the system(s) that owner pays for are designed, installed and function according to the Owner's requirements. The individuals validating those systems should be required to be independent of the project and third-party certified, regardless of their profession. The identified, certifying organizations require extensive experience, knowledge and testing. They also require ongoing education and testing to keep current on codes. Adding this requirement to the Florida Building Code will avoid conflicts of interest and bias that can occur otherwise, while also ensuring the installed systems perform as efficiently as possible, thereby, saving energy.					

#### Fiscal Impact Statement

##### Impact to local entity relative to enforcement of code

Little to none

##### Impact to building and property owners relative to cost of compliance with code

Little to none

##### Impact to industry relative to the cost of compliance with code

Little to none

##### Impact to small business relative to the cost of compliance with code

#### Requirements

##### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The health, safety and welfare of the general public will be improved by ensuring the mechanical, electrical and plumbing systems have been inspected and certified by a duly authorized, certified and objective third-party that is specifically trained in those systems.

##### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification will improve the code to allow for clear, equal and fair requirements of individuals or firms tasked with inspecting and/or testing building components

##### Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

##### Does not degrade the effectiveness of the code

This proposed modification does not degrade the effectiveness of the code, it improves and clarifies it.

### 1st Comment Period History

EN10251-A2	<b>Proponent</b>	Douglas Baggett	<b>Submitted</b>	4/13/2022 1:55:06 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> The current language allows for bias and conflicts of interest to occur on projects requiring commissioning. The commissioning effort should be completed by someone independent and objective from the project, doing so ensures the Owner's voice, priorities and requirements are completely fulfilled without bias. (This proposed mod. may be better suited for section C408.1.2)					

#### Fiscal Impact Statement

##### Impact to local entity relative to enforcement of code

Little to none

##### Impact to building and property owners relative to cost of compliance with code

Little to none

##### Impact to industry relative to the cost of compliance with code



Little to none

**Impact to small business relative to the cost of compliance with code**

## **Requirements**

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

The health, safety and welfare of the general public will be improved by ensuring the mechanical, electrical and plumbing systems have been inspected and certified by a duly authorized, certified and objective third-party that is specifically trained in those systems.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This proposed modification will improve the code by removing any potential for conflicts of interest on the construction project

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This proposed modification does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

**Does not degrade the effectiveness of the code**

No, this proposed modification does not degrade the effectiveness of the code, it enhances it.

## **2nd Comment Period**

N10251-G1	Proponent	Mo Madani	Submitted	7/26/2022 4:41:57 PM	Attachments	No
	Comment: The proposed code change is in conflict with Section 553.9081(1)(b), Florida Statutes which authorize that commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer without additional professional qualification requirements.					

## ALTERNATE LANGUAGE COMMENT

C104.4.1 ~~Requirement.~~ Approved Commissioning Agencies. Buildings/systems requiring commissioning must be performed by a certified ~~Design Professional, Mechanical Engineer, Electrical Engineer or a certified and approved independent,~~ third-party agency. Firms and individuals providing commissioning services, inspections and/or functional tests, shall be independent from all aspects of the project, in so far as, the firm the individual works for/represents, cannot have a contract, or be in the employment of someone that does, to provide another service for that same project/building. The individual conducting the commissioning, and the firm they work for, must be certified for commissioning by one of the following organizations: AABC Commissioning Group (ACG), National Environmental Balancing Bureau (NEBB), Building Commissioning Association (BCA), American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), University of Wisconsin or the Association of Energy Engineers (AEE).

~~C104.4.1~~ C408.1.2 Buildings/systems requiring commissioning must be performed by a certified design professional, ~~mechanical engineer, electrical engineer or approved~~ third-party commissioning agent. Agencies providing commissioning services, inspections and/or functional tests, shall be independent from ~~all~~ the aspects of the project ~~in so far as, the firm the individual works for/represents, cannot have a contract to provide another service for that same project/building, being commissioned so as to avoid potential conflicts of interest. This includes, but is not limited to, the following instances:~~

- If commissioning is to be part of the design phase, the design engineer cannot commission his/her own work
- A contractor that performs test and balance work, cannot also commission the same hvac system, nor can anyone else from the company that contractor works for.

In the instance where a Mechanical Contractor contracts out the Test and Balance work CAN also contract out the Commissioning work, but it cannot be contracted to the same firm.

The individual conducting the commissioning, and the firm they work for, must be certified for commissioning by one of the following organizations: AABC Commissioning Group (ACG), National Environmental Balancing Bureau (NEBB), Building Commissioning Association (BCA), American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), or the Association of Energy Engineers (AEE).

C104.4.1 Requirement. Buildings/systems requiring commissioning must be performed by a certified Design Professional, Mechanical Engineer, Electrical Engineer or a certified and approved third-party agency. Firms and individuals providing commissioning services, inspections and/or functional tests, shall be independent from all aspects of the project, in so far as, the firm the individual works for/represents, cannot have a contract, or be in the employment of someone that does, to provide another service for that same project/building. The individual conducting the commissioning, and the firm they work for, must be certified for commissioning by one of the following organizations: AABC Commissioning Group (ACG), National Environmental Balancing Bureau (NEBB), Building Commissioning Association (BCA), American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), or the Association of Energy Engineers (AEE).

# TAC: Energy

Total Mods for **Energy** in **Approved as Submitted** : 11

Total Mods for report: 21

## Sub Code: Energy Conservation

EN9963

4

Date Submitted	02/15/2022	Section	402.2.7	Proponent	Amanda Hickman
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

### Comments

General Comments No

Alternate Language Yes

### Related Modifications

None

### Summary of Modification

New Section: C402.2.7 Airspaces

### Rationale

This modification provides language for reflective and non-reflective air spaces consistent with ASHRAE's Handbook of Fundamentals. Airspaces are common in building assemblies, but the term itself is not defined in the code. Airspaces are permitted to be counted as contributing toward satisfying the building envelope thermal requirements. Properly constructed airspaces can contribute to the thermal performance of an assembly. This section provides provisions for that purpose.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

Yes, will improve enforceability of the code through clarification of airspace language.

#### Impact to building and property owners relative to cost of compliance with code

No impact to cost of compliance with the code. This is already common practice.

#### Impact to industry relative to the cost of compliance with code

No impact to cost of compliance with the code. This is already common practice.

#### Impact to small business relative to the cost of compliance with code

### Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, will ensure more energy efficiency.

#### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes, codifies and clarifies common practice.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

No, it only clarifies an already common practice.

**Does not degrade the effectiveness of the code**

No, it only clarifies an already common practice.

## Alternate Language

### 2nd Comment Period

IN9963-A1	<b>Proponent</b>	Amanda Hickman	<b>Submitted</b>	8/22/2022 10:58:01 AM	<b>Attachments</b>	Yes
	Rationale: This revision aligns with the recently approved IECC language (CEPI-48) and will result in more consistency in application, usability and enforcement.					

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

No impact; this language gives guidance, does not add more requirements and improves enforcement of the code.

#### Impact to building and property owners relative to cost of compliance with code

No impact; this language will not increase cost of compliance with code.

#### Impact to industry relative to the cost of compliance with code

No impact; this language will not increase cost of compliance with code.

#### Impact to small business relative to the cost of compliance with code

### Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This language will result in more consistency in application, usability and enforcement

#### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code by resulting in more consistency in application, usability and enforcement.

#### Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No, this language simply gives more guidance.

#### Does not degrade the effectiveness of the code

No, this language simply gives more guidance and does not add more requirements.

C402.2.7 Airspaces. Where the R-value of an airspace is used for compliance in accordance with Section C402.1, the airspace shall be enclosed in an unventilated cavity bounded on all sides by building components and constructed to minimize airflow into and out of the enclosed airspace. Airflow shall be deemed minimized where one of the following conditions occur:

1. The enclosed airspace is unventilated.
2. The enclosed airspace is bounded on at least one side by an anchored masonry veneer, constructed in accordance with Chapter 14 of the IBC, and vented by veneer weep holes located only at the bottom of the airspace and spaced not less than 15 inches on center with the top of the cavity airspace closed.

Exception: For ventilated cavities, the effect of the ventilation of airspaces located on the exterior side of the continuous air barrier and adjacent to and behind the exterior wall-covering material shall be determined in accordance with ASTM C1363 modified with an airflow entering the bottom and exiting the top of the airspace at an air movement rate of not less than 70 mm/second.



**C402.2.7 Airspaces.** Where the R-value of an airspace is used for compliance in accordance with Section C402.1, the airspace shall be enclosed in an unventilated cavity bounded on all sides by building components.

# TAC: Energy

Total Mods for **Energy** in **Approved as Submitted** : 11

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10123

5

Date Submitted	02/15/2022	Section	408.2.1	Proponent	Douglas Baggett
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language No**

### Related Modifications

10251 10245 10445

### Summary of Modification

This proposed modification will serve to keep requirements and verbiage consistent with proposed modifications 10245, 10251 and 10445

### Rationale

It is important to keep verbiage and requirements consistent throughout the energy codes in order to prevent confusion and misunderstanding.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

There will be no impact - this would just be a verbiage and clarification modification

#### Impact to building and property owners relative to cost of compliance with code

There will be no impact - this would just be a verbiage and clarification modification

#### Impact to industry relative to the cost of compliance with code

There will be no impact - this would just be a verbiage and clarification modification

#### Impact to small business relative to the cost of compliance with code

### Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The health, safety and welfare of the general public will be by ensuring the building codes are consistent and by ensuring properly trained and certified individuals commission the mechanical systems

#### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification will improve the code by allowing for clear and consistent requirements for commissioning systems

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This proposed modification does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

**Does not degrade the effectiveness of the code**

This proposed modification does not degrade the effectiveness of the code, it enhances it.

## 2nd Comment Period

N10123-G1

Proponent Mo Madani Submitted 8/2/2022 9:51:53 AM Attachments Yes

Comment:

The proposed code change is in conflict with Section 553.9081(1)(b), Florida Statutes which authorize that commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer without additional professional qualification requirements.

**408.2.1. Commissioning Plan.** A commissioning plan shall be developed by a certified third-party commissioning agent that meet the requirements set forth in C104.4.1 licensed design professional, ~~electrical engineer, mechanical engineer or approved agency~~ and shall include the following items:

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

7/15/22, 10:22 AM

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## The 2021 Florida Statutes

[Title XXXIII](#)  
REGULATION OF TRADE, COMMERCE, INVESTMENTS, AND  
SOLICITATIONS

[Chapter 553](#)  
BUILDING CONSTRUCTION  
STANDARDS

[View Entire Chapter](#)

**553.9081 Florida Building Code; required amendments.**—The Florida Building Commission shall amend the Florida Building Code-Energy Conservation to:

- (1)(a) Eliminate duplicative commissioning reporting requirements for HVAC and electrical systems; and
- (b) Authorize commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer.
- (2) Prohibit the adoption of American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 9.4.1.1(g).

**History.**—s. 13, ch. 2017-149.

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## The 2021 Florida Statutes

[Title XXXIII](#)  
REGULATION OF TRADE, COMMERCE, INVESTMENTS, AND  
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- (1)(a) Eliminate duplicative commissioning reporting requirements for HVAC and electrical systems; and
- (b) Authorize commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer.
- (2) Prohibit the adoption of American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 9.4.1.1(g).

**History.**—s. 13, ch. 2017-149.

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# TAC: Energy

Total Mods for **Energy** in **Approved as Submitted** : 11

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10213

6

Date Submitted	02/11/2022	Section	403.2.3	Proponent	Bereket Nigusse
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

### Comments

General Comments No

Alternate Language Yes

Related Modifications

### Summary of Modification

Updates Table C403.2.3(1) Minimum Efficiency Requirements: Electrically Operated Unitary Air Conditioners and Condensing Units

### Rationale

The proposed modification updates minimum efficiency requirements of Unitary Air Conditioners and Condensing Units based on federal minimum standards. If adapted this change makes the 2023 FBC-Energy Conservation minimum efficiency requirements of unitary air conditioners and condensing units consistent with that of the 2019 ASHRAE Standard 90.1.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

The proposed modification will not impact the local entity relative to code enforcement.

#### Impact to building and property owners relative to cost of compliance with code

The proposed modification may slightly impact the building and property owners cost.

#### Impact to industry relative to the cost of compliance with code

The proposed modification will not change the cost of compliance.

#### Impact to small business relative to the cost of compliance with code

### Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The proposed modification does not impact the health, safety, and welfare of the general public.

#### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The proposed modification improves and strengthens the code by providing efficient unitary air conditioners and condensing units.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

The proposed modification does not discriminate against materials, products, methods, or systems of construction.

**Does not degrade the effectiveness of the code**

The proposed modification enhances the effectiveness of code enforcement due to added clarifications.



## Alternate Language

### 2nd Comment Period

N10213-A1	<b>Proponent</b>	Jeff Sonne for FSEC	<b>Submitted</b>	8/26/2022 1:54:26 PM	<b>Attachments</b>	Yes
	Rationale: Updates Table RC-1(1) coefficients to account for new federal regulations that apply to Florida heating and cooling equipment.					

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

No impact.

#### Impact to building and property owners relative to cost of compliance with code

May affect compliance cost but necessary to account for new federal regulations that apply to Florida heating and cooling equipment.

#### Impact to industry relative to the cost of compliance with code

May affect compliance cost but necessary to account for new federal regulations that apply to Florida heating and cooling equipment.

#### Impact to small business relative to the cost of compliance with code

### Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Benefits public welfare by accounting for new federal regulations that apply to Florida heating and cooling equipment.

#### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code by properly accounting for new federal regulations that apply to Florida heating and cooling equipment.

#### Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate; properly accounts for new federal regulations that apply to Florida heating and cooling equipment.

#### Does not degrade the effectiveness of the code

Improves code effectiveness by properly accounting for new federal regulations that apply to Florida heating and cooling equipment.

[Keep previously TAC approved Table C403.2.3(1) changes, and also modify related residential energy Appendix RC Table RC-1(1) as follows.]

**TABLE RC-1(1) COEFFICIENTS ‘a’ AND ‘b’**

<b>FUEL TYPE AND END USE</b>	<b>a</b>	<b>b</b>
Electric space heating	<del>2.4026</del> <u>2.5853</u>	0.0000
Fossil fuel* space heating	<del>1.0370</del> <u>0.7618</u>	<del>0.2962</del> <u>-0.0477</u>
Biomass space heating	<del>0.7297</del> <u>0.5361</u>	<del>0.1583</del> <u>-0.1490</u>
Electric air conditioning	<del>4.1020</del> <u>4.4104</u>	0.0000
Electric water heating	0.9500	0.0000
Fossil fuel* water heating	1.3774	1.2217
* Such as natural gas, LP, fuel oil		

[No other changes to Appendix RC.]

See attached documents for the updated table C403.2.3(1).

## COMMERCIAL ENERGY EFFICIENCY

TABLE C403.2.3(1)  
MINIMUM EFFICIENCY REQUIREMENTS:  
ELECTRICALLY OPERATED UNITARY AIR CONDITIONERS AND CONDENSING UNITS<sup>c</sup>

EQUIPMENT TYPE	SIZE CATEGORY	HEATING SECTION TYPE	SUBCATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY	TEST PROCEDURE <sup>a</sup>
Air conditioners, air cooled	< 645,000 Btu/h <sup>b</sup>	All	Split System, three phase and applications outside US single phase <sup>b</sup>	14.0 SEER before 1/1/2023 14.3 SEER <sub>2</sub> after 1/1/2023	AHRI 210/240 – 2017 before 1/1/2023 AHRI 210/240 – 2023 after 1/1/2023
	≥ 45,000 Btu/h <sup>b</sup> and < 65,000 Btu/h <sup>b</sup>		Single Package, three phase and applications outside US single phase <sup>b</sup>	14.0 SEER before 1/1/2023 13.8 SEER <sub>2</sub> after 1/1/2023	
	< 65,000 Btu/h <sup>b</sup>		Single Package, three phase and applications outside US single phase <sup>b</sup>	14.0 SEER <sup>c</sup> before 1/1/2023 13.4 SEER <sub>2</sub> after 1/1/2023	
Through-the-wall (air cooled)	≤ 30,000 Btu/h <sup>b</sup>	All	Split system, three phase and applications outside US single phase <sup>b</sup>	12.0 SEER before 1/1/2023 11.7 SEER <sub>2</sub> after 1/1/2023	
			Single Package, three phase and applications outside US single phase <sup>b</sup>	12.0 SEER before 1/1/2023 11.7 SEER <sub>2</sub> after 1/1/2023	
Small-duct high-velocity (air cooled)	< 65,000 Btu/h <sup>b</sup>	All	Split system, three phase and applications outside US single phase <sup>b</sup>	12.0 SEER before 1/1/2023 12.0 SEER <sub>2</sub> after 1/1/2023	
Air conditioners, air cooled	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.2 EER 12.9 IEER before 1/1/2023 14.8 IEER after 1/1/2023	AHRI 340/360
		All other	Split System and Single Package	11.0 EER 12.7 IEER before 1/1/2023 14.6 IEER after 1/1/2023	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.0 EER 12.4 IEER before 1/1/2023 14.2 IEER after 1/1/2023	
		All other	Split System and Single Package	10.8 EER 12.2 IEER before 1/1/2023 14.0 IEER after 1/1/2023	
	≥ 240,000 Btu/h and < 760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	10.0 EER 11.6 IEER before 1/1/2023 13.2 IEER after 1/1/2023	
		All other	Split System and Single Package	9.8 EER 11.4 IEER before 1/1/2023 13.0 IEER after 1/1/2023	
	≥ 760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	9.7 EER 11.2 IEER before 1/1/2023 12.5 IEER after 1/1/2023	
		Electric Resistance (or None)	Split System and Single Package	9.7 EER 11.2 IEER before 1/1/2023 12.5 IEER after 1/1/2023	

		All other	Split System and Single Package	9.5 EER 11.0 IEER <u>before 1/1/2023</u> 12.3 IEER <u>after 1/1/2023</u>
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(continued)

C-32

FLORIDA BUILDING CODE — ENERGY CONSERVATION, 7th EDITION (2020)

**TABLE C403.2.3(1)—continued**  
**MINIMUM EFFICIENCY REQUIREMENTS:**  
**ELECTRICALLY OPERATED UNITARY AIR CONDITIONERS AND CONDENSING UNITS<sup>c</sup>**

EQUIPMENT TYPE	SIZE CATEGORY	HEATING SECTION TYPE	SUB-CATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY	TEST PROCEDURE <sup>a</sup>
Air conditioners, water cooled	< 65,000 Btu/h <sup>b</sup>	All	Split System and Single Package	12.1 EER 12.3 IEER	AHRI 210/240
	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.1 EER 13.9 IEER	AHRI 340/360
		All other	Split System and Single Package	11.9 EER 13.7 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.5 EER 13.9 IEER	
		All other	Split System and Single Package	12.3 EER 13.7 IEER	
	≥ 240,000 Btu/h and < 760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.4 EER 13.6 IEER	
		All other	Split System and Single Package	12.2 EER 13.4 IEER	
	≥ 760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.2 EER 13.5 IEER	
		All other	Split System and Single Package	12.0 EER 13.3 IEER	
Air conditioners, evaporatively cooled	< 65,000 Btu/h <sup>b</sup>	All	Split System and Single Package	12.1 EER 12.3 IEER	AHRI 210/240
	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.1 EER 12.3 IEER	AHRI 340/360
		All other	Split System and Single Package	11.9 EER 12.1 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.0 EER 12.2 IEER	
		All other	Split System and Single Package	11.8 EER 12.0 IEER	
	≥ 240,000 Btu/h and < 760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.9 EER 12.1 IEER	
		All other	Split System and Single Package	11.7 EER 11.9 IEER	
	≥ 760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.7 EER 11.9 IEER	
		All other	Split System and Single Package	11.5 EER 11.7 IEER	
Condensing units, air cooled	≥ 135,000 Btu/h			10.5 EER 11.8 IEER	AHRI 340/360
Condensing units, water cooled	≥ 135,000 Btu/h			13.5 EER 14.0 IEER	
Condensing units, evaporatively cooled	≥ 135,000 Btu/h			13.5 EER 14.0 IEER	

For SI: 1 British thermal unit per hour = 0.2931 W.

- a. Chapter 6 contains a complete specification of the referenced standards, which include test procedure, including the reference year version of the test procedure.
- b. Single-phase, US air-cooled air conditioners less than 65,000 Btu/h are regulated by NAECAs as consumer products by the US Department of Energy Code of Federal Regulations DOE 10 CFR 430. SEER and SEER2 values for single-phase products are set by the US Department of Energy. SEER values are those set by NAECA.
- c. DOE 10 CFR 430 Subpart B Appendix M1 includes the test procedure updates effective 1/1/2023 that will be incorporated in AHRI 210/240 – 2023.

# TAC: Energy

Total Mods for **Energy** in **Approved as Submitted** : 11

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10401

7

Date Submitted	02/14/2022	Section	408.2	Proponent	Dominique Flickinger
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

### Comments

**General Comments** Yes

**Alternate Language** No

### Related Modifications

408.2.1 408.3.1

### Summary of Modification

Change wording on who should provide commissioning services to eliminate loopholes of firms providing commissioning on their own work and thereby circumventing the intent of this code.

### Rationale

The above proposed change would bring the code into line with the specifications on federal projects. It would also conform to recommendations made by professional associations such as ASHRAE, AEE, BCxA and the USGBC to hire an independent third party to provide commissioning services. This change would eliminate the loopholes some contractors and engineers are using to sign off on their own work. Although some firms are policing themselves appropriately many are not. Some examples of issues discovered include engineering firms not including sequence of operations on their mechanical drawings thereby not allowing a third party to bid on the work, engineers informing their clients that commissioning wasn't required although the equipment size met or exceeded the code, commissioning specifications being omitted from the specifications for a project altogether, and specifications that state the EOR will perform the commissioning. This has led to Owners not receiving the project they requested, mechanical drawings not being completed 100% at construction and being modified "on the fly" to meet commissioning requirements, and errors in engineering that the Owner would not be made aware of.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

There should be no additional construction costs for this change as commissioning should already be included in the cost of a project to comply with the code. The above change would only affect how the code is applied.

#### Impact to building and property owners relative to cost of compliance with code

There should be no additional construction costs for this change as commissioning should already be included in the cost of a project to comply with the code. The above change would only affect how the code is applied.

### Impact to industry relative to the cost of compliance with code

There should be no additional construction costs for this change as commissioning should already be included in the cost of a project to comply with the code. The above change would only affect how the code is applied.

### Impact to small business relative to the cost of compliance with code

## Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This change will help to ensure the intent of the code is being enforced to help with energy savings.

#### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This change will improve this code by closing loopholes and ensuring the intent of the code is enforced with regards to energy conservation and proper equipment installation and function.

#### Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This change does not discriminate against anything or anyone with the exception of unscrupulous contractors who are disregarding the intent of the current code.

#### Does not degrade the effectiveness of the code

This change will not degrade the effectiveness of the code. It will strengthen the code.

## 2nd Comment Period

IN10401-G1	Proponent	Mo Madani	Submitted	7/15/2022 10:38:26 AM	Attachments	Yes
	Comment: The proposed code change is in conflict with Section 553.9081(1)(b), Florida Statutes which authorize that commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer. See attached.					



Prior to the final mechanical and plumbing inspections, ~~the licensed design professional, electrical engineer, mechanical engineer, or approved agency~~ an independent commissioning firm that is a 1st tier subcontractor of the General or Prime Contractor or Owner and is financially and corporately independent of all other subcontractors including any Design or Engineering firms, shall provide evidence of mechanical systems commissioning and completion in accordance with the provisions of this section.

7/15/22, 10:22 AM

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## The 2021 Florida Statutes

[Title XXXIII](#)  
REGULATION OF TRADE, COMMERCE, INVESTMENTS, AND  
SOLICITATIONS

[Chapter 553](#)  
BUILDING CONSTRUCTION  
STANDARDS

[View Entire Chapter](#)

**553.9081 Florida Building Code; required amendments.**—The Florida Building Commission shall amend the Florida Building Code-Energy Conservation to:

- (1)(a) Eliminate duplicative commissioning reporting requirements for HVAC and electrical systems; and
- (b) Authorize commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer.
- (2) Prohibit the adoption of American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 9.4.1.1(g).

**History.**—s. 13, ch. 2017-149.

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## The 2021 Florida Statutes

[Title XXXIII](#)  
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[View Entire Chapter](#)

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- (1)(a) Eliminate duplicative commissioning reporting requirements for HVAC and electrical systems; and
- (b) Authorize commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer.
- (2) Prohibit the adoption of American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 9.4.1.1(g).

**History.**—s. 13, ch. 2017-149.

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Sequence of operations omitted from drawings.

Project No.:	11962
Issue Date:	2020.10.09
Drawn By:	LI
Approved By:	JL
Scale:	AS NOTED
Drawing Title:	

## MECHANICAL LEGEND



FAN COILS AND CONDENSING UNIT									
PLAN MARK	MODEL NO.	TOTAL COOLING CAPACITY (BTU/H)	TOTAL HEATING CAPACITY (BTU/H)	WELL / FAN/UNIT	ELECTRICAL DATA			WEIGHT (LBS)	LOCATION
					AMPS	MCA	MOP		
FCL-8	8-0000	8,000	11,000	208V/1	0.35	15	15	20	BEDROOM 8
FCL-9	9-0000	9,000	12,000	208V/1	0.35	15	15	20	BEDROOM 9
FCL-10	10-0000	10,000	13,000	208V/1	0.35	15	15	20	BEDROOM 10
FCL-11	11-0000	11,000	14,000	208V/1	0.35	15	15	20	BEDROOM 11
FCL-12	12-0000	12,000	15,000	208V/1	0.35	15	15	20	BEDROOM 12
FCL-13	13-0000	13,000	16,000	208V/1	0.35	15	15	20	BEDROOM 13
FCL-14	14-0000	14,000	17,000	208V/1	0.35	15	15	20	BEDROOM 14
FCL-15	15-0000	15,000	18,000	208V/1	0.35	15	15	20	BEDROOM 15
FCL-16	16-0000	16,000	19,000	208V/1	0.35	15	15	20	BEDROOM 16
FCL-17	17-0000	17,000	20,000	208V/1	0.35	15	15	20	BEDROOM 17
FCL-18	18-0000	18,000	21,000	208V/1	0.35	15	15	20	BEDROOM 18
FCL-19	19-0000	19,000	22,000	208V/1	0.35	15	15	20	BEDROOM 19
FCL-20	20-0000	20,000	23,000	208V/1	0.35	15	15	20	BEDROOM 20
FCL-21	21-0000	21,000	24,000	208V/1	0.35	15	15	20	BEDROOM 21
FCL-22	22-0000	22,000	25,000	208V/1	0.35	15	15	20	BEDROOM 22
FCL-23	23-0000	23,000	26,000	208V/1	0.35	15	15	20	BEDROOM 23
FCL-24	24-0000	24,000	27,000	208V/1	0.35	15	15	20	BEDROOM 24
FCL-25	25-0000	25,000	28,000	208V/1	0.35	15	15	20	BEDROOM 25
FCL-26	26-0000	26,000	29,000	208V/1	0.35	15	15	20	BEDROOM 26
FCL-27	27-0000	27,000	30,000	208V/1	0.35	15	15	20	BEDROOM 27
FCL-28	28-0000	28,000	31,000	208V/1	0.35	15	15	20	BEDROOM 28
FCL-29	29-0000	29,000	32,000	208V/1	0.35	15	15	20	BEDROOM 29
FCL-30	30-0000	30,000	33,000	208V/1	0.35	15	15	20	BEDROOM 30
FCL-31	31-0000	31,000	34,000	208V/1	0.35	15	15	20	BEDROOM 31
FCL-32	32-0000	32,000	35,000	208V/1	0.35	15	15	20	BEDROOM 32
FCL-33	33-0000	33,000	36,000	208V/1	0.35	15	15	20	BEDROOM 33
FCL-34	34-0000	34,000	37,000	208V/1	0.35	15	15	20	BEDROOM 34
FCL-35	35-0000	35,000	38,000	208V/1	0.35	15	15	20	BEDROOM 35
FCL-36	36-0000	36,000	39,000	208V/1	0.35	15	15	20	BEDROOM 36
FCL-37	37-0000	37,000	40,000	208V/1	0.35	15	15	20	BEDROOM 37
FCL-38	38-0000	38,000	41,000	208V/1	0.35	15	15	20	BEDROOM 38
FCL-39	39-0000	39,000	42,000	208V/1	0.35	15	15	20	BEDROOM 39
FCL-40	40-0000	40,000	43,000	208V/1	0.35	15	15	20	BEDROOM 40
FCL-41	41-0000	41,000	44,000	208V/1	0.35	15	15	20	BEDROOM 41
FCL-42	42-0000	42,000	45,000	208V/1	0.35	15	15	20	BEDROOM 42
FCL-43	43-0000	43,000	46,000	208V/1	0.35	15	15	20	BEDROOM 43
FCL-44	44-0000	44,000	47,000	208V/1	0.35	15	15	20	BEDROOM 44
FCL-45	45-0000	45,000	48,000	208V/1	0.35	15	15	20	BEDROOM 45
FCL-46	46-0000	46,000	49,000	208V/1	0.35	15	15	20	BEDROOM 46
FCL-47	47-0000	47,000	50,000	208V/1	0.35	15	15	20	BEDROOM 47
FCL-48	48-0000	48,000	51,000	208V/1	0.35	15	15	20	BEDROOM 48
FCL-49	49-0000	49,000	52,000	208V/1	0.35	15	15	20	BEDROOM 49
FCL-50	50-0000	50,000	53,000	208V/1	0.35	15	15	20	BEDROOM 50
FCL-51	51-0000	51,000	54,000	208V/1	0.35	15	15	20	BEDROOM 51
FCL-52	52-0000	52,000	55,000	208V/1	0.35	15	15	20	BEDROOM 52
FCL-53	53-0000	53,000	56,000	208V/1	0.35	15	15	20	BEDROOM 53
FCL-54	54-0000	54,000	57,000	208V/1	0.35	15	15	20	BEDROOM 54
FCL-55	55-0000	55,000	58,000	208V/1	0.35	15	15	20	BEDROOM 55
FCL-56	56-0000	56,000	59,000	208V/1	0.35	15	15	20	BEDROOM 56
FCL-57	57-0000	57,000	60,000	208V/1	0.35	15	15	20	BEDROOM 57
FCL-58	58-0000	58,000	61,000	208V/1	0.35	15	15	20	BEDROOM 58
FCL-59	59-0000	59,000	62,000	208V/1	0.35	15	15	20	BEDROOM 59
FCL-60	60-0000	60,000	63,000	208V/1	0.35	15	15	20	BEDROOM 60
FCL-61	61-0000	61,000	64,000	208V/1	0.35	15	15	20	BEDROOM 61
FCL-62	62-0000	62,000	65,000	208V/1	0.35	15	15	20	BEDROOM 62
FCL-63	63-0000	63,000	66,000	208V/1	0.35	15	15	20	BEDROOM 63
FCL-64	64-0000	64,000	67,000	208V/1	0.35	15	15	20	BEDROOM 64
FCL-65	65-0000	65,000	68,000	208V/1	0.35	15	15	20	BEDROOM 65
FCL-66	66-0000	66,000	69,000	208V/1	0.35	15	15	20	BEDROOM 66
FCL-67	67-0000	67,000	70,000	208V/1	0.35	15	15	20	BEDROOM 67
FCL-68	68-0000	68,000	71,000	208V/1	0.35	15	15	20	BEDROOM 68
FCL-69	69-0000	69,000	72,000	208V/1	0.35	15	15	20	BEDROOM 69
FCL-70	70-0000	70,000	73,000	208V/1	0.35	15	15	20	BEDROOM 70
FCL-71	71-0000	71,000	74,000	208V/1	0.35	15	15	20	BEDROOM 71
FCL-72	72-0000	72,000	75,000	208V/1	0.35	15	15	20	BEDROOM 72
FCL-73	73-0000	73,000	76,000	208V/1	0.35	15	15	20	BEDROOM 73
FCL-74	74-0000	74,000	77,000	208V/1	0.35	15	15	20	BEDROOM 74
FCL-75	75-0000	75,000	78,000	208V/1	0.35	15	15	20	BEDROOM 75
FCL-76	76-0000	76,000	79,000	208V/1	0.35	15	15	20	BEDROOM 76
FCL-77	77-0000	77,000	80,000	208V/1	0.35	15	15	20	BEDROOM 77
FCL-78	78-0000	78,000	81,000	208V/1	0.35	15	15	20	BEDROOM 78
FCL-79	79-0000	79,000	82,000	208V/1	0.35	15	15	20	BEDROOM 79
FCL-80	80-0000	80,000	83,000	208V/1	0.35	15	15	20	BEDROOM 80
FCL-81	81-0000	81,000	84,000	208V/1	0.35	15	15	20	BEDROOM 81
FCL-82	82-0000	82,000	85,000	208V/1	0.35	15	15	20	BEDROOM 82
FCL-83	83-0000	83,000	86,000	208V/1	0.35	15	15	20	BEDROOM 83
FCL-84	84-0000	84,000	87,000	208V/1	0.35	15	15	20	BEDROOM 84
FCL-85	85-0000	85,000	88,000	208V/1	0.35	15	15	20	BEDROOM 85
FCL-86	86-0000	86,000	89,000	208V/1	0.35	15	15	20	BEDROOM 86
FCL-87	87-0000	87,000	90,000	208V/1	0.35	15	15	20	BEDROOM 87
FCL-88	88-0000	88,000	91,000	208V/1	0.35	15	15	20	BEDROOM 88
FCL-89	89-0000	89,000	92,000	208V/1	0.35	15	15	20	BEDROOM 89
FCL-90	90-0000	90,000	93,000	208V/1	0.35	15	15	20	BEDROOM 90
FCL-91	91-0000	91,000	94,000	208V/1	0.35	15	15	20	BEDROOM 91
FCL-92	92-0000	92,000	95,000	208V/1	0.35	15	15	20	BEDROOM 92
FCL-93	93-0000	93,000	96,000	208V/1	0.35	15	15	20	BEDROOM 93
FCL-94	94-0000	94,000	97,000	208V/1	0.35	15	15	20	BEDROOM 94
FCL-95	95-0000	95,000	98,000	208V/1	0.35	15	15	20	BEDROOM 95
FCL-96	96-0000	96,000	99,000	208V/1	0.35	15	15	20	BEDROOM 96
FCL-97	97-0000	97,000	100,000	208V/1	0.35	15	15	20	BEDROOM 97
FCL-98	98-0000	98,000	101,000	208V/1	0.35	15	15	20	BEDROOM 98
FCL-99	99-0000	99,000	102,000	208V/1	0.35	15	15	20	BEDROOM 99
FCL-100	100-0000	100,000	103,000	208V/1	0.35	15	15	20	BEDROOM 100
FCL-101	101-0000	101,000	104,000	208V/1	0.35	15	15	20	BEDROOM 101
FCL-102	102-0000	102,000	105,000	208V/1	0.35	15	15	20	BEDROOM 102
FCL-103	103-0000	103,000	106,000	208V/1	0.35	15	15	20	BEDROOM 103
FCL-104	104-0000	104,000	107,000	208V/1	0.35	15	15	20	BEDROOM 104
FCL-105	105-0000	105,000	108,000	208V/1	0.35	15	15	20	BEDROOM 105
FCL-106	106-0000	106,000	109,000	208V/1	0.35	15	15	20	BEDROOM 106
FCL-107	107-0000	107,000	110,000	208V/1	0.35	15	15	20	BEDROOM 107
FCL-108	108-0000	108,000	111,000	208V/1	0.35	15	15	20	BEDROOM 108
FCL-109	109-0000	109,000	112,000	208V/1	0.35	15	15	20	BEDROOM 109
FCL-110	110-0000	110,000	113,000	208V/1	0.35	15	15	20	BEDROOM 110
FCL-111	111-0000	111,000	114,000	208V/1	0.35	15	15	20	BEDROOM 111
FCL-112	112-0000	112,000	115,000	208V/1	0.35	15	15	20	BEDROOM 112
FCL-113	113-0000	113,000	116,000	208V/1	0.35	15	15	20	BEDROOM 113
FCL-114	114-0000	114,000	117,000	208V/1	0.35	15	15	20	BEDROOM 114
FCL-115	115-0000	115,000	118,000	208V/1	0.35	15	15	20	BEDROOM 115
FCL-116	116-0000	116,000	119,000	208V/1	0.35	15	15	20	BEDROOM 116
FCL-117	117-0000	117,000	120,000	208V/1	0.35	15	15	20	BEDROOM 117
FCL-118	118-0000	118,000	121,000	208V/1	0.35	15	15	20	BEDROOM 118
FCL-119	119-0000	119,000	122,000	208V/1	0.35	15	15	20	BEDROOM 119
FCL-120	120-0000	120,000	123,000	208V/1	0.35	15	15	20	BEDROOM 120
FCL-121	121-0000	121,000	124,000	208V/1	0.35	15	15	20	BEDROOM 121
FCL-122	122-0000	122,000	125,000	208V/1	0.35	15	15	20	BEDROOM 122
FCL-123	123-0000	123,000	126,000	208V/1	0.35	15	15	20	BEDROOM 123
FCL-124	124-0000	124,000	127,000	208V/1	0.35	15	15	20	BEDROOM 124
FCL-125	125-0000	125,000	128,000	208V/1	0.35	15	15	20	BEDROOM 125
FCL-126	126-0000	126,000	129,000	208V/1	0.35	15	15	20	BEDROOM 126
FCL-127	127-0000	127,000	130,000	208V/1	0.35	15	15	20	BEDROOM 127
FCL-128	128-0000	128,000	131,000	208V/1	0.35	15	15	20	BEDROOM 128
FCL-129	129-0000	129,000	132,000	20					

## SCALE 15: 10% = 100%

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**VITAS Healthcare Lecanto**  
Inpatient Hospice Unit  
HVAC Upgrades

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Lecanto, FL 34461

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Project No.: 110626

Issue Date: 2020-10-08

Page 11 of 11

Approved By: JLA

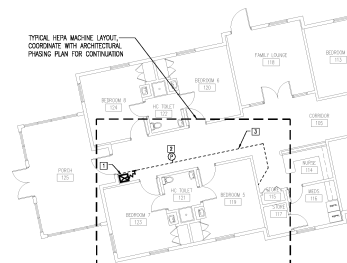
Growing Time:

MECHANICAL  
FLOOR PLAN - UEDR

FLOOR PLAN - HEPA  
MACHINE

Figure 1 is a line graph showing the percentage of respondents who believe that the use of force is justified in various circumstances. The x-axis represents the percentage of respondents who believe that the use of force is justified, ranging from 0% to 100%. The y-axis represents the percentage of respondents who believe that the use of force is justified, ranging from 0% to 100%. The graph shows a positive correlation between the two variables, with a regression line and a confidence interval.

M102



[illegible]

**VITAS Healthcare Lecanto**  
Inpatient Hospice Unit  
HVAC Upgrades

3350 W Audubon Park Path  
Lecanto, FL 34461

Seal

Aaron Johnston, P.E.  
Florida License 71576



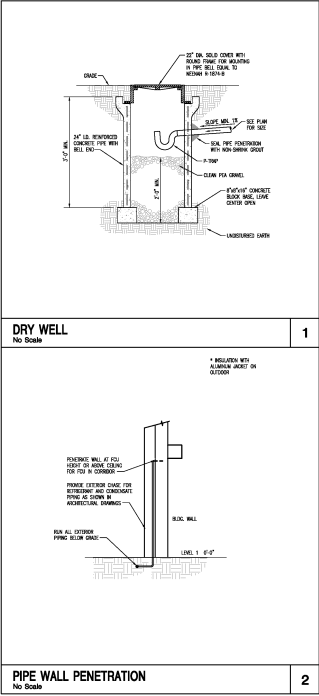
A circular professional engineer seal for Aaron Johnston, P.E. The outer ring contains the text "AARON JOHNSTON" at the top and "P.E." at the bottom. Inside the ring, it says "No. 71576" and "STATE OF FLORIDA".

## MECHANICAL CONTROLS AND DETAILS

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Issue Date: 2020.10.06  
Drawn By: JLA  
Approved By: JLA  
Drawing Title: MECHANICAL DETAILS  
Drawing No.: M202

See page 8  
of this pdf.



# The Strategic Guide to Commissioning

Report from the ASHRAE Presidential Ad-Hoc Committee  
Building Performance Alliance on Commissioning

Presented to ASHRAE Board of Directors  
June 24, 2014





2

## The Building Performance Alliance Committee on Commissioning The Strategic Guide to Commissioning

### Committee Roster (2012–2014)

ASHRAE President William P. Bahinleth, PhD, P.E. (2013–14)  
ASHRAE President Thomas E. Watson, P.E. (2012–13)  
Ross D. Montgomery, P.E., CPMP, CxA, Chairman 2013–14: Vice-chairman 2012–13:  
Quality Systems and Technology Inc.  
Hugh F. Crowther, Chairman 2012–13: Price Mechanical.  
Ray Bert: AABC Commissioning Group; ACG  
James W. Bochat: Commissioning Concepts; NEBB  
Hoy R. Bohanon, Jr, P.E.: Working Buildings  
Ron Burton: PTW Advisors, LLC; BOMA  
Michael Choleznik: URS Corporation; AIA  
Michael F. DeSantiago, P.E.: Primera Engineers, Ltd.; CAMEE  
James E. Feeney, P.E.: Manager Cx Group, Primera Engineers, Ltd.  
James R. Fields: Superior Mechanical Services  
Liz Fischer, BCA Building Commissioning Association  
Eli P. Howard, III: SMACNA Sheet Metal and A/C Contractors Association  
Earle Kennett: National Institute of Building Sciences NIBS  
Gerald J. Kettler: Air Engineering & Testing Inc.  
Michael J. King: ARCOM Master Systems  
James I. Magee: Facility Commissioning Group  
Thomas R. Meyer: National Environmental Balancing Bureau NEBB  
Mark F. Miller: Strategic Building Solutions; BCA  
Davor Novosel: National Center for Energy Management and Building Technology  
Brendan Owens: USGBC United States Green Building Council  
James Page: NEMIC National Energy Management Institute Committee  
Thomas H. Phoenix, P.E.: Moser Mayer Phoenix Assoc. PA  
Richard M. Rose: Mechanical Technology Inc.  
Ginger Scoggins, P.E., LEED-AP: Engineered Designs, Inc.  
Dominic Sims: ICC International Code Council  
David Underwood, P. Eng. (retired), ASHRAE  
Timothy G. Wentz, P.E.: University of Nebraska  
Claire Ramspeck: ASHRAE staff; Director of Technology  
Denise Latham: ASHRAE staff; Administrative Assistant to the Director of Technology

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Foreword

This is the first edition of the Strategic Guide to Commissioning produced by the Building Performance Alliance committee on Commissioning. BPA began as a Presidential Ad Hoc committee appointed by ASHRAE President Thomas E. Watson, and completed under the direction of ASHRAE President William P. Bahnfleth. Its charge was to "meet with interested and affected parties in the commissioning industry and identify ways to improve the commissioning process through working together".

This guide was developed in collaboration with twenty-eight ASHRAE members with direct representatives from fourteen major commissioning related organizations and stakeholders ("BPA team") that can best represent the common needs of the commissioning industry. The "Roadmap", or outline, was created during its 2012-13 term (Figure 2); this guide was created during its 2013-14 term, based on that "Roadmap".

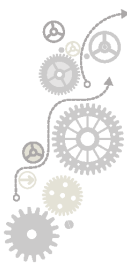
The BPA team collaborated with industry leaders to develop a strategic document that communicates overarching commissioning goals and objectives. This effort will lead to improving overall building and system performance, as well as protecting the existing and established industry interests and processes/procedures.

This guide serves as a quality-focused, high level strategic commissioning document that provides stakeholders with a basis for understanding enhanced delivery of new and existing building projects. It describes the value, benefits and rationale for verifying and documenting that all of the commissioned systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the Owner's Project Requirements (OPR) for new buildings and/or major renovations, and the Current Facility Requirements (CFR) for existing buildings.

Key users of this guide are anyone involved in design, construction, optimizing and operating buildings, including:

- |   |  |
|---|--|
| Owners  | Design-Build Contractors   |
| Facility Managers                                   | Construction Managers  |
| Maintenance and Operations Personnel                | Subcontractors   |
| Architects and Engineers                            | Utility Operators and Providers  |
| Commissioning Authorities and Providers (Certified) | Inspectors and Code Officials (Authorities Having Jurisdiction, or AHJs) |
| Facility Design Engineers                           | Developers   |
| Building Controls Contractors                       | Occupants, Users, and Visitors   |
| General Contractors                                 |  |





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Types of Commissioning (Figure 1) addressed by this guide include, but are not limited to:

- Site Development and Land Use
- Construction, Demolition, and Renovation Waste Management
- Enclosure (including Roofing, Exterior Walls, Openings and Ground Floor)
- Building Pressurization (including Thermography and Air Tightness testing),
- Interior Systems (including Architectural Walls, Ceilings, Floors/ Interior Doors, Windows, Openings)
- Structural
- Heating, Ventilation, Air Conditioning and Refrigeration
- Energy Systems (including renewables)
- Indoor Environmental Quality (IEQ)
- Electrical Systems and Emergency Power/Generation, Smoke Control, Fire Protection, Fire Suppression, Fire Alarm, Lighting Systems
- Specialty Processes
- Vertical Conveyances (including Elevators, Hoist Ways, and Escalators)
- Plumbing, Domestic Water, and non-potable Systems
- Security Systems
- Telecommunications, IT, Audio Visual



**Figure 1: Commissioning Types**

This guide is intended to have far-reaching impact on the industry to establish and maintain consistent high level goals and objectives, including performance, cost effectiveness, consistency, and best practice.

## Section 1: Introduction

The Building Performance Alliance Roadmap, Figure 2 – next page, was developed through a cooperative process by a wide spectrum of building performance stakeholders. The twenty eight members and fourteen organizations that participated in the development of the Roadmap and this guide over the course of two years are bound together in the belief that our industry, and ultimately our clients, are evolving to expect a higher level of performance from their buildings. Evidence of this evolution is seen in the emergence of performance benchmarking and energy reduction incentives from both public and private sources. The Roadmap is a tangible commitment to prepare the users of this guide for a future where building performance and functionality is the baseline foundation and a fundamental need of our industry.

## Section 2: Strategic Overview

Buildings often do not perform as expected, in spite of the best efforts put forth by the parties involved in the process. In order for a building to meet its true performance potential, all facets of the planning, design, construction, maintenance and operation must work holistically, focused on common goals for the building's performance.

The reasons that many buildings do not perform properly are sometimes complex. Historically, the building industry has not placed enough importance about addressing building performance early in the project development. Waiting too long to engage the commissioning process at project inception can result in "fixing" problems and delivering performance at the end of the project in lieu of preventing them from happening from the beginning. At times in the past the process has been approached in a very prescriptive manner with segregated duties and responsibilities, resulting in performance expectations that may not be communicated well enough and thus are sometimes not met. This guide chooses an all-inclusive path by concentrating on building performance as the priority outcome.

Interpretation of the OPR or CFR is a shared responsibility of the Commissioning Authority, owner/client, and designer, and is a sensitive area for all participants in the commissioning process. It is valuable to consider that a commissioned project must have the cooperation and collaboration of all parties in the facility planning, design and construction efforts.

Consistently achieving high levels of building performance, given the current state of the design, construction and facilities management professions, is difficult and complicated, but obtainable.

*continued on page 10*

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Figure 2: The Roadmap

# The Building Performance Alliance Strategic Guide to Commissioning Building Performance Alliance (BPA) Forum 'Roadmap' for Commissioning

Authors: The entire BPA committee / September, 2013

Create a quality-focused, high level strategic commissioning document for enhancing the delivery of new and existing building projects. The overall deliverable is to focus on verifying and documenting that all of the commissioned systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the Owner's Project Requirements (OPR) of a new building and/or major renovation, and the Current Facility Requirements (CFR) of an existing building.

**Vision:** To collaborate with industry leaders to develop a plan that will lead to strategic document(s) that will communicate over-arching Commissioning goals and objectives. This effort will lead to increasing overall building and system performance, protecting the existing and established industry interests and processes/procedures.

- Site Development and Land Use
- Construction, Demolition, and Renovation Waste Management
- Enclosure (including Roofing, Exterior Walls, Openings and Ground Floor)
- Building Pressurization (including Thermography and Air Tightness testing)
- Interior Systems (including Architectural Walls, Ceilings, Floors/ Interior Doors, Windows, Openings)
- Structural
- HVAC/R
- Energy Systems (including renewables)
- Indoor Environmental Quality (IEQ)
- Electrical Systems and Emergency Power/Generation
- Smoke Control, Fire Protection, Fire Suppression, Fire Alarm
- Lighting Systems
- Specialty Processes
- Vertical Conveyances (including Elevators, Hoist Ways, and Escalators)
- Plumbing, Domestic Water, and non-potable Systems
- Security Systems
- Telecommunications, IT, Audio Visual

## BEGINNING

New Building/Major Renovation or Existing Building

Key Customers and Stakeholders

Owners  
Facility Managers/  
Maintenance and  
Operations Personnel  
Architects  
Engineers  
Contractors  
Utility Operators and Providers  
Inspectors and Code Officials  
(Authority having Jurisdiction)  
Developers/Occupants  
Users and Visitors

## BPA COMMISSIONING

New Building/Major Renovation and Existing Building Commissioning

### New Building/Major Renovation Commissioning:

The application of the Commissioning Process requirements and Owners Project Requirements (OPR) to a new construction and/or major renovation project.

### Existing Building Commissioning (includes re-, retro, and on-going commissioning activities):

An application of the Commissioning Process requirements for attaining the Current Facility Requirements (CFR) of an existing facility and/or its systems and assemblies. The process focuses on planning, investigating, implementing, verifying, and documenting that the facility and/or its systems and assemblies are operated and maintained to meet the Current Facility Requirements, with a program to maintain the enhancements for the remaining life of the facility.

## Commissioning Plan Created

- Define "Commissioning" (not the process or procedure)
- Technical high level goals and objectives
- Ethical goals and best practice objectives
- Value added benefits and features to Owner
- OPR/CFR/BOD - Owners Project Requirements/Current Facility Requirements/Basis of Design
- Value added benefits and features of a consensus deliverable that the commissioning industry can adopt
- Credentialing of the Commissioning Agent/Authority
- Accreditation, Education, Training, Licensure
- Reasons why Building Commissioning is necessary
- Develop business cases why Building Commissioning is valuable
- Commissioning Protocols between owner, designer, contractor, vendor, operator
- Training and education to end users, customers, facility managers, O&M staff, etc.

### Scope – including, but not limited to:

Technical areas/  
Disciplines Included in  
Commissioning Plan

### Boundaries

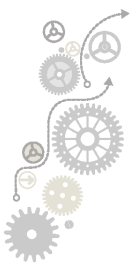
Specific Commissioning  
Tasks Addressed

- Requirements of Submittal review, System Verification checklists, Performance Testing
- Phases: New Construction/Major Renovation; such as Pre-design, Design, Construction, Acceptance, Post Occupancy, Seasonal Testing
- System manual requirements
- Commissioning team membership
- Outreach to other stakeholders, such as end users, architects, community or public at large
- Near end of warranty period review/seasonal testing and review, etc.
- Final commissioning report
- RFO's (Request for Qualifications), RFP's (Request for Proposals), Contracts
- Differentiate and quality/quantity conditions relevant to new and existing building commissioning
- Conflict resolution

## END RESULT

A strategic document that:

- a) provides over-arching commissioning goals and objectives that can be used as a common foundation for all providers of commissioning services.
- b) provides a path that produces the building (new and existing) as designed, constructed, and that meets the Owners Project Requirements (OPR)/Current Facility Requirements (CFR).



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This guide:

- Demonstrates that the commissioning process is a good tool to begin efforts to achieve consistently higher building capabilities according to intent, which can provide the most direct path to improving building performance.
- Provides a strategic outline and vision for commissioning new and existing projects by providing a common foundation for use by all providers of commissioning services.
- Assists and informs building project participants on how to produce and sustain high-quality buildings by ensuring that all of the commissioning systems and assemblies are planned, designed, installed, tested, operated and maintained to meet the Owner's Project Requirements (OPR) for a new building and the Current Facility Requirements (CFR) for an existing building.

### Section 3: The Commissioning Process

Building Commissioning is a process, defined as "a quality focused process for enhancing the delivery of a new and existing building project. The overall process focuses upon verifying and documenting that all of the commissioned systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the Owner's Project Requirements (OPR) of a new building and/or major renovation, and the Current Facility Requirements (CFR) of an existing building."

It is recognized that specific and detailed commissioning procedural methods and means may differ slightly from organization to organization, and we have agreed these variations are outside the scope of this high level strategic document.

In terms of building performance, the commissioning process helps owners and project teams achieve quality performance in new and existing buildings. Post-occupancy on-going commissioning can also contribute to sustaining optimal performance over time, delivering energy efficiency and operational savings.

The commissioning process includes defined activities and deliverables that are accomplished throughout the pre-design, design, construction and operations of the building. The commissioning actions and documents provide the plans, procedures, coordination, verification, and project records that will produce high performing buildings.

Special systems and assembly commissioning expertise, such as building enclosure commissioning (BECx), is often required for commercial facilities due to the complex nature and interface of enclosure materials and assemblies.

The new building construction commissioning (NCx) process differs from existing building commissioning (EBCx), because the forensic (investigative) components of EBCx are unnecessary for new projects. EBCx is also variously known as retro commissioning (RCx), and recommissioning.

On going commissioning is a process of continuously testing and/or tuning building systems to maintain building performance as expected, in keeping with the OPR/CFR.

*Refer to Appendix A for definitions of terms.*

*Refer to Appendix B for a description of the commissioning process activities and deliverables.*

*Refer to Appendix C for commissioning resources.*

### Section 4: Value and Benefits

Commissioning provides value and benefits to the owner, the project design and construction team, and ultimately the occupants and building operators in many ways as described herein.

The added value and many benefits to the owner by commissioning a building are manifested in higher performing buildings that efficiently serve the occupants and, by extension, the economies they serve.

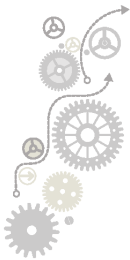
Our Appendix C has many examples and resources that explain in great detail how commissioning can be credibly proven to be valuable and useful, but perhaps is best expressed by the author of resource #8 citing, "16% median whole-building energy savings in existing buildings and 13% in new construction, with payback times of 1.1 years and 4.2 years, respectively. Median benefit cost ratios of 4.5 and 1.1, and cash-on-cash returns of 91% and 23% were achieved"; and goes on to say that "commissioning is arguably the single most cost effective strategy for reducing energy, costs, and greenhouse gas emissions in buildings today".

Buildings are as diverse as the people who utilize them. The value and benefits of the commissioning process can be demonstrated in direct proportion to the cost and advantages of performing commissioning weighed against the cost and risks of not performing commissioning. The design and construction process is enhanced by the expertise and facilitation of the commissioning authority in integrating its multi-faceted levels and phases in order to obtain its maximum potentials.

Facilitation of the design and construction phases, and review from phase to phase, add value to the process and the building performance outcome. These activities are performed by a commissioning authority that is an experienced professional using industry "standards of care" and accepted best practices. Issues and their resolutions are facilitated and documented with communication to all members of the commissioning team. The Owner can then receive the design and construction results at the scheduled time period, and within its budget. All of this provides a direct path toward informed and good practices during maintenance & operations.

Commissioning documentation and verification can lead to obtaining various energy, comfort, IAQ, and IEQ, and high performing building awards, while enhancing the learning experience, and helping to perpetuate the buildings' sustainability aspects.

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#### 4.1 Value and Benefits: Owner's Project Requirements/Current Facility Requirements (OPR/CFR)

The process of developing the OPR/CFR, updating, and validating fulfillment of the OPR/CFR from conception through occupancy and operation, keeps the owner, design team, and construction team focused on the delivery of the end product. The commissioning authority focuses on the OPR/CFR at every stage of project delivery, diminishing or eliminating undocumented changes in design requirements.

The commissioning authority monitors, and reports the metrics of performance and operation for the commissioning process, creating the path that produces the building as designed and constructed to meet the Owners OPR and/or CFR.

#### 4.2 Value and Benefits: Process

The commissioning process streamlines and accelerates the work flow of the project from start to finish. Scheduling and meeting milestones are enhanced by monitoring and intervention/facilitation by the commissioning authority. For example:

- Design and submittal reviews assure compliance with OPR/CFR and plans and specifications, as well as prequalification of equipment, systems, personnel, and code/standards compliance.
- Checklists are issued and documented, establishing prerequisites for timely provision of equipment and systems installation.
- Performance testing assures compliance with design objectives and requirements.
- Start-ups are performed as an integral part of the process and documented before any performance testing is started.
- Training is facilitated to ensure continued operations.

#### 4.3 Value and Benefits: Project Team (Planning, Design, Construction)

As a result of the commissioning process, the owner, designer, contractor, and operator realize fewer costs due to downtime, delays, change orders, clarifications, and requests for extension of time for completion. Owners, designers and contractors realize that the commissioning authority is working in their best interests to assist in facilitating and executing the project schedule and milestones based on unbiased execution of the OPR and/or CFR.

Designers benefit by commissioning review due to commissioning diligence by verifying the design works properly and is provided in accordance with the OPR/CFR. Designers experience reduced requests for clarification, information, and questions about system design and its intended operations.

The commissioning process, including testing, identification of premature equipment failures, and due diligence, benefits contractors, equipment vendors and subcontractors by reducing material and labor costs, punch lists, callbacks, and warranty work.

Performance testing and any re-testing of poor results assure that the project works in compliance with the project requirements. The construction team, vendors and product manufacturers realize the benefit of concentrating on products and activities that meet the OPR/CFR as a guideline, forefront in everyone's mind, which can reduce product substitutions and value engineering. Vendors and material providers benefit from proper equipment start-ups, performance testing, and operation/maintenance training to verify compliance with contract documents which accelerates the successful project turnover process. Finally, warranty claims, completion delays, call-backs, and building down-time due to repairs are reduced because the systems are tested and performance is verified prior to occupancy.

#### 4.4 Value and Benefits: Performance and Operation Outcomes

The operational outcomes in terms of minimizing costs and maximizing building performance are many. Results include, for example:

- Training is facilitated and enhanced by requiring a plan and curriculum followed by monitoring and documentation of results.
- O&M staffs are provided with comprehensive systems manuals and O&M documentation that allows seamless transfer of knowledge base about its equipment and systems understanding.
- Users and occupants of facilities benefit from having a working or living environment in which conditions are designed, constructed, and efficiently and sustainably operated with their specific uses in mind.

### Section 5: Performance Requirements

Commissioning performance requirements are a function of the specific project. The performance requirements document goals, expectations, values, and benefits that will be achieved in a successful project. Performance requirements will be different for a new building as opposed to an existing building. Both new and existing types of buildings can benefit from the commissioning process.

In general, these requirements are intended to maximize the effective performance of the building by allowing people to optimize their productivity as the facility operates properly, and mandating that the building meets performance thresholds determined by established metrics and specific owner's needs.

The OPR or CFR must clearly define the expected building performance and outcomes from the commissioning process. These documents will require considerable effort from the owner or project manager and the Commissioning Authority working collaboratively. These define the project criteria to be used in developing an appropriate commissioning plan for systems that are to be commissioned. The purpose of the facility, activities performed, and operator's ability must be some of the many items to be included in the commissioning plan.

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Commissioning can be used to document and achieve these goals without jeopardizing other performance requirements such as indoor environmental quality. The commissioning process can be utilized to assure that the goals of technology integration, interoperability, sustainability, and coordination are achieved while, at the same time, minimizing effects of unintended consequences.

#### 5.1 The Owner's Project Requirements should contain performance requirements for the building, such as:

- Performance requirements needed to achieve a high performance energy rating/label in an energy rating system.
- The performance requirements needed to prove compliance with energy codes and statutes.
- Certain requirements with regard to indoor environmental quality (IEQ), building envelope performance, or other requirements specific to the new building.
- Adequate scoping to explicitly list the inclusion of "green" building commissioning as a subset of the total building commissioning scope.

#### 5.2 Existing facilities may have a wide variety of requirements. These requirements may differ from the original project requirements when the building was originally designed and built due to a number of reasons, such as:

- The building, or parts of the building, may be used for a different purpose.
- Some changes in occupancy type may differ from the way the building was being used for the same purpose.
- Technology enhancements with respect to better performing equipment and systems may be available.
- New regulations or codes may impose new requirements and/or energy goals.
- The owner may want to include additional "green" building requirements, in the change, retrofit, or upgrade.

### Section 6: Commissioning Authority Characteristics

The Commissioning Authority is in charge of the commissioning process and makes the final recommendations to the owner regarding functional and practical performance of the commissioned building systems. In the selection of a commissioning authority it is important that it be based on the qualifications and experience of the proposed candidate. For each project, the commissioning purpose and scope should be clearly defined in the Commissioning Authority's contract for services. There are many key skills, characteristics, and ethics required to perform successful and effective commissioning, as discussed herein.

The Commissioning Authority is an objective and independent advocate for the owner. The Commissioning Authority should work directly for the owner, keeping the owner's objectives and best interests as the top priority. The Commissioning Authority does not provide peer review, but ensures that OPR/CFR is being met by all parties involved in the project. The Commissioning Authority is to facilitate the process, to insure that all parties provide good communication, demonstrate good judgment and professionalism, resolve issues as a team approach, and document performance.

In addition to having good written and verbal communication skills, the Commissioning Authority should have current engineering knowledge, with extensive and relevant hands-on field experience in the area of expertise of their commissioning discipline. The commissioning authority should be credentialed and certified by a reliable, nationally recognized, and credible professional association/organization specializing in the commissioning business.

The Commissioning Authority recommends clearly defined roles and scope for all members of the design and construction teams for the execution of the commissioning process; this allows for each team member to have a better understanding of the commissioning process. Additionally, it helps to identify and resolve problems in the process, and document the performance of the building. Since the commissioning authority provides constructive input for the resolution of system problems and deficiencies, diplomacy and consensus building during these discussions are critical. However, this role does not give the Commissioning Authority any rights or responsibilities to overrule and/or perform the specific work of this team of professionals.

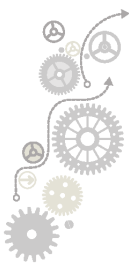
The Commissioning Authority must also know how to interview building staff on their knowledge of the systems they maintain to determine the appropriate level of training once the project is complete. Training and mentoring the building staff during the turnover phase combines the Commissioning Authority's technical skills with communication skills which are critical to the long term success of the building.

A conflict of interest may exist if the Commissioning Authority's firm has other project responsibilities or function, and/or is not under direct contract to the owner. The commissioning authority needs to be a provider without any financial or business interests or potential conflicts of interest that would interfere with the faithful execution of his/her duties. Wherever this occurs the Commissioning Authority should disclose, in writing, the nature of the conflict and the means by which the conflict shall be managed.

Situations may arise during many of the decision-making points in the commissioning process that may require that the Commissioning Authority address some difficult decisions, deliberations, and/or conversations; these should be handled with the utmost professionalism and ethics.

Quality assurance and optimization are essential elements of any commissioning effort, including efforts to improve energy efficiency, indoor environmental quality, comfort, and operations.

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### Section 7: Commissioning Expectations

Utilizing the commissioning process as outlined in this Strategic Guide to Commissioning will result in better buildings and building systems. It will support a quality focused mutually acceptable commissioning process and procedure. The ultimate intent is to make the owner confident and satisfied that "they got what they paid for," reduced risk, and met/exceeded their scheduling targets and financial goals.

The strategic commissioning suggestions outlined herein will provide benefits to the key customers and stakeholders of buildings, most importantly being the owner. Commissioning has been proven to save time and costs for the owner, designer, and contracting team members. Studies and resources listed in this guide have provided results and research that has concluded that commissioning is beneficial and should be used as much as possible.

It is expected that this guide will provide principles of commissioning for a broad audience of users of the building commissioning verification approach to improving building performance and the built environment. These principles can be used to enhance building performance at many levels, such as benchmarking, exploring opportunities for increased efficiencies, achieving goals and objectives of management, exploring alternatives, and promoting best practices. With the use of these principles and methodologies, the benefits of better building performance, enhanced maintenance and operations, improved occupant comfort, and energy efficiency/reduction can be achieved.

Effective commissioning provides opportunities for enhanced integrated design, improved and timely construction procedures, lower warranty costs, and proper operator training which all lead to satisfied building occupants. The systems that the owner decides to commission on each project may differ.

Commissioning is the most reliable path and process to produce properly performing building systems and assemblies that are as planned, designed, installed and operated.

It is intended that this guide can be used to communicate over-arching commissioning goals and objectives that can be used as a common foundation for all providers of commissioning services. A fully utilized commissioning process and procedure from project inception through to building testing and occupancy is the best and most cost effective way to improve building performance and operation.

### APPENDIX A: Definitions<sup>1</sup>

**Acceptance:** A formal action, taken by a person with appropriate authority (which may or may not be contractually defined) to declare that some aspect of the project meets defined requirements, thus permitting subsequent activities to proceed.

**Basis of Design (BOD):** A document that records the concepts, calculations, decisions, and product selections used to meet the Owner's Project Requirements and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

**Checklists:** Project and element-specific checklists that are developed and used during all phases of the commissioning process to verify that the Owner's Project Requirements or Current Facility Requirements (CFR) are being achieved. Checklists are used for general evaluation, testing, training, and other design and construction requirements.

**Commissioning Authority (or Agent):** An entity identified by the Owner who leads, plans, schedules, and coordinates the commissioning team to implement the Commissioning Process.

**Commissioning Plan:** A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the Commissioning Process.

**Commissioning Process:** A quality process for enhancing the delivery of new and existing building projects. It focuses on verifying and documenting that all of the commissioned systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the Owner's Project Requirements (OPR) of a new building and/or major renovation, and the Current Facility Requirements (CFR) of an existing building.

**Commissioning Progress Report:** A written document that details activities completed as part of the Commissioning Process and significant findings from those activities, and is continuously updated during the course of a project.

**Commissioning Team:** The individuals and agencies, which through coordinated actions, are responsible for implementing the Commissioning Process.

**Commissioning Testing:** The evaluation and documentation of the equipment and assemblies: delivery and condition; installation; proper function according to the manufacturer's specifications, and project documentation to meet the criteria in the Owner's Project Requirements or Current Facility Requirements (CFR).

**Commissioning: New Building/Major Renovation:** The application of the Commissioning Process requirements and Owners Project Requirements (OPR) to a new construction and/or major renovation project.

**Commissioning: Existing Building: (includes re-, retro, and on-going commissioning activities):** An application of the Commissioning Process requirements for attaining the Current Facility Requirements (CFR) of an existing facility and/or its systems and assemblies. The process focuses on planning, investigating, implementing, verifying, and documenting that the facility and/or its systems and assemblies are operated and maintained to meet the Current Facility Requirements, with a program to maintain the enhancements for the remaining

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life of the facility. Re-commissioning refers to commissioning performed on an existing building that had commissioning performed when it was new. Retro-commissioning methodology is identical to that for re-commissioning, except that it occurs when the building was not commissioned when new, and is being commissioned for the first time. On-going commissioning is a process of continuously testing and/or tuning building systems to maintain building performance as expected and previously commissioned.

**Construction Documents:** This includes a wide range of documents, which will vary from project to project, and with the Owner's needs, regulations, laws, and jurisdictional requirements. Construction documents usually include the project manual (specifications), plans (drawings), and General Terms and Conditions of the contract.

**Contract Documents:** This includes a wide range of documents, which will vary from project to project and with the Owner's needs, regulations, laws, and jurisdictional requirements. Contract Documents frequently include price agreements, construction management process, sub-contractor agreements or requirements, requirements and procedures for submittals, changes, and other construction requirements, timeline for completion, and the Construction Documents.

**Coordination Drawings:** Drawings showing the work of all trades to illustrate that equipment can be installed in the space allocated without compromising equipment function or access for maintenance and replacement. These drawings graphically illustrate and dimension manufacturers' recommended maintenance clearances.

**Current Facility Requirements (CFR):** A written document that details the current functional requirements of an existing facility and the expectations of how it should be used and operated. This includes goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information to meet the requirements of occupants, users, and owners of the facility.

**Design Checklist:** A form developed by the commissioning team to verify that elements of the design are in compliance with the Owner's Project Requirements.

**Design Review – PEER:** An independent and objective technical review of the design of the Project or a part thereof, conducted at specified stages of design completion by one or more qualified professionals, for the purpose of enhancing the quality of the design.

**Design Review – Constructability:** The review of effective and timely integration of construction knowledge into the conceptual planning, design, construction and field operation of a project to achieve project objectives efficiently and accurately at the most cost effective levels to reduce or prevent errors, delays and cost overruns.

**Design Review – Code or Regulatory:** A review of a document conducted by staff or designated entity of an Authority Having Jurisdiction to determine whether the content of the document complies with regulations, codes, or other standards administered by the Jurisdiction.

**Design Review – Commissioning:** A review of the design documents to determine compliance with the Owner's Project Requirements, including coordination between systems and assemblies being commissioned, features and access for testing, commissioning and maintenance, and other reviews required by the OPR and commissioning plan.

**Existing building commissioning:** An application of the Commissioning Process requirements for attaining the Current Facility Requirements (CFR) of an existing facility and/or its

systems and assemblies. The process focuses on planning, investigating, implementing, verifying, and documenting that the facility and/or its systems and assemblies are operated and maintained to meet the Current Facility Requirements, with a program to maintain the enhancements for the remaining life of the facility.

**Evaluation:** The process by which specific documents, components, equipment, assemblies, systems, and interfaces among systems and their performance are confirmed with respect to the criteria required in the Owner's Project Requirements and/or the Current Facility Requirements (CFR).

**Facility Guide:** A basic building systems description and operating plan with general procedures and confirmed facility operating conditions, set points, schedules, and operating procedures for use by facility operators to properly operate the facility.

**Final Commissioning Report:** A document that records the activities and results of the Commissioning Process and is developed from the final Commissioning Plan with all of its attached appendices.

**Issues and Resolution Log:** A formal and on-going record of problems or concerns and their resolutions that have been raised by members of the Commissioning Team during the course of the Commissioning Process.

**New building commissioning:** the application of the commissioning process requirements and owners project requirements to a new construction and/or major renovation project.

**Owner's Project Requirements (OPR):** A written document that details the requirements of a project and the expectations of how it will be used and operated. This includes project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

**Performance Test (PT):** Performance Testing is the process of verifying that a material, product, assembly, or system meets defined performance criteria. The methods and conditions under which performance is verified are described in one or more test protocols.

**Record Documents: (the term "as-builts" have been previously used):** Documents prepared by the architect, engineer, and/or contractor that reflect on-site changes the contractor noted in the as-built drawings. They are often compiled as a set of on-site changes made for the owner per the contract requirements.

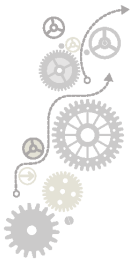
**Systems Manual:** A system-focused composite document that includes the design and construction documentation, facility guide and operation manual, maintenance information, training information, commissioning process records, and additional information of use to the Owner during occupancy and operations.

**Test Procedure:** A written protocol that defines methods, personnel, and expectations for tests conducted on components, equipment, assemblies, systems, and interfaces among systems to verify compliance with the Owner's Project Requirements.

**Training Plan:** A written document that details the expectations, schedule, duration and deliverables of Commissioning Process activities related to training of project operating and maintenance personnel, users, and occupants.

<sup>1</sup> These definitions are taken directly from the BPA "Roadmap", and ASHRAE Standard 202-2013.

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#### APPENDIX B: Commissioning Process Activities and Deliverables.

The Commissioning Process is defined as a quality-focused process for enhancing the delivery of a new and existing building project. The overall process focuses upon verifying and documenting that all of the commissioned systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the Owner's Project Requirements (OPR).

The commissioning process has a series of actions and schedules for proper completion. Each action has specific deliverables. These define the building and commissioning requirements, the documentation of the performance results, training for the systems, and assemblies commissioned. The actions in the commissioning process shall be:

1. The owner initiates the Commissioning Process and retains the commissioning authority at the beginning of the project. The roles and responsibilities of the project and commissioning teams are determined. Procedures and contracts are prepared and executed.
2. Project requirements are then determined and documented, including not only the site and building scope and use but also the performance, training, commissioning and documentation requirements. The deliverable for this action is the Owner's Project Requirements (OPR) document, which is the guiding instruction for the project, and is updated throughout the project.
3. The initial Commissioning Plan is developed in the next step showing the commissioning scope, roles and responsibilities, communication procedures, and design and construction requirements for providing and integrating commissioning into the project. This Commissioning Plan is updated throughout the project with checklists, functional, and performance testing protocols and procedures, schedules and documentation details.
4. The design team then determines and documents the design approach to meet the Owner's Project Requirements. The commissioning authority reviews this Basis of Design (BOD) for conformance to the OPR.
5. During the design phase, the contractor commissioning requirements are determined for each commissioned system, and commissioning specifications are included in the construction documents package.
6. Also in the design phase, the commissioning authority reviews the design documents for conformance to the OPR, and provides the design review report.
7. Early in the project construction, the commissioning team reviews the materials and equipment submittals for conformance to the OPR and construction documents. Discrepancies, problems or inadequacies should be reported. This submittal review and report provides familiarity with the building systems for development of testing and commissioning requirements.
8. As the project is constructed, the commissioning team observes and verifies the installation and witnesses the equipment start up and testing. At system completion, performance testing is conducted and documented in checklists, logs and reports to verify performance compliance with the OPR and design documents.

9. One of the main functions and benefits of commissioning process is the identification and resolution of project issues, in both the design and construction phases, using the Issues and Resolution Log and project team collaboration. The design team and contractors should provide responses to the issues.
10. During design and construction the project documents are assembled into the systems manual that provides the details and history of the design and construction of the building, and information needed to properly operate the building. The systems manual is used in the training of the operations and facility staff and occupants, and is updated throughout the life of the building.
11. In order to operate the building in accordance with the OPR and design capabilities. The building operations, maintenance, and facility staff should be trained on the installed and commissioned equipment and systems. The training plans and records are retained and updated for use in later training.
  - Commissioning logs and interim reports are collected throughout the project and distributed as required by the commissioning plan.
  - At the completion of the project, the commissioning report is assembled and provided to the owner and others as required by the OPR, project documents, and local jurisdiction requirements.

Existing building commissioning processes involve planning, development of Current Facility Requirements (CFR), investigating, testing, project selection and implementation followed by system testing, commissioning, training and final documentation.

To maintain building performance, an on-going commissioning plan is developed and documented during the commissioning process for the use of building staff and occupants.

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### APPENDIX C: Commissioning Resources

This list of commissioning resources and providers, either published by or recommended by this committee, is intended to provide the user of this guide where to find the best sources of information about the commissioning industry and practices, procedures, means and methods from credentialed and reliable sources.

1. ACG Commissioning Guideline for Building Owners, Design Professionals and Commissioning Service Providers, 2nd Edition, AABC Commissioning Group (ACG), 2005.
2. ASHRAE Guideline 0-2013: The Commissioning Process Guideline.
3. ASHRAE Guideline 1.1, The HVAC Commissioning Process Guideline
4. ASHRAE Standard 202-2013 -- Commissioning Process for Buildings and Systems
5. ASTM E2813 -- 12 Standard Practices for Building Enclosure Commissioning
6. Building Commissioning Association (BCA): New Construction Building Commissioning Best Practice
7. Building Commissioning Association (BCA): Best Practices in Commissioning Existing Buildings
8. "Building Commissioning: A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions", Evan Mills, Ph.D., Lawrence Berkeley National Laboratory, July 21, 2009
9. California Commissioning Guide, 2006
10. Canadian Commissioning Manual, 2006
11. DOE Commissioning Guide, 2011
12. GSA Commissioning Guide, 2005
13. ICC G4- 2012 Guideline for Commissioning
14. ICC/IAS AC 476 Accreditation Criteria for Organizations Providing Training and/or Certification of Commissioning Personnel
15. ICC 1000 -- 201X Standard for Commissioning
16. IECC (various commissioning requirements), 2012
17. IgCC (various commissioning requirements), 2012
18. IESNA, The Commissioning Process Applied to Lighting and Control Systems; 2011
19. NAVFAC Design Build Commissioning Manual, 2009
20. NECA 90-2009 Standard for Commissioning Building Electrical Systems.

21. NEBB, Procedural Standards for Whole Building Systems Technical Commissioning for New Construction, National Environmental Balancing Bureau (NEBB), 2014.
22. NEBB, Procedural Standards for the Technical Retro-Commissioning of Existing Building Systems, National Environmental Balancing Bureau (NEBB), 2014.
23. NIBS Guideline 3-2012 Building Enclosure Commissioning Process BECx, National Institute of Building Sciences, 2012.
24. NFPA Commissioning Fire Protection Systems, David R. Hague, 2005
25. SMACNA/ANSI HVAC Systems Commissioning Manual.
26. The Building Commissioning Guide, U.S. General Services Administration, 2005.
27. VA Commissioning Manual, 2010

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This guide was developed by a BPA team consisting of twenty-eight ASHRAE members and direct representation by fourteen organizations who are major stakeholders in the commissioning industry. This collaborative effort will lead to improved overall building and system performance while maintaining established industry interests and practices which has led to continuing advances in its technology.





## Page: 1

[illegible][illegible]

<b>m&amp;D</b> <b>studio</b> ARCHITECTURE	
201 N. W. 10TH AVE. SUITE 200 MIAMI BEACH, FL 33139 TEL: 305-673-8888 FAX: 305-673-8889 <a href="mailto:m&amp;d@architect.com">m&amp;d@architect.com</a>	
JOB#	C-00000001
DRAWN /	
CHECKED	JG
DATE	
<input type="checkbox"/> 10	
<input type="checkbox"/> 20	
<input type="checkbox"/> 30	
<input type="checkbox"/> PERMIT	
<input type="checkbox"/> 10	
REVISIONS:	
▲	
▲	
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<b>FLORIDA INSTITUTE OF TECHNOLOGY</b> <b>MERTEN'S MARINE CENTER</b> <b>EAST RIVER DRIVE</b> <b>MELBOURNE, FL 32901</b>	
SHEET	Single's Register

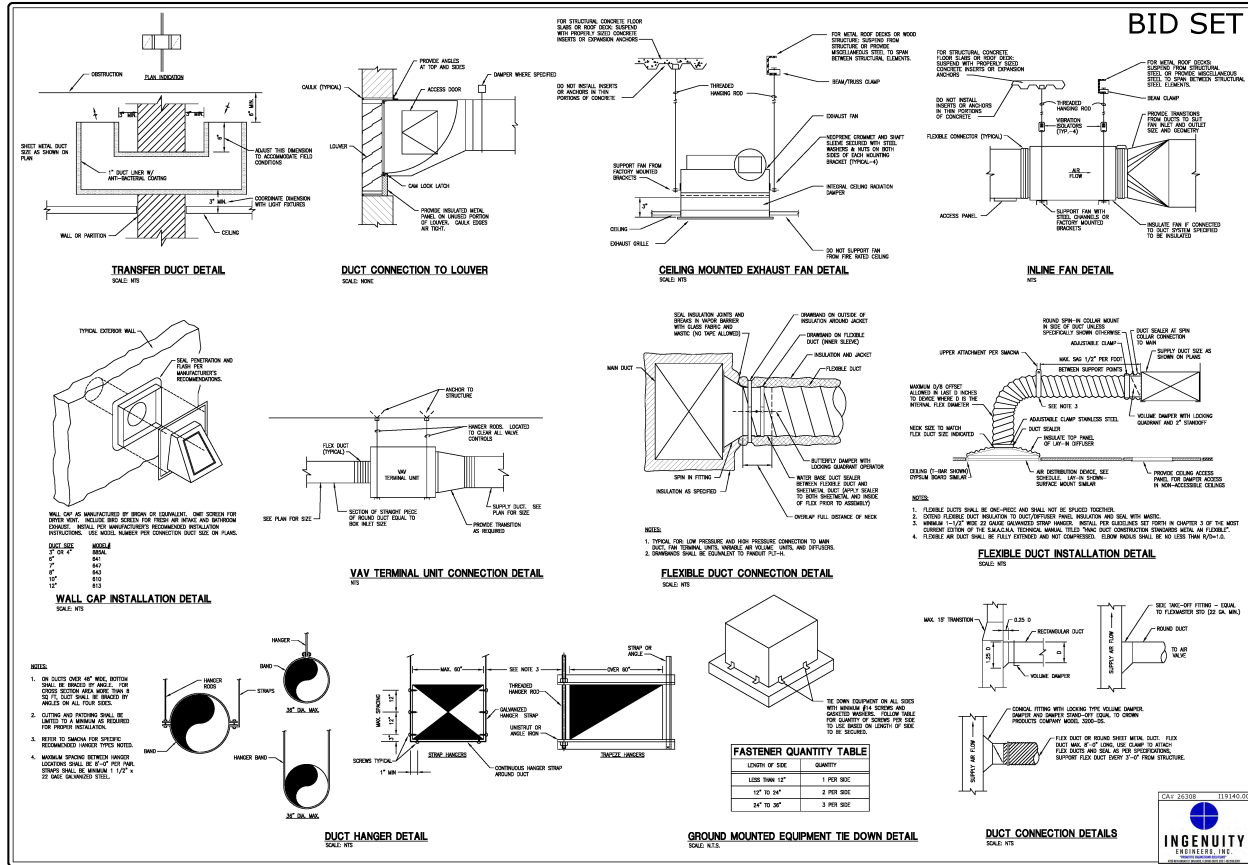
BY DATE  
 PROJECT NO. C-00000001  
 PROJECT NAME MECHANICAL LEGEND, NOTES  
 ABBREVIATIONS  
 SHEET NUMBER

**Poorly engineered and no sequence of operations**









med  
studio  
ARCHITECTURE

1001 BAYVIEW AVE.  
SUITE 100  
MELBOURNE, FL 32901  
TEL: 321.486.1111  
FAX: 321.486.1112  
WWW.MEDSTUDIOARCH.COM

DATE: 01/14/2008  
JOB#: 10401-001  
CHECKED: JG

DATE: \_\_\_\_\_  
BY: \_\_\_\_\_  
CHECKED: \_\_\_\_\_  
DATE: \_\_\_\_\_

REVISIONS:  
1. \_\_\_\_\_  
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4. \_\_\_\_\_  
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FLORIDA INSTITUTE OF TECHNOLOGY  
MERTENS MARINE CENTER  
EAST RIVER DRIVE  
MELBOURNE, FL 32901

SCALE: As Shown

DATE: 01/14/2008

SHEET TITLE

MECHANICAL

DETAILS

SHEET NUMBER

M6.1

BID SET

GENERAL NOTE

VOLTAGE DROP



1001 SOUTH AVE  
SUITE 100  
MELBOURNE, FL 32901  
TEL: 321.480.1111  
WWW.MEDSTUDIOARCH.COM

DATE: 02/07/2021

CHECKED: JEN

DATE:

BY:

DATE:

BY:

DATE:

BY:

DATE:

BY:

DATE:

BY:

FLORIDA INSTITUTE OF TECHNOLOGY  
MERTENS MARINE CENTER  
EAST RIVER DRIVE  
MELBOURNE, FL 32901

DATE: 11/26/2020

PROJECT TITLE  
ELECTRICAL LEGEND, NOTES  
& ABBREVIATIONS

E0.1

ELECTRICAL SYMBOLS LEGEND

LIGHTING

FIRE ALARM

SWITCHES

DATA/COMM

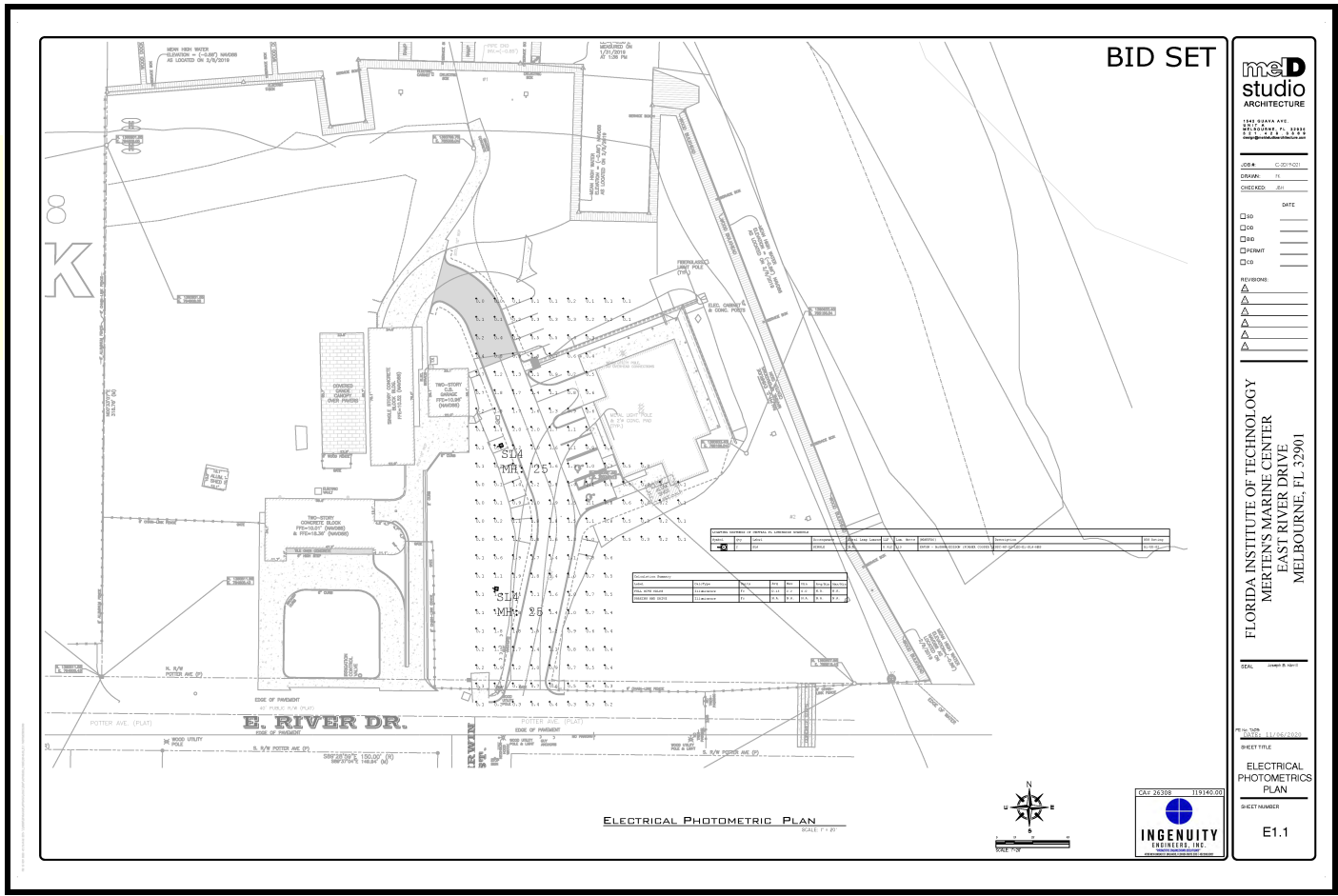
SERVICE AND DISTRIBUTION

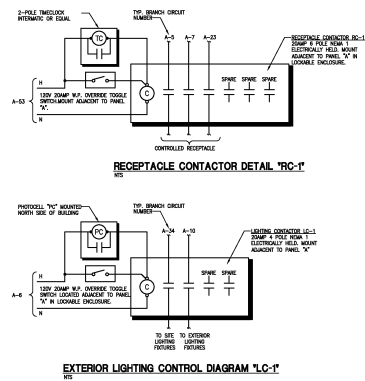
ABBREVIATIONS

BUILDING LIGHTING FIXTURE SCHEDULE

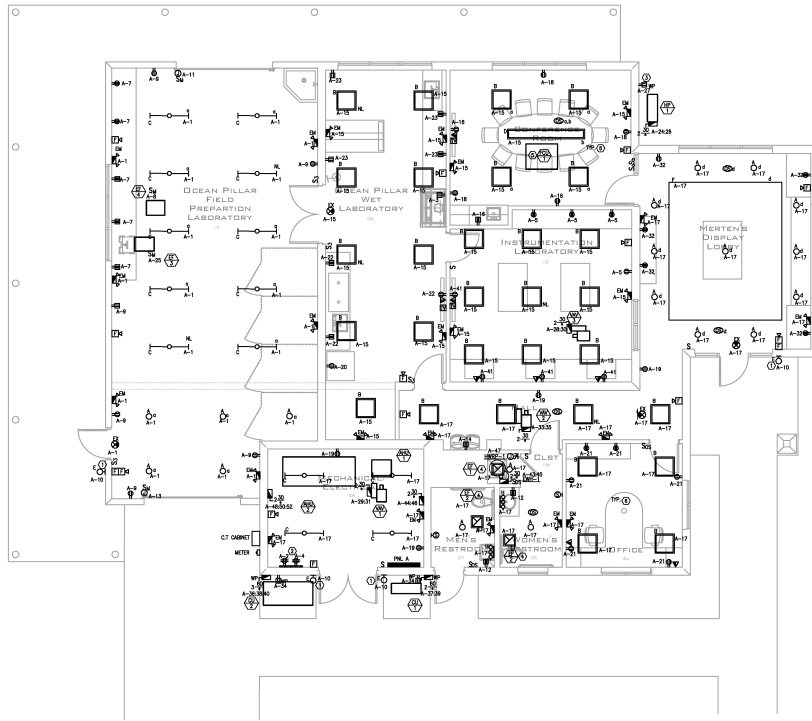
TYPE	MANUFACTURER & MODEL NO.	DESCRIPTION	LUMENS	WOLTS	AS APPROVED BY OWNER
A	DELTA	4" LED DOWNLIGHT	1200	120	AS APPROVED BY OWNER
B	DELTA	4" LED DOWNLIGHT	1200	120	AS APPROVED BY OWNER
C	DELTA	4" LED DOWNLIGHT	1200	120	AS APPROVED BY OWNER
D	DELTA	4" LED DOWNLIGHT	1200	120	AS APPROVED BY OWNER
E	DELTA	4" LED DOWNLIGHT	1200	120	AS APPROVED BY OWNER
F	DELTA	4" LED DOWNLIGHT	1200	120	AS APPROVED BY OWNER
EM	DELTA	4" LED DOWNLIGHT	1200	120	AS APPROVED BY OWNER
H	DELTA	4" LED DOWNLIGHT	1200	120	AS APPROVED BY OWNER







- GENERAL NOTES**
1. ALL EXTERIOR AND EET LIGHTING SHALL BE CONNECTED AHEAD OF ANY SWITCHING ARRANGEMENTS OR CONTROLLED BY A LISTED LEAKY CURRENT PROTECTIVE DEVICE (LCPD).
  2. THIS PROJECT IS IN COMPLIANCE WITH 2017 FSC-CHARTER CONSTRUCTION CAN ALSO BE USED TO BE WITH REQUIRED TO VARIATE SHOP FOR BOTH DISTRIBUTION PANELS (SND).
  3. REFER TO ARCHITECTURAL LIGHTING PLANS FOR ANY AND ALL LIGHTING FIXTURE MOUNTING DIMENSIONS.
  4. COORDINATE LIGHTING FIXTURE MOUNTING HEIGHT WITH ARCHITECT & INTERIOR DESIGNER LIGHTING PACKAGE AND SPECIFICATIONS.
- REFERENCE NOTES**
- ① EXTERIOR LIGHTING SHALL BE CONTROLLED BY ANY NOTED THROUGH LIGHTING CONTROL (LCPD), SEE DETAIL ON THIS SHEET.
  - ② TELEPHONE TERMINAL, SIGNAL PROVIDE 4" X 6" X 5/8" PLUMBED WITH FIRE RATED FRAME.
  - ③ PROVIDE REINFORCEMENT OF 200 MMS SERVICE RECEPTACLE IN ACCORDANCE WITH NEC 210.15.
  - ④ CORRECT CORRECT NAME TAG INTO THE OCCUPANCY SENSOR SWITCH WHICH CONTROLS THE SPACE.
  - ⑤ INDOOR FAN COOL UNIT POWERED BY OUTDOOR CONDENSING UNIT.
  - ⑥ ALL RECEPTACLES IN THIS ROOM TO BE ONLY CONTROLLED BY A RECEPTACLE AND WALL SWITCH WHICH CONTROLS THE SPACE. SEE DETAIL ON DRAWING SHEET 10.1.



ELECTRICAL GROUND FLOOR PLAN



BID SET

**med studio**  
ARCHITECTURE

1001 SOUTH AVE  
SUITE 1000  
MELBOURNE, FL 32901  
TEL: 321.484.4444  
WWW.MEDSTUDIOARCH.COM

DATE: 11/26/2020

DESIGNER: med studio

CHECKED: JEN

DATE: 11/26/2020

REVISIONS:

NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMIT	11/26/2020
2	ISSUED FOR BIDDING	11/26/2020
3	ISSUED FOR CONSTRUCTION	11/26/2020
4	ISSUED FOR AS-BUILT	11/26/2020

FLORIDA INSTITUTE OF TECHNOLOGY  
MERTENS MARINE CENTER  
EAST RIVER DRIVE  
MELBOURNE, FL 32901

SCALE: 1/8"=1'-0"

SHEET TITLE: ELECTRICAL GROUND FLOOR PLAN

SHEET NUMBER: E2.0







Construct Operations Facility Advanced Battle Management System  
Robins AFB, GA

22B3001

SECTION 01 91 00

TOTAL BUILDING COMMISSIONING  
05/19

PART 1 GENERAL

1.1 SUMMARY

Commission the building systems listed herein. Employ the services of an independent Commissioning Firm. The Commissioning Firm must be a 1st tier subcontractor of the General or Prime Contractor and must be financially and corporately independent of all other subcontractors. The Commissioning Firm must employ a Lead Commissioning Specialist that coordinates all aspects of the commissioning process. Conform to the commissioning procedures outlined in this specification.

1.2 SYSTEMS TO BE COMMISSIONED

Commission the following systems:

Heating, Ventilating, Air Conditioning, and Refrigeration Systems  
(HVAC)  
Building Automation System

Lighting Systems  
Power Distribution Systems

Service Water Heating Systems  
Plumbing Systems

Energy and Water Utility Metering Systems and Sub-Meters

Building Envelope: include moisture, thermal integrity, and air tightness for the entire building envelope including systems such as walls, fenestration.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING  
ENGINEERS (ASHRAE)

ASHRAE 202 (2013; Addenda B 2018) Commissioning  
Process for Buildings and Systems

ASSOCIATED AIR BALANCE COUNCIL (AABC)

ACG Commissioning Guideline (2005) Commissioning Guideline

NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)

NEBB Commissioning Standard (2009) Procedural Standards for Whole

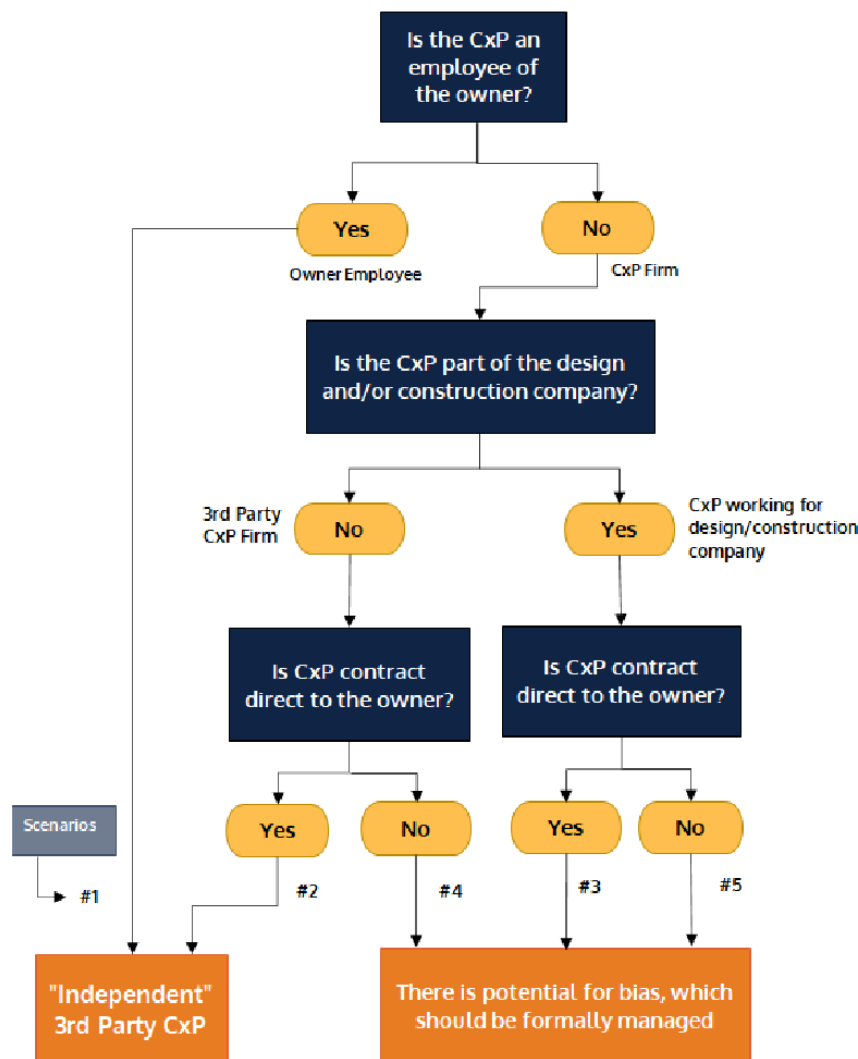
Multiple Systems Third Party Commissioning	
2018 ASHRAE Standard 202 Informative Appendix G, Cx Process Specifications, Section G2	<p>"G2.2) When the Owner's organization cannot perform the CxP duties with qualified personnel, then the CxP should have a separate professional services agreement with the Owner, as this avoids conflicts of interest and provides independence from the other parties (the Owner's project manager, designers of record, construction managers, suppliers and construction contractors). This professional services agreement defines the duties, rights, and responsibilities of the CxP for each phase of the project. This separate relationship allows the CxP to act independently as director of Cx Activities, to focus on achieving the OPR, and to communicate directly with the Owner."</p> <p>"G2.4) If the CxP is an employee, associate, or partner of the same organization as the designer of record or construction management firm, there is a conflict of interest. While not a recommended approach, in these instances, the CxP must have a separate professional service agreement, be organizationally separate from the Design Team or Construction Team, and define and manage the conflict of interest to provide the Owner with the independence required for the Cx to be successful."</p> <p>Note: this references an appendix to the ASHRAE Standard. As an appendix, it does not contain requirements necessary for conformance to the standard.</p>
2018 International Green Construction Code (IGCC) Informative Appendix I, Section I101 (I1.c)	<p><b><i>Applies to Mechanical/Electrical/Plumbing, for Buildings &gt; 10,000 SF</i></b></p> <p>"The Cx provider and the functional performance test (FPT) provider should be independent of the building system design and construction functions of the systems being commissioned. The Cx provider and FPT provider should disclose possible conflicts of interest to ensure objectivity."</p> <p>Note: this references an appendix to the IGCC code. As an appendix, it does not carry the same enforcement authority as the content written within the code sections.</p>
ASHRAE 90.1-2019	<p><b><i>Applies to building systems, controls, and building envelope:</i></b></p> <p>"Verification and Testing Providers shall be Owner's employees, commissioning providers, qualified designers or experienced technicians not involved in design or construction of project."</p> <p>Note: Many of the commissioning requirements in ASHRAE 90.1-2019 come from ASHRAE Standard 189.1-2017.</p>

## FAQ #2: What is the definition of third-party commissioning?

**Summary.** The purpose of this document is to define third party commissioning and describe the various means by which building commissioning can be contracted to meet the needs of a project, in the best interest of the Owner.

**Definition tied to Contractual Relationship.** The term "third-party," or "independent third-party," commissioning is typically used to describe a contractual relationship in which the commissioning provider (CxP) is accountable directly to the Owner and independent of any other entity involved in the project, especially with responsibility for the design or construction of the systems being commissioned.

The following flowchart represents multiple scenarios in which the CxP is connected contractually to the Owner on a project.



### Third Party Cx Independence

are considered "independent" third-party contracts.

**Scenario #1** – Qualified Provider part of the Owner staff.

**Scenario #2** – Qualified Provider hired directly by the Owner with no other relationship to the project's design or construction companies.

**Scenario #3** – Qualified Provider hired by the Owner directly, who is not a participating member of the project design or construction team but is employed by one of those companies.

**Scenario #4** – Qualified Provider with contractual relationship to design or construction team who is a separate company from those teams. **In this scenario, the CxP is third-party, but not independent.**

**Scenario #5** – Qualified Provider who is not a participating member of the project design or construction team but is employed by one of those companies and is contractually obligated to the design or construction team.

# TAC: Energy

Total Mods for **Energy** in **Approved as Submitted** : 11

Total Mods for report: 21

## Sub Code: Energy Conservation

8

EN10445

Date Submitted	02/15/2022	Section	408.2	Proponent	Douglas Baggett
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language No**

### Related Modifications

10251 10245

### Summary of Modification

This proposed modification will serve to keep requirements and verbiage consistent with Mod's 10245 and 10251, as well as, to clearly define the term 'evidence'

### Rationale

The modification will keep requirements and verbiage consistent with proposed modifications 10251 & 10245 and will also simplify language by using one term to refer to the person that is certified to provide commissioning. It also clearly defines the term evidence.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

There will be no impact - this would just be a verbiage and clarification modification

#### Impact to building and property owners relative to cost of compliance with code

There will be no impact - this would just be a verbiage and clarification modification

#### Impact to industry relative to the cost of compliance with code

There will be no impact - this would just be a verbiage and clarification modification

#### Impact to small business relative to the cost of compliance with code

### Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will improve the health, safety and welfare of the general public by ensuring the building codes are consistent and by ensuring properly trained and certified individuals commission the mechanical systems

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This modification will improve the code to allow for clear and consistent requirements for commissioning systems

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

**Does not degrade the effectiveness of the code**

No it does not degrade the effectiveness of the code, it enhances it.

## 2nd Comment Period

N10445-G1

Proponent Mo Madani Submitted 8/2/2022 10:06:07 AM Attachments Yes

Comment:

The proposed code change is in conflict with Section 553.9081(1)(b), Florida Statutes which authorize that commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer without additional professional qualification requirements.

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

Prior to the final mechanical and plumbing inspections, the ~~licensed design professional, electrical engineer, mechanical engineer or approved agency~~ certified third-party commissioning agent shall provide evidence in the form of completed construction documents, commissioning plan, completed functional performance tests and a Final Commissioning Report of mechanical systems *commissioning* and completion in accordance with the provisions of this section.

*Construction document* notes shall clearly indicate provisions for *commissioning* and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner or owner's authorized agent and made available to the *code official* upon request in accordance with Sections C408.2.4 and C408.2.5.

**Exceptions:** The following systems are exempt:

1. Mechanical systems and service water heater systems in buildings where the total mechanical equipment capacity is less than 480,000 Btu/h (140.7 kW) cooling capacity and 600,000 Btu/h (175.8 kW) combined service water-heating and space-heating capacity. Capacities of individual systems serving dwelling or sleeping units shall not be counted in determining the total mechanical and/or water heating systems' capacity for the whole building.
2. Systems included in Section C403.3 that serve individual *dwelling units* and *sleeping units*.

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**553.9081 Florida Building Code; required amendments.**—The Florida Building Commission shall amend the Florida Building Code-Energy Conservation to:

- (1)(a) Eliminate duplicative commissioning reporting requirements for HVAC and electrical systems; and
- (b) Authorize commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer.
- (2) Prohibit the adoption of American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 9.4.1.1(g).

**History.**—s. 13, ch. 2017-149.

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**History.**—s. 13, ch. 2017-149.

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# TAC: Energy

Total Mods for **Energy** in **Approved as Submitted** : 11

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10446

9

Date Submitted	02/15/2022	Section	408.2.3	Proponent	Douglas Baggett
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language Yes**

#### Related Modifications

10251 10445 10123

### Summary of Modification

This modification proposes to clarify how functional performance testing should be completed and the roles of the contractor(s) and commissioning agent(s).

### Rationale

The proposed modification will ensure commissioning agents are on site and physically observing the functional performance tests.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

There will be little to no impact to the local entity.

#### Impact to building and property owners relative to cost of compliance with code

There will be little to no impact to the owners.

#### Impact to industry relative to the cost of compliance with code

There may be a small increase to some construction project costs if functional testing is not currently being witnessed by a certified third-party commissioning agent, but there's no way to know at this time if that is the case.

#### Impact to small business relative to the cost of compliance with code

### Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will improve the health, safety and welfare of the general public by ensuring the building codes are consistent and by ensuring properly trained and certified individuals commission the mechanical systems properly.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This modification will improve the code to allow for clear and consistent requirements for commissioning systems

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

**Does not degrade the effectiveness of the code**

No it does not degrade the effectiveness of the code, it enhances it.

## Alternate Language

### 2nd Comment Period

EN10446-A1	<b>Proponent</b>	Douglas Baggett	<b>Submitted</b>	8/15/2022 5:14:13 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> The purpose of this is to simply clarify who should actually be performing the tests vs. documenting the performance/results of the tests. The contractors can and should complete the Pre-functional checklists. However, the Functional Performance Tests should be witnessed (the contractor would physically perform the test with the licensed professional in attendance for liability reasons with operating the equipment) and completed by the person affirming the system's functionality. It's a form of quality assurance. Contractors, engineers, etc. that test / grade their own work is not quality assurance. In addition, any individual providing a Commissioning Report should always be present whenever the tests are conducted. This provides transparency and accuracy.					

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

There will be little to no impact.

#### Impact to building and property owners relative to cost of compliance with code

There will be little to no impact to the owners.

#### Impact to industry relative to the cost of compliance with code

There will be little to no impact.

#### Impact to small business relative to the cost of compliance with code

### Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification will improve the health, safety and welfare of the general public by ensuring the building codes are consistent and the systems' functionality have been verified by the appropriate professionals.

#### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification will improve the code to allow for clear and consistent requirements for commissioning systems

#### Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

#### Does not degrade the effectiveness of the code

No it does not degrade the effectiveness of the code, it enhances it.

### 2nd Comment Period

EN10446-G1	<b>Proponent</b>	Mo Madani	<b>Submitted</b>	8/2/2022 9:18:55 AM	<b>Attachments</b>	Yes
	<b>Comment:</b> The proposed change has the potential of being in conflict with s.553.9081, F.S., and s. 553.73(2), F.S. See attached.					

Functional performance testing specified in Sections C408.2.3.1 through C408.2.3.3 shall be ~~conducted~~ witnessed and documented by a licensed design professional, electrical engineer, mechanical engineer or approved agency. The reporting commissioning professional shall be present for any functional performance tests being conducted.

**408.2.3 Functional performance testing.** Functional performance testing specified in Sections C408.2.3.1 through C408.2.3.3 shall be ~~conducted~~ witnessed and documented by the certified third-party commissioning agent. The commissioning agent must be present for any functional performance testing to proceed.

## Florida Statutes

**553.9081 Florida Building Code; required amendments.**—The Florida Building Commission shall amend the Florida Building Code-Energy Conservation to:

- (1)(a) Eliminate duplicative commissioning reporting requirements for HVAC and electrical systems; and
- (b) Authorize commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer.
- (2) Prohibit the adoption of American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 9.4.1.1(g).

**History.**—s. 13, ch. 2017-149.

## 553.73 Florida Building Code.— Florida Statutes

(2) The Florida Building Code shall contain provisions or requirements for public and private buildings, structures, and facilities relative to structural, mechanical, electrical, plumbing, energy, and gas systems, existing buildings, historical buildings, manufactured buildings, elevators, coastal construction, lodging facilities, food sales and food service facilities, health care facilities, including assisted living facilities, adult day care facilities, hospice residential and inpatient facilities and units, and facilities for the control of radiation hazards, public or private educational facilities, swimming pools, and correctional facilities and enforcement of and compliance with such provisions or requirements. Further, the Florida Building Code must provide for uniform implementation of ss. 515.25, 515.27, and 515.29 by including standards and criteria for residential swimming pool barriers, pool covers, latching devices, door and window exit alarms, and other equipment required therein, which are consistent with the intent of s. 515.23. Technical provisions to be contained within the Florida Building Code are restricted to requirements related to the types of materials used and construction methods and standards employed in order to meet criteria specified in the Florida Building Code. Provisions relating to the personnel, supervision or training of personnel, or any other professional qualification requirements relating to contractors or their workforce may not be included within the Florida Building Code, and subsections (4), (6), (7), (8), and (9) are not to be construed to allow the inclusion of such provisions within the Florida Building Code by amendment. This restriction applies to both initial development and amendment of the Florida Building Code.

## Florida Statutes

**553.9081 Florida Building Code; required amendments.**—The Florida Building Commission shall amend the Florida Building Code-Energy Conservation to:

(1)(a) Eliminate duplicative commissioning reporting requirements for HVAC and electrical systems; and

(b) Authorize commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer.

(2) Prohibit the adoption of American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 9.4.1.1(g).

**History.**—s. 13, ch. 2017-149.

## 553.73 Florida Building Code.— Florida Statutes

(2) The Florida Building Code shall contain provisions or requirements for public and private buildings, structures, and facilities relative to structural, mechanical, electrical, plumbing, energy, and gas systems, existing buildings, historical buildings, manufactured buildings, elevators, coastal construction, lodging facilities, food sales and food service facilities, health care facilities, including assisted living facilities, adult day care facilities, hospice residential and inpatient facilities and units, and facilities for the control of radiation hazards, public or private educational facilities, swimming pools, and correctional facilities and enforcement of and compliance with such provisions or requirements. Further, the Florida Building Code must provide for uniform implementation of ss. 515.25, 515.27, and 515.29 by including standards and criteria for residential swimming pool barriers, pool covers, latching devices, door and window exit alarms, and other equipment required therein, which are consistent with the intent of s. 515.23. Technical provisions to be contained within the Florida Building Code are restricted to requirements related to the types of materials used and construction methods and standards employed in order to meet criteria specified in the Florida Building Code. Provisions relating to the personnel, supervision or training of personnel, or any other professional qualification requirements relating to contractors or their workforce may not be included within the Florida Building Code, and subsections (4), (6), (7), (8), and (9) are not to be construed to allow the inclusion of such provisions within the Florida Building Code by amendment. This restriction applies to both initial development and amendment of the Florida Building Code.

# TAC: Energy

Total Mods for **Energy** in **Approved as Submitted** : 11

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10448

10

Date Submitted	02/15/2022	Section	408.2.4	Proponent	Douglas Baggett
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language No**

**Related Modifications**

10251 10245 10123 10446

### Summary of Modification

This proposed modification will serve to keep requirements and verbiage consistent regarding commissioning activities and requirements.

### Rationale

It is necessary to keep verbiage and requirements consistent throughout the energy codes in order to prevent confusion and misunderstanding.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

There will be little to no impact to the local entity.

#### Impact to building and property owners relative to cost of compliance with code

There will be little to no impact to the owners.

#### Impact to industry relative to the cost of compliance with code

There will be little to no impact to the industry

#### Impact to small business relative to the cost of compliance with code

### Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification will improve the health, safety and welfare of the general public by ensuring the building codes are consistent with no room for misinterpretation or misunderstanding.

#### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction



This modification will improve the code by allowing for clear and consistent verbiage and requirements for commissioning systems.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

**Does not degrade the effectiveness of the code**

No it does not degrade the effectiveness of the code, it enhances it.

## 2nd Comment Period

N10448-G1

Proponent Mo Madani Submitted 8/2/2022 10:11:18 AM Attachments Yes

Comment:

The proposed code change is in conflict with Section 553.9081(1)(b), Florida Statutes which authorize that commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer without additional professional qualification requirements.

A preliminary report of commissioning test procedures and results shall be completed ~~and certified by the certified~~ third-party commissioning agent ~~licensed design professional, electrical engineer, mechanical engineer or approved agency~~ and provided to the building owner or owner's authorized agent. The report shall be organized with mechanical and service hot water findings in separate sections to allow independent review. The report shall be identified as "Preliminary Commissioning Report" and shall identify:

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

# TAC: Energy

Total Mods for **Energy** in **Approved as Submitted** : 11

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10459

11

Date Submitted	02/15/2022	Section	408.3.1	Proponent	Douglas Baggett
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language No**

### Related Modifications

10251 10245 10446

### Summary of Modification

This proposed modification is to provide a consistent requirement for all functional testing to be conducted by a certified third-party commissioning agent.

### Rationale

This modification would provide a consistent requirement for all functional testing to be conducted by an independent and objective third-party. It would also go towards limiting conflicts of interest, biased testing and unqualified individuals from performing inspections and tests. It would also serve to encourage fair business practice.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

If commissioning is already being conducted by certified commissioning agents/firms - there will be no impact to the local entity.

#### Impact to building and property owners relative to cost of compliance with code

If commissioning is already being conducted by certified commissioning agents/firms - there will be no impact to the owners.

#### Impact to industry relative to the cost of compliance with code

If commissioning is already being conducted by certified commissioning agents/firms - there will be no impact to the industry.

#### Impact to small business relative to the cost of compliance with code

### Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, in that, the public can be assured the testing agency has no vested interest in the design, construction or project as a whole, and therefore, is objective, consistent and fair.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This modification will improve the code by allowing for clear and consistent verbiage and requirements for commissioning systems.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

**Does not degrade the effectiveness of the code**

No it does not degrade the effectiveness of the code, it enhances it.

## 2nd Comment Period

N10459-G2

Proponent Mo Madani Submitted 8/2/2022 10:01:03 AM Attachments Yes

Comment:

The proposed code change is in conflict with Section 553.9081(1)(b), Florida Statutes which authorize that commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer without additional professional qualification requirements.

**C408.3.1 Functional testing.**

Prior to passing final inspection, the ~~registered design professional or approved agency~~ certified third-party commissioning agent shall provide evidence that the lighting control systems have been tested to ensure that control hardware and software are calibrated, adjusted, programmed and in proper working condition in accordance with the construction documents and manufacturer's instructions. Functional testing shall be in accordance with Sections C408.3.1.1 through C408.3.1.3 for the applicable control type.

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- (b) Authorize commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer.
- (2) Prohibit the adoption of American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 9.4.1.1(g).

**History.**—s. 13, ch. 2017-149.

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**History.**—s. 13, ch. 2017-149.

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# TAC: Energy

Total Mods for **Energy** in **Approved as Submitted** : 11

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10463

12

Date Submitted	02/15/2022	Section	502.1	Proponent	Douglas Baggett
Chapter	5	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language No**

### Related Modifications

10251 10245

### Summary of Modification

This proposed modification will serve to keep commissioning requirements and verbiage consistent, as well as, to treat new construction as new construction - even if it is an addition.

### Rationale

This proposed modification would serve to ensure the building's systems fulfill the functional and performance requirements set forth by the owner while also ensuring it functions in tandem and as efficiently as possible with the existing system. It will also ensure consistent verbiage and requirements.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

This modification will require the local entity to add specific verbiage and requirements for projects requiring an addition that involves new mechanical equipment and/or air distribution systems. In addition, the local entity may need to create a separate solicitation for a project.

#### Impact to building and property owners relative to cost of compliance with code

Commissioning for new construction should range between .5%-2% of construction costs depending on the complexity and size. If commissioning has not already been budgeted as part of an addition the owners will experience an impact of that amount to the project. This is based on the GSA Cost Schedule.

#### Impact to industry relative to the cost of compliance with code

No impact to the industry other than ensuring the project budget incorporates the anticipated cost of commissioning the new system(s).

#### Impact to small business relative to the cost of compliance with code

### Requirements



**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

This modification will improve the health, safety and welfare of the general public by ensuring any new addition to a building's mechanical systems meet indoor air quality standards and is certified by a person specifically trained for such equipment.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This modification will improve the code by allowing for clear and consistent verbiage and requirements for commissioning systems.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

**Does not degrade the effectiveness of the code**

No it does not degrade the effectiveness of the code, it enhances it.

## 2nd Comment Period

N10463-G1

Proponent Mo Madani Submitted 8/2/2022 9:40:50 AM Attachments Yes

**Comment:**

The proposed code change is in conflict with Section 553.9081(1)(b), Florida Statutes which authorize that commissioning reports to be provided by a licensed design professional, electrical engineer, or mechanical engineer without additional professional qualification requirements.

Additions to an existing building, building system or portion thereof shall conform to the provisions of this code as those provisions relate to new construction without requiring the unaltered portion of the existing building or building system to comply with this code. Additions shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building. Additions shall comply with 502.2. Additions requiring new mechanical equipment shall comply with sections 408.2, 408.2.1, 408.2.3 (proposed modifications for those sections). Additions complying with ANSI/ASHRAE/IESNA 90.1 need not comply with sections C402, C403, C404 and C405.

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- (2) Prohibit the adoption of American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 9.4.1.1(g).

**History.**—s. 13, ch. 2017-149.

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**History.**—s. 13, ch. 2017-149.

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# TAC: Energy

Total Mods for **Energy** in **Denied** : 9

Total Mods for report: 21

## Sub Code: Energy Conservation

EN9974

13

Date Submitted	02/02/2022	Section	405.9	Proponent	John Hall
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Denied				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language Yes**

### Related Modifications

None

### Summary of Modification

This modification creates new section C405.9 to require electric vehicle charging equipment (EVSE) in all new commercial construction. The number of EV Ready and EV Capable parking spaces required would be determined by the attached chart that is part of the modification.

### Rationale

Florida is ranked number two in the United States for the number of registered electric vehicle as of the latest ranking in June 2021. EVs provide significant economic benefits for consumers through fuel and maintenance cost savings, and have been identified as a key climate strategy to reduce GHG emissions from the U.S. transportation sector. The interest in EVs has grown alongside greater EV model availability and increased vehicle range. Every major auto manufacturer in the world has announced a plan to electrify a significant portion of their vehicle fleets over the next 3-5 years. Ford recently announced an \$11 billion investment to reach their goal of 40 EV models by 2022. The goal for GM: 20 EV models by 2023; for VW: 27 EV models by 2022; for Toyota: 10 BEVs by the early 2020's; and similar goals for Volvo, Daimler, Nissan, BMW, and Fiat-Chrysler. However, the lack of access to EV charging stations continues to be a critical barrier to EV adoption. In particular, there are significant logistical barriers for commercial building tenants to upgrade existing electrical infrastructure and install new EV charging stations. A lack of pre-existing EV charging infrastructure, such as electrical panel capacity, raceways, and pre-wiring, can make the installation of a new charging station cost-prohibitive for a potential EV-owner. The installation of an EV charging station is made three to four times less expensive when the infrastructure is installed during the initial construction phase as opposed to retrofitting existing buildings to accommodate the new electrical equipment.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

This modification will increase the number of inspections to be performed. The cost of enforcement will be offset by permit fees.

**Impact to building and property owners relative to cost of compliance with code**

The proposed modification increases the cost of construction. Costs for new EV Capable parking spaces range from \$300 to \$850 per space. Costs for new EV Ready spaces range from \$800 to \$1300. The cost for EVSE retrofit in can be three or more times the cost of installations in new construction.

**Impact to industry relative to the cost of compliance with code**

Industry will likely benefit from this modification. Industry is adjusting by adopting a business model that involves installation, maintenance, and operation by an off site entity that then shares a portion of the revenue with the property or business owner.

**Impact to small business relative to the cost of compliance with code**

## Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

This modification provides an additional resource to reduce greenhouse gas emissions from petroleum fueled vehicles, thus contributing to the reduction in the effects of climate change, which has been identified as a hazard too the health and welfare of the general public.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This modification strengthens the code by providing guidance on the installation electric vehicle service equipment.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This modification does not discriminate against any materials, products, methods, or systems of construction of demonstrated capabilities.

**Does not degrade the effectiveness of the code**

This modification does not degrade the effectiveness of the code. To the contrary, this modification provides guidance on the installation of electric vehicle service equipment.

## Alternate Language

### 2nd Comment Period

EN9974-A4	<b>Proponent</b>	John Hall	<b>Submitted</b>	8/22/2022 3:37:13 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> This alternate language proposal seeks to create Appendix CC for EVSE provision in new commercial construction. construction					

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

There will be no impact unless adopted by the local jurisdiction.

#### Impact to building and property owners relative to cost of compliance with code

There will be no impact unless adopted by the local jurisdiction.

#### Impact to industry relative to the cost of compliance with code

There will be no impact unless adopted by the local jurisdiction.

#### Impact to small business relative to the cost of compliance with code

### Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The proposed appendix will reduce carbon emissions and traffic noise.

#### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The proposed appendix improves the code code by providing an additional means for interested jurisdictions to address climate change and other factors affected by carbon emissions.

#### Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposed appendix does not discriminate against any materials, products, methods, or systems of construction.

#### Does not degrade the effectiveness of the code

The proposed appendix does not degrade the effectiveness of the code. On the other hand it enhances the code by providing another avenue for jurisdictions to address issues that they face that may not be encountered state wide.

### 1st Comment Period History

EN9974-A1	<b>Proponent</b>	Bryan Holland	<b>Submitted</b>	3/28/2022 5:20:22 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> This alternative proposed modification makes a few minor revisions to the original proposed modification. This includes editorial revisions to the definitions and the rules to provide technical clarity. Otherwise, NEMA fully supports the concept of EV-ready provisions in the FBC-EC as proposed and substantiated in the original proposed modification. NEMA urges the TAC(s) and Commission approve this proposed modification.					

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

This alternative proposed modification provides clear and enforceable language for the AHJ.

#### Impact to building and property owners relative to cost of compliance with code

This alternative proposed modification will increase the cost of compliance for buildings/property owners at time of initial construction while reducing the cost of compliance for an existing building that does not have the capacity or infrastructure in-place for the installation of EVSE.

#### Impact to industry relative to the cost of compliance with code

This alternative proposed modification will increase the cost of compliance for industry.

#### Impact to small business relative to the cost of compliance with code

## Requirements

### **Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

This alternative proposed modification improves the general welfare of the public as the electrification of transportation becomes a fundamental of modern society.

### **Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This alternative proposed modification improves the code.

### **Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This alternative proposed modification does not discriminate against materials, products, methods, or systems of construction.

### **Does not degrade the effectiveness of the code**

This alternative proposed modification improves the code.

## 1st Comment Period History

EN9974-G1	Proponent	John Hall	Submitted	3/31/2022 10:35:28 AM	Attachments	No
	Comment: I support the alternate language comment submitted by Bryan Holland and endorse it's submission to the TAC(s) for consideration of inclusion in the 2023 FBC.					

## 1st Comment Period History

EN9974-G2	Proponent	Susannah Troner	Submitted	4/12/2022 11:24:34 PM	Attachments	No
	Comment: Writing to express strong SUPPORT for proposed code modification EN 9974. The transportation sector, dominated by traditional internal combustion engine vehicles, currently generates 55% of our community's carbon pollution. EVs greatly reduce this pollution. Therefore this code modification will help minimize future impacts such as sea level rise and intensification of storms that are associated with carbon pollution (GHGs). These pollution reductions resulting from the code change will lead to community health and safety benefits which are core objectives of the Florida Building Code. Our office is fielding more inquiries every day from stakeholders regarding the lack of EVSE and standardization and perceived costs. It is time to standardize the process and require EV Ready Spaces and EV Capable Spaces for new commercial construction. This will help prevent future EVSE scarcity and extreme costs associated with facility retrofits.					

## 1st Comment Period History

EN9974-G3	Proponent	kamrath christian	Submitted	4/13/2022 12:35:56 PM	Attachments	No
	Comment: I am writing to express strong SUPPORT for proposed code modification EN 9974. The transportation sector, dominated by traditional internal combustion engine vehicles, generates 55% of our community's carbon pollution. EVs greatly reduce this pollution and help create healthier environments. And we need to be doing everything we can to reduce carbon pollution faster to stem the acceleration of rising water levels and climate disruption. Therefore this code modification will help minimize future impacts such as sea level rise and intensification of storms that are associated with carbon pollution (GHGs). Pollution reductions resulting from the code change will lead to community health and safety benefits which are core objectives of the Florida Building Code. Our County's office is fielding more inquiries every day from stakeholders regarding the lack of EVSE and standardization, and perceived costs. It is time to standardize the process and require EV Ready Spaces and EV Capable Spaces for new commercial construction. This will help prevent future EVSE scarcity and extreme costs associated with facility retrofits.					



## 1st Comment Period History

EN9974-G4	Proponent	Matthew Chen	Submitted	4/13/2022 4:44:23 PM	Attachments	No
	Comment:	SemaConnect, a leading provider of EV charging solutions with many EVSE projects in Florida, supports proposed code modification EN 9974, which establishes modest but necessary EVSE commercial requirements for new construction. We also support the proposed alternative modification submitted by Bryan Holland. We respectfully recommend inclusion of the proposed alternative modification in the 2023 Florida Building Code.				

## 1st Comment Period History

EN9974-G5	Proponent	Nicholas Gunia	Submitted	4/14/2022 10:09:32 AM	Attachments	No
	Comment:	As past Chair of the Miami Branch of the South Florida Chapter of the US Green Building Council, I am writing to voice my support for EN10370 for requiring new commercial to have EVSE. I believe the proposed changes will help future-proof our commercial buildings given the rise of EVs. As such, the proposed changes should be adopted.				

## 1st Comment Period History

EN9974-G6	Proponent	Amanda Hickman	Submitted	4/14/2022 11:16:08 AM	Attachments	No
	Comment:	LBA does not support the modification, as it is not appropriate for Florida and/or is not cost justified.				

## 1st Comment Period History

EN9974-G7	Proponent	Jared Walker	Submitted	4/14/2022 2:25:00 PM	Attachments	No
	Comment:	EN 9974 - Electric vehicle charging infrastructure (EVSE) commercial requirements The Electrification Coalition (EC) is a national, nonpartisan, not-for-profit organization committed to promoting policies and actions that facilitate the deployment of electric vehicles on a mass scale to combat the national security, economic, and public health impacts associated with our nation's dependence on oil. The EC SUPPORTS proposed code modification EN 9974, establishing modest but necessary EVSE commercial requirements for new construction. Mass adoption of EVs is key to addressing the U.S.'s reliance on oil, which currently powers 91% of our nation's transportation system. Not only will ongoing transportation electrification policies such as Miami Dade's code modification (EN 9974) accelerate EV adoption, but fostering investments in the future of electric transportation will be a boon to Miami-Dade's economy and job growth.				

## 1st Comment Period History

EN9974-G8	Proponent	Estela Tost	Submitted	4/14/2022 6:56:52 PM	Attachments	Yes
	Comment:	I am in support of EN9974 Electrical Vehicle Charging Station infrastructure for new commercial construction				

## 1st Comment Period History

N9974-G9	Proponent	Richard Logan	Submitted	4/15/2022 9:57:28 AM	Attachments	No
	Comment:					
	AIA Florida supports this code modification with the alternate language					

## 1st Comment Period History

EN9974-G10	Proponent	James Ellis	Submitted	4/15/2022 2:34:08 PM	Attachments	No
	Comment:					
	EV Connect, a leading electric vehicle infrastructure network and services provider with many EVSE projects in Florida, SUPPORTS proposed code modification EN 9974, which establishes modest but necessary commercial EVSE requirements for new construction. EV Connect encourages this body to consider diversity of electric supply for more than 10 parking spaces in accordance with 2017 NFPA 70. Please Note: An omission of the number "20" in Table C405.9.2.1 under Total Number of Parking Spaces requires revision for clarity.					

## 1st Comment Period History

EN9974-G11	Proponent	Sandra St. Hilaire	Submitted	4/15/2022 2:44:53 PM	Attachments	No
	Comment:					
	Writing to express strong SUPPORT for proposed code modification EN 9974. The transportation sector, dominated by traditional internal combustion engine vehicles, generates 55% of our community's carbon pollution. EVs greatly reduce this pollution. Therefore this code modification will help minimize future impacts such as sea level rise and intensification of storms that are associated with carbon pollution (GHGs). Pollution reductions resulting from the code change will lead to community health and safety benefits which are core objectives of the Florida Building Code. Our office is fielding more inquiries every day from stakeholders regarding the lack of EVSE and standardization, and perceived costs. It is time to standardize the process and require EV Ready Spaces and EV Capable Spaces for new commercial construction. This will help prevent future EVSE scarcity and extreme costs associated with facility retrofits.					

## 1st Comment Period History

EN9974-G12	Proponent	Mike Gibaldi	Submitted	4/15/2022 4:50:58 PM	Attachments	No
	Comment:					
	No brainer here. Our firm with hundreds of EVSE charging ports installed throughout the State, fully SUPPORTS this proposed code modification which establishes modest but necessary EVSE commercial requirements for new construction. This will encourage more emission-free driving in Florida which will in turn greatly reduce CO2 pollution.					

## 1st Comment Period History

EN9974-G13	Proponent	Chris Sanchez	Submitted	4/15/2022 5:12:18 PM	Attachments	No
	Comment:					
	I am strongly in favor of the proposed modifications to EN 9974. The transportation sector currently generates 55% of our community's carbon pollution. EVs greatly reduce this pollution by shifting from tail-pipe to electricity grid. Therefore this code modification will help minimize future impacts such as sea level rise and intensification of storms that are associated with carbon pollution (GHGs). Pollution reductions resulting from the code change will lead to community health and safety benefits which are core objectives of the Florida Building Code. Our office is fielding more inquiries every day from stakeholders regarding the lack of EVSE and standardization, and					

perceived costs. It is time to standardize the process and require EV Ready Spaces and EV Capable Spaces for new commercial construction. This will help prevent future EVSE scarcity and extreme costs associated with facility retrofits.

## 1st Comment Period History

EN9974-G14	Proponent	Marta Marello	Submitted	4/17/2022 4:02:30 PM	Attachments	No
	Comment: I express strong SUPPORT for proposed code modification EN 9974. It is time to standardize the process and require EV Ready Spaces and EV Capable Spaces for new commercial construction. As more EV models are coming onto the market and the share of EVs increases, it is important to integrate EVSE in buildings in a cost-effective way and avoid very costly retrofits. The transportation sector is the number one cause of our region's carbon pollution. EVs greatly reduce this pollution. Pollution reductions resulting from the code change will lead to community health and safety benefits which are core objectives of the Florida Building Code. Miami-Dade County's Office of Resilience has responded to an increasing number of inquiries from stakeholders regarding the lack of EVSE, EVSE standardization, and perceived costs.					

## **APPENDIX CC**

### **ELECTRIC VEHICLE CHARGING PROVISIONS FOR NEW COMMERCIAL CONSTRUCTION**

*(The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.)*

#### **SECTION CC 101**

##### **SCOPE**

##### **CC 101.1 General.**

These provisions shall be applicable for new commercial construction where electric vehicle charging provisions are required.

#### **SECTION CC 102**

##### **DEFINITIONS**

**ELECTRIC VEHICLE (EV).** An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are electric vehicles having a second source of motive power. Off-road, self-propelled electric mobile equipment, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats, and the like are not considered electric vehicles.

**ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE).** The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the *Electric Vehicle* connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the *Electric Vehicle*.

**EV CAPABLE SPACE.** Electrical distribution equipment capacity and space to support a minimum 40-ampere, 208/240-volt branch circuit for each EV parking space, and the installation of necessary wiring methods and materials to supply *EVSE*.

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**EV READY SPACE.** A designated parking space which is provided with one 40-ampere, 208-volt or 240-volt branch circuit for *EVSE* supplying *Electric Vehicles*. The circuit shall terminate in a suitable termination point such as a receptacle, outlet box, enclosure, or an *EVSE*, and be located in close proximity to the proposed location of the EV parking spaces.

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**SECTION CC 103**  
**REQUIREMENTS FOR ELECTRIC VEHICLE CHARGING**

-

**CC 103.1 Electric Vehicle (EV) power transfer for new construction.** New construction shall facilitate future installation and use of *EVSE* in accordance with NFPA 70.

-

**CC 103.2 New Commercial Buildings.** *EV Ready Spaces* and *EV Capable Spaces* shall be provided in accordance with Table CE 103.2. Where the calculation of percent served results in a fractional parking space, it shall be rounded up to the next whole number. The electrical distribution equipment circuit directory shall identify the spaces reserved to support EV power transfer as “EV Capable” or “EV Ready”. The box or enclosure provided for future *EVSE* shall be marked “FOR *EVSE* Use”. The marking shall comply with NFPA 70, Section 110.21(B).

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**TABLE CC 103.2**  
**EV READY SPACE AND EV CAPABLE SPACE REQUIREMENTS**

Total Number of Parking Spaces	Minimum Number of <i>EV Ready</i> <i>Spaces</i>	Minimum Number of <i>EV Capable</i> <i>Spaces</i>
1 _____	1 _____	0 _____

<u>2-10</u>	<u>2</u>	<u>0</u>
<u>11-15</u>	<u>2</u>	<u>3</u>
<u>16-20</u>	<u>2</u>	<u>4</u>
<u>21-25</u>	<u>2</u>	<u>5</u>
<u>26+</u>	<u>2</u>	<u>20% of total</u>
<u>Parking spaces</u>		

**CC 103.3 Identification.** Construction documents shall indicate the raceway or cable assembly termination point and the proposed location of future EV spaces and *EVSE*. Construction documents shall also provide information on the wiring methods, wiring schematics, and electrical load calculations to verify that the service capacity and premises wiring system have sufficient capacity to simultaneously charge all EVs at all required EV spaces at the full rating of the *EVSE*.

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### **C405.9. Electric Vehicle Service Equipment**

**ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE).** Equipment for plug-in power transfer including the ungrounded, grounded, and equipment grounding conductors, and the Electric Vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the Electric Vehicle.

**EV CAPABLE SPACE.** Electrical distribution equipment capacity and space to support a minimum 40-ampere, 208-volt or 240-volt branch circuit for each EV parking space, and the installation of necessary wiring methods and materials to supply *EVSE*.

**EV READY SPACE.** A designated parking space which is provided with one 40-ampere, 208-volt or 240-volt individual branch circuit for *EVSE* supplying *Electric Vehicles*. The circuit shall terminate in a suitable termination point such as a receptacle, outlet box, enclosure, or an *EVSE*, and be located in close proximity to the proposed location of the EV parking spaces.

**C405.9.2. Electric Vehicle (EV) power transfer for new construction.** New construction shall facilitate future installation and use of *EVSE* in accordance with the NFPA 70.

**C405.9.2.1. New commercial buildings.** *EV Ready Spaces* and *EV Capable Spaces* shall be provided in accordance with Table C405.9.1. Where the calculation of percent served results in a fractional parking space, it shall be rounded up to the next whole number. The electrical distribution equipment circuit directory shall identify the spaces reserved to support EV power transfer as “EV Capable” or “EV Ready”. The box or enclosure provided for future *EVSE* shall be marked “FOR EVS USE.” The marking shall comply with NFPA 70, Section 110.25

**TABLE C405.9.2.1.**

#### **EV READY SPACE AND EV CAPABLE SPACE REQUIREMENTS**

<b>Total Number of Parking Spaces</b>	<b>Minimum number of <i>EV Ready Spaces</i></b>	<b>Minimum number of <i>EV Capable Spaces</i></b>
<u>1</u>	<u>1</u>	<u>1</u>
<u>2 – 10</u>	<u>2</u>	<u>1</u>
<u>11 – 15</u>	<u>2</u>	<u>3</u>
<u>16 – 19</u>	<u>2</u>	<u>4</u>
<u>21 – 25</u>	<u>2</u>	<u>5</u>
<u>26+</u>	<u>2</u>	<u>20% of total parking spaces</u>

**C405.9.2.2. Identification.** Construction documents shall indicate the raceway or cable assembly termination point and proposed location of future EV spaces and *EVSE*. Construction documents shall also provide information on the wiring methods, wiring schematics, and electrical load calculations to verify that the service capacity and premises wiring system have sufficient capacity to simultaneously charge all EVs at all required EV spaces at the full rating of the *EVSE*.

## SECTION C405

### ELECTRICAL POWER AND LIGHTING SYSTEMS

#### **C405.1 General (Mandatory).**

This section covers lighting system controls, the maximum lighting power for interior and exterior applications and electrical energy consumption.

Dwelling units within multifamily buildings shall comply with Section R404.1. All other dwelling units shall comply with Section R404.1, or with Sections C405.2.4 and C405.3. Sleeping units shall comply with Section C405.2.4, and with Section R404.1 or C405.3. Lighting installed in walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with the lighting requirements of Section C403.2.14.

#### **C405.9. Electric Vehicle Service Equipment**

-  
-

**ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE).** The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the Electric Vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the Electric Vehicle.

**EV CAPABLE SPACE.** Electrical panel capacity and space to support a minimum 40-ampere, 208/240-volt branch circuit for each EV parking space, and the installation of raceways, both underground and surface mounted, to support the *EVSE*.

**EV READY SPACE.** A designated parking space which is provided with one 40-ampere, 208/240-volt dedicated branch circuit for EVSE servicing *Electric Vehicles*. The circuit shall terminate in a suitable termination point such as a receptacle, junction box, or an *EVSE*, and be located in close proximity to the proposed location of the EV parking spaces.

#### **C405.9.2. Electric Vehicle (EV) charging for new construction. New construction**



shall facilitate future installation and use of Electric Vehicle Supply Equipment (EVSE) in accordance with the NFPA 70.

**C405.9.2.1. New commercial buildings. EV Ready Spaces and EV Capable Spaces** shall be provided in accordance with Table C405.9.1. Where the calculation of percent served results in a fractional parking space, it shall be rounded up to the next whole number. The service panel or sub panel circuit directory shall identify the spaces reserved to support EV charging as “EV Capable” or “EV Ready”. The raceway location shall be permanently and visibly marked as “EV Capable”.

**TABLE C405.9.2.1.**

**EV READY SPACE AND EV CAPABLE SPACE REQUIREMENTS**

Total Number of Parking Spaces	Minimum number of <i>EV Ready Spaces</i>	Minimum number of <i>EV Capable Spaces</i>
<u>1</u>	<u>1</u>	<u>-</u>
<u>2 – 10</u>	<u>2</u>	<u>-</u>
<u>11 – 15</u>	<u>2</u>	<u>3</u>
<u>16 – 19</u>	<u>2</u>	<u>4</u>
<u>21 - 25</u>	<u>2</u>	<u>5</u>
<u>26+</u>	<u>2</u>	<u>20% of total parking spaces</u>

**C405.9.2.2. Identification.** Construction documents shall indicate the raceway termination point and proposed location of future EV spaces and EV chargers. Construction documents shall also provide information on amperage of future EVSE, raceway methods, wiring schematics and electrical load calculations to verify that the electrical panel service capacity and electrical system, including any on-site distribution transformers, have sufficient capacity to simultaneously charge all EVs at all required EV spaces at the full rated amperage of the EVSE.

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Proposed Code Modifications  
USER: Estela Test

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Required fields

Modification #

EN9974-G8

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Estela Test

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Code Change Cycle

2023 Triennial First Comment Period 03/03/2022 - 04/17/2022

Code Version

2023

Sub Code

Energy Conservation

Chapter & Topic

Chapter 4 - [CE] - Commercial Energy Efficiency

Section

105.0

-

Status

Pending DBPR Review

General Comment\*

I am in support of EN9974 Electrical Vehicle Charging Station infrastructure for new commercial construction

Upload Comment File


Date Submitted

04/14/2022

Page: 1


Mod\_9974\_G8\_General\_EN9974.pdf

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**Proposed Code Modifications**  
USER: Estela Test

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**\*\* Required fields**

Modification #	EN9974-G8
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Code Version	2023
Sub Code	Energy Conservation
Chapter & Topic	Chapter 4 - [CE] - Commercial Energy Efficiency
Section	105.0
	-

Status

Pending DBPR Review

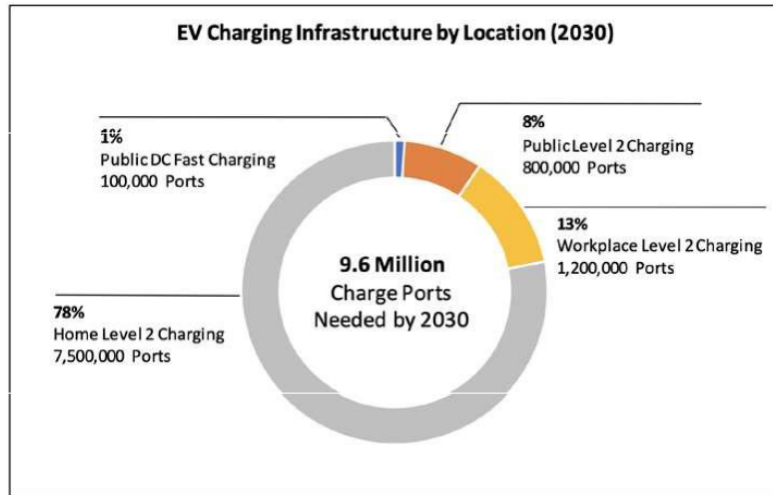
General Comment\*\*

I am in support of EN9974 Electrical Vehicle Charging Station infrastructure for new commercial construction

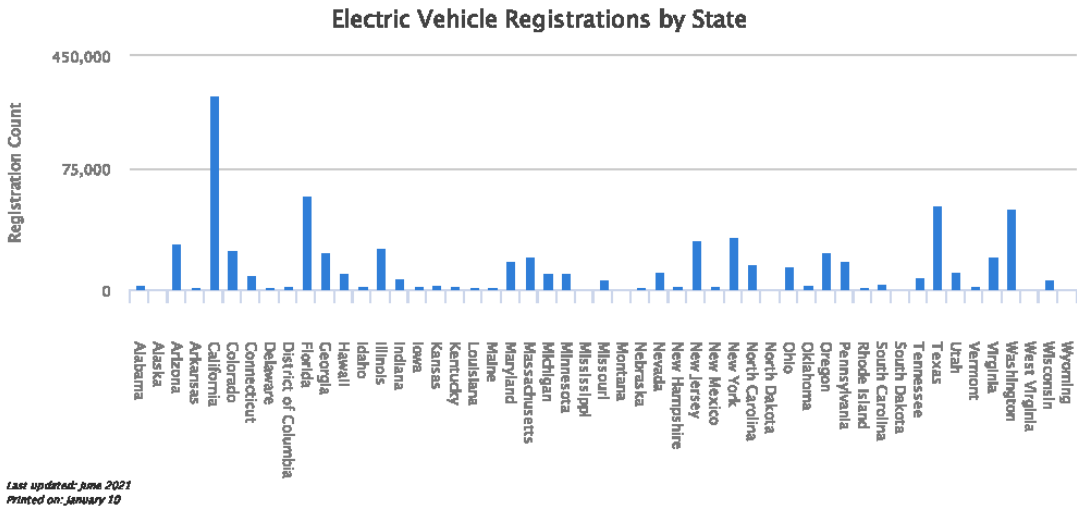
Upload Comment File

Date Submitted

04/14/2022



**Figure 1. EV Charging Infrastructure in 2030 Based on EEI/IEI Forecast.**



# TAC: Energy

Total Mods for **Energy** in **Denied** : 9

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10410

14

Date Submitted	02/14/2022	Section	402.4	Proponent	Eric Lacey
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Denied				
Commission Action	Pending Review				

### Comments

**General Comments** Yes

**Alternate Language** No

### Related Modifications

See attached proposal.

### Summary of Modification

This proposal adopts the SHGC requirements for commercial fenestration in both the 2021 IECC and ASHRAE 90.1-2019, but applies climate zone 2 values statewide for simplicity. It also eliminates orientation-specific SHGC requirements in favor of "fixed" and "operable" values.

### Rationale

See attached supporting materials

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

This proposal will simplify enforcement by replacing orientation-specific SHGCs with single "fixed" and "operable" values, consistent with fixed and operable values contained in ASHRAE Standard 90.1-2019.

#### Impact to building and property owners relative to cost of compliance with code

These SHGCs were determined to be life cycle cost-effective through an analysis of a broad range of fenestration assembly types and using ASHRAE's scalar method. Payback periods ranged between 0-16 years, depending on occupancy type and product selection.

#### Impact to industry relative to the cost of compliance with code

These SHGCs were determined to be optimally cost-effective through ASHRAE's process. Further, we are proposing a single set of SHGCs, rather than separate requirements for the two climate zones in Florida. This should reduce the cost of compliance for fenestration manufacturers.

#### Impact to small business relative to the cost of compliance with code

### Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

This proposal will improve the comfort of building occupants and will help reduce energy use and related emissions.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This proposal strengthens the code by maintaining consistency with the latest commercial model codes.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

The SHGCs required in the 2021 IECC and ASHRAE 90.1-2019 are material-neutral and non product-specific.

**Does not degrade the effectiveness of the code**

This proposal will improve both the effectiveness and the simplicity of the code by applying a consistent set of SHGCs statewide and across all compliance paths.

## 2nd Comment Period

EN10410-G1

Proponent	Laura Baker	Submitted	8/26/2022 4:27:41 PM	Attachments	No
Comment:					

This code proposal should be adopted; it makes a common-sense improvement to SHGC requirements for vertical fenestration by adopting the SHGC requirements for climate zone 2 of ASHRAE 90.1-2019 and the 2021 IECC. Because Florida normally ASHRAE Standard 90.1 as a compliance option for commercial buildings, leaving the values unchanged would create an inconsistency in Florida's building code that this code proposal is designed to correct.

TABLE C402.4  
BUILDING ENVELOPE FENESTRATION MAXIMUM U-FACTOR AND SHGC REQUIREMENTS

CLIMATE ZONE	1		2	
VERTICAL FENESTRATION				
SHGC				
Orientation <sup>a</sup>	SEW Fixed	N Operable	SEW Fixed	N Operable
PF < 0.2	0.25	<del>0.33</del> <u>0.23</u>	0.25	<del>0.33</del> <u>0.23</u>
0.2 = PF < 0.5	0.30	<del>0.37</del> <u>0.28</u>	0.30	<del>0.37</del> <u>0.28</u>
PF = 0.5	0.40	<del>0.40</del> <u>0.37</u>	0.40	<del>0.40</del> <u>0.37</u>

NR = No Requirement, PF = Projection Factor

a. ~~“N” indicates vertical fenestration oriented within 45 degrees of true north. “SEW” indicates orientations other than “N.” For buildings in the southern hemisphere, reverse south and north. Buildings located at less than 23.5 degrees latitude shall use SEW for all orientations.~~



Revise Table C402.4 as follows:

TABLE C402.4  
BUILDING ENVELOPE FENESTRATION MAXIMUM U-FACTOR AND SHGC REQUIREMENTS

CLIMATE ZONE	1		2	
VERTICAL FENESTRATION				
SHGC				
	Fixed	Operable	Fixed	Operable
PF < 0.2	0.25	<del>0.33</del> 0.23	0.25	<del>0.33</del> 0.23
0.2 ≤ PF < 0.5	0.30	<del>0.37</del> 0.28	0.30	<del>0.37</del> 0.28
PF ≥ 0.5	0.40	<del>0.40</del> 0.37	0.40	<del>0.40</del> 0.37

NR = No Requirement, PF = Projection Factor

- a. ~~“N” indicates vertical fenestration oriented within 45 degrees of true north. “SEW” indicates orientations other than “N.” For buildings in the southern hemisphere, reverse south and north. Buildings located at less than 23.5 degrees latitude shall use SEW for all orientations.~~

#### Reason Statement

This proposal will bring consistency and a cost-effective improvement in energy efficiency by adopting the SHGC requirements for climate zone 2 of the 2021 IECC and ASHRAE 90.1-2019.

- Consistent with both ASHRAE Standard 90.1-2019 and the 2021 IECC, the orientation-specific SHGC requirements are replaced by single “fixed” and “operable” values, simplifying compliance. For the first time in several code cycles, the IECC and ASHRAE Standard 90.1 apply the same commercial fenestration U-factor and SHGC requirements. ASHRAE conducted extensive cost-effectiveness analyses to determine optimal SHGC requirements for the 2019 edition of the Standard, and the 2021 IECC effectively mirrors these same requirements. Because Florida typically adopts ASHRAE Standard 90.1 as a compliance alternative, it is important that the values remain relatively consistent.
- Credit for projection factors is maintained at a level consistent with both ASHRAE 90.1-2019 and the 2021 IECC. Although permanent projections are not required, code users receive additional efficiency credit where projections effectively reduce direct solar exposure. These numbers have been adjusted to be consistent with the latest model codes.
- The only difference between this proposal and the full model code requirements is that the same SHGC requirements are applied across the whole state, rather than a more stringent set of SHGCs applying in climate zone 1. Although we would prefer the slightly more stringent SHGCs for climate zone 1 in both ASHRAE and the IECC, we believe there is value in a statewide requirement (as Florida currently has), and we are proposing a single set of SHGC requirements for the whole state.
- In the 2021 IECC process, the full SHGC improvements were approved 15-0 in the Committee and no public comment was received, meaning all significant stakeholders were satisfied with the outcome. While this proposal does not adopt all elements of that proposal, we believe the

requirements above will be a reasonable improvement to the code that will improve energy savings and reduce costs statewide.

# TAC: Energy

Total Mods for **Energy** in **Denied** : 9

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10470

15

Date Submitted	02/15/2022	Section	402.5	Proponent	Laura Baker
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Denied				
Commission Action	Pending Review				

### Comments

General Comments No

Alternate Language Yes

### Related Modifications

C202 - Definitions to add definition of testing unit enclosure area

### Summary of Modification

This proposal implements air leakage testing requirements for residential buildings greater than 3 stories in height.

### Rationale

The purpose of this code proposal is to require that blower door testing be applied to a sample of units or occupiable spaces in a multiple unit residential construction project. This code proposal is a companion to CE97, which was already approved during the initial code review process. Air leakage can be a significant source of energy waste in buildings, contributing to higher heating and cooling costs for building owners and occupants, and increasing risk related to comfort and durability. Air tightness testing can result in more attention to air barrier sealing and significantly reduced building leakage. Currently, the residential energy code requires air tightness testing for residential buildings three stories and less in height to ensure proper tightness and a controlled indoor environment. However, in the commercial energy code there is no testing requirement for residential buildings four stories or more in height (e.g., apartments, dormitories, hotel guest rooms). Industry standards affecting these buildings have historically relied upon visual verification, as well as material and assembly requirements. Providing adequate control over air leakage can also allow many benefits, including reduced HVAC equipment sizing, better building pressurization, and energy savings due to reduced heating and cooling of infiltrated outside air. In moist climates, ensuring lower leakage through testing can also result in better humidity control and reduced risk of durability issues. Air barrier testing saves energy by reducing infiltration of outside air into and out of the building. Most of the time, outside air is hotter or colder than the comfort temperature being maintained in the residence by the heating and cooling systems. Therefore, reducing the infiltration will reduce energy use for heating and cooling.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

This code proposal will not have any fiscal impact to the local entity relative to enforcement of the code. Code officials will be familiar with air leakage testing from the residential code.

**Impact to building and property owners relative to cost of compliance with code**

This proposal will provide energy cost savings to building and property owners by ensuring that multifamily construction units under the commercial code will be tested for air tightness, which will increase occupant comfort.

**Impact to industry relative to the cost of compliance with code**

This proposal will increase the cost of construction for multi-family commercial construction by requiring air barrier testing for certain building types. For buildings doing whole building testing, this proposal would decrease the cost of construction.

**Impact to small business relative to the cost of compliance with code**

## Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

This proposal will increase the health and safety of building occupants by ensuring that the building air barrier is operating as intended. This will promote occupant comfort and decrease the need for occupants to alter the thermostat, which leads to excess energy use and costs.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This proposal will strengthen the code by providing a better method of construction by ensuring that the air barrier is operating as intended.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This proposal does not discriminate against any materials or systems of construction.

**Does not degrade the effectiveness of the code**

This proposal does not degrade the effectiveness of the code; rather, it improves the code.

## Alternate Language

### 2nd Comment Period

IN10470-A2	<b>Proponent</b>	Laura Baker	<b>Submitted</b>	8/26/2022 4:58:47 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> Per the discussion at the June 24, 2022 TAC meeting, this alternative code language removes references to climate zones not relevant to Florida's building code. The rationale for the proposed code modification remains the same as originally submitted.					

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

This code proposal will not have any fiscal impact to the local entity relative to enforcement of the code. Code officials will be familiar with air leakage testing from the residential code.

#### Impact to building and property owners relative to cost of compliance with code

This proposal will provide energy cost savings to building and property owners by ensuring that multifamily construction units under the commercial code will be tested for air tightness, which will increase occupant comfort.

#### Impact to industry relative to the cost of compliance with code

This proposal will increase the cost of construction for multi-family commercial construction by requiring air barrier testing for certain building types. For buildings doing whole building testing, this proposal would decrease the cost of construction.

#### Impact to small business relative to the cost of compliance with code

### Requirements

#### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposal will increase the health and safety of building occupants by ensuring that the building air barrier is operating as intended. This will promote occupant comfort and decrease the need for occupants to alter the thermostat, which leads to excess energy use and costs.

#### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal will strengthen the code by providing a better method of construction by ensuring that the air barrier is operating as intended.

#### Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal does not discriminate against any materials or systems of construction.

#### Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code; rather, it improves the code.

**Add new definition as follows:**

**TESTING UNIT ENCLOSURE AREA.** The area sum of all the boundary surfaces that define the *dwelling unit, sleeping unit, or occupiable conditioned space* including top/ceiling, bottom/floor, and all side walls. This does not include interior partition walls within the *dwelling unit, sleeping unit, or occupiable conditioned space*. Wall height shall be measured from the finished floor of the *conditioned space* to the finished floor or roof/ceiling air barrier above.

**C402.5 Air leakage—thermal envelope (Mandatory).** The building thermal envelope of buildings shall comply with Sections C402.5.1 through C402.5.11.18, or the building thermal envelope shall be tested in accordance with Section C402.5.2 or C402.5.31.2.3. Where compliance is based on such testing, the building shall also comply with Sections C402.5.5, C402.5.6 and C402.5.7.

**C402.5.1 Air barriers.** A continuous air barrier shall be provided throughout the building thermal envelope. The continuous air barriers shall be located on the inside or outside of the building thermal envelope, located within the assemblies composing the building thermal envelope, or any combination thereof. The air barrier shall comply with Sections C402.5.1.1 and C402.5.1.2.

**Exception:** ~~Air barriers are not required in buildings located in Climate Zone 2B.~~

**C402.5.1.2 Air barrier compliance.** A continuous air barrier for the opaque building envelope shall comply with the following:

1. Buildings or portions of buildings, including group R and group I occupancy~~ies~~, shall meet the provisions of Section C402.5.2.1.2.1 ~~or C402.5.1.2.2.~~
2. Buildings or portions of buildings of other than group R and group I occupancy shall meet the provisions of Section C402.5.1.2.3.

**Exceptions:**

1. ~~Buildings in Climate Zones 2B, 3B, 3C, and 5C.~~
2. ~~Buildings larger than 5,000 square feet (464.5 m<sup>2</sup>) floor area in Climate Zones 0B, 1, and 2A, 4B, and 4C.~~
3. ~~Buildings between 5,000 square feet (464.5 m<sup>2</sup>) and 50,000 square feet (4,645 m<sup>2</sup>) floor area in Climate Zones 0A, 3A and 5B.~~
3. Buildings or portions of buildings ~~other than group R and group I occupancy~~ that do not complete air barrier testing shall meet the provisions of Section C402.5.1.2.13 ~~or C402.5.1.42.2, in addition to Section C402.5.1.5.~~

Add new text as follows:

**C402.5.2. Dwelling and sleeping unit enclosure testing.** The building thermal envelope shall be tested in accordance with ASTM E 779, ANSI/RESNET/ICC 380, ASTM E1827 or an equivalent method approved by the code official. The measured air leakage shall not exceed 0.30 cfm/ft<sup>2</sup>(1.5 L/sm<sup>2</sup>) of the testing unit enclosure area at a pressure differential of 0.2 inch water gauge (50 Pa). Where multiple dwelling units or sleeping units or other occupiable conditioned spaces are contained within one building thermal envelope, each unit shall be considered an individual testing unit and the building air leakage shall be the weighted average of all testing unit results, weighted by each testing unit's testing unit enclosure area. Units shall be tested separately with an unguarded blower door test as follows:

1. Where buildings have fewer than eight testing units, each testing unit shall be tested.
2. For buildings with eight or more testing units the greater of seven units or 20 percent of the testing units in the building shall be tested including a top floor unit, a ground floor unit, and a unit with the largest testing unit enclosure area. Where any tested unit exceeds the maximum air leakage rate, an additional 20 percent of units shall be tested, including a mixture of testing unit types and locations.

Add new definition as follows:

**TESTING UNIT ENCLOSURE AREA.** The area sum of all the boundary surfaces that define the *dwelling unit, sleeping unit, or occupiable conditioned space* including top/ceiling, bottom/floor, and all side walls. This does not include interior partition walls within the *dwelling unit, sleeping unit, or occupiable conditioned space*. Wall height shall be measured from the finished floor of the *conditioned space* to the finished floor or roof/ceiling air barrier above.

**C402.5 Air leakage—thermal envelope (Mandatory).** The building thermal envelope of buildings shall comply with Sections C402.5.1 through C402.5.11.18, or the building thermal envelope shall be tested in accordance with Section C402.5.2 or C402.5.31-2.3. Where compliance is based on such testing, the building shall also comply with Sections C402.5.5, C402.5.6 and C402.5.7.

**C402.5.1 Air barriers.** A continuous air barrier shall be provided throughout the building thermal envelope. The continuous air barriers shall be located on the inside or outside of the building thermal envelope, located within the assemblies composing the building thermal envelope, or any combination thereof. The air barrier shall comply with Sections C402.5.1.1 and C402.5.1.2.

Exception: Air barriers are not required in buildings located in Climate Zone 2B.

**C402.5.1.2 Air barrier compliance.** A continuous air barrier for the opaque building envelope shall comply with the following:

1. Buildings or portions of buildings, including group R and group I occupancyies, shall meet the provisions of Section C402.5.2.1.2.1 or C402.5.1.2.2.

Exception: Buildings in Climate Zones 2B, 3C, and 5C.

2. Buildings or portions of buildings of other than group R and group I occupancy shall meet the provisions of Section C402.5.1.2.3.

Exceptions:

1. Buildings in Climate Zones 2B, 3B, 3C, and 5C.
2. Buildings larger than 5,000 square feet (464.5 m<sup>2</sup>) floor area in Climate Zones 0B, 1, 2A, 4B, and 4C.
3. Buildings between 5,000 square feet (464.5 m<sup>2</sup>) and 50,000 square feet (4,645 m<sup>2</sup>) floor area in Climate Zones 0A, 3A and 5B.

3. Buildings or portions of buildings other than group R and group I occupancy that do not complete air barrier testing shall meet the provisions of Section C402.5.1.2.13 or C402.5.1.42-2, in addition to Section C402.5.1.5.



Add new text as follows:

C402.5.2. Dwelling and sleeping unit enclosure testing. The building thermal envelope shall be tested in accordance with ASTM E 779, ANSI/RESNET/ICC 380, ASTM E1827 or an equivalent method approved by the code official. The measured air leakage shall not exceed 0.30 cfm/ft<sup>2</sup> (1.5 L/sm<sup>2</sup>) of the testing unit enclosure area at a pressure differential of 0.2 inch water gauge (50 Pa). Where multiple dwelling units or sleeping units or other occupiable conditioned spaces are contained within one building thermal envelope, each unit shall be considered an individual testing unit and the building air leakage shall be the weighted average of all testing unit results, weighted by each testing unit's testing unit enclosure area. Units shall be tested separately with an unguarded blower door test as follows:

1. Where buildings have fewer than eight testing units, each testing unit shall be tested.
2. For buildings with eight or more testing units the greater of seven units or 20 percent of the testing units in the building shall be tested including a top floor unit, a ground floor unit, and a unit with the largest testing unit enclosure area. Where any tested unit exceeds the maximum air leakage rate, an additional 20 percent of units shall be tested, including a mixture of testing unit types and locations.

# TAC: Energy

Total Mods for **Energy** in **Denied** : 9

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10230

16

Date Submitted	02/11/2022	Section	401.2.2	Proponent	Jeff Sonne for FSEC
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Denied				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language Yes**

**Related Modifications**

### Summary of Modification

Additional energy efficiency requirements.

### Rationale

This proposal introduces a new section within the code that will require additional efficiency measures (options) for residential buildings which will better allow Florida code to keep up with stringency increases in the 2021 IECC. When taking the prescriptive approach, one of the new Section R407.2 efficiency options must be installed. For the performance approach, the annual total normalized Modified Loads of the proposed design are reduced to 95% of the annual total loads of the standard reference design. The proposal allows a wide range of improvements, providing flexibility for each compliance path. See cost effectiveness analyses and related discussion on pages 28 – 31 of <https://publications.energyresearch.ucf.edu/wp-content/uploads/2021/06/FSEC-CR-2112-21.pdf>.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

None to slight impact to verify compliance.

#### Impact to building and property owners relative to cost of compliance with code

The code change proposal will increase the cost of construction. However, for a given project one or more of these efficiency options should be cost effective. See cost analyses and related on pgs. 28 – 31 of <https://publications.energyresearch.ucf.edu/wp-content/uploads/2021/06/FSEC-CR-2112-21.pdf>.

#### Impact to industry relative to the cost of compliance with code

The code change proposal will increase the cost of construction. However, for a given project one or more of these efficiency options should be cost effective. See cost analyses and related on pgs. 28 – 31 of <https://publications.energyresearch.ucf.edu/wp-content/uploads/2021/06/FSEC-CR-2112-21.pdf>.

#### Impact to small business relative to the cost of compliance with code

## Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

Yes, benefits public by increasing energy efficiency while maintaining compliance flexibility.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

Improves the code by increasing energy efficiency while maintaining compliance flexibility.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

Does not discriminate; a range of efficiency improvements can be used to comply.

**Does not degrade the effectiveness of the code**

Improves code effectiveness by increasing energy efficiency while maintaining compliance flexibility.

## Alternate Language

### 2nd Comment Period

EN10230-A2	<b>Proponent</b>	Jeff Sonne for FSEC	<b>Submitted</b>	8/25/2022 4:02:25 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> This alternative language mod A2 replaces the original 10230 mod or 10230-A1 in its entirety and only affects performance (R405) compliance, reducing the annual total normalized Modified Loads of the proposed design to 95% of the annual total loads of the standard reference design (so reduces the allowed total e-Ratio from 1.0 to 0.95). This allows a wide range of both envelope and equipment efficiency improvement options, allowing decision makers to select the most cost effective improvement(s) for each project. The mod improves the most often used method of Florida residential energy code compliance without adding complexity to the code; it just requires a simple software change and no training for industry or code officials. An e-Ratio reduction such as this has been used in past code cycles as well.					

#### Fiscal Impact Statement

##### Impact to local entity relative to enforcement of code

No code enforcement impact.

##### Impact to building and property owners relative to cost of compliance with code

The code change proposal will increase the cost of construction in most cases. However, the mod maintains compliance flexibility (allowing both envelope and equipment efficiency improvements).

##### Impact to industry relative to the cost of compliance with code

The code change proposal will increase the cost of construction in most cases. However, the mod maintains compliance flexibility (allowing both envelope and equipment efficiency improvements).

##### Impact to small business relative to the cost of compliance with code

#### Requirements

##### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, benefits public by increasing energy efficiency while maintaining compliance flexibility.

##### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code by increasing energy efficiency while maintaining compliance flexibility.

##### Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate; a wide range of efficiency improvements can be used to comply.

##### Does not degrade the effectiveness of the code

Improves code effectiveness by increasing energy efficiency while maintaining compliance flexibility.

### 1st Comment Period History

EN10230-A1	<b>Proponent</b>	Jeff Sonne for FSEC	<b>Submitted</b>	4/16/2022 2:56:25 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> Further research found 8.2 HSPF2 to be a more appropriate efficiency requirement than 10 HSPF2 for this entry. No other changes to mod.					

#### Fiscal Impact Statement

##### Impact to local entity relative to enforcement of code

None; just provides more appropriate efficiency requirement than in original mod.

##### Impact to building and property owners relative to cost of compliance with code

None; just provides more appropriate efficiency requirement than in original mod.

##### Impact to industry relative to the cost of compliance with code

None; just provides more appropriate efficiency requirement than in original mod.

##### Impact to small business relative to the cost of compliance with code

## Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

Yes; provides more appropriate efficiency requirement than in original mod.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

Yes; provides more appropriate efficiency requirement than in original mod.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

No; just provides more appropriate efficiency requirement than in original mod.

**Does not degrade the effectiveness of the code**

No; just provides more appropriate efficiency requirement than in original mod.

## 2nd Comment Period

EN10230-G2	Proponent	Jeff Sonne for FSEC	Submitted	8/25/2022 4:12:12 PM	Attachments	No
	Comment: Part of the Inflation Reduction Act (IRA) dollars are now available only to states that meet or exceed the 2021 IECC. Florida won't be eligible for this funding if we don't meet 2021 IECC stringency. Mod 10230 (with 10230-A1) will not guarantee that Florida residential energy code stringency will meet 2021 IECC stringency, but would move the state significantly towards that goal. NASEO provides the following draft summary of building energy code related IRA provisions: "Section 50131 provides \$1 billion for support of the updated building energy codes. \$330 million of this amount is directed to states and local governments to support adoption of codes that meet or exceed the 2021 IECC for residential buildings and ANSI/ASHRAE/IES Standards 90.1-2019 for commercial buildings, and to support a plan to achieve compliance, and include training, enforcement and measurement. \$670 million of this amount is provided for grants to state and local governments to support efforts to achieve the zero energy provisions of the 2021 IECC and a plan to promote full compliance. There is no state match requirement and DOE can retain 5% of the amount for administrative costs."					

## 1st Comment Period History

EN10230-G1	Proponent	Amanda Hickman	Submitted	4/14/2022 11:12:54 AM	Attachments	No
	Comment: LBA does not support the modification, as it is not appropriate for Florida and/or is not cost justified.					

**[This alternative mod A2 replaces mod 10230 or 10230-A1 in its entirety.] Modify text from Chapter 4 and Appendix RC as follows:**

**[Ch. 4] R405.3 Performance-based compliance.**

Compliance based on simulated energy performance requires that a proposed residence (*proposed design*) be shown to have annual total normalized Modified Loads that are less than or equal to 95% of the annual total loads of the *standard reference design* as calculated in accordance with Appendix RC of this standard.

**[Appendix RC] RC-2**

Following normalization of the heating, cooling and hot water energy consumptions for the *Proposed Design* as specified in Section RC-1 above, the *Standard Reference Design* home's total reference end use loads for heating, cooling and hot water (REUL<sub>tot</sub>) shall be compared with the *Proposed Design* home's total normalized modified end use loads for heating, cooling and hot water (nMEUL<sub>tot</sub>). If the total normalized modified loads of the Proposed Design home (nMEUL<sub>tot</sub>) are equal to or less than 95% of the total reference loads of the *Standard Reference Design* home (REUL<sub>tot</sub>), the *Proposed Design* complies with this code.

**[Keep original mod 10230 with following HSPF2 change to Section R407.2.2 (no other changes to original mod)]**

**R407.2.2 More efficient HVAC equipment performance option.** All heating and cooling equipment shall meet or exceed one of the following efficiencies:

1. Greater than or equal to 95 AFUE natural gas furnace and 16 SEER2 air conditioner.
2. Greater than or equal to 40 8.2 HSPF2 / 16 SEER2 air source heat pump.
3. Greater than or equal to 3.5 COP ground source heat pump.

Add new text as follows:

**R401.2.2 Additional Energy Efficiency (Mandatory).** This section establishes additional requirements applicable to all compliance approaches to achieve additional energy efficiency.

1. For buildings complying under Sections R401 through R404, one of the Additional Efficiency Package Options shall be installed according to Section R407.2.
2. For buildings complying under the simulated performance alternative in Section R405, the *proposed design* of the building under Section R405.3 shall have annual total normalized Modified Loads less than or equal to 95 percent of the annual total loads of the *standard reference design*.
3. For buildings complying under the energy rating index alternative in Section R406, the energy rating index value shall be at least 5 percent less than the energy rating index target specified in Table R406.4.

The option selected for compliance shall be identified in the energy performance level (EPL) display card required by Section R401.3.

#### **SECTION R407** **ADDITIONAL EFFICIENCY PACKAGE OPTIONS**

**R407.1 Scope.** This section establishes Additional Efficiency Package Options to achieve additional energy efficiency in accordance with Section R401.2.2.

**R407.2 Additional Efficiency Package Options.** Additional efficiency package options for compliance with Section R401.2.2 are set forth in Sections R407.2.1 through R407.2.5.

**R407.2.1 Enhanced envelope performance option.** The total building thermal envelope UA, the sum of *U*-factor times assembly area, shall be less than or equal to 95 percent of the total UA resulting from multiplying the *U*-factors in Table R402.1.4 by the same assembly area as in the proposed building. The UA calculation shall be performed in accordance with Section R402.1.5. The area-weighted average SHGC of all glazed fenestration shall be less than or equal to 95 percent of the maximum glazed fenestration SHGC in Table R402.1.2.

**R407.2.2 More efficient HVAC equipment performance option.** All heating and cooling equipment shall meet or exceed one of the following efficiencies:

1. Greater than or equal to 95 AFUE natural gas furnace and 16 SEER2 air conditioner.
2. Greater than or equal to 10 HSPF2 / 16 SEER2 air source heat pump.
3. Greater than or equal to 3.5 COP ground source heat pump.



**R407.2.3 Reduced energy use in service water heating option.** The hot water system shall meet or exceed one of the following efficiencies:

1. Greater than or equal to 0.82 UEF fossil fuel service water heating system.
2. Greater than or equal to 2.0 UEF electric service water heating system.
3. Greater than or equal to 0.4 Solar Fraction solar water heating system.

**R407.2.4 More efficient duct thermal distribution system option.** The thermal distribution system shall meet or exceed one of the following efficiencies:

1. 100 percent of ducts and air handlers located entirely within the *building thermal envelope*.
2. 100 percent of ductless thermal distribution system or hydronic thermal distribution system located completely inside the *building thermal envelope*.

**R407.2.5 Improved air sealing and efficient ventilation system option.** The measured air leakage rate shall be less than or equal to 3.0 ACH50, with an Energy Recovery Ventilator (ERV) installed. Minimum ERV requirements, measured at the lowest tested net supply airflow, shall be greater than or equal to 75 percent Sensible Recovery Efficiency (SRE), greater than or equal to 1.2 CFM/W Fan Energy, and shall not use recirculation as a defrost strategy. In addition, the ERV shall be greater than or equal to 50 percent Latent Recovery/Moisture Transfer (LRMT).

# TAC: Energy

Total Mods for **Energy** in **Denied** : 9

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10252

17

Date Submitted	02/11/2022	Section	403.1.3	Proponent	David Calabrese
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Denied				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language No**

**Related Modifications**

### Summary of Modification

The use of electric resistance heaters as backup heating devices can significantly increase winter energy consumption, and air source heat pumps can effectively provide heating without such devices in Florida. This proposed modification minimizes the increase of such winter energy consumption.

### Rationale

Reason: The use of electric resistance heaters as backup heating devices can significantly increase winter energy consumption, and air source heat pumps can effectively provide heating without such devices in Florida in the United States. Also, Daikin has observed that it's common for heat pumps to be installed with electric resistance heaters configured to operate in conditions where sufficient heating capacity is available from the heat pump alone. This results in reducing the operation hours of heat pumps and increasing the operation hours of electric resistance heaters. Such setting of heat pump systems will fail to yield expected reduction of GHG emissions and result in higher energy consumption and longer peak demand events. Therefore, Daikin proposes to revise R403.1.3, which defines the use of electric resistance heaters as supplementary heat for heat pumps, to prevent such practice.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

This proposed modification is specifically for residential buildings. Therefore, there will be no impact to local entity relative to enforcement of the code.

#### Impact to building and property owners relative to cost of compliance with code

The code change proposal will neither increase nor decrease the cost of construction to comply with the code. Requiring the use of the switchover temperature controls will not increase nor decrease such cost either. Yet, it will result in energy savings and lower utilities costs for the end-user.

#### Impact to industry relative to the cost of compliance with code

This proposed modification is specifically for residential buildings. Therefore, there will be no impact to industry relative to the cost of compliance with code.

## Impact to small business relative to the cost of compliance with code

### Requirements

#### **Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

This modification will result in energy savings and lower utilities costs for the end-user. The reduced energy use will also reduce emissions of air pollutants and greenhouse gases, which will lead to a reasonable and substantial connection with the health, safety, and welfare of the general public.

#### **Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This modification will optimize the operation of heat pump systems with electric supplementary heat, which leads to improvement of the code.

#### **Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

No it does not.

#### **Does not degrade the effectiveness of the code**

No it does not.

### 2nd Comment Period

EN10252-G1

Proponent	David Calabrese	Submitted	8/4/2022 8:32:01 PM	Attachments	No
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Comment:  
We were not able to the Florida Building Commission Energy Technical Advisory Committee (TAC) meeting on June 24th in support of this proposed code modification (#10252) on Section 403.1.3 in Chapter 4 - [RE] - Residential Energy Efficiency. We believe that this proposed code modification will play a critical role in ensuring proper installation of supplementary electric resistance heaters for heat pumps and preventing them from operating when heat pumps can sufficiently provide heating. We would like to attend and make a public comment during the next proposed TAC meetings to be scheduled between October 11th and 14th to support the proposed code modification.

## Mandatory requirements for HP switchover temperature

2023 Florida Building Code, Energy Conservation, 8th Edition: R403.1.3

Revise as follows:

### R403.1.3 Heat pump supplementary heat (Mandatory).

-

Heat pumps with supplementary electric resistance heaters shall have controls that ~~except during defrost, prevent supplemental heat operation when the capacity of the heat pump compressor can meet the heating load.~~ limit supplemental heat operation to only those times when one of the following applies:

1. The vapor compression cycle cannot provide the necessary heating energy to satisfy the thermostat setting.
2. The heat pump is operating in defrost mode.
3. The vapor compression cycle malfunctions.
4. The thermostat malfunctions.

## Mandatory requirements for HP switchover temperature

2023 Florida Building Code, Energy Conservation, 8th Edition: R403.1.3

Revise as follows:

### R403.1.3 Heat pump supplementary heat (Mandatory).

Heat pumps with supplementary electric resistance heaters shall have controls that ~~except during defrost, prevent supplemental heat operation when the capacity of the heat pump compressor can meet the heating load.~~ limit supplemental heat operation to only those times when one of the following applies:

1. The vapor compression cycle cannot provide the necessary heating energy to satisfy the thermostat setting.
2. The heat pump is operating in defrost mode.
3. The vapor compression cycle malfunctions.
4. The thermostat malfunctions.

**Reason:** The use of electric resistance heaters as backup heating devices can significantly increase winter energy consumption, and air source heat pumps can effectively provide heating without such devices in Florida in the United States. Also, Daikin has observed that it's common for heat pumps to be installed with electric resistance heaters configured to operate in conditions where sufficient heating capacity is available from the heat pump alone. This results in reducing the operation hours of heat pumps and increasing the operation hours of electric resistance heaters. Such setting of heat pump systems will fail to yield expected reduction of GHG emissions and result in higher energy consumption and longer peak demand events. Therefore, Daikin proposes to revise R403.1.2, which defines the use of electric resistance heaters as supplementary heat for heat pumps, to prevent such practice.

**Cost Impact:** The code change proposal will neither increase nor decrease the cost of construction. Requiring the use of the switchover temperature controls will not increase nor decrease the cost of construction - however, it will result in energy savings and lower utilities costs for the end-user.

# TAC: Energy

Total Mods for **Energy** in **Denied** : 9

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10253

18

Date Submitted	02/11/2022	Section	407	Proponent	David Calabrese
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Denied				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language No**

**Related Modifications**

### Summary of Modification

Daikin requests that the 2023 version of Florida IECC incorporates Section R408 of 2021 IECC, with modifications to Section R408.2.2, as Section R407 to continue effectively driving builders and users to optimize the energy performance of their homes.

### Rationale

Reason: The 2021 IECC has implemented a new section, R408 Additional Efficiency Package Options, which defines five optional requirements to achieve additional energy efficiency: 1. Enhanced envelope performance option., 2. More efficient HVAC equipment performance option., 3. Reduced energy use in servicing water-heating option., 4. More efficient duct thermal distribution system option., and 5. Improved air sealing and efficient ventilation system option. Daikin requests that the 2023 version of Florida IECC incorporates Section R408 of 2021 IECC as Section R407 to continue effectively driving builders and users to optimize the energy performance of their homes. In addition, variable speed heat pumps provide superior energy performance over commonly used and equivalently rated single and two-stage equipment due to their higher efficiency attained during partial load operation. Also, mini and multi-split systems with variable speed compressors provides homeowners opportunities to further save energy consumption by turning off individual indoor units in unoccupied zones. For the 2023 Florida Building Code, Energy Conservation, 8th Edition, as incorporating Section R408 of 2021 IECC as Section R407, Daikin proposes changes to Section R408.2.2 and reflect the changes to R407.2.2 to accurately capture the energy performance superiority of variable speed air source heat pumps in both centrally ducted and ductless systems. The metrics of HSPF and SEER are being updated to the new metrics of HSPF2 and SEER2 that will be in effect when the 2023 Florida Building Code is adopted by jurisdictions (see 10 CFR 430.32).

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

This modification proposal is specifically for residential building and property owners. So there will no impact.

#### Impact to building and property owners relative to cost of compliance with code

This modification proposal will increase the cost of construction. This proposal may increase the cost of construction including when utilizing variable speed air source heat pumps, but it will result in energy savings and lower utility costs for the end-user.

**Impact to industry relative to the cost of compliance with code**

This modification proposal is specifically for residential building and property owners. So there will no impact.

**Impact to small business relative to the cost of compliance with code**

## Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

This modification proposal will result in energy savings and lower utility costs for the end-user. The modification will also reduce emissions of air pollutants and greenhouse gases. Them combined will reasonably and substantially improve the health, safety, and welfare of the general public.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This modification proposal will drive the market adoption of variable speed heat pumps (VSHP). VSHP has superior energy performance as well as peak power management capability; in other words, they are better HVAC systems.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

No it does not.

**Does not degrade the effectiveness of the code**

No it does not.

## 2nd Comment Period

EN10253-G2	Proponent	David Calabrese	Submitted	8/4/2022 8:37:51 PM	Attachments	No
	Comment: We were not able to the Florida Building Commission Energy Technical Advisory Committee (TAC) meeting on June 24th in support of this proposed code modification (#10253) on Section 407 in Chapter 4 - [RE] - Residential Energy Efficiency. We believe that this proposed code modification will provide home owners opportunities to optimize energy performance of HVAC systems in their homes by retaining and refining the newly introduced 408 Additional Efficiency Package Options in the 2021 IECC as Section 407. We would like to attend and make a public comment during the next proposed TAC meetings to be scheduled between October 11th and 14th to support the proposed code modification.					

## 1st Comment Period History

EN10253-G1	Proponent	Amanda Hickman	Submitted	4/14/2022 11:13:23 AM	Attachments	No
	Comment: LBA does not support the modification, as it is not appropriate for Florida and/or is not cost justified.					

**Section R407****ADDITIONAL EFFICIENCY PACKAGE OPTIONS****R407. 1. Scope.**

This section establishes additional efficiency package options to achieve additional energy efficiency in accordance with Section R401.2.

**R407.2. Additional efficiency package options.**

Additional efficiency package options for compliance with Section R401.2 are set forth in Sections R407.2.1 through R407.2.5.

**R407.2.1 Enhanced envelope performance option.**

The total building thermal envelope UA, the sum of U-factor times assembly area, shall be less than or equal to 95 percent of the total UA resulting from multiplying the U-factors in Table 402.1.2. by the same assembly area as in the proposed building. The UA calculation shall be performed in accordance with Section R402.1.5. The area-weighted average SHGC of all glazed fenestration shall be less than or equal to 95 percent of the maximum glazed fenestration SHGC in Table 402.1.2.

**R407.2.2 More efficient HVAC equipment performance option.**

Heating and cooling equipment shall meet one of the following efficiencies:

**Centrally Ducted Systems**

1. Greater than or equal to 95 AFUE natural gas furnace and 15.2 SEER2 variable speed air conditioner.
2. Greater than or equal to 15.2 SEER2, 8.5 HSPF2 variable speed air source heat pump.
3. Greater than or equal to 3.5 COP ground source heat pump.

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**Ductless Systems**

1. Single Zone: 16.9 SEER2, 8.5 HSPF2 variable speed air source heat pump.
2. Multi Zone: 16.9 SEER2, 8.5 HSPF2 variable speed air source heat pump (Non-Ducted Indoor Units).
3. Multi Zone: 15.2 SEER2, 8.5 HSPF2 variable speed air source heat pump (Ducted or Mixed Indoor Units)

**R407.2.3. Reduced energy use in service water-heating options.**

The hot water system shall meet one of the following efficiencies:



Greater than or equal to 82 EF fossil fuel service water-heating system.

Greater than or equal to 2.0 EF electric service water-heating system.

Greater than or equal to 0.4 solar fraction solar water-heating system.

#### **R407.2.4 More efficient duct thermal distribution system option.**

The thermal distribution system shall meet one of the following efficiencies:

1. 100 percent of ducts and air handles located entirely within the *building thermal envelope*.
2. 100 percent of ductless thermal distribution system or hydronic thermal distribution system located completely inside the *building thermal envelope*.
3. 100 percent of duct thermal distribution system located in *conditioned space* as defined by Section R403.4.

-

#### **R407.2.5 Improved air sealing and efficient ventilation system option.**

The measured air leakage rate shall be less than or equal to 3.0 ACH50, with either an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) installed. Minimum HRV and ERV requirements, measured at the lowest tested net supply airflow, shall be greater or equal to 75 percent Sensible Recovery Efficiency (SRE), less than or equal to 1.1 cubic feet per minute per watt (0.03m<sup>3</sup>/min/watt) and shall not use recirculation as a defrost strategy. In addition, the ERV shall be greater than or equal to 50 percent Latent Recovery/Moisture Transfer (LRMT).

## **Daikin Proposal for the Florida State Energy Code amendment**

Daikin U.S. Corporation (“Daikin”) hereby submits the following code change proposal in response to the development process of 2023 Florida Building Code, Energy Conservation, 8th Edition. Daikin U.S. Corporation is a subsidiary of Daikin Industries, Ltd., the world’s largest air conditioning equipment manufacturer. The Daikin Group includes Daikin Applied Americas Inc., Daikin North America LLC., and Goodman Manufacturing Company, L.P.

### **I. Introduction**

Buildings account for 40 percent of all US energy consumption and 24 percent of its greenhouse gas (GHG) emissions<sup>1</sup>. Out of those, 22 percent of the consumption and 12 percent of the emissions come from residential buildings<sup>2</sup>. Under the Biden Administration, the United States targets to reduce its GHG emission by 50-52 percent by 2030. To achieve the decarbonization goal, energy efficiency as well as building electrification will need to play a critical role.

Replacement of lower efficiency or carbon intensive HVAC equipment with heat pumps are an effective solution to drive energy efficiency and building electrification and thus building decarbonization. Within heat pumps, variable speed heat pumps have demonstrated superior energy performance over equivalent single and two-stage equipment. For instance, the United States Environmental Protection Agency (U.S. EPA) notes that variable speed equipment and modulating systems specifically provide additional customer comfort advantages by following load, provide further energy efficiency improvements, and provide unique advantages for demand response<sup>3</sup>. The benefits of variable speed equipment are most prevalent when it operates at part-load capacities (i.e., less than 100% capacity). When operating at part-load, it can be significantly more efficient. The efficiency of variable speed equipment increases significantly as its load reduces below 100%. This exceeds the performance of both single and two-stage equipment as load reduces. According to computer simulations, laboratory validated by the Electric Power Research Institute (EPRI), variable speed HVAC equipment reduces its cooling capacity by 25% it results in a 43% reduction in power consumption while for single-speed equipment it would yield only a 25% reduction in power consumption<sup>4</sup>. However, according to National Resource Defense Council (NRDC), “current test procedures do not adequately capture the impact of a variable [speed] unit’s control logic, which can have a large

<sup>1</sup> Use of energy in explained - U.S. Energy Information Administration, <https://www.eia.gov/energyexplained/use-of-energy/>

<sup>2</sup> Fast Facts on Transportation Greenhouse Gas Emissions | US EPA, <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>

<sup>3</sup> U.S. EPA, ENERGY STAR Residential Air Source Heat Pump and Central Air Conditioning Equipment Version 6.0 Discussion Guide dated August 3, 2018, <https://www.energystar.gov/sites/default/files/>

<sup>4</sup> HRAI and AHRI, Letter to U.S. EPA Regarding ENERGY STAR Residential Air Source Heat Pump and Central Air Conditioning Equipment Version 6.0 Discussion Guide dated September 21, 2018, [https://www.energystar.gov/sites/default/files/AHRI\\_HRAI\\_Comments\\_CAC\\_ASHP\\_Discussion%20Guide\\_09%2021%202018.pdf](https://www.energystar.gov/sites/default/files/AHRI_HRAI_Comments_CAC_ASHP_Discussion%20Guide_09%2021%202018.pdf)

impact on efficiency<sup>5</sup>.” Lastly, Daikin would like to point out that ductless systems can further improve energy performance of HVAC systems by allowing homeowners to turn off indoor units in unoccupied zones.

In Florida specifically, a large install base, as well as existing use case of electric resistance heaters closely correlates to the state winter peak demand issues. As of 2019, 31% of the total space heating equipment installed in the state’s homes were electric resistance heaters (3,010,332 out of the 9,673,682). Heat pumps, typically installed with electric resistance heaters for emergency or supplemental use, account for 55% or 5,339,804 installed, and a large portion of the remainder primarily consists of combustion equipment such as furnaces and boilers (5% of total) including 464,154 gas furnaces. Based on the state’s 2019 sales volume of electric resistance heaters (52,846), which represented approximately 10% of the state’s residential space heating market and based on the equipment’s 2024 sales volume projection (51,553), it will take 204 years for them to be eliminated from the market assuming a linear decline of the sales. Additionally, based on the state’s 2019 sales volume of gas furnaces (20,185), which represented approximately 4% of the state’s residential space heating market and based on the equipment’s 2024 sales volume projection (14,204), it will take 17 years for them to be eliminated from the market assuming a linear decline of the sales<sup>6</sup>. To further boost the proportion of heat pumps, especially variable speed heat pumps including the ones in ductless configuration, effective and aggressive market transformation will be required. Daikin believes that building codes should play a critical role in accelerating the adoption of such technologies in the State of Florida.

Hereby, to execute the forementioned market transformation, Daikin would like to make the following code change proposals for the development process of 2023 Florida Building Code, Energy Conservation, 8th Edition:

## **II. Code Change Proposal to R403.1.3 Heat Pump Supplementary Heat**

The use of electric resistance heaters as backup heating devices can significantly increase winter energy consumption, and air source heat pumps can effectively provide heating without such devices including the cold climate regions in the United States. Also, Daikin has observed that it’s common for heat pumps to be installed with electric resistance heaters configured to operate in conditions where sufficient heating capacity is available from the heat pump alone. This results in reducing the operation hours of heat pumps and increasing the operation hours

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<sup>5</sup> NRDC, NRDC Comments on ENERGY STAR Program Requirements for Air Source Heat Pump and Central Air Conditioner Equipment Version 6.0, Draft 1 dated May 23, 2019, <https://www.energystar.gov/sites/default/files/NRDC%20Comments%20on%20CACASHP%20Draft%201%20V6.0.pdf>

<sup>6</sup> Statistics Office

of electric heaters. Such setting of heat pump systems will fail to yield expected reduction of GHG emissions and result in higher energy consumption and longer peak demand events. Therefore, Daikin proposes to revise R403.1.2, which defines the use of electric resistance heaters as supplementary heat for heat pumps, to prevent such practice as following:

**R403.1.3 Heat pump supplementary heat (Mandatory).**

Heat pumps with supplementary electric resistance heaters shall have controls that, except during defrost, prevent supplemental heat operation when the capacity of the heat pump compressor can meet the heating load, limit supplemental heat operation to only those times when one of the following applies:

1. The vapor compression cycle cannot provide the necessary heating energy to satisfy the thermostat setting.
2. The heat pump is operating in defrost mode.
3. The vapor compression cycle malfunctions.
4. The thermostat malfunctions.

**III. Code Addition Proposal to Revise and Include the 2021 IECC R408 Additional Efficiency Package Options as R407**

Daikin understands that the State of Florida is developing the 2023 building code referring to the 2021 International Energy Conservation Code (IECC). The 2021 IECC has implemented a new section, R408 Additional Efficiency Package Options, which defines five optional requirements to achieve additional energy efficiency: 1. Enhanced envelope performance option., 2. More efficient HVAC equipment performance option., 3. Reduced energy use in servicing water-heating option., 4. More efficient duct thermal distribution system option., and 5. Improved air sealing and efficient ventilation system option. Daikin requests that the 2023 version of the Florida Building Code, Energy Conservation reflects the change and incorporates the section as R407 to more effectively driving builders and users to optimize the energy performance of their homes.

As mentioned in our Introduction, Variable speed heat pumps provide superior energy performance over commonly used and equivalently rated single and two-stage equipment due to their higher efficiency attained during partial load operation. Also, ductless systems with variable speed compressors provides homeowners opportunities to further save energy consumption by turning off individual indoor units in unoccupied zones. Upon incorporating the new section, Daikin also proposes changes to Section R408.2.2 of the 2021 IECC and add the

entire Section R408 of the code as Section R407 in the 2023 version of the state energy conservation code.

**Section R407**  
**ADDITIONAL EFFICIENCY PACKAGE OPTIONS**

**R407. 1. Scope.**

This section establishes additional efficiency package options to achieve additional energy efficiency in accordance with Section R401.2.

**R407.2. Additional efficiency package options.**

Additional efficiency package options for compliance with Section R401.2 are set forth in Sections R407.2.1 through R407.2.5.

**R407.2.1 Enhanced envelope performance option.**

The total *building thermal envelope* UA, the sum of *U-factor* times assembly area, shall be less than or equal to 95 percent of the total UA resulting from multiplying the *U-factors* in Table 402.1.2. by the same assembly area as in the proposed building. The UA calculation shall be performed in accordance with Section R402.1.5. The area-weighted average SHGC of all glazed fenestration shall be less than or equal to 95 percent of the maximum glazed fenestration SHGC in Table 402.1.2.

**R407.2.2 More efficient HVAC equipment performance option.**

Heating and cooling equipment shall meet one of the following efficiencies:

Centrally Ducted Systems

1. Greater than or equal to 95 AFUE natural gas furnace and 15.2 SEER2 variable speed air conditioner.
2. Greater than or equal to 15.2 SEER2, 8.5 HSPF2 variable speed air source heat pump.
3. Greater than or equal to 3.5 COP ground source heat pump.

Ductless Systems

1. Single Zone: 16.9 SEER2, 8.5 HSPF2 variable speed air source heat pump.
2. Multi Zone: 16.9 SEER2, 8.5 HSPF2 variable speed air source heat pump (Non-Ducted Indoor Units).
3. Multi Zone: 15.2 SEER2, 8.5 HSPF2 variable speed air source heat pump (Ducted or Mixed Indoor Units)

**R407.2.3. Reduced energy use in service water-heating options.**

The hot water system shall meet one of the following efficiencies:

1. Greater than or equal to 82 EF fossil fuel service water-heating system.

2. Greater than or equal to 2.0 EF electric service water-heating system.
3. Greater than or equal to 0.4 solar fraction solar water-heating system.

**R407.2.4 More efficient duct thermal distribution system option.**

The thermal distribution system shall meet one of the following efficiencies:

1. 100 percent of ducts and air handles located entirely within the *building thermal envelope*.
2. 100 percent of ductless thermal distribution system or hydronic thermal distribution system located completely inside the *building thermal envelope*.
3. 100 percent of duct thermal distribution system located in *conditioned space* as defined by Section R403.4.

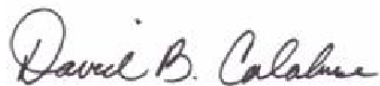
**R407.2.5 Improved air sealing and efficient ventilation system option.**

The measured air leakage rate shall be less than or equal to 3.0 ACH50, with either an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) installed. Minimum HRV and ERV requirements, measured at the lowest tested net supply airflow, shall be greater or equal to 75 percent Sensible Recovery Efficiency (SRE), less than or equal to 1.1 cubic feet per minute per watt (0.03m<sup>3</sup>/min/watt) and shall not use recirculation as a defrost strategy. In addition, the ERV shall be greater than or equal to 50 percent Latent Recovery/Moisture Transfer (LRMT).

**IV. Conclusion**

Daikin appreciates the opportunity to provide these comments. If you have any questions regarding this submission, please do not hesitate to contact me.

Sincerely,



David Calabrese

Senior Vice President, Government Affairs

# TAC: Energy

Total Mods for **Energy** in **Denied** : 9

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10331

19

Date Submitted	02/13/2022	Section	402.2.5	Proponent	Greg Johnson
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Denied				
Commission Action	Pending Review				

### Comments

General Comments No

Alternate Language Yes

### Related Modifications

Type IV mass timber modifications proposed for the building code.

### Summary of Modification

Adds mass timber to the list of mass wall of mass materials and assemblies.

### Rationale

See uploaded rationale

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

No impact; just an addition to the list of qualifying materials/assemblies.

#### Impact to building and property owners relative to cost of compliance with code

No impact; just an addition to the list of qualifying materials/assemblies.

#### Impact to industry relative to the cost of compliance with code

No impact; just an addition to the list of qualifying materials/assemblies.

#### Impact to small business relative to the cost of compliance with code

### Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

Provides for an energy efficient alternative method of compliance.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

Improves the code by providing for an energy efficient alternative method of compliance.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

No material is required or prohibited by this modification.

**Does not degrade the effectiveness of the code**

Improves the code by providing for an energy efficient alternative method of compliance.



## Alternate Language

### 2nd Comment Period

EN10331-A1	<b>Proponent</b>	Greg Johnson	<b>Submitted</b>	8/11/2022 5:45:03 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> This is a simple material equity issue. There is no prohibition on the use of mass timber in the FL Building or Residential Codes. Such construction can be proposed and accepted currently. The proposed modification makes it clear that if a mass timber wall assembly meets the heat capacity performance requirements of R402.2.5 it can be considered a mass wall. R402.2.5 already recognizes solid timber/log walls. It should do the same for built up timber.					

### Fiscal Impact Statement

**Impact to local entity relative to enforcement of code**

none

**Impact to building and property owners relative to cost of compliance with code**

Might provide a more cost effective approach to energy code compliance

**Impact to industry relative to the cost of compliance with code**

Might provide a more cost effective approach to energy code compliance

**Impact to small business relative to the cost of compliance with code**

### Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

Energy efficiency related.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

Provides an equivalent method or system of construction

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

Eliminates discrimination against mass timber materials

**Does not degrade the effectiveness of the code**

Improves the code by providing flexibility

**[Modify 10331 as follows]**

**R402.2.5 Mass walls.**

Mass walls for the purposes of this chapter shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and any solid timber/logs, mass timber, or ~~any~~ other walls having a heat capacity greater than or equal to  $6 \text{ Btu/ft}^2 \cdot ^\circ\text{F}$  ( $123 \text{ kJ/m}^2 \cdot \text{K}$ ).

## R402.2.5 Mass walls.

Mass walls for the purposes of this chapter shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and solid timber/logs, mass timber, or any other walls having a heat capacity greater than or equal to  $6 \text{ Btu/ft}^2 \cdot ^\circ\text{F}$  ( $123 \text{ kJ/m}^2 \cdot \text{K}$ ).

**RE402.2.5 Mass timber added to mass walls**

The technical requirements for lightweight mass assemblies are in the commercial provisions of the IECC (C402.2.2) and ASHRAE 90.1. Both state that walls can be considered mass if they “have a heat capacity exceeding 5 Btu/ft<sup>2</sup> F where the material weight is not more than 120 pcf.” The following calculations demonstrate that typical mass timber walls and floors meet this requirement.

The heat capacity of mass timber is dominated by the wood. The Wood Handbook states that the heat capacity is “practically independent of density or species,” and gives equation 4-17, which calculates the heat capacity based upon moisture content and temperature. Using a temperature of 75 °F and a moisture content of 12%, the heat capacity is calculated as 0.393 Btu/lb °F. This calculated value for wood corresponds well with tested values for CLT (KLH rates its CLT at 0.382 Btu/lb °F). The closeness of these values show that the glue has little effect upon the heat capacity.

The temperature of 75 degrees is given in 16 CFR Part 460, which regulates R-values for home insulation (<https://www.ftc.gov/policy/federalregister-notices/16-cfr-part-460-labeling-advertising-home-insulation-trade-0>).

A moisture content of 12% is the average given in PRG 320: Standard for Performance-Rated Cross-Laminated Timber. Cross-Laminated Timber (CLT) is a type of mass timber.

Unit conversion is needed for comparison with the requirements in the IECC and ASHRAE 90.1, so a density and wall thickness need to be assumed. PRG 320 says that the minimum specific gravity of wood used shall be 0.35. Typical lumber species used in CLT manufacture range in specific gravity from 0.35-0.55. Denser wood will give a higher heat capacity. Per the Wood Handbook, the density of wood with a specific gravity of 0.35 and a moisture content of 12% is 24.0 lb/ft<sup>3</sup>. The density of wood with a specific gravity of 0.55 at 12% moisture content is 38.4 lb/ft<sup>3</sup>.

A 5-ply CLT assembly will be assumed with a thickness given in PRG 320 as 6 7/8". A thinner assembly will likely have gypsum wallboard, which is denser and has a higher heat capacity than wood.

By combining the above assumptions with the calculated heat capacity, typical mass timber CLT walls are shown to have a heat capacity of 5.4-8.6 Btu/ft<sup>2</sup> °F, which meet the requirement of the IECC and ASHRAE 90.1.

For floors, ASHRAE 90.1 has the same minimum heat capacity requirement as walls, so no further calculation is necessary, but the commercial IECC also requires a minimum weight of 25 psf where the material weight is 120 pcf or less. This requirement can be easily met by adding a concrete or gypcrete topping to the mass timber floor panel, which is common practice. Using the minimum CLT density and the same thickness as above, and assuming lightweight concrete topping of 90 pcf, 1.5 inches of concrete will meet the minimum weight requirement. Heavier concrete, denser wood species, or a thicker CLT panel will reduce the thickness of concrete topping needed to meet the weight requirement.

Bibliography: Forest Products Laboratory. Wood handbook - Wood as an engineering material. General Technical Report FPL-GTR-190. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory: 4-12 p.

2010 [https://www.fpl.fs.fed.us/documnts/fplgtr/fpl\\_gtr190.pdf](https://www.fpl.fs.fed.us/documnts/fplgtr/fpl_gtr190.pdf) {accessed 02-13-2022}

# TAC: Energy

Total Mods for **Energy** in **Denied** : 9

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10358

20

Date Submitted	02/15/2022	Section	402.5	Proponent	Laura Baker
Chapter	4	Affects HVHZ	No	Attachments	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language No**

**Related Modifications**

### Summary of Modification

This proposal updates the mandatory maximum fenestration Solar Heat Gain Coefficients (SHGC) permitted in the performance path consistent with improvements in prescriptive fenestration values.

### Rationale

The purpose of this code change proposal is to update the mandatory maximum Solar Heat Gain Coefficients (SHGC) permitted in the performance path consistent with improvements in prescriptive fenestration values made since the maximums were originally included in the code. The fenestration maximums have been in the IECC since the 2006 IECC, and have provided a critical backstop in the event of trade-offs, helping to ensure reasonable energy efficiency and occupant comfort. Over the past 16 years and 5 code update cycles that these backstops have been in place, prescriptive fenestration efficiencies have improved substantially, but the maximum U-factors and SHGCs have never been updated. To maintain the effectiveness of these backstops, we recommend that they be updated. The current SHGC maximum allows builders to essentially double the amount of heat gain (0.25 to 0.50) before hitting the current cap. Improving the SHGC trade-off maximum from 0.50 to 0.40 as we propose above still leaves more trade-off room than was available to builders in 2006 when the cap was originally instituted. We believe that the improved fenestration maximums will be easily met. In fact, based on data collected by the U.S. Department of Energy regarding Residential Energy across 8 states, we expect little or no change in homebuilding practices or any impact on homebuilding costs. In climate zones 1-3, of the 477 homes sampled, over 98% already complied with the proposed SHGC maximum of 0.40. See [https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.energycodes.gov%2Fsites%2Fdefault%2Ffiles%2F2019-09%2FPhase\\_I\\_Data\\_for\\_States\\_07192019.xlsx&wdOrigin=BROWSELINK](https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.energycodes.gov%2Fsites%2Fdefault%2Ffiles%2F2019-09%2FPhase_I_Data_for_States_07192019.xlsx&wdOrigin=BROWSELINK) Finally, this proposal was approved during the committee action hearings of the 2021 IECC code update process and didn't receive public comment, indicating that it was supported or not opposed by industry advocates.

### Fiscal Impact Statement

**Impact to local entity relative to enforcement of code**

This proposal will not fiscally impact any local entity relative to enforcement of code. Local officials are already enforcing the maximum weighted average complies; this merely updates the value.

**Impact to building and property owners relative to cost of compliance with code**

This proposal will either not affect or will provide energy cost savings for building and property owners from the improved SHGC backstop.

**Impact to industry relative to the cost of compliance with code**

This proposal will have no fiscal impact on industry. Because this is only a change to a trade-off backstop and not a code requirement and because such a high percentage of homebuilders are likely already meeting or exceeding this requirement, we expect no real cost impact in most cases.

**Impact to small business relative to the cost of compliance with code**

## Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

This proposal will improve the health and safety of the general public by making a common sense incremental improvement to the code which will increase occupant comfort.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This proposal will improve the code by making an incremental improvement to the maximum area-weighted SHGC in the performance path. The prescriptive requirements have improved in the last few cycles, so this will follow those.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This proposal does not discriminate against materials or systems of construction; it is merely an update of the tradeoff maximum for area-weighted SHGC.

**Does not degrade the effectiveness of the code**

This proposal will not degrade the effectiveness of the code; it is an improvement to the code.

## 2nd Comment Period

EN10358-G3	Proponent	Laura Baker	Submitted	8/26/2022 4:40:54 PM	Attachments	No
	Comment:					
	This code proposal should be adopted; this proposal reduces the SHGC backstop for the performance path from 0.50 to 0.40. This value has remained stagnant while prescriptive SHGC values have steadily improved over the last few code cycles. Updating this value will keep it consistent with the prescriptive SHGC values in effect in Florida. Because many builders are already achieving these SHGC values, this should be a common sense, low-cost improvement to the code.					

## 1st Comment Period History

EN10358-G1	Proponent	Timothy de Carion	Submitted	3/7/2022 1:41:09 PM	Attachments	No
	Comment:					
	I agree with this proposal. Minimum values should be lowered to save energy.					

## 1st Comment Period History

	Proponent	Amanda Hickman	Submitted	4/14/2022 11:13:47 AM	Attachments	No
	Comment:					
	LBA does not support the modification. as it is not appropriate for Florida and/or is not cost justified.					

## R405.5.3.4 Maximum fenestration SHGC.

The Proposed Design must have either an area-weighted average maximum fenestration SHGC of ~~0.50~~0.40 or a window area-weighted average overhang depth of 4.0 feet or greater (all conditioned space windows must be included in the calculation). The area-weighted average maximum fenestration *U*-factor permitted using tradeoffs from Section R402.1.5 or R405 shall be 0.48 in Climate Zones 4 and 5 and 0.40 in Climate Zones 6 through 8 for vertical fenestration, and 0.75 in Climate Zones 4 through 8 for skylights. The area-weighted average maximum fenestration SHGC permitted using tradeoffs from Section R405 in Climate Zones 1 through 3 shall be ~~0.40~~0.50.

# TAC: Energy

Total Mods for **Energy** in **Denied** : 9

Total Mods for report: 21

## Sub Code: Energy Conservation

EN10370

21

Date Submitted	02/14/2022	Section	404	Proponent	John Hall
Chapter	4	Affects HVHZ	No	Attachments	Yes
TAC Recommendation	Denied				
Commission Action	Pending Review				

### Comments

**General Comments Yes**

**Alternate Language Yes**

**Related Modifications**

### Summary of Modification

The proposed modification provides for infrastructure to accommodate future electric vehicle charging equipment in one- and two-family dwellings and townhouses with garages.

### Rationale

Florida is ranked number two in the United States for the number of registered electric vehicle as of the latest ranking in June 2021. EVs provide significant economic benefits for consumers through fuel and maintenance cost savings, and have been identified as a key climate strategy to reduce GHG emissions from the U.S. transportation sector. The interest in EVs has grown alongside greater EV model availability and increased vehicle range. Every major auto manufacturer in the world has announced a plan to electrify a significant portion of their vehicle fleets over the next 3-5 years. Ford recently announced an \$11 billion investment to reach their goal of 40 EV models by 2022. The goal for GM: 20 EV models by 2023; for VW: 27 EV models by 2022; for Toyota: 10 BEVs by the early 2020's; and similar goals for Volvo, Daimler, Nissan, BMW, and Fiat-Chrysler. However, the lack of access to EV charging stations continues to be a critical barrier to EV adoption. In particular, there are significant logistical barriers for commercial building tenants to upgrade existing electrical infrastructure and install new EV charging stations. A lack of pre-existing EV charging infrastructure, such as electrical panel capacity, raceways, and pre-wiring, can make the installation of a new charging station cost-prohibitive for a potential EV-owner. The installation of an EV charging equipment is made significantly less expensive when the infrastructure is installed during the initial construction phase as opposed to retrofitting existing homes to accommodate the new electrical equipment.

### Fiscal Impact Statement

#### Impact to local entity relative to enforcement of code

There will be no cost impact relative to enforcement of the code due to this proposed modification. The inspection activity will be performed during already required inspections that are regularly scheduled.

#### Impact to building and property owners relative to cost of compliance with code

The cost impact to building and property owners for compliance with the proposed modification will be negligible. The modification seeks only the provision of a raceway and space in the electrical panel to facilitate



the installation of EV charging equipment at a future date.

**Impact to industry relative to the cost of compliance with code**

The cost impact to industry will likewise be negligible due to the limited scope of the proposed modification. No installation of equipment, wiring, or outlet is required by the modification. Only an empty raceway and space in the electrical panel for the future circuit breaker is envisioned.

**Impact to small business relative to the cost of compliance with code**

## Requirements

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

The proposed modification has a connection with the health, safety, and welfare of the general public through reduction of emissions from the use of fossil fuels and the economic savings of operating an electric vehicle versus the cost of operating fossil fuel powered vehicles.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

The proposed modification improves the code by making provision for the implementation of better products and methods of powering transportation. Electrical vehicle use is increasing annually and these systems are crucial to further adoption of the technology.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

The proposed modification does not discriminate against any materials, products, methods, or systems of construction as none are specified. The modification simply provides for the easier implementation of the technology with no destructive effect to the structure.

**Does not degrade the effectiveness of the code**

The proposed modification does not degrade the effectiveness of the code. The implementation of the code is enhanced through the provision of simplified means of compliance for property owners desiring to operate electric vehicles.

## Alternate Language

### 2nd Comment Period

EN10370-A3	<b>Proponent</b>	John Hall	<b>Submitted</b>	8/22/2022 3:24:13 PM	<b>Attachments</b>	Yes
	<b>Rationale:</b> The intent of this comment is to create an appendix to allow jurisdictions to adopt provisions for electric vehicle charging equipment in new commercial construction.					

#### Fiscal Impact Statement

##### Impact to local entity relative to enforcement of code

There will be no impact unless adopted by the local jurisdiction.

##### Impact to building and property owners relative to cost of compliance with code

There will be no impact unless adopted by the local jurisdiction.

##### Impact to industry relative to the cost of compliance with code

There will be no impact unless adopted by the local jurisdiction.

##### Impact to small business relative to the cost of compliance with code

#### Requirements

##### Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This is an alternate language comment. The proposed appendix will reduce carbon emissions and traffic noise.

##### Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed appendix improves the code by providing a easy way to adopt electric vehicle charging without have to impose it on jurisdictions that are not ready to do so.

##### Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed appendix does not discriminate against any materials, products, methods, or systems of construction.

##### Does not degrade the effectiveness of the code

This proposed appendix does not degrade the code in any way. On the contrary, it provides another option for jurisdictions to meet problems they feel are important.

### 1st Comment Period History

EN10370-A1	<b>Proponent</b>	Bryan Holland	<b>Submitted</b>	3/28/2022 10:30:55 AM	<b>Attachments</b>	Yes
	<b>Rationale:</b> This alternative proposed modifications makes a few minor revisions to the original proposed modification. This includes a slight revision to the definition of "EVSE," the inclusion of "cable assemblies" in R404.2.3, and editorial revisions to 404.2.4 and 404.25 to provide technical clarity. Otherwise, NEMA fully supports the concept of EV-ready provisions in the FBC-EC as proposed and substantiated in the original proposed modification. NEMA urges the TAC(s) and Commission approve this proposed modification.					

#### Fiscal Impact Statement

##### Impact to local entity relative to enforcement of code

This alternative proposed modification provides clear and enforceable language for the AHJ.

##### Impact to building and property owners relative to cost of compliance with code

This alternative proposed modification will increase the cost compliance for building/property owners at time of initial construction while reducing the cost of compliance for an existing building that does not have the capacity or infrastructure in-place for the installation of EVSE.

##### Impact to industry relative to the cost of compliance with code

This alternative proposed modification will increase the cost of compliance for industry.

##### Impact to small business relative to the cost of compliance with code

## Requirements

### **Has a reasonable and substantial connection with the health, safety, and welfare of the general public**

This alternative proposed modification improves the general welfare of the public as the electrification of transportation becomes a fundamental of modern society.

### **Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**

This alternative proposed modification improves the code.

### **Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**

This alternative proposed modification does not discriminate against materials, products, methods, or system of construction.

### **Does not degrade the effectiveness of the code**

This alternative proposed modification improves the effectiveness of the code.

## 1st Comment Period History

EN10370-G1	Proponent	John Hall	Submitted	3/31/2022 10:33:59 AM	Attachments	No
	Comment: I support the alternate language comment submitted by Bryan Holland and endorse it's submission to the TAC(s) for consideration of inclusion in the 2023 FBC.					

## 1st Comment Period History

EN10370-G2	Proponent	Susannah Troner	Submitted	4/12/2022 11:10:38 PM	Attachments	No
	Comment: Writing to express SUPPORT for proposed code modification EN 10370. Residential requirements for basic electrical panel capacity, raceways, and pre-wiring for new one- and two-family dwellings and townhouses with garages will help avoid extreme costs of retrofitting existing homes to install EVSE while having negligible cost impacts. Approximately 80% of EV owners prefer to charge at home as it is more convenient and electricity is cheaper at home compared to using fee-based public chargers that are limited in availability. Our office is responding to more and more inquiries every day from community members regarding EVSE. It is time to require these basic elements to help avoid EVSE scarcity and extreme costs. In addition, the transportation sector generates 55% of our community's carbon pollution and EVs greatly reduce this pollution, resulting in community health and safety benefits which are core objectives of the Florida Building Code.					

## 1st Comment Period History

EN10370-G3	Proponent	kamrath christian	Submitted	4/13/2022 12:33:46 PM	Attachments	No
	Comment: I am writing to express support for proposed code modification EN 10370. We need to be continually adapt how we build to account for growing demand of EV charging in a convenient way. Residential requirements for basic electrical panel capacity, raceways, and pre-wiring for new one- and two-family dwellings and townhouses with garages will help avoid extreme costs of retrofitting existing homes to install EVSE while having negligible cost impacts. Approximately 80% of EV owners prefer to charge at home as it is more convenient and electricity is cheaper at home compared to using fee-based public chargers that are limited in availability. Our office is responding to more and more inquiries every day from community members regarding EVSE. It is time to require these basic elements to help avoid EVSE scarcity and extreme costs. In addition the transportation sector generates 55% of our community's carbon pollution and EVs greatly reduce this pollution, resulting in community health and safety benefits which are core objectives of the Florida Building Code.					

## 1st Comment Period History

EN10370-G4 Proponent Matthew Chen Submitted 4/13/2022 4:35:14 PM Attachments No  
Comment:  
SemaConnect, a leading provider of electric vehicle charging solutions based in Bowie, Maryland with many projects in Florida, supports the alternate language comment submitted by Bryan Holland. We respectfully recommend it to the TAC(s) for consideration of inclusion in the 2023 Florida Building Code. Proposed code modification EN 10370 establishes modest but necessary EVSE residential requirements for new construction.

### 1st Comment Period History

EN10370-G5 Proponent Nicholas Gunia Submitted 4/14/2022 10:07:57 AM Attachments No  
Comment:  
As past Chair of the Miami Branch of the South Florida Chapter of the US Green Building Council, I am writing to voice my support for EN10370 for requiring new dwellings to have EVSE. I believe the proposed changes will help future proof our dwellings given the rise of EVs. As such, the proposed changes should be adopted.

### 1st Comment Period History

EN10370-G6 Proponent Amanda Hickman Submitted 4/14/2022 11:14:07 AM Attachments No  
Comment:  
LBA does not support the modification, as it is not appropriate for Florida and/or is not cost justified.

### 1st Comment Period History

EN10370-G7 Proponent Jeff Sonne for FSEC Submitted 4/14/2022 1:53:47 PM Attachments No  
Comment:  
FSEC supports Alternate Language Comment A1.

### 1st Comment Period History

EN10370-G8 Proponent Jared Walker Submitted 4/14/2022 2:23:47 PM Attachments No  
Comment:  
The Electrification Coalition (EC) is a national, nonpartisan, not-for-profit organization committed to promoting policies and actions that facilitate the deployment of electric vehicles on a mass scale to combat the national security, economic, and public health impacts associated with our nation's dependence on oil. The EC SUPPORTS proposed code modification EN 10370, establishing modest but necessary EVSE residential requirements for new construction. Many EV owners rely heavily on at-home charging for up to 80% of their charging needs. Not having access to such charging creates barriers to ownership for tenants. And while installing EV charging adds modest cost to projects, integrating charging into buildings during construction, rather than retro-fitting, has been found to save up to 80% in project costs.

### 1st Comment Period History

EN10370-G9 Proponent Estela Tost Submitted 4/14/2022 6:39:31 PM Attachments Yes  
Comment:  
I am in support of EN10370 for electric vehicle charging infrastructure to require design of one and two family dwellings to include future installation capabilities of electric vehicle supply equipment (EVSE)

## 1st Comment Period History

EN10370-G10 Proponent Richard Logan Submitted 4/15/2022 9:56:09 AM Attachments No  
Comment:  
AIA Florida supports this code modification with the alternate language

## 1st Comment Period History

EN10370-G11 Proponent James Ellis Submitted 4/15/2022 2:27:37 PM Attachments No  
Comment:  
EV Connect, a leading electric vehicle infrastructure network and services provider with many EVSE projects in Florida, SUPPORTS proposed code modification EN 10370, which establishes modest but necessary EVSE residential requirements for new construction. This proactive code increases construction costs slightly but has a significant positive savings over retrofit for EVSE for the life of the property.

## 1st Comment Period History

EN10370-G12 Proponent Sandra St. Hilaire Submitted 4/15/2022 2:43:56 PM Attachments No  
Comment:  
Writing to express support for proposed code modification EN 10370. Residential requirements for basic electrical panel capacity, raceways, and pre-wiring for new one- and two-family dwellings and townhouses with garages will help avoid extreme costs of retrofitting existing homes to install EVSE while having negligible cost impacts. Approximately 80% of EV owners prefer to charge at home as it is more convenient and electricity is cheaper at home compared to using fee-based public chargers that are limited in availability. Our office is responding to more and more inquiries every day from community members regarding EVSE. It is time to require these basic elements to help avoid EVSE scarcity and extreme costs. In addition the transportation sector generates 55% of our community's carbon pollution and EVs greatly reduce this pollution, resulting in community health and safety benefits which are core objectives of the Florida Building Code.

## 1st Comment Period History

EN10370-G13 Proponent Mike Gibaldi Submitted 4/15/2022 4:41:26 PM Attachments No  
Comment:  
Our firm, Brickell Energy, with many EVSE projects throughout the State, fully SUPPORTS this proposed code modification, which establishes modest but necessary EVSE residential requirements for new construction. This will make it much easier for people to transition to safer, emission-free electric vehicles because the difficult retrofit costs will be avoided.

## 1st Comment Period History

EN10370-G14

Proponent Chris Sanchez Submitted 4/15/2022 5:11:01 PM Attachments No  
Comment:

I am in favor of the proposed code modification for EN10370 Residential requirements for basic electrical panel capacity, raceways, and pre-wiring for new one- and two-family dwellings and townhouses with garages will help avoid extreme costs of retrofitting existing homes to install EVSE while having negligible cost impacts. Approximately 80% of EV owners prefer to charge at home as it is more convenient and electricity is cheaper at home compared to using fee-based public chargers that are limited in availability. Our office is responding to more and more inquiries every day from community members regarding EVSE. It is time to require these basic elements to help avoid EVSE scarcity and extreme costs. In addition the transportation sector generates 55% of our community's carbon pollution and EVs greatly reduce this pollution, resulting in community health and safety benefits which are core objectives of the Florida Building Code.

1st Comment Period History

EN10370-G15

Proponent Marta Marello Submitted 4/17/2022 3:56:19 PM Attachments No  
Comment:

I express support for proposed code modification EN 10370. Retrofitting existing homes to install EVSE is extremely costly while integrating residential requirements for basic electrical panel capacity, raceways, and pre-wiring for new one- and two-family dwellings and townhouses with garages is a much more cost-effective way to accommodate skyrocketing EV use. Approximately 80% of EV owners prefer to charge at home as it is more convenient and electricity is cheaper compared to using fee-based public chargers that are limited in availability. Miami-Dade County's Office of Resilience is spending significantly more time responding to inquiries every day from community members regarding EVSE. It is time to require these basic elements to help transition households into the future without adding to the cost. In addition the transportation sector is the number one contributor to community's carbon pollution and EVs greatly reduce this pollution, resulting in community health and safety benefits which are core objectives of the Florida Building Code.

## APPENDIX RE

### ELECTRIC VEHICLE CHARGING PROVISIONS FOR ONE- AND TWO-FAMILY DWELLINGS AND TOWNHOUSES

*(The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.)*

#### SECTION RE 101

##### SCOPE

##### RE 101.1 General.

These provisions shall be applicable for new construction where electric vehicle charging provisions are required.

#### SECTION RE 102

##### DEFINITIONS

**ELECTRIC VEHICLE (EV).**An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are electric vehicles having a second source of motive power. Off-road, self-propelled electric mobile equipment, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats, and the like are not considered electric vehicles.

**ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE).**The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the *Electric Vehicle* connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the *Electric Vehicle*.

**EV CAPABLE SPACE.** Electrical panel capacity and space to support a minimum 40-ampere, 240-volt branch circuit for each EV parking space, and the installation of raceways, both underground and surface mounted, to support the EVSE.

## **SECTION RE 103**

### **REQUIREMENTS FOR ELECTRIC VEHICLE CHARGING**

**RE 103.1 New one- and two-family dwellings and townhouses with attached or detached private garages.** Each dwelling unit with an attached or detached garage shall be designed with provision for future installation of *electric vehicle supply equipment* in accordance with this section.

-

#### **RE 103.2 Raceway.**

-

A listed raceway of minimum trade size 1 shall be installed to accommodate a branch circuit for *electric vehicle supply equipment*.

-

The raceway shall originate at the main electrical panel or a properly rated sub-panel, and terminate in a listed box or enclosure in close proximity to the proposed location of the *electric vehicle supply equipment*.

-

The raceway shall be continuous from the point of origin to the termination at the proposed location of the *electric vehicle supply equipment*.

-

The enclosure provided for future *electric vehicle supply equipment* shall be labeled "EV CAPABLE". The label shall comply with NFPA 70 Section 110.21(B).

-

#### **RE 103.3 Service capacity.**

-

The electrical panel from which the *electric vehicle supply equipment* branch circuit originates shall be rated for, and be provided with open space for installation of a two-pole 40-ampere overcurrent protective device. The provided overcurrent device space(s) shall be identified in the panel circuit directory as "EV CAPABLE".



**R404.2 Electric vehicle (EV) charging for new construction.**

New construction shall comply with this Section to facilitate future installation of *electric vehicle supply equipment*.

**R404.2.1 Definitions.**

**ELECTRIC VEHICLE (EV).** An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are electric vehicles having a second source of motive power. Off-road, self-propelled electric mobile equipment, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats, and the like are not considered electric vehicles.

**ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE).** Equipment for plug-in power transfer, including the ungrounded, grounded, and equipment grounding conductors, and the *electric vehicle* connectors, attachment plugs, personnel protection system, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

**EV CAPABLE SPACE.** Electrical panel capacity and space to support a minimum 40-ampere, 240-volt branch circuit for each EV parking space, and the installation of raceways, both underground and surface mounted, to support the *EVSE*.

**R404.2.2 New one- and two-family dwellings and townhouses with attached or detached private garages.** For each dwelling unit with an attached or detached garage shall be designed with provision for future installation of *electric vehicle supply equipment* in accordance with Section R404.2.3, R404.2.4, and R404.2.5.

**R404.2.3 Wiring Method.**

A listed raceway of minimum trade size 1 or listed cable assembly with conductors having an ampacity not less than 40 amperes shall be installed to accommodate a branch circuit for *electric vehicle supply equipment*.

The raceway or cable assembly shall originate at properly rated electrical distribution equipment and terminate and outlet box, enclosure, or properly rated receptacle in close proximity to the proposed location of the *electric vehicle supply equipment*.

The raceway or cable assembly shall be continuous from the point of origin to the termination at the proposed location of the *electric vehicle supply equipment*.

The box or enclosure provided for future *electric vehicle supply equipment* shall be labeled "FOR EVSE USE". The label shall comply with NFPA 70 Section 110.21(B).

**R404.2.4 Service Capacity.**

The electrical service shall be sized to accommodate a minimum 40-ampere, 240-volt branch (9,600 volt-amperes) circuit for *electric vehicle supply equipment*.

**R404.2.5 Electrical distribution equipment capacity.**

The electrical distribution equipment from which the *electric vehicle supply equipment* branch circuit originates shall be provided with adequate space for installation of a two-pole overcurrent protective device and have

additional capacity not less than 40 amperes or 9,600 volt-amperes. The provided overcurrent device space(s) shall be identified on the circuit directory as "FOR EVSE USE".

## SECTION R404

## ELECTRICAL POWER AND LIGHTING SYSTEMS

## R404.1 Lighting equipment (Mandatory).

Not less than 90 percent of the lamps in permanently installed luminaires shall have an efficacy of at least 45 lumens-per-watt or shall utilize lamps with an efficacy of not less or shall utilize lamps with an efficacy of not less than 65 lumens-per-watt.

## R404.1.1 Lighting equipment (Mandatory).

Fuel gas lighting systems shall not have continuously burning pilot lights.

**R404.2 Electric vehicle (EV) charging for new construction.**

New construction shall comply with this Section to facilitate future installation of *electric vehicle supply equipment*.

**R404.2.1 Definitions.**

**ELECTRIC VEHICLE (EV).** An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are electric vehicles having a second source of motive power. Off-road, self-propelled electric mobile equipment, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats, and the like are not considered electric vehicles.

**ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE).** The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the *Electric Vehicle* connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the *Electric Vehicle*.

**EV CAPABLE SPACE.** Electrical panel capacity and space to support a minimum 40-ampere, 240-volt branch circuit for each EV parking space, and the installation of raceways, both underground and surface mounted, to support the *EVSE*.

**R404.2.2 New one- and two-family dwellings and townhouses with attached or detached private garages.** For each dwelling unit with an attached or detached garage shall be designed with provision for future installation of *electric vehicle supply equipment* in accordance with Section R404.2.3, R404.2.4, and R404.2.5.

**R404.2.3 Raceway.**

A listed raceway of minimum trade size 1 shall be installed to accommodate a branch circuit for *electric vehicle supply equipment*.

The raceway shall originate at the main electrical panel or a properly rated sub-panel, and terminate in a listed box or enclosure in close proximity to the proposed location of the *electric vehicle supply equipment*.

The raceway shall be continuous from the point of origin to the termination at the proposed location of the *electric vehicle supply equipment*.

The enclosure provided for future *electric vehicle supply equipment* shall be labeled “EV CAPABLE”. The label shall comply with NFPA 70 Section 110.21(B).

#### **R404.2.4 Service Capacity.**

The electrical service shall be sized to accommodate a minimum 40-ampere 240-volt branch circuit for *electric vehicle supply equipment*.

#### **R404.2.5 Electrical panel capacity.**

The electrical panel from which the electric vehicle supply equipment branch circuit originates shall be rated for, and be provided with open space for installation of a two-pole 40-ampere overcurrent protective device. The provided overcurrent device space(s) shall be identified in the panel circuit directory as “EV CAPABLE”.



Proposed Code Modifications

USER: Estela Toet

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Required Fields

Modification #

EN10370-G9

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Code Change Cycle

2023 Triennial First Comment Period 03/03/2022 - 04/17/2022

Code Version

2021

Sub Code

Energy Conservation

Chapter & Topic

Chapter 4 - (K6) - Residential Energy Efficiency

Section

401

-

Status

Pending DBPR Review

General Comment\*

I am in support of EN10370 for electric vehicle charging infrastructure to require design of one and two family dwellings to include future installation capabilities of electric vehicle supply equipment (EVSE)

Upload Comment File

Date Submitted

04/14/2022

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Proposed Code Modifications

USER: Estela Toet

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Required Fields

Modification #

EN10370-G9

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Code Change Cycle

2023 Triennial First Comment Period 03/03/2022 - 04/17/2022

Code Version

2021

Sub Code

Energy Conservation

Chapter & Topic

Chapter 4 - (K) - Residential Energy Efficiency

Section

401

-

Status

Pending DBPR Review

General Comment\*

I am in support of EN10370-U for electric vehicle charging infrastructure to require design of one and two family dwellings to include future installation capabilities of electric vehicle supply equipment (EVSE)

Upload Comment File

Date Submitted

04/14/2022

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