

## **Proposed Code Modifications**

**This document created by the Florida Department of Business and Professional Regulation -  
850-487-1824**

**WITHOUT COMMENTS**

# TAC: Mechanical

Total Mods for **Mechanical** in **Approved as Submitted: 9**

Total Mods for report: 14

## Sub Code: Mechanical

M6750

1

<b>Date Submitted</b>	12/21/2015	<b>Section</b>	601.6	<b>Proponent</b>	Jeff Sonne / FSEC
<b>Chapter</b>	6	<b>Affects HVHZ</b>	No	<b>Attachments</b>	No
<b>TAC Recommendation</b>	Approved as Submitted				
<b>Commission Action</b>	Pending Review				

### Comments

**General Comments** No **Alternate Language** No

#### Related Modifications

6748

#### Summary of Modification

Balanced return air requirement and exceptions.

#### Rationale

Restricted return air affects building pressures and increases air infiltration which in turn increases energy use and can cause comfort, building durability, and health and safety issues. This modification reduces restricted return air and these related issues.

Supporting publication:

Cummings, J., C. Withers, &quot;Balanced Return Air, Duct Airtightness, and Combustion/Dilution Air Code Compliance in 40 Central Florida Homes&quot; Florida Solar Energy Center, FSEC-CR-1789-06, Nov. 29, 2006.  
(<http://www.fsec.ucf.edu/en/publications/pdf/FSEC-CR-1789-06.pdf>)

#### Fiscal Impact Statement

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

Some additional effort to verify compliance. Proposed language is in the 2014 Florida Building Code.

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

Some additional cost in some cases. Proposed language is in the 2014 Florida Building Code.

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

Cost is justified since restricted return air affects building pressures and increases air infiltration which in turn increases energy use and can cause comfort, building durability, and health and safety issues. Proposed language is in the 2014 Florida Building Code.

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

Cost is justified since restricted return air affects building pressures and increases air infiltration which in turn increases energy use and can cause comfort, building durability, and health and safety issues. Proposed language is in the 2014 Florida Building Code.

#### Requirements

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

Yes. Restricted return air affects building pressures and increases air infiltration which in turn increases energy use and can cause comfort, building durability, and health and safety issues. Proposed language is in the 2014 Florida Building Code.

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

Yes. Restricted return air affects building pressures and increases air infiltration which in turn increases energy use and can cause comfort, building durability, and health and safety issues. Proposed language is in the 2014 Florida Building Code.

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

No. Proposed language is in the 2014 Florida Building Code.

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

Increases code effectiveness. Proposed language is in the 2014 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

**The provisions contained in the proposed amendment are addressed in the applicable international code?**

NO

**The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?**

OTHER

**Explanation of Choice**

[Yes.] Florida is largely a ducted HVAC system state and this affects us as much or more than other states. It is important for Florida to keep its balanced return air requirement for the reasons provided above; allowing the requirement to lapse until it is included in the IMC or IRC would be confusing, potentially cause safety and health issues, provide poorer energy performance and is not in the interest of the state.

**The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?**

YES

**601.6 Balanced Return Air.**

Restricted return air occurs in buildings when returns are located in central zones and closed interior doors impede air flow to the return grill or when ceiling spaces are used as return plenums and fire walls restrict air movement from one portion of the return plenum to another. Provisions shall be made in both residential and commercial buildings to avoid unbalanced air flows and pressure differentials caused by restricted return air. Pressure differentials across closed doors where returns are centrally located shall be limited to 0.01 inch WC (2.5 pascals) or less. Pressure differentials across fire walls in ceiling space plenums shall be limited to 0.01 inch WC (2.5 pascals) by providing air duct pathways or air transfer pathways from the high pressure zone to the low zone.

**Exceptions:**

1. Transfer ducts may achieve this by increasing the return transfer 1½ times the cross sectional area (square inches) of the supply duct entering the room or space it is serving and the door having at least an unrestricted 1 inch undercut to achieve proper return air balance.
2. Transfer grilles shall use 50 square inches (of grille area) to 100 cfm (of supply air) for sizing through-the-wall transfer grilles and using an unrestricted 1 inch undercutting of doors to achieve proper return air balance.
3. Habitable rooms only shall be required to meet these requirements for proper balanced return air excluding bathrooms, closets, storage rooms and laundry rooms, except that all supply air into the master suite shall be included.

<b>Date Submitted</b>	1/1/2016	<b>Section</b>	603.7	<b>Proponent</b>	Cheryl Harris
<b>Chapter</b>	6	<b>Affects HVHZ</b>	No	<b>Attachments</b>	No
<b>TAC Recommendation</b>	Approved as Submitted				
<b>Commission Action</b>	Pending Review				

**Comments**

<b>General Comments</b>	No	<b>Alternate Language</b>	No
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**Related Modifications**

**Summary of Modification**

Allows for an alternative material, foil-faced fiberglass duct in garages that does not compromise fire protection or allow harmful gases to penetrate the dwelling.

**Rationale**

Rigid foil-faced fiberglass duct is a proven equivalent or better material than sheet steel for ducts in garages that penetrate a wall or ceiling for fire retardation or smoke/gas infiltration.

**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**

Allowing fiberglass duct is more cost effective in Florida than steel and would reduce cost of installation and materials up to \$1,000 or more.

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

Allowing fiberglass duct is more cost effective in Florida than steel and would reduce cost of installation and materials up to \$1,000 or more.

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

Allowing fiberglass duct is more cost effective in Florida than steel and would reduce cost of installation and materials up to \$1,000 or more.

**Requirements**

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

Use of rigid, foil-faced fiberglass duct in garages provides the same protection or better steel ducts.

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

Improves the code by allowing proven equivalent or better products for ductwork in Florida.

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

The original code discriminates against a proven alternative material for ductwork. Including fiberglass ductwork will eliminate that discrimination

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

The modification does not degrade the effectiveness of the code.

**Is the proposed code modification part of a prior code version? No**

Duct system penetrations of walls, floors, ceilings and roofs and air transfer openings in such building components shall be protected as required by Section 607. Ducts in a private garage that penetrate a wall or ceiling that separates a dwelling from a private garage shall be continuous, shall be constructed of sheet steel having a thickness of not less than 0.0187 inch (0.4712 mm) (No.26gage) or rigid foil-faced fiberglass, and shall not have openings into the garage. Fire and smoke dampers are not required in such ducts passing through the wall or ceiling separating a dwelling from a private garage except where required by Chapter 7 of the *International Building Code*.

<b>Date Submitted</b>	1/1/2016	<b>Section</b>	606	<b>Proponent</b>	Cheryl Harris
<b>Chapter</b>	6	<b>Affects HVHZ</b>	No	<b>Attachments</b>	Yes
<b>TAC Recommendation</b>	Approved as Submitted				
<b>Commission Action</b>	Pending Review				

**Comments**

<b>General Comments</b>	No	<b>Alternate Language</b>	No
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**Related Modifications**

**Summary of Modification**

Eliminates duplication of Smoke Detectors in both the supply and return side of air distribution systems and other changes to be in compliance with the Florida Fire Code.

**Rationale**

Eliminates conflicts of Smoke Detectors in both the supply and return side of air distribution systems and other changes to be in compliance with the Florida Fire Prevention Code and NFPA 90.

**Fiscal Impact Statement**

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

Simplifies enforcement.

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

Eliminates the cost of a duplicate smoke detector system and wiring to Fire Alarm systems which could save \$500 to \$2000 in cost per system.

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

Reduces the cost in time and materials to install duplicate smoke detector systems and wiring to Fire Alarm systems. Savings could range from \$500 to \$2000 per system on average.

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

Eliminates the cost of a duplicate smoke detector system and wiring to Fire Alarm systems which could save \$500 to \$2000 in cost per system.

**Requirements**

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

Modification follows Florida Fire Code requirements for life and safety.

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

Modification improves the code by eliminating conflicting requirements for Fire Alarm placement in air distribution systems.

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

There are no proprietary materials, products, methods required and follows Florida Fire Code requirements.

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

Eliminating requirement for smoke detectors in both the return and supply side of an air distribution system does not degrade the effectiveness of the code as it follows Florida Fire Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

NO

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

YES

1st Comment Period History

7011-A1	<b>Proponent</b>	Don Whitehead	<b>Submitted</b>	2/4/2016	<b>Attachments</b>	Yes
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**Rationale**

1. The exception in 606.2 states that smoke detectors shall not be required for air distribution systems that are incapable of spreading smoke beyond the enclosing walls, floors and ceilings of the room or space in which the smoke is generated; however, this exception does not take into account the importance of student safety in educational areas. Student areas require close supervision and monitoring systems to ensure hazards are quickly identified and reported to the appropriate agencies. Therefore, smoke detectors should be required in such occupancies. 2. Smoke detectors are currently required in the supply ducts under NFPA 90A; therefore, the FBC, Building, 606 should be updated to include this requirement for smoke detectors in the supply ducts. However, smoke detectors should also be considered as necessary in the return ducts for the following reasons: a. Smoke contaminants can be more difficult to detect in the turbulent air which is discharged from the supply ducts. b. Smoke detectors in the return ducts can allow for faster recognition of the smoke's point of origin. 3. Because student areas require close supervision and monitoring, it is necessary to provide appropriate systems to prevent the oversight of hazardous conditions. Therefore when facilities are monitored by supervising stations; although it may be permissible to allow one (1) duct smoke detector signal to be reported as a supervisory signal, two (2) signals would indicate a high probability that an actual hazard exists and a fire alarm should be activated.

**Fiscal Impact Statement**

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

No change from current requirement.

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

No change from current requirement.

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

No change from current requirement.

**Impact to Small Business relative to the cost of compliance with code**

Eliminates the cost of a duplicate smoke detector system and wiring to Fire Alarm systems which could save \$500 to \$2000 in cost per system.

**Requirements**

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

No change from current requirement.

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

No change from current requirement.

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

No change from current requirement.

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

No change from current requirement.

**Is the proposed code modification part of a prior code version? No**



## SECTION 606

### SMOKE DETECTION SYSTEMS CONTROL

#### 606.1 Controls required.

Air distribution systems shall be equipped with smoke detectors *listed* and *labeled* for installation in air distribution systems, as required by this section. Duct smoke detectors shall comply with UL 268A. Other smoke detectors shall comply with UL 268.

**606.2 Where required.** Smoke detectors shall be installed where indicated in Sections 606.2.1 through 606.2.3.

~~**Exception:** Smoke detectors shall not be required where air distribution systems are incapable of spreading smoke beyond the enclosing walls, floors and ceilings of the room or space in which the smoke is generated.~~

#### 606.2.1

To prevent the recirculation of dangerous quantities of smoke, a detector approved for air duct use shall be installed on the Supply side of air-handling systems as required by NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*. Smoke detectors listed for use in air distribution systems shall be located downstream of the air filters and ahead of any branch connections in air supply systems having the capacity greater than 2000 cuft/min.

#### ~~Return air systems.~~

~~Smoke detectors shall be installed in return air systems with a design capacity greater than 2,000 cfm (0.9 m<sup>3</sup>/s), in the return air duct or *plenum* upstream of any filters, *exhaust air* connections, outdoor air connections, or decontamination *equipment* and appliances.~~

**Exception:** Smoke detectors are not required in the ~~return~~ supply air system where all portions of the building served by the air distribution system are protected by area smoke detectors connected to a fire alarm system in accordance with the *International Fire Code*. The area smoke detection system shall comply with Section 606.4.

#### **606.2.2 Common supply and return air systems.**

Where multiple air-handling systems share common supply ~~or return air ducts or plenums~~ with a combined design capacity greater than 2,000 cfm (0.9 m<sup>3</sup>/s), ~~the~~ each supply ~~return~~ air system shall be provided with smoke detectors in accordance with Section 606.2.1.

**Exception:** Individual smoke detectors shall not be required for each fan-powered

terminal unit, provided that such units do not have an individual design capacity greater than 2,000 cfm (0.9 m<sup>3</sup>/s) and will be shut down by activation of one of the following:

1. Smoke detectors required by Sections 606.2.1 and 606.2.3.
2. An *approved* area smoke detector system located in the return air *plenum* serving such units.
3. An area smoke detector system as prescribed in the exception to Section 606.2.1.

In all cases, the smoke detectors shall comply with Sections 606.4 and 606.4.1.

### **606.2.3 Return air risers.**

Where return air risers serve two or more stories and serve any portion of a return air system having a design capacity greater than 15,000 cfm (7.1 m<sup>3</sup>/s), smoke detectors shall be installed at each story. Such smoke detectors shall be located upstream of the connection between the return air riser and any air ducts or plenums.

### **[F] 606.3 Installation.**

Smoke detectors required by this section shall be installed in accordance with NFPA 72. The required smoke detectors shall be installed to monitor the entire airflow conveyed by the system

~~including return air and exhaust or relief air.~~ **Smoke detectors shall not be required for fan units whose sole function is to remove air from the inside of the building to the outside of the building.** Access shall be provided to smoke detectors for inspection and maintenance.

### **[F] 606.4 Controls operation.**

Upon activation, the smoke detectors shall shut down all operational capabilities of the air distribution system in accordance with the listing and labeling of appliances used in the system.

Air distribution systems that are part of a smoke control system shall switch to the smoke control mode upon activation of a detector.

**[F] 606.4.1 Supervision.**

The duct smoke detectors shall be connected to a fire alarm system where a fire alarm system is required by Section 907.2 of the *International Fire Code*. The actuation of a duct smoke detector shall activate a visible and audible supervisory signal at a constantly attended location. **In facilities that are required to be monitored by a supervising station, duct smoke detectors shall report only as a supervisory signal, not as a fire alarm.**

**Exceptions:**

1. The supervisory signal at a constantly attended location is not required where the duct smoke detector activates the building's alarm-indicating appliances.
  2. In occupancies not required to be equipped with a fire alarm system, actuation of a smoke detector shall activate a visible and audible signal in an *approved* location.
- Duct smoke detector trouble conditions shall activate a visible or audible signal in an *approved* location and shall be identified as air duct detector trouble.

## SECTION 606 – SMOKE DETECTION SYSTEMS CONTROL

### 606.1 Controls required.

Air distribution systems shall be equipped with smoke detectors *listed* and *labeled* for installation in air distribution systems, as required by this section. Duct smoke detectors shall comply with UL 268A. Other smoke detectors shall comply with UL 268.

### 606.2 Where required.

Smoke detectors shall be installed where indicated in Sections 606.2.1 through 606.2.3.

**Exception:** ~~Smoke detectors shall not be required where air distribution systems are incapable of spreading smoke beyond the enclosing walls, floors and ceilings of the room or space in which the smoke is generated.~~

#### 606.2.1 Return and supply air systems.

Smoke detectors shall be installed in both supply and return air systems with a design capacity greater than 2,000 cfm (0.9 m<sup>3</sup>/s); ~~in~~ . In the return air duct or plenum, detectors are to be installed upstream of any filters, exhaust air connections, outdoor air connections, or decontamination equipment and appliances. In the supply air duct, detectors are to be located downstream of the air filters and ahead of any branch connections.

**Exception:** Smoke detectors are not required in the return and supply air system where all portions of the building served by the air distribution system are protected by area smoke detectors connected to a fire alarm system in accordance with the *International Fire Code*. The area smoke detection system shall comply with Section 606.4.

#### 606.2.2 Common supply and return air systems.

Where multiple air-handling systems share common supply or return air ducts or plenums with a combined design capacity greater than 2,000 cfm (0.9 m<sup>3</sup>/s), the return air and supply air system shall be provided with smoke detectors in accordance with Section 606.2.1.

**Exception:** Individual smoke detectors shall not be required for each fan-powered terminal unit, provided that such units do not have an individual design capacity greater than 2,000 cfm (0.9 m<sup>3</sup>/s) and will be shut down by activation of one of the following:

1. Smoke detectors required by Sections 606.2.1 and 606.2.3.
2. An *approved* area smoke detector system located in the return air *plenum* serving such units.
3. An area smoke detector system as prescribed in the exception to Section 606.2.1.

In all cases, the smoke detectors shall comply with Sections 606.4 and 606.4.1.

#### 606.2.3 Return and supply air risers.

Where return air and supply air risers serve two or more stories and are part of a return air and supply air system ~~serve any portion of a return air system~~ having a design capacity greater than 15,000 cfm (7.1 m<sup>3</sup>/s), smoke detectors shall be installed at each story. Such smoke detectors shall be located upstream of the connection between the return air riser and any air ducts or plenums and between the air supply source and the first branch or take-off to the areas served.

### [F] 606.3 Installation.

Smoke detectors required by this section shall be installed in accordance with NFPA 72. The required smoke detectors shall be installed to monitor the entire airflow conveyed by the system ~~including return air and exhaust or relief air.~~ Smoke detectors shall not be required for fan units whose sole function is to remove air from the inside of

the building to the outside of the building. Access shall be provided to smoke detectors for inspection and maintenance.

**[F] 606.4 Controls operation.**

Upon activation, the smoke detectors shall shut down all operational capabilities of the air distribution system in accordance with the listing and labeling of appliances used in the system. Air distribution systems that are part of a smoke control system shall switch to the smoke control mode upon activation of a detector.

**[F] 606.4.1 Supervision.**

The duct smoke detectors shall be connected to a fire alarm system where a fire alarm system is required by Section 907.2 of the *International Fire Code*. The actuation of a duct smoke detector shall activate a visible and audible supervisory signal at a constantly attended location. In facilities that are required to be monitored by a supervising station, duct smoke detectors shall report only as a supervisory signal, ~~not a fire alarm, unless verified by a second signal in which case the fire alarm shall be activated.~~

**Exceptions:**

1. The supervisory signal at a constantly attended location is not required where the duct smoke detector activates the building's alarm-indicating appliances.
2. In occupancies not required to be equipped with a fire alarm system, actuation of a smoke detector shall activate a visible and audible signal in an *approved* location. Duct smoke detector trouble conditions shall activate a visible or audible signal in an *approved* location and shall be identified as air duct detector trouble.

- 606.2 Where required.** Strikethrough language in conflict with FFPC, NFPA 90 and NFPA 72  
Insert language directly from NFPA 90 and NFPA 72 corresponding with FFPC.
- RATIONAL: Bring FBC 2014 into conformity with provisions of FFPC, NFPA 90 and NFPA 72 duct smoke detector requirements and eliminate conflicting language currently in FBC 2014.
- NFPA 90 and NFPA 72 outline criteria for air distribution smoke detectors including location, air volume criteria, installation and connection to alarm systems and smoke control systems. These are the reference standards for the FFPC and they are not in conflict with any other sections of FBC 2014. Language taken directly from NFPA 90 and NFPA 72 are recommend.  
**Language Source Codes: NFPA90 6.4.2.1 and NFPA 72 17.7.5.3.1**
- 606.2.1 Return air systems.** Strikethrough language in conflict with FFPC, NFPA 90 and NFPA 72  
Other provisions exist in other sections of 606 ; no new language needed.
- RATIONAL: Bring FBC 2014 into conformity with provisions of FFPC, NFPA 90 and NFPA 72 duct smoke detector requirements and eliminate conflicting language currently in FBC 2014.
- NFPA 90 and NFPA 72 outline criteria for air distribution smoke detectors including location, air volume criteria, installation and connection to alarm systems and smoke control systems. These are the reference standards for the FFPC and they are not in conflict with any other sections of FBC 2014. Language taken directly from NFPA 90 is recommend.
- 606.2.2 Common supply and return air systems.** Strikethrough language in conflict with FFPC, NFPA 90 and NFPA 72  
Other provisions of FFPC, NFPA 90 and NFPA 72 determine requirements for air distribution systems ; no new language needed.
- RATIONAL: Bring FBC 2014 into conformity with provisions of FFPC, NFPA 90 and NFPA 72 duct smoke detector requirements. Eliminate conflicting language currently in FBC 2014.
- NFPA 90 and NFPA 72 outline criteria for air distribution smoke detectors including location, air volume criteria, installation and connection to alarm systems and smoke control systems. These are the reference standards for the FFPC and they are not in conflict with any other sections of FBC 2014. Language taken directly from NFPA 90 is recommend.
- 606.3 Installation.** Strikethrough language in conflict with FFPC, NFPA 90 and NFPA 72  
Insert language directly from NFPA 90 and NFPA 72 corresponding with FFPC.
- RATIONAL: Bring FBC 2014 into conformity with provisions of FFPC, NFPA 90 and NFPA 72 duct smoke detector requirements and eliminate conflicting language currently in FBC 2014.
- NFPA 90 and NFPA 72 outline criteria for air distribution smoke detectors including location, air volume criteria, installation and connection to alarm systems and smoke control systems. These are the reference standards for the FFPC and they are not in conflict with any other sections of FBC 2014. Language taken directly from NFPA 90 and NFPA 72 are recommend.  
**Language Source Code: NFPA90 6.4.2.3**

<b>Date Submitted</b>	1/1/2016	<b>Section</b>	12345678	<b>Proponent</b>	Cheryl Harris
<b>Chapter</b>	15	<b>Affects HVHZ</b>	No	<b>Attachments</b>	No
<b>TAC Recommendation</b>	Approved as Submitted				
<b>Commission Action</b>	Pending Review				

**Comments**

**General Comments** No **Alternate Language** No

**Related Modifications**

**Summary of Modification**

Incorporates the National Fire Codes as referenced standards as they are referenced in the Florida Fire Code to ensure consistency between codes.

**Rationale**

There should be consistency between the Building Code and Florida Fire Code. The National Fire Code is a referenced standard in the Florida Fire Code but not listed as a referenced standard in the Building Code.

**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**  
No impact
- Impact to industry relative to the cost of compliance with code**  
No impact
- Impact to small business relative to the cost of compliance with code**  
No impact

**Requirements**

- Has a reasonable and substantial connection with the health, safety, and welfare of the general public**  
The NFPA standards have been part of our Code for many years. In specifying methods of fire and smoke control, consistency with the Fire Code is crucial. Life safety depends on this and NFPA90a, 90b are needed in Mechanical to mirror the Fire Code.
- Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**  
Makes Mechanical and Fire Prevention Code consistent with each other. Eliminates duplication of some smoke detectors which creates better system function.
- Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**  
Does not discriminate against materials, products, methods or systems.
- Does not degrade the effectiveness of the code**  
Does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

NO

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

## 1st Comment Period History

<b>Proponent</b>	Cheryl Harris	<b>Submitted</b>	1/18/2016	<b>Attachments</b>	No
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**Comment:**

Wording should be included that states the References NFPA 90A and 90B be the 2015 version.

M7022-G1



Insert the following standards in alphabetical order within the list:

Chapter 15

Referenced Standards

NFPA 90A

NFPA 90B

M6819

5

<b>Date Submitted</b>	12/28/2015	<b>Section</b>	303.4	<b>Proponent</b>	Joseph Belcher
<b>Chapter</b>	3	<b>Affects HVHZ</b>	Yes	<b>Attachments</b>	Yes
<b>TAC Recommendation</b>	Approved as Submitted				
<b>Commission Action</b>	Pending Review				

**Comments**

<b>General Comments</b>	No	<b>Alternate Language</b>	No
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**Related Modifications**

**Summary of Modification**

Modify air changes triggering whole house mechanical ventilation.

**Rationale**

See uploaded Support File for Rationale

**Fiscal Impact Statement**

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

No impact to cost of code enforcement for local entity.

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

Possible reduction in costs to building and property owners not required to install whole-house mechanical ventilation system.

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

Possible reduction in costs to industry where not required to install whole-house mechanical ventilation system.

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

No fiscal impact on small business.

**Requirements**

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

Yes, the proposal will improve the health, safety, and welfare of the general public by instituting a reasonable level for requiring whole house mechanical ventilation systems.

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

The proposal improves the code by instituting a reasonable level for requiring whole house mechanical ventilation systems.

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

No, does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

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

No, the provision approves the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

**1st Comment Period History**

<b>Proponent</b>	Mike Moore	<b>Submitted</b>	2/22/2016	<b>Attachments</b>	Yes
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**Comment:**

Please see attached rationale for disapproval of this proposal.

M6819-G1

## 1st Comment Period History

<b>Proponent</b>	Jeff Sonne / FSEC	<b>Submitted</b>	2/25/2016	<b>Attachments</b>	No
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### Comment:

The proponent correctly conveys that an FSEC PPT document included a slide indicating that "8,296 or 9.9% of buyers are priced out of the market for every \$1,000.00 increase in a house's price based on 2014 data"; however the slide in the FSEC PPT document that shows this increase is incorrect (the impact is less severe). Note that while this slide was included in the PPT document forwarded to DBPR, it was not included in the actual presentations made to the Mechanical and Energy TACs. We're sorry for any confusion this slide may have caused.

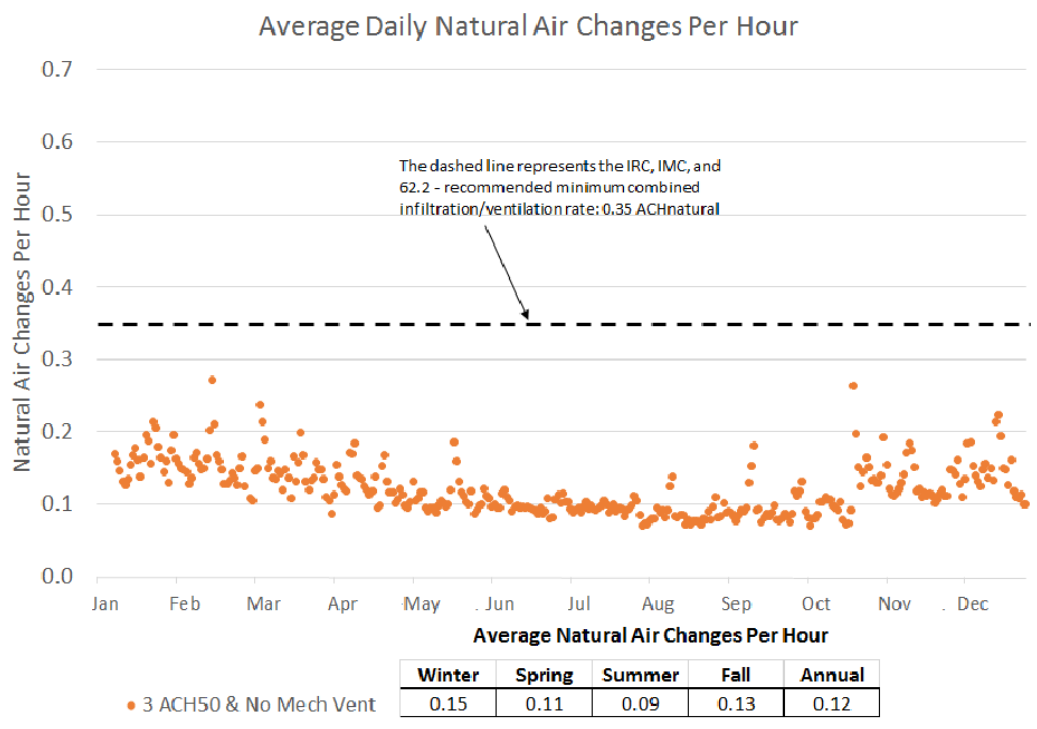
M6819-G2

**R303.4 Mechanical ventilation.** Where the air infiltration rate of a dwelling unit is ~~5 air changes per hour or less than 3.00~~ air changes per hour where tested with a blower door at a pressure of 0.2-inch w.c (50 Pa) in accordance with ~~Section N1102.4.1.2, Section R402.4.1.2~~ of the *Florida Building Code, Energy Conservation* the dwelling unit shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.

**M 6819: Rationale to Disapprove**  
**Submitted by:** Mike Moore, P.E., Newport

Recommend disapproval of this proposal. The proponent makes the unsubstantiated claim that the proposal “will improve the health, safety, and welfare of the general public by instituting a reasonable level for requiring whole house mechanical ventilation systems”. There is no technical basis to support this claim, which runs counter to engineering calculations and research showing that natural ventilation and infiltration are insufficient to achieve acceptable indoor air quality.

As an example, following is a chart created using DOE’s EnergyPlus software that shows the average daily combined infiltration and ventilation rate for a typical 2,600 ft<sup>2</sup> three-bedroom, single-family home located in Orlando with a building air tightness of 3 ACH50 and *no* mechanical ventilation, as proposed by the proponent. The average annual natural air change rate for this typical home is 0.12 (roughly a third of the 0.35 air changes per hour promulgated by model codes and standards), with a seasonal low of 0.09 in the summer. Research has shown that formaldehyde emissions from building materials increase with increasing temperature and relative humidity, and formaldehyde concentrations increase with decreasing infiltration/ventilation rates. In other words, formaldehyde emissions and concentration are likely to spike in the summer when natural infiltration is at its lowest. Resultant poor indoor air quality can significantly diminish occupants’ health. In fact, research suggests that poor IAQ is responsible for around \$500 annually in health related costs per person in the U.S., which translates to \$10 billion annually in Florida.\*



\*Assumes poor IAQ accounts for 0.01 disability adjusted life years (DALYs) per person, and that the value of a DALY is \$50,000. This value is at the low end of epidemiological studies that estimate the value of a DALY between \$50k - \$200k.

References:

- Logue JM, Price PN, Sherman MH, & Singer BC. 2012. A Method to Estimate the Chronic Health Impact of Air Pollutants in U.S. Residences. *Environmental Health Perspectives* 120(2): 216-222.
- Turner WJN, Logue JM, and Wray CP. 2012. Commissioning Residential Ventilation Systems: A Combined Assessment of Energy and Air Quality Potential Values. LBNL-5969E.
- Brown DW. 2008. Economic value of disability-adjusted life years lost to violence: estimates for WHO Member States. *Rev. Panam Salud Publica*, 24, 203-209.
- Lvovsky K, Huges G, Maddison D, Ostro B, and Pearce D. 2000. Environmental costs of fossil fuels: a rapid assessment method with application to six cities. Washington, D.C.: The World Bank Environment Department.
- Highfill T and Bernstein E. 2014. Using Disability Adjusted Life Years to Value the Treatment of Thirty Chronic Conditions in the U.S. from 1987-2010. U.S. Department of Commerce Bureau of Economic Analysis WP 2014-9.
- Hult EL, Willem H, Price PN, Hotchi T, Russell ML, and Singer BC. 2015. Formaldehyde and acetaldehyde exposure mitigation in US residences: in-home measurements of ventilation control and source control. *Indoor Air* 25:523-535.

This proposal reduces the trigger for whole-house mechanical ventilation from 5 ACH or less to less than 3 ACH. There is no argument that as houses get tighter to meet or exceed energy conservation measures, there is a potential for indoor air quality issues. However, the reasons given by the proponent of the change to the foundation code for requiring whole-house mechanical ventilation did not provide substantiation for the trigger air change level mandated. The proponent, a representative of a manufacturer of mechanical ventilation systems, did state the cost of construction would increase, but provided no estimate of the amount of the increase. (M156-09/10; ICC 2009/2010 Code Development Cycle) The increased costs associated with the trigger level of 5 ACH are not justified in the State of Florida.

Before discussing costs, a serious problem with requiring whole-house mechanical ventilation in moderately tight houses in Florida should be noted. Whole-house mechanical ventilation brings outside air into the house. The hot humid climate of Florida will result in the introduction of moisture to the interior. Once introduced, the health problems associated with excess moisture such as mold, mildew, and rotting, must be addressed which may require the installation of a dehumidification system. The overall effect could very well be an increase in energy use.

Regarding the costs, an interim progress report of a study by FSEC was presented to various Commission TACs. As part of the project a survey was developed and widely distributed to stakeholders. The survey specified an example house and asked respondents to estimate the cost of providing a whole-house mechanical ventilation system. The costs of the interim report are based on the results of the survey and range from \$800.00 to \$1000.00. (Interim Progress Report for Evaluating the Economic Impacts of the Legislatively Delayed Provisions of the 5th Edition (2014) Florida Solar Energy Center, FSEC-CR-2009-15, Interim Report, Nov. 13, 2015) In addition, cost estimates from other sources were provided. Other estimates of the costs from builders outside the report have ranged from \$3200.00 to \$3,500.00.

In addition to the estimated costs, the FSEC presentation indicates for Florida: "8,296 or 9.9% of buyers are 'priced out' of the market for every \$1,000.00 increase in a house's price based on 2014 data" This "priced out" data is based on a study by NAHB "State and Metro Area House Prices: the "Priced Out" Effect Special Studies", August 1, 2014. Finally, in cases where a dehumidification system is needed, cost estimate provided by a builder for the typical sized house is \$2700.00 to \$3000.00. Using the low side of the estimated cost ranges above, yields a total potential cost increase for the whole-house ventilation system in a one story 2,000 ft<sup>2</sup> three bedroom two bath home of \$3,500.00; on the high side we have a potential increase of \$4,500.00. This equates to potentially denying more than 25,000 Florida citizens the opportunity to purchase a home.

Further, in another report of whole-house ventilation the operation of such system in existing buildings is shown to be woefully short of expectations. The



Florida Building Commission engaged FSEC to conduct an investigation of the effectiveness and failure rates of existing whole-house mechanical ventilation systems. The investigation included a survey and testing of twenty-one homes built in the last fifteen years in Florida. The testing results showed only three of the homes were capable of providing a ventilation flow close to the design level and two of the three systems were turned off by the homeowner. Therefore, only one of the twenty-one systems investigated was found to be delivering the expected ventilation. The remainder of the findings are similar indicating even where whole-house mechanical ventilation systems are installed and operational they are not functioning or not functioning at near the expected level. (Report: Investigation of the Effectiveness and Failure Rates of Whole-House Mechanical Ventilation Systems in Florida” FSEC-CR-2002-15, June 1, 2015.)

While there are a number of recommendations made by the June 1, 2015, report, the following recommendation addressing allowable leakage levels, taken with the testing results reported, may be seen to support a reduction in the trigger for the requirement for mechanical ventilation:

“Do not require houses to become tighter than already specified by code. Consider increasing allowed leakage to 7 ACH50 in climate zones 1 and 2 (all of Florida)”

(Source: Investigation of the Effectiveness and Failure Rates of Whole-House Mechanical Ventilation Systems in Florida” FSEC-CR-2002-15, June 1, 2015.)

It is understood that whole-house mechanical ventilation may well be needed in very tightly constructed homes. The proposal recognizes this need by retaining the requirement for whole-house mechanical ventilation in homes where the air changes per hour are less than 3. The potential of the unmodified provision to deny thousands of Florida residents the ability of to buy a home seems unquestionably counter to the statutorily stated intent of the code ‘... of providing requirements which will allow effective and reasonable protection for public safety, health, and general welfare for all the people of Florida at the most reasonable cost to the consumer.’ [Ch. 553.72(1)]



<b>Date Submitted</b>	12/27/2015	<b>Section</b>	1401.1	<b>Proponent</b>	Joseph Belcher
<b>Chapter</b>	14	<b>Affects HVHZ</b>	Yes	<b>Attachments</b>	No
<b>TAC Recommendation</b>	Approved as Submitted				
<b>Commission Action</b>	Pending Review				

**Comments**

<b>General Comments</b>	No	<b>Alternate Language</b>	No
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**Related Modifications****Summary of Modification**

Adds reference to AHU in attics in FBC-EC.

**Rationale**

The proposal is intended to draw attention to requirements of another volume of the code addressing the installation of heating and cooling equipment to make certain it is not overlooked.

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

None. Proposed language adds a reference to an existing section of the Florida Building Code which is part of a rule challenge settlement.

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

None. Proposed language adds a reference to an existing section of the Florida Building Code which is part of a rule challenge settlement.

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

None. Proposed language adds a reference to an existing section of the Florida Building Code which is part of a rule challenge settlement.

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

None. Proposed language adds a reference to an existing section of the Florida Building Code which is part of a rule challenge settlement.

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

Yes, the proposed language adds a reference to an existing section of the Florida Building Code which is part of a rule challenge settlement.

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

Yes, the proposed language adds a reference to an existing section of the Florida Building Code which is part of a rule challenge settlement.

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

No, the proposal does not discriminate.

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

No, the proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

**M1401.1 Installation.** Heating and cooling *equipment* and *appliances* shall be installed in accordance with the manufacturer's installation instructions and the requirements of this code. Air-handling units installed in attics shall comply with the Florida Building Code-Energy Conservation Section R403.3.6.

<b>Date Submitted</b>	1/1/2016	<b>Section</b>	1411.8	<b>Proponent</b>	Cheryl Harris
<b>Chapter</b>	14	<b>Affects HVHZ</b>	No	<b>Attachments</b>	No
<b>TAC Recommendation</b>	Approved as Submitted				
<b>Commission Action</b>	Pending Review				

**Comments**

<b>General Comments</b>	No	<b>Alternate Language</b>	No
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**Related Modifications****Summary of Modification**

Exempts locking caps on refrigerant ports on residential outside equipment if the port is inside the cabinet and not generally accessible.

**Rationale**

If refrigerant circuit access ports are inside a condensing cabinet they are generally not accessible to the general public who the code is intended to protect and becomes an unnecessary cost.

**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**

Modification will reduce the cost of installing an unnecessary lock cap. Cost savings up to \$100.

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

Modification will reduce the cost of installing an unnecessary lock cap. Cost savings up to \$100.

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

Modification will reduce the cost of installing an unnecessary lock cap. Cost savings up to \$100.

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

The general public is protected from the easy access of the refrigerant port if it is placed inside the equipment cabinet.

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

Improves the code by eliminating an unnecessary / redundant method of limiting access by the general public to refrigerant ports.

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

Modification does not require proprietary materials, products, methods or construction systems.

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

Modification does not degrade the effectiveness of the code by eliminating the unnecessary locking caps inside an equipment cabinet that requires disassembly to reach refrigerant ports.

Is the proposed code modification part of a prior code version? No

**RM1411.8 Locking access port caps.** Refrigerant circuit

access ports located outdoors shall be fitted with locking-type tamper-resistant caps or shall be otherwise secured to prevent unauthorized access.

Exemption: No locking-type tamper-resistant caps are required if ports are located inside the Condensing Unit cabinet.

<b>Date Submitted</b>	1/1/2016	<b>Section</b>	1503.2	<b>Proponent</b>	Cheryl Harris
<b>Chapter</b>	15	<b>Affects HVHZ</b>	No	<b>Attachments</b>	No
<b>TAC Recommendation</b>	Approved as Submitted				
<b>Commission Action</b>	Pending Review				

**Comments**

<b>General Comments</b>	No	<b>Alternate Language</b>	No
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**Related Modifications**

**Summary of Modification**

Changes the ground clearance for PVC outside pipe from 1" to 8" above grade to allow space for connection of a vent cap or hood when installing a downdraft range vent.

**Rationale**

Extension of an outside PVC pipe from 1" to 8" above grade allows space for connection of a vent cap or hood when installing a range hood.

**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 decrease the cost of installing a downdraft range vent by an estimated \$100 to \$200 per dwelling.

**Impact to industry relative to the cost of compliance with code**  
Allows for standard method of installing a cap or vent hood onto the outside pipe and reduces cost to comply by an estimated \$100 to \$200 per dwelling.

**Impact to small business relative to the cost of compliance with code**  
Allows for standard method of installing a cap or vent hood onto the outside pipe and reduces cost to comply by an estimated \$100 to \$200 per dwelling.

**Requirements**

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**  
The change in ground clearance does not negatively impact the health, safety or welfare of the general public.

**Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**  
Improves the code by allowing a more standard method of connecting a vent hood or cap onto an outside PVC vent pipe.

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**  
No proprietary materials, products, methods, systems of construction are required by the modification.

**Does not degrade the effectiveness of the code**  
The modification does not degrade the code when allowing a more standard method of connecting a vent hood or cap onto an outside pipe.

**Is the proposed code modification part of a prior code version?** No

**RM1503.2 Duct material.** Ducts serving range hoods shall be constructed of galvanized steel, stainless steel or copper.

**Exception:** Ducts for domestic kitchen cooking *appliances*

equipped with down-draft exhaust systems shall be permitted to be constructed of schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:

1. The duct is installed under a concrete slab poured on grade.
2. The underfloor trench in which the duct is installed is completely backfilled with sand or gravel.
3. The PVC duct extends not more than 1 inch (25 mm) above the indoor concrete floor surface.
4. The PVC duct extends not more than  $\pm 8''$  inches above grade *outside of the building*.
5. The PVC ducts are solvent cemented

<b>Date Submitted</b>	12/21/2015	<b>Section</b>	1602.3	<b>Proponent</b>	Jeff Sonne / FSEC
<b>Chapter</b>	16	<b>Affects HVHZ</b>	No	<b>Attachments</b>	No
<b>TAC Recommendation</b>	Approved as Submitted				
<b>Commission Action</b>	Pending Review				

**Comments**

**General Comments** No **Alternate Language** No

**Related Modifications**

6750

**Summary of Modification**

Balanced return air requirement and exceptions.

**Rationale**

Restricted return air affects building pressures and increases air infiltration which in turn increases energy use and can cause comfort, building durability, and health and safety issues. This modification reduces restricted return air and these related issues.

Supporting publication:

Cummings, J., C. Withers, &quot;Balanced Return Air, Duct Airtightness, and Combustion/Dilution Air Code Compliance in 40 Central Florida Homes&quot; Florida Solar Energy Center, FSEC-CR-1789-06, Nov. 29, 2006.  
(<http://www.fsec.ucf.edu/en/publications/pdf/FSEC-CR-1789-06.pdf>)

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

Some additional effort to verify compliance. Proposed language is in the 2014 Florida Building Code.

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

Some additional cost in some cases. Proposed language is in the 2014 Florida Building Code.

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

Cost is justified since restricted return air affects building pressures and increases air infiltration which in turn increases energy use and can cause comfort, building durability, and health and safety issues. Proposed language is in the 2014 Florida Building Code.

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

Cost is justified since restricted return air affects building pressures and increases air infiltration which in turn increases energy use and can cause comfort, building durability, and health and safety issues.  
Proposed language is in the 2014 Florida Building Code.

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

Yes. Restricted return air affects building pressures and increases air infiltration which in turn increases energy use and can cause comfort, building durability, and health and safety issues. Proposed language is in the 2014 Florida Building Code.

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

Yes. Restricted return air affects building pressures and increases air infiltration which in turn increases energy use and can cause comfort, building durability, and health and safety issues. Proposed language is in the 2014 Florida Building Code.

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

No. Proposed language is in the 2014 Florida Building Code.

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

Increases code effectiveness. Proposed language is in the 2014 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

**Explanation of Choice**

[Yes.] Florida is largely a ducted HVAC system state and this affects us as much or more than other states. It is important for Florida to keep its balanced return air requirement for the reasons provided above; allowing the requirement to lapse until it is included in the IMC or IRC would be confusing, potentially cause safety and health issues, provide poorer energy performance and is not in the interest of the state.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

**M1602.3 Balanced Return Air.** Restricted return air occurs in buildings when returns are located in central zones and closed interior doors impede air flow to the return grill or when ceiling spaces are used as return plenums and fire walls restrict air movement from one portion of the return plenum to another. Provisions shall be made in both residential and commercial buildings to avoid unbalanced air flows and pressure differentials caused by restricted return air. Pressure differentials across closed doors where returns are centrally located shall be limited to 0.01 inch WC (2.5 pascals) or less. Pressure differentials across fire walls in ceiling space plenums shall be limited to 0.01 inch WC (2.5 pascals) by providing air duct pathways or air transfer pathways from the high pressure zone to the low zone.

**Exceptions:**

1. Transfer ducts may achieve this by increasing the return transfer 1½ times the cross sectional area (square inches) of the supply duct entering the room or space it is serving and the door having at least an unrestricted 1 inch undercut to achieve proper return air balance.
2. Transfer grilles shall use 50 square inches (of grille area) to 100 cfm (of supply air) for sizing through-the-wall transfer grilles and using an unrestricted 1 inch undercutting of doors to achieve proper return air balance.
3. Habitable rooms only shall be required to meet these requirements for proper balanced return air excluding bathrooms, closets, storage rooms and laundry rooms, except that all supply air into the master suite shall be included.





# TAC: Mechanical

Total Mods for **Mechanical** in **No Affirmative Recommendation with a Second: 4**

Total Mods for report: 14

## Sub Code: Mechanical

M7009

10

Date Submitted 1/1/2016  
Chapter 4

Section 403.3.2.1  
Affects HVHZ No

Proponent Cheryl Harris  
Attachments No

TAC Recommendation No Affirmative Recommendation with a Second  
Commission Action Pending Review

### Comments

General Comments No

Alternate Language No

### Related Modifications

### Summary of Modification

Changes the intent of mechanical ventilation from mandatory to optional.

### Rationale

Allows flexibility in design of ventilation to include natural and infiltration in addition to mechanical.

### 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

Modification could decrease cost of ventilation if natural and infiltration methods are allowed for ventilation in addition to mechanical.

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

No impact.

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

Modification could decrease cost of ventilation if natural and infiltration methods are allowed for ventilation in addition to mechanical.

### Requirements

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

The modification does not harm the public when allowing alternate methods of ventilation.

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

The modification improves the code by allowing alternate methods of ventilation.

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

There are not proprietary materials, products, methods, or systems required in the modification.

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

The modification increases the effectiveness of the code by allowing alternate methods of ventilation.

Is the proposed code modification part of a prior code version? No

**403.3.2.1 Outdoor air for dwelling units.**

An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof ~~shall~~ may be installed for each dwelling unit. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

<b>Date Submitted</b> 12/31/2015	<b>Section</b> 505.2	<b>Proponent</b> Jeff Sonne / FSEC
<b>Chapter</b> 5	<b>Affects HVHZ</b> No	<b>Attachments</b> Yes
<b>TAC Recommendation</b>	No Affirmative Recommendation with a Second	
<b>Commission Action</b>	Pending Review	

**Comments**

<b>General Comments</b>	No	<b>Alternate Language</b>	No
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**Related Modifications**

6937

**Summary of Modification**

Modify exhaust hood makeup air requirements.

**Rationale**

Tighter homes result in greater pressure differentials indoors with reference to outdoors (see figure in supporting file) when mechanical fans move air across the building envelope. This modification will diminish health and safety risks associated with significant depressurization.

**Fiscal Impact Statement**

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

Will require a method of assuring the mechanical contractor has followed the code.

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

Minor differences than base code for most owners.

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

For upscale homes may increase cost slightly for the purpose of reduced risk of health and safety issues and callbacks.

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

None.

**Requirements**

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

Yes; diminishes health and safety risks associated with significant depressurization.

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

Yes, testing for pressure differences in homes without makeup air is a better methodology than relying on cfm limits alone. As shown, the depressurization in tight homes could be substantial.

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

No.

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

No; increases effectiveness of the code by diminishing health and safety risks associated with significant depressurization.

**Is the proposed code modification part of a prior code version? No**

**505.2 Makeup air required.**

Exhaust hood systems capable of exhausting in excess of 400 cfm (~~0.19 m<sup>3</sup>/s~~) (0.071 m<sup>3</sup>/s) shall be provided with *makeup air* at a rate approximately equal to the *exhaust air* rate. ~~Such m~~ *Makeup air* systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.

**Exception:**

In a single-family dwelling, makeup air is not required if there are no gravity vent appliances, the range hood is rated at less than 400 cfm of exhaust and the indoor house pressure with reference to outdoors is tested (with kitchen exhaust fan running at its maximum flow rate) not to exceed 3 Pascals.

~~In a single-family dwelling, make-up air is not required for range hood exhaust systems capable of exhausting:~~

~~(a) Four hundred cubic feet per minute or less; or~~

~~(b) More than 400 cubic feet per minute but no more than 800 cubic feet per minute if there are no gravity vent appliances within the conditioned living space of the structure.~~

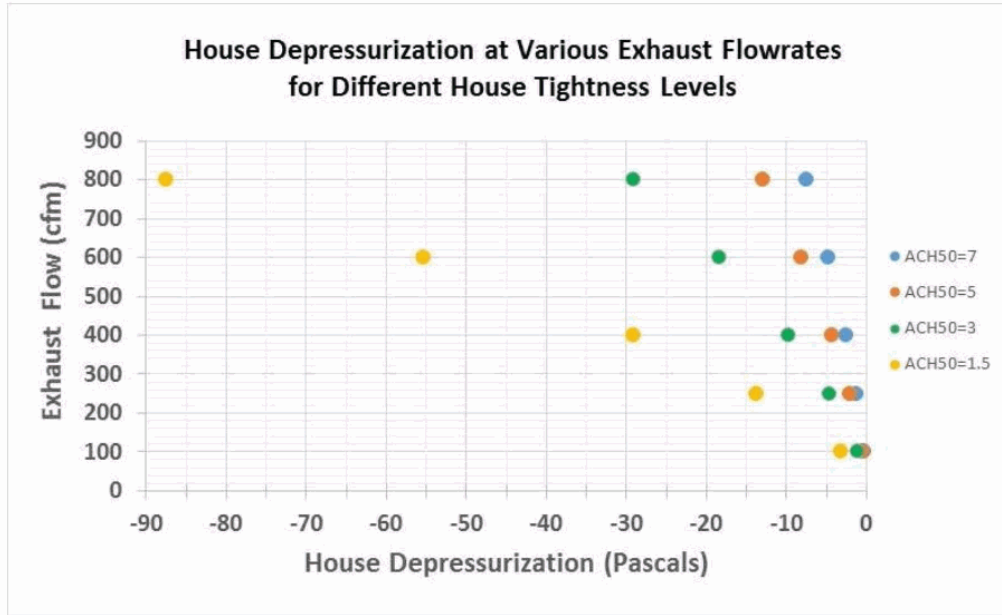


Figure above based on flow coefficient (C) calculated based upon assumed flow exponent =0.63, and specified house tightness (ACH50); C. Withers.

M6937

12

<b>Date Submitted</b>	12/31/2015	<b>Section</b>	1503.4	<b>Proponent</b>	Jeff Sonne / FSEC
<b>Chapter</b>	15	<b>Affects HVHZ</b>	No	<b>Attachments</b>	Yes
<b>TAC Recommendation</b>	No Affirmative Recommendation with a Second				
<b>Commission Action</b>	Pending Review				

**Comments**

<b>General Comments</b>	No	<b>Alternate Language</b>	No
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**Related Modifications**

**Summary of Modification**

Modify exhaust hood makeup air requirements.

**Rationale**

Tighter homes result in greater pressure differentials indoors with reference to outdoors (see figure in supporting file) when mechanical fans move air across the building envelope. This modification will diminish health and safety risks associated with significant depressurization.

**Fiscal Impact Statement**

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

Will require a method of assuring the mechanical contractor has followed the code.

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

Minor differences than base code for most owners.

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

For upscale homes may increase cost slightly for the purpose of reduced risk of health and safety issues and callbacks.

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

None

**Requirements**

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

Yes; diminishes health and safety risks associated with significant depressurization.

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

Yes, testing for pressure differences in homes without makeup air is a better methodology than relying on cfm limits alone. As shown, the depressurization in tight homes could be substantial.

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

No.

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

No; increases effectiveness of the code by diminishing health and safety risks associated with significant depressurization

Is the proposed code modification part of a prior code version? No

**M1503.4 Makeup air required.** Exhaust hood systems capable of exhausting in excess of 400150 cubic feet per minute (~~0.19 m<sup>3</sup>/s~~) (~~0.071 m<sup>3</sup>/s~~) shall be mechanically or naturally provided with makeup air at a rate approximately equal to the exhaust air rate. ~~Such m-~~ Makeup air systems shall be equipped with not less than one damper. Each damper shall be a gravity damper or an electrically operated damper that automatically opens when the exhaust system operates. Dampers shall be accessible for inspection, service, repair and replacement without removing permanent construction or any other ducts not connected to the damper being inspected, serviced, repaired or replaced.

**Exception:**

In a single-family dwelling, makeup air is not required if there are no gravity vent appliances, the range hood is rated at less than 400 cfm of exhaust and the indoor house pressure with reference to outdoors is tested (with kitchen exhaust fan running at its maximum flow rate) not to exceed 3 Pascals.

~~In a single-family dwelling, make-up air is not required for range hood exhaust systems capable of exhausting:~~

~~(a) less than Ffour hundred cubic feet per minute or less; or~~

~~(b) More than 400 cubic feet per minute but no more than 800 cubic feet per minute if there are no gravity vent appliances within the conditioned living space of the structure.~~



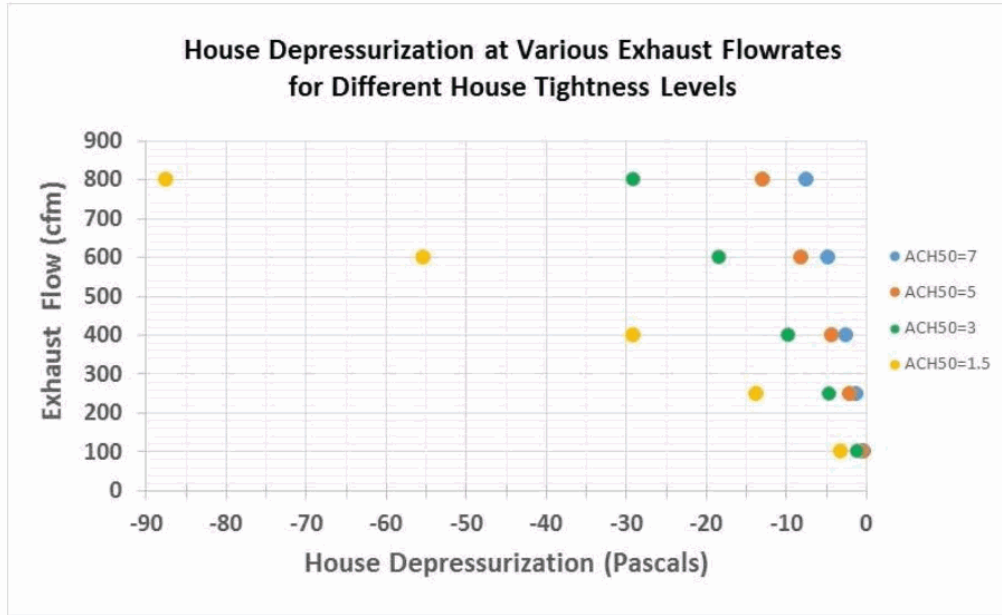


Figure above based on flow coefficient (C) calculated based upon assumed flow exponent =0.63, and specified house tightness (ACH50); C. Withers.

<b>Date Submitted</b> 1/1/2016	<b>Section</b> 1506.2	<b>Proponent</b> Cheryl Harris
<b>Chapter</b> 15	<b>Affects HVHZ</b> No	<b>Attachments</b> No
<b>TAC Recommendation</b>	No Affirmative Recommendation with a Second	
<b>Commission Action</b>	Pending Review	

**Comments**

<b>General Comments</b>	No	<b>Alternate Language</b>	No
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**Related Modifications**

**Summary of Modification**

Modifies wording on sizing of duct used for ventilating equipment that allows for designer's choice of sizing method in accordance with recognized standards

**Rationale**

Modifies wording on sizing of duct used for ventilating equipment that allows for designer's choice of sizing method in accordance with recognized standards.

**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**  
Cost impact is unknown as it depends on the designer and project needs. Cost could decrease if designer has more flexibility in sizing.

**Impact to industry relative to the cost of compliance with code**  
No impact.

**Impact to small business relative to the cost of compliance with code**  
Cost impact is unknown as it depends on the designer and project needs. Cost could decrease if designer has more flexibility in sizing.

**Requirements**

**Has a reasonable and substantial connection with the health, safety, and welfare of the general public**  
Sizing choice for ductwork does not impact the general public as sizing must still comply with known sizing standards.

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

**Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**  
The modification does not require proprietary materials, products, methods, or systems of construction.

**Does not degrade the effectiveness of the code**  
The modification does not degrade the effectiveness of the code as duct sizing must still comply with referenced standards.

**Is the proposed code modification part of a prior code version? No**

**RM1506.2 Duct length.** The length of exhaust and supply

ducts used with ventilating equipment ~~shall not exceed the~~

~~lengths determined~~ shall be sized in accordance with Table M1506.2, or in accordance with ACCA Manual D or other approved methods.

**Exception:** Duct length shall not be limited where the duct system complies with the manufacturer's design criteria or where the flow rate of the installed ventilating equipment is verified by the installer or approved third party using a flow hood, flow grid or other airflow measuring device.

# TAC: Mechanical

Total Mods for **Mechanical** in **Withdrawn**: 1

Total Mods for report: 14

## Sub Code: Mechanical

M6989

14

Date Submitted 1/1/2016

Chapter 4

Section 401.2

Affects HVHZ No

Proponent Cheryl Harris

Attachments No

TAC Recommendation Withdrawn

Commission Action Pending Review

### Comments

General Comments No

Alternate Language No

### Related Modifications

### Summary of Modification

Eliminates mandatory outside air mechanical ventilation for residential dwellings based on an artificially set air exchange rate.

### Rationale

Eliminates the Mandatory introduction of Outside Air into residential dwellings and avoids the need for necessary humidity control in Florida's Hot & Humid Climate. There is no scientific study that shows this is needed in current Code-built residential buildings for proper IAQ. Natural infiltration is sufficient to provide the necessary ventilation.

### 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

Impact would be to lower the cost to comply which could vary from \$350 to \$3500 depending on the building/residence.

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

No increased cost to comply.

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

Impact would be to lower the cost to comply which could vary from \$350 to \$3500 depending on the building/residence.

### Requirements

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

Eliminating the mandate for mechanical form of ventilation and removing the artificial number requiring it, leaves Natural, Infiltration or Mechanical as designer's options. This may avoid raising the humidity levels inside the home and help prevent mold and IAQ problems.

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

Improves the code by eliminating an artificial, unproven air exchange number that triggers requirement for mechanical ventilation.

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

Modification does not discriminate.

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

Eliminating an artificial, unproven air exchange number that triggers requirement for mechanical ventilation does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

1st Comment Period History

6989-A1

**Proponent** Jeff Sonne / FSEC                      **Submitted** 2/25/2016                      **Attachments** Yes

**Rationale**

This alternate language mod restores the mechanical ventilation trigger that mod 6989 removes and adds ASHRAE 62.2-2010 and 2013 as ventilation options. ASHRAE Standard 62.2-2010 and 62.2-2013 allow natural house air leakage to meet part of the outdoor air requirement (so the total outdoor air requirement is met by a combination of infiltration and mechanical ventilation). Although the current code tables for ventilation are the same as ASHRAE 62-2 2010 for the cases of no credit for infiltration, this modification allows designers to provide only that ventilation necessary according to the standards without creating potential unnecessary moisture or energy impacts. For consistency and to avoid code conflict, this modification should also be made in the residential code. The comparison table below shows that for a number of house size, bedroom, height and ach50 level combinations, the ASHRAE 62.2 options in most cases require less ventilation than the 2015 IRC and IMC requirements. Mechanical ventilation requirements of various codes and standards in the average Florida weather and shielding factor (62.2 wsf) climate Florida Home Characteristics Mechanical Vent Requirements (cfm) CFA Nbr Height 62.2 wsf ach50 IRC IMC 62.2-2010 62.2-1013 3000 3 17 0.39 5 60 60 60 62 3000 3 17 0.39 7 60 60 50 39 2400 3 17 0.39 5 60 60 54 56 2400 3 17 0.39 7 60 60 46 37 2000 3 9 0.39 5 60 60 50 58 2000 3 9 0.39 7 60 60 48 46 1600 2 9 0.39 5 60 45 39 45 1600 2 9 0.39 7 60 45 37 35

**Fiscal Impact Statement**

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

Just being aware that the ASHRAE 62.2 ventilation options are in the code.

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

Optional, so none if not used, or similar or possibly less cost than other options.

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

Optional, so none if not used, or similar or possibly less cost than other options.

**Impact to Small Business relative to the cost of compliance with code**

Impact would be to lower the cost to comply which could vary from \$350 to \$3500 depending on the building/residence.

**Requirements**

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

Yes, provides ASHRAE Standard level ventilation options which may reduce moisture and/or energy impacts.

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

Improves the code by providing ASHRAE Standard level ventilation options which may reduce moisture and/or energy impacts.

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

Does not discriminate; provides additional options.

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

Does not degrade code effectiveness; improves the code by providing ASHRAE Standard level ventilation options which may reduce moisture and/or energy impacts.

**Is the proposed code modification part of a prior code version? No**

**401.2 Ventilation required.**

Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. ~~Where the air infiltration rate in a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch water column (50 Pa) in accordance with Section R402.4.1.2 of the *International Energy Conservation Code*, the dwelling unit shall be ventilated by mechanical means in accordance with Section 403.~~ Ambulatory care facilities and Group I-2 occupancies shall be ventilated by mechanical means in accordance with Section 407.

**401.2 Ventilation required.**

Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. Where the air infiltration rate in a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2-inch water column (50 Pa) in accordance with Section R402.4.1.2 of the International Energy Conservation Code, the dwelling unit shall be ventilated by mechanical means in accordance with Section 403 or in accordance with Section 4 of ASHRAE Standard 62.2-2010 or Section 4 of ASHRAE Standard 62.2-2013, as applicable. Ambulatory care facilities and Group I-2 occupancies shall be ventilated by mechanical means in accordance with Section 407.

### Mod 6989 Alternate Language A1 Rationale

This alternate language mod restores the mechanical ventilation trigger that mod 6989 removes and adds ASHRAE 62.2-2010 and 2013 as ventilation options. ASHRAE Standard 62.2-2010 and 62.2-2013 allow natural house air leakage to meet part of the outdoor air requirement (so the total outdoor air requirement is met by a combination of infiltration and mechanical ventilation). Although the current code tables for ventilation are the same as ASHRAE 62-2 2010 for the cases of no credit for infiltration, this modification allows designers to provide only that ventilation necessary according to the standards without creating potential unnecessary moisture or energy impacts. For consistency and to avoid code conflict, this modification should also be made in the residential code.

The comparison table below shows that for a number of house size, bedroom, height and ach50 level combinations, the ASHRAE 62.2 options in most cases require less ventilation than the 2015 IRC and IMC requirements.

**Mechanical ventilation requirements of various codes and standards  
in the average Florida weather and shielding factor (62.2 wsf) climate**

Florida Home Characteristics					Mechanical Vent Requirements (cfm)			
CFA	Nbr	Height	62.2 wsf	ach50	IRC	IMC	62.2-2010	62.2-1013
3000	3	17	0.39	5	60	60	60	62
3000	3	17	0.39	7	60	60	50	39
2400	3	17	0.39	5	60	60	54	56
2400	3	17	0.39	7	60	60	46	37
2000	3	9	0.39	5	60	60	50	58
2000	3	9	0.39	7	60	60	48	46
1600	2	9	0.39	5	60	45	39	45
1600	2	9	0.39	7	60	45	37	35