Mechanical
Proposed Code Modifications
Including Comments
This document created by the Florida Department of Business and Professional Regulation -
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<td>Sub Code: Building</td>
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<td>Total Mods for Mechanical: 19</td>
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**Related Modifications**
None

**Summary of Modification**
Moves exceptions to carbon monoxide protection and alarm placement from section 908.7.2 to 908.7. Exceptions are intended to apply broadly to the alarm requirements for carbon monoxide. The current code appears to limit the application of the exceptions to combination smoke/carbon monoxide alarms.

**Rationale**
This revision and relocation is needed because it is currently being misunderstood by code enforcing authorities and is not meeting the intent of the Florida statute chapter 553.885.
Informal interpretation from the Building Official Association of Florida, report numbers 7572, 7618 (see attached) provide incorrect information to the user because of the location of this exception under the combination smoke/CO detectors. Chapter 553.885 (attached) clearly states the exception for hospitals, nursing homes and inpatient hospices is a general requirement to be located under Section 907.7. The slight revision of the existing language is meant to alert the user of this exception for those occupancies as excepted in Florida statute.

**Fiscal Impact Statement**
- **Impact to local entity relative to enforcement of code**
  There is no fiscal impact on the local entity relative to enforcement.
- **Impact to building and property owners relative to cost of compliance with code**
  There is no fiscal impact to building and property owners relative to cost of compliance
- **Impact to industry relative to the cost of compliance with code**
  There is no fiscal impact to industry relative to the cost of compliance

**Requirements**
- **Has a reasonable and substantial connection with the health, safety, and welfare of the general public**
  Yes.
- **Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**
  Strengthens or improves the code by making the code requirements clearer to the user.
- **Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**
  Does not discriminate against materials, products, methods, or systems of construction
- **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?** No
908.7 Carbon monoxide protection. Every separate building or an addition to an existing building for which a permit for new construction is issued and having a fossil-fuel burning heater or appliance, a fireplace, an attached garage, or other feature, fixture, or element that emits carbon monoxide as a by product of combustion shall have an operational carbon monoxide alarm installed within 10 feet of each room used for sleeping purposes in the new building or addition, or at such other locations as required by this code.

Exceptions:

1. An approved operational carbon monoxide detector shall only be required to be installed inside or directly outside of each room or area where a fossil-fuel burning heater, engine, or appliance is located within a hospital, inpatient hospice facility or skilled nursing home facility licensed by the Agency for Health Care Administration, or a new state correctional institution. The carbon monoxide detector shall be connected to the fire-alarm system of the hospital, inpatient hospice facility, or nursing home facility as a supervisory signal.

2. This section shall not apply to existing buildings that are undergoing alterations or repairs unless the alteration is an addition as defined in Section 908.7.3.

908.7.1 Carbon monoxide alarm. The requirements of Section 908.7 shall be satisfied by providing for one of the following alarm installations:

1. A hard-wired carbon monoxide alarm.

2. A battery-powered carbon monoxide alarm.


4. A battery-powered combination carbon monoxide and smoke alarm.

908.7.2 Combination alarms. Combination smoke/carbon monoxide alarms shall be listed and labeled by a nationally recognized testing laboratory.

Exceptions:

1. An approved operational carbon monoxide detector shall be installed inside or directly outside of each room or area within a hospital, inpatient hospice facility or nursing home facility licensed by the Agency for Health Care Administration, or a new state correctional institution where a fossil-fuel burning heater, engine, or appliance is located. The carbon monoxide detector shall be connected to the fire-alarm system of the hospital, inpatient hospice facility, or nursing home facility as a supervisory signal.
2. This section shall not apply to existing buildings that are undergoing alterations or repair unless the alteration is an addition as defined in Section 908.7.3.
553.885 Carbon monoxide alarm required.—
(1) Every separate building or addition to an existing building, other than a hospital, an inpatient hospice facility, or a nursing home facility licensed by the Agency for Health Care Administration, constructed on or after July 1, 2008, and having a fossil-fuel-burning heater or appliance, a fireplace, an attached garage, or other feature, fixture, or element that emits carbon monoxide as a byproduct of combustion shall have an approved operational carbon monoxide alarm installed within 10 feet of each room used for sleeping purposes in the new building or addition, or at such other locations as required by the Florida Building Code. The requirements of this subsection may be satisfied with the installation of a hard-wired or battery-powered carbon monoxide alarm or a hard-wired or battery-powered combination carbon monoxide and smoke alarm. For a new hospital, an inpatient hospice facility, a nursing home facility licensed by the Agency for Health Care Administration, or a new state correctional institution, an approved operational carbon monoxide detector shall be installed inside or directly outside of each room or area within the hospital or facility where a fossil-fuel-burning heater, engine, or appliance is located. This detector shall be connected to the fire alarm system of the hospital or facility as a supervisory signal. This subsection does not apply to existing buildings that are undergoing alterations or repairs unless the alteration is an addition as defined in subsection (3).
Informal Interpretation
Report Number 7572

Date: Thu Aug 20 2015
Report: 7572
Code: Building  Code Year: 2010
Section: 916.1.2

Question:
Is it the intent of 916.1.2 Exception #1 to not require carbon monoxide alarm installed within 10 feet of each room used for sleeping purposes of nursing homes facility licensed by the Agency for Health Care Administration?

Comment:
None

Answer:
No. The alarm is required inside or directly outside, based on agency requirements.

Commentary:
Please careful about the location of the requirement for the interpretation. The Exception is from the provision allowing a combination smoke/CO detector; not from the requirement for the CO detector. The provisions are found at Section 908.7 in the FBC's 8th Edition.

Notice:
The Building Officials Association of Florida, in cooperation with the Florida Building Commission, the Florida Department of Community Affairs, ICC, and industry and professional experts offer this interpretation of the Florida Building Code in the interest of consistency in their application statewide. This interpretation is informal, non-binding and subject to acceptance and approval by the local building official.
Informal Interpretation
Report Number 7618

Date:  Wed Sep 16 2015

Report:  7618

Code:  Building  Code Year:  2010

Section:  916.1.2

Question:
Is it the intent of 916.1.2, Exceptions #1 to not require carbon monoxide detectors within 10 feet of rooms used for sleeping purposes within nursing home facility licensed by AHCA having no fossil-fuel burning appliances located in sleeping rooms?

Comment:
None

Answer:
The Section cited is for combination alarms. If there is no fossil fuel-burning heater, engine, or appliance, there is no code requirement for a CO detector.

Commentary:
None

Notice:
The Building Officials Association of Florida, in cooperation with the Florida Building Commission, the Florida Department of Community Affairs, ICC, and industry and professional experts offer this interpretation of the Florida Building Code in the interest of consistency in their application statewide. This interpretation is informal, non-binding and subject to acceptance and approval by the local building official.
Sub Code: Energy Conservation
Summary of Modification
Modify air leakage rate.

Rationale
The sole reason for the change given by the proponent to the change from 7 ACH to 5 ACH in the base code was to make buildings tighter.

“There are four key areas of improvement in this proposal: Reduced leakage in duct systems and building envelopes, verified by testing. The proposal requires that all ductwork be inside conditioned space, sets new leakage limits on the ductwork, and adds a new requirement for testing the air tightness of the building envelope. As an alternative, homes with high-efficiency HVAC equipment are exempted from the requirement for ducts inside the conditioned space and are subject to less stringent duct and whole-house testing requirements.” (Excerpt from Reason statement for ICC Code Change EC13-09/10, ICC Monograph for ICC Public Hearings October 2009)

The statement of the first “key area” is the only reference to tighter building envelopes and was the sole reason given. Florida has enacted other measures through Florida specific amendments to the foundation code that result in greater energy efficiency.

In a report on whole-house ventilation effectiveness and failure rates by FSEC, one recommendation was to not require houses to become tighter than already specified by code and to consider increasing allowed air leakage to 7 ACH50 throughout Florida. (Source: Investigation of the Effectiveness and Failure Rates of Whole-House Mechanical Ventilation Systems in Florida” FSEC-CR-2002-15, June 1, 2015.) According to a statement by a member of FSEC on an Energy TAC conference call the energy loss at a 7 ACH infiltration rate is not sufficient to be of concern in Florida’s climate. Running models on Energy Gauge for a typical Florida house using 5 ACH and using 7 ACH resulted in no change.

Fiscal Impact Statement
Impact to local entity relative to enforcement of code
No impact to local entity for code enforcement. Proposal reverts to requirement of FBC-EC 2010.

Impact to building and property owners relative to cost of compliance with code
The proposal could result in a cost savings without a sacrifice of energy efficiency, Proposal reverts to requirement of FBC-EC 2010. Building and property owners would still have the option of requesting the builder to provide greater energy efficiency if desired.

Impact to industry relative to the cost of compliance with code
The proposal could result in a cost savings without a sacrifice of energy efficiency, Proposal reverts to requirement of FBC-EC 2010. Building and property owners would still have the option of requesting the builder to provide greater energy efficiency if desired.

Requirements
Has a reasonable and substantial connection with the health, safety, and welfare of the general public
The proposal has a reasonable connection with the health, safety, and welfare of the general public because it recognizes that Florida has different needs in some aspects that other states using the foundation code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
The proposal improves the code by removing an overly restrictive requirement and reverting to a reasonable provision with no loss in energy efficiency.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
The proposal does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code
The proposal does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No
R402.4.1.2 Testing.

The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding five 7.00 air changes per hour in Climate Zones 1 and 2, and three air changes per hour in Climate Zones 3 through 8. Testing shall be conducted in accordance with ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Where required by the code official, testing shall be conducted by an approved third party in accordance with the provisions of Section 489 or 553.99, Florida Statutes, or as otherwise authorized by Florida Statutes. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope.

Remainder of Section unchanged.
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<td>6385</td>
<td>Adds definition for LOCKING-TYPE TAMPER-RESISTANT CAP.</td>
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**Rationale**
See attachment.

**Fiscal Impact Statement**

- **Impact to local entity relative to enforcement of code**
  Yes. Adding definition will make enforcing the requirement easier to enforce.

- **Impact to building and property owners relative to cost of compliance with code**
  None. Only adds definition.

- **Impact to industry relative to the cost of compliance with code**
  None. Only adds definition.

**Requirements**

- **Has a reasonable and substantial connection with the health, safety, and welfare of the general public**
  Yes. Helps to prevent “Sniffing” or “huffing” refrigerant gas.

- **Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**
  Yes. Clarifies requirement.

- **Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**
  No. Only adds definition.

- **Does not degrade the effectiveness of the code**
  No. Only adds definition.

**Is the proposed code modification part of a prior code version?**
No
LOCKING-TYPE TAMPER-RESISTANT CAP. A cap that is designed to prevent its removal by means of hand-loosening or by means of commonly available tools. Such caps can be removed only by means of a unique key that is specifically designed for the locking cap.
RATIONAL:

Section 1101.10 is a new section in 2009 IMC and IRC that addresses the locking access of refrigerant port caps. New code sections in both the 2015 IMC and IRC require that access ports for refrigerants be contained in a secure location or, if located outside a locked, controlled area, be secured with a tamper-resistant locking cap. This code change was approved during the 2009, 2012 and 2015 cycles to help reduce unauthorized access to refrigerants, and to help AC system efficiency from the accidental mixing of refrigerant gases.

This proposal is intended to expand on intent and purpose of the new code section in the IMC and the IRC by defining the primary safeguard: the locking-type tamper resistant cap.

Refrigerant gas theft has become increasingly problematic in recent years. Some of this is due to the rising costs of these gases; however, stealing refrigerant for the act of huffing is increasing at an alarming rate. "Sniffing" or "huffing" refrigerant gas is extremely dangerous, causing brain damage or even death. Inhalants are the fourth most abused substance. According to the Inhalant Statistics and Reports "59% of children are aware of friends huffing at age 12." In the U.S., the 2006 National Survey on Drug Use and Health found that 1.1 million youths aged 12 to 17 had used inhalants in the past year. "Sniffing" and "huffing" can begin at age 10 or younger. 22% of inhalant abusers who died of Sudden Sniffing Death Syndrome had no history of previous inhalant abuse—they were first-time users.

Some port caps are designed to be removed with a set bit, Allen wrench, Schrader valve tool or screwdriver. The use of such tools to remove a cap could be considered an annoying delay by a determined thief because such port caps are not truly LOCKED. The majority of the victims of huffing are teens and pre-teens, many of whom could easily tamper with a port cap using such readily available tools.

This definition clarifies that the cap should be a truly tamper resistant lock to be effective, that is, can only be opened with a specially designed key. This clarification of the definition of a specially designed "lock and "key" will reduce theft and help to safe guard youngsters from serious injury or death resulting from the inhalation of dangerous refrigerants.
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.

**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
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 R402.4.1.1 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.
Related Modifications
FBC-Building-453.15.5

Summary of Modification
Allows for reduction in minimum Outside Airflow Rate. Creates agreement with proposed Mod to SBC-Building-453.15.5. Provides uniform method of application by Engineer and verification by Building Code Official. Complies with intent of ASHRAE 62.1.

Rationale
To reduce the Outside Air and respective Exhaust Systems Equipment cost and life cycle operating cost. To create agreement with proposed Modification to FBC-Building-453.15.5. To provide a uniform method of application by the Engineer and verification by the Building Code Official.

Fiscal Impact Statement
Impact to local entity relative to enforcement of code
No impact to local entity relative to enforcement of code.

Impact to building and property owners relative to cost of compliance with code
Reduction in Equipment size and cost and reduction in Life Cycle Operating costs of Outside Air Systems and their respective Exhaust Systems.

Impact to industry relative to the cost of compliance with code
No impact to industry 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 Outside Ventilation Air for occupants.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Improves the Code by creating a uniform method of application by the Engineer and verification by the Building Code Official.

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

Does not degrade the effectiveness of the code
It improves the effectiveness of the code by creating a uniform method of application by the Engineer and verification by the Building Code Official.

Is the proposed code modification part of a prior code version? No
403.2 Outdoor air required.
The minimum outdoor airflow rate shall be determined in accordance with Section 403.3. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the breathing zone within each occupiable space.

Exception (1): Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

Exception (2): For all occupancies, in accordance with Exception (1) and FBC-Mechanical-403.5, the minimum design airflow rate of Outside Air shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column). If the registered design professional determines that additional outside air is required, the Area Outdoor Airflow Rate (FBC-Mechanical-Table-403.3) shall be added to the People Outdoor Air Flow Rate (FBC-Mechanical-Table-403.3) for the applicable room(s).

In accordance with FBC-Mechanical-401.3, the Outside Air Systems and their respective Exhaust Systems are only required to operate when the rooms are occupied. When an Outside Air System and its respective Exhaust System are shut down, the Building shall remain in a relatively neutral pressure condition in accordance with FBC-Mechanical-403.1.
401.3 When required.
Ventilation shall be provided during the periods that the room or space is occupied.
SECTION 403 MECHANICAL VENTILATION

403.1 Ventilation system.
Mechanical ventilation shall be provided by a method of supply air and return or exhaust air. The amount of supply air shall be approximately equal to the amount of return and exhaust air. The system shall not be prohibited from producing negative or positive pressure. The system to convey ventilation air shall be designed and installed in accordance with Chapter 6.

403.2 Outdoor air required.
The minimum outdoor airflow rate shall be determined in accordance with Section 403.3. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the breathing zone within each occupiable space.

Exception: Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

403.2.1 Recirculation of air.
The outdoor air required by Section 403.3 shall not be recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from being recirculated as a component of supply air to building spaces, except that:

1. Ventilation air shall not be recirculated from one dwelling to another or to dissimilar occupancies.

2. Supply air to a swimming pool and associated deck areas shall not be recirculated unless such air is dehumidified to maintain the relative humidity of the area at 60 percent or less. Air from this area shall not be recirculated to other spaces where more than 10 percent of the resulting supply airstream consists of air recirculated from these spaces.

3. Where mechanical exhaust is required by Note b in Table 403.3, recirculation of air from such spaces shall be prohibited. All air supplied to such spaces shall be exhausted, including any air in excess of that required by Table 403.3.

4. Where mechanical exhaust is required by Note g in Table 403.3, mechanical exhaust is required and recirculation is prohibited where more than 10 percent of the resulting supply airstream consists of air recirculated from these spaces.

403.2.2 Transfer air.
Except where recirculation from such spaces is prohibited by Table 403.3, air transferred from occupiable spaces is not prohibited from serving as makeup air for required exhaust systems in such spaces as kitchens, baths, toilet rooms, elevators and smoking lounges. The amount of transfer air and exhaust air shall be sufficient to provide the flow rates as specified in Section 403.3. The required outdoor airflow rates specified in Table 403.3 shall be introduced directly into such spaces or into the occupied spaces from which air is transferred or a combination of both.

**403.3 Outdoor airflow rate.**
Ventilation systems shall be designed to have the capacity to supply the minimum outdoor airflow rate determined in accordance with this section. The occupant load utilized for design of the ventilation system shall not be less than the number determined from the estimated maximum occupant load rate indicated in Table 403.3. Ventilation rates for occupancies not represented in Table 403.3 shall be those for a listed occupancy classification that is most similar in terms of occupant density, activities and building construction; or shall be determined by an approved engineering analysis. The ventilation system shall be designed to supply the required rate of ventilation air continuously during the period the building is occupied, except as otherwise stated in other provisions of the code.

With the exception of smoking lounges, the ventilation rates in Table 403.3 are based on the absence of smoking in occupiable spaces. Where smoking is anticipated in a space other than a smoking lounge, the ventilation system serving the space shall be designed to provide ventilation over and above that required by Table 403.3 in accordance with accepted engineering practice.

**Exception:** The occupant load is not required to be determined based on the estimated maximum occupant load rate indicated in Table 403.3 where approved statistical data document the accuracy of an alternate anticipated occupant density.

**TABLE 403.3 MINIMUM VENTILATION RATES**

In accordance with 401.3, the intent of the code is that ventilation (outside air) shall be provided during the periods that the room or space is occupied.

403.4 Exhaust ventilation.
Exhaust airflow rate shall be provided in accordance with the requirements in Table 403.3. Exhaust makeup air shall be permitted to be any combination of outdoor air, recirculated air and transfer air, except as limited in accordance with Section 403.2.

403.5 System operation.
The minimum flow rate of outdoor air that the ventilation system must be capable of supplying during its operation shall be permitted to be based on the rate per person indicated in Table 403.3 and the actual number of occupants present.

403.6 Variable air volume system control.
Variable air volume air distribution systems, other than those designed to supply only 100-percent outdoor air, shall be provided with controls to regulate the flow of outdoor air. Such control system shall be designed to maintain the flow rate of outdoor air at a rate of not less than that required by Section 403.3 over the entire range of supply air operating rates.

403.7 Balancing.
The ventilation air distribution system shall be provided with means to adjust the system to achieve at least the minimum ventilation airflow rate as required by Sections 403.3 and 403.4. Ventilation systems shall be balanced by an approved method. Such balancing shall verify that the ventilation system is capable of supplying and exhausting the airflow rates required by Sections 403.3 and 403.4.

2017 Proposed Change to 2014 FBC-Building-453.15.5

**Background:** The wording of 2014-Florida Building Code (FBC)-Building-453.15.5 came from ASHRAE 62-1999 and is no longer supported by ASHRAE. In 2001, ASHRAE 62 became ASHRAE 62.1. The wording of 2014-Florida Building Code (FBC)-Building-453.15.5 was not included in ASHRAE 62.1 and was removed in the 2004 Edition of FBC - Mechanical-Section 403.3 and subsequent Editions. The Proposed Code Modification deletes the current wording of FBC-Building-453.15.5 and adds new wording supported by ASHRAE 62.1 and FBC-Mechanical-Section 403. In addition, this Proposed Code Modification also includes a change to FBC-Mechanical Section 403.2-Exception to create agreement between FBC-Building Section 453.15.5 and FBC-Mechanical-Section 403.

**Existing:**

**2014-FBC-Building-453.15.5:** "Ventilation Air Makeup for HVAC Systems: Where peak occupancies of less than 3 hours duration occur, the outside airflow may be determined on the basis of average occupancy for school buildings for the duration of operation of the air conditioning system, provided that the occupancy used is not less than one-half the maximum."

The Proposed Change to FBC-453.15.5 is requested for the following reasons:

1. **FBC-Building 453.15.5** is based on ASHRAE 62-1999 and earlier editions for Variable and Intermittent Use Occupancies. In 2001, ASHRAE 62 became ASHRAE 62.1. ASHRAE 62.1-2001 and later editions do not include the wording and support of FBC-Building-453.15.5.

2. FBC-Building-453.15.5 does not agree with FBC-Mechanical-403.1 and 403.3.

3. An Educational Facility is a Constant and Continuous Use Occupancy, and FBC 453.15.5 should never have been considered applicable.

4. The wording and intent of FBC-Building-453.15.5 is very ambiguous. There is no uniform application of the wording of FBC-Building 423.15.5. There is no way for the Building Code Official to uniformly verify that FBC-Building-453.15.5 is applied correctly.

5. The wording of FBC-Building-Section-453.15.5 was included in 2001-FBC-Mechanical-403.3 because of ASHRAE 62-1999. The Florida Building Code caught up with ASHRAE 62.1-2001 and removed the wording of FBC-Building-453.15.5 from FBC-Mechanical-403.3 in the 2004 and subsequent Editions. The wording of FBC 453.15.5 was added in 2007-FBC-Building (in 2007 it was FBC-Building-423.15.6) even though this same wording had been removed from 2004 and 2007 FBC-Mechanical-403.3 and subsequent Editions. Due to revisions of ASHRAE 62.1 and FBC-Mechanical 403.3, 2014-FBC-Building-453.15.5 no longer has any basis of support.

6. The wording of 2014-FBC-Building-453.15.5 which states in part “...for the duration of operation of the air conditioning system...” is requiring the operation of the Ventilation (Outside) Air Systems and associated Exhaust Systems even when spaces are unoccupied. For a large School District the operating cost of Ventilation (Outside) Air Systems and associated Exhaust Systems is approximately $500,000 per hour per year District wide. 2014-FBC-Building-453.15.5 is costing large School Districts approximately $1,000,000 per year in unnecessary operating cost (See Economic Analysis attached).

7. **2014-FBC-Mechanical-401.3-When required:** Ventilation shall be provided during the periods that the room or space is occupied.

8. **2007-FBC-Mechanical-403.4 ASHRAE 62 Alternative.** In lieu of compliance with Section 403.1 through Section 403.3, mechanical ventilation may be implemented in compliance with ASHRAE 62 including approved addenda. The above reference to ASHRAE 62 was removed in the 2010 Edition of FBC-Mechanical-Section 403. 2004 and subsequent Editions of FBC-Mechanical-Section-403 are now based on ASHRAE 62.1.
2017 Proposed Change to 2014-FBC-Building-453.15.5

FBC-Building-453.15.5: Delete the existing wording in its entirety.

The new wording of FBC-Building-453.15.5 should read as follows:

FBC-Building-453.15.5: In accordance with FBC-Mechanical-403.2-Exceptions (1) and (2) and FBC-Mechanical-403.5, the minimum design airflow rate of Outside Air shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column). If the Licensed Mechanical Professional Engineer determines that additional outside air is required, then the Area Outdoor Airflow Rate (FBC-Mechanical-Table 403.3) shall be added to the People Outdoor Air Flow Rate (FBC-Mechanical-Table 403.3) for the applicable room(s).

In accordance with FBC-Mechanical-401.3, the Outside Air Systems and their respective Exhaust Systems are only required to operate when the rooms are occupied. When an Outside Air System and its respective Exhaust System are shut down, the Building shall remain in a relatively neutral pressure condition in accordance with FBC-Mechanical-403.1.

The above should be considered acceptable for the following reasons:

1. The above complies with 2014-FBC-Mechanical-403.5 which states “The minimum airflow rate of Outside Air that the Ventilation System must be capable of supplying during its operation shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column) and the actual number of occupants present.

2. The above change creates agreement between FBC-Building-453.15.5 and FBC-Mechanical-403 and 401.3.

3. The above will reduce Outside Air and associated Exhaust Equipment size and construction cost as well as reduce the life cycle (perpetual) operating costs of the Outside Air Systems and associated Exhaust Systems by approximately $1,000,000 per year.

4. The above can be applied uniformly. The above can be uniformly verified by the Building Code Official.

5. The above complies with 2014-FBC-Mechanical-401.3-When required: Ventilation shall be provided during the periods that the room or space is occupied.

6. The above complies with the intent of ASHRAE 62.1.
2017 Proposed Changes to 2014-FBC-Mechanical-403.2

In order to create agreement between FBC-Building-453.15.5 and FBC-Mechanical-Chapter-4, FBC-Mechanical-403.2 shall be revised as follows:

Existing:

2014-FBC-Mechanical-403.2 Outdoor air required.
The minimum outdoor airflow rate shall be determined in accordance with Section 403.3. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the breathing zone within each occupiable space.

Exception: Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

New:

2014-FBC-Mechanical-403.2 Outdoor air required.
The minimum outdoor airflow rate shall be determined in accordance with Section 403.3. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the breathing zone within each occupiable space.

Exception (1): Where the Licensed Mechanical Professional Engineer demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

Exception (2): In accordance with Exception (1), for all occupancies, the minimum design airflow rate of Outside Air shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column). If the Licensed Mechanical Professional Engineer determines that additional outside air is required, the Area Outdoor Airflow Rate (FBC-Mechanical-Table 403.3) shall be added to the People Outdoor Air Flow Rate (FBC-Mechanical-Table403.3) for the applicable room(s).

In accordance with FBC-Mechanical-401.3, the operation of the Outside Air Systems and their respective Exhaust Systems are only required to operate when the rooms are occupied. When an Outside Air System and its respective Exhaust System are shut down, the Building shall remain in a relatively neutral pressure condition in accordance with FBC-Mechanical-403.1.

The above should be considered acceptable for the following reasons:

1. The above complies with 2014-FBC-Mechanical-403.5-2014 which states “The minimum airflow rate of Outside Air that the Ventilation System must be capable of supplying during its operation shall be permitted to be based on the rate per-person indicated in Table 403.3 (People Outdoor Airflow Rate Column) and the actual number of occupants present.

2. The above will reduce Outside Air and associated Exhaust Equipment size and construction cost as well as reduce the Life Cycle (perpetual) operating costs of the Outside Air Systems and associated Exhaust Systems.

3. The above can be applied uniformly. The above can be uniformly verified by the Building Code Official.

4. The above complies with 2014-FBC-Mechanical-401.3-When required: Ventilation shall be provided during the periods that the room or space is occupied.

5. The above complies with the intent of ASHRAE 62.1.
Economic Analysis of FBC-Building-453.15.5-2014 (423.15.5-2010)

A Typical School District utilizes separate Dedicated Outside Air Systems (DOAS) to supply fresh outside air to all occupant spaces. The purpose of the DOASs is to provide oxygen replenishment for the occupants, reduce the level of carbon dioxide exhaled by the space occupants and dissipate any odors emitted by the space occupants. Therefore, the DOASs are occupant based systems. Typically, separate chilled water air handling systems (CHWAHU) provide space cooling for each occupant space. For each school, the DOASs and CHWAHUs are connected into a chilled water system that is serviced by either air cooled or water cooled chillers. The Typical School District may also have some DOASs that utilize refrigerant instead of chilled water. The following economic analysis is also applicable for DOASs that utilize refrigerant. In addition to the DOASs, there are respective Exhaust Systems (ES) that run when the DOASs run to exhaust air from the respective spaces to maintain the building pressure balance.

The methodology utilized by the Typical School District is based on Florida Building Code-Building (FBC-B) 453.15.5-2014 (FBC-B-423.15.5-2010) which is based on Florida Building Code-Mechanical (FBC-M)-2001 Edition and ASHRAE 62-1999 Edition. The typical School District is currently under FBC-B-2010 and FBC-M-2010 Edition and ASHRAE 62.1-2004 Edition. FBC-M-403.3 and ASHRAE 62.1-2004 have been revised and longer make any reference to the wording of FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010). The wording of FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010) came from ASHRAE 62.1. Therefore, FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010) is not included in or supported by ASHRAE 62.1. The wording of FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010) is no longer has any basis of support. Due to the wording of FBC-B 453.15.5-2014 (FBC-B-423.15.5-2010), The Typical School District is operating the DOASs and respective ESs for approximately an extra 2 hours per day when the spaces are unoccupied.

The operation of the DOASs and respective ESs should be in accordance with FBC-M-401.3. The intent of FBC-M-401.3 is that all spaces are to be supplied with Ventilation (Outside) Air when they are occupied. The Typical School District schedules the Outside Air Systems and respective Exhaust Systems to run for a minimum of approximately 2 hours after the students are dismissed for the day when the spaces (e.g., classrooms) are unoccupied. This is not necessary. The need for operation of the DOASs is occupant based per FBC-M-401.3. The DOASs and respective Exhaust Systems should be turned off when the students are dismissed for the day and the spaces are unoccupied. If the DOASs and respective Exhaust Systems are turned off, their respective chillers would unload and utilize less electricity for the 2 hour period. In addition, the speed of the chilled water pumps would be reduced via the VFDs which would reduce the operating cost of the chilled water pumps. For water cooled chillers, there may also be some reduction in operating costs of the condenser water pumps. To be on the conservative side, the EER of the chillers will be assumed to include the chilled and condenser water pumps. Each DOAS has a fan motor and an electric reheat coil that utilizes electricity for the 2 hour period. The following analysis is based on an energy cost of $0.1 per Kwh. In addition to energy cost there is a peak electrical demand charge ($ per Kw) that is also levied by the Utility. This economic analysis does not include any possible savings do to a possible reduction in peak KW demand. This economic analysis does not include any possible savings in maintenance cost due to reduced run time of the Chillers, DOASs and respective ESs. Therefore, the actual savings may be more than what is shown. This economic analysis is for comparison purposes only and will give the an idea of how much money the unnecessary 2 hours of operation is costing a Typical School District.

For classrooms the outside air is supplied at 7.5 CFM per person. A large Typical School District serves approximately 210,000 students and 7500 teachers for a total of 217,500 people. 7.5 CFM per person x 217,500 people = 1,631,250 CFM. There are 180 school days per year.

1. **Chiller Energy Cost for DOASs**: Based on 1,631,250 CFM; a chiller EER of 9.6 Btu/h/watt; 150 CFM per cooling Ton; 12,000-Btuh per Ton and $0.1 per Kwh:

\[
\begin{align*}
1,631,250 \text{ CFM} / 150 \text{ CFM per Ton} &= 10,875 \text{ Tons of cooling} \\
130,500,000 \text{ Btu} / 9.6 \text{ Btu per \(1000\) Watts} &= 13,594 \text{ Kw x 2 Hrs per day} = 27,188 \text{ Kw per day} \\
27,188 \text{ Kw per day} x \$0.1 \text{ per Kw} &= \$2,719 \text{ per day x 180 days per year} = \$489,420 \text{ per year.}
\end{align*}
\]

2. **DOAS Fan Energy Cost**: Based on Bhp=5.2PQ/(33000 (0.6)); 5.2 PSF per inch w.g.; \$0.1 per Kwh, and 3.0 inches w.g.; Bhp= Brake Horsepower. 0.6 is the Efficiency of the fan wheel.

\[
\begin{align*}
\text{Bhp} &= 5.2 \times 3 \times (1,631,250) / (33000 (0.6)) = 1285 \text{ Bhp} \\
1285 \text{ Bhp x 0.75 Kw per Bhp} &= 964 \text{ Kw x 2 Hrs per day} = 1,928 \text{ Kwh per day}
\end{align*}
\]
1928 Kwh per day x 0.1$ per Kwh = $193 per day x 180 days per year = $34,740 per year

3. DOAS Reheat Energy Cost: The air leaves the cooling coil at 50F and has to be reheated to 72F before entering space. 72 - 50 = 22F dT; Btuh = 1.085 (CFM) (dT); 3,413 Btuh/Kw; 1,631,250 CFM and $0.1/Kwh

Btuh = 1.085 (1,631,250) (22) = 38,937,936 Btuh x 1 Kw / 3,413 Btuh = 11,409 Kw
11,409 Kw x 2Hr per day = 22,818 Kwh per day x $0.1/Kwh = $2,282 per day
$2,282 per day x 180 days per year = $410,760 per year

4. Exhaust Fan Cost: Based on Bhp=5.2PQ/(33000 (0.6)); 5.2 PSF per inch w.g.; $0.1 per Kwh, and 1.0 inches w.g.; Bhp= Brake Horsepower 0.6 is the Efficiency of the fan wheel.

Bhp = 5.2 x (1) x (1,631, 250) / (33000 (0.6)) = 428 Bhp
428 Bhp x 0.75 Kw per Bhp = 321 Kw x 2 Hrs per day = 642 Kwh per day
642 Kwh per day x 0.1$ per Kwh = $64.2 per day x 180 days per year = $11,556 per year

5. Total Energy Cost For 2 Unnecessary Hours of DOAS Operation: $489,420 + $34,740 + $410,760 + 11,556 = $946,476 per year or $473,238 per hour per year of unnecessary operation of the DOASs. In addition, there might be additional savings due to a possible reduction in the peak demand Kw. There may also be some savings due to a possible reduction in maintenance cost due to reduced run time of the chillers, DOASs and respective ESs.

For conservative purposes let use 10 years. For 10 years of unnecessary operation of the DOASs and respective ESs for 2 hours per day it has cost the Typical School District approximately 10 years x $946,476 per year = $9,464,760 that could have been saved and utilized to educated students. Until this issue is corrected, it will continue to cost the Typical School District approximately $946,476 per year.

There is a simple solution. Program the Energy Management System (EMS) for each school to shutdown all DOASs and respective ESs for unoccupied spaces at the time of student dismissal. This would automatically cause the chillers to unload and the chilled water pumps to slow down. For schools without Energy Management Systems, there is some type of time clock system control. The time clock system can be programmed to shut down all the respective DOASs and respective ESs at the time of school dismissal.

The intent of FBC-M 401.3 is that all occupied spaces be supplied with Ventilation (Outside) Air. If the spaces are unoccupied and have Dedicated Outside Air Systems (DOAS) that do not affect other occupied spaces, then the unoccupied space DOASs and respective Exhaust Systems can be turned off. Optimizing the operation of DOASs and respective ESs to shut down when rooms are unoccupied will save the Typical School District approximately $1,000,000 per year.

It is imperative that a clear and concise interpretation by the Florida Building Code Commission be made as to the intent and application of the codes. Petitioner appreciates the due diligence of the Florida Building Code Commission and fully understands the extensive work of the Florida Building Code Commission in developing the Codes for the greater safety and improvement of the consumer. Likewise, it would seem reasonable to ensure the Codes are uniformly interpreted. Section 553.775(1) Florida Statutes states: "It is the intent of the Legislature that the Florida Building Code be interpreted by the Building Officials, Local Enforcement Agencies and the Florida Building Code Commission in a manner that protects the public safety and welfare at the most reasonable cost to the consumer by ensuring uniform interpretations throughout the State by providing processes for resolving disputes regarding interpretations of the Florida Building Code that are just and expeditious."

Thank you for your time and consideration.

Respectfully Submitted,

Michael Ippolito, PE
T: 813-985-8652
C: 813-362-8507
E: ippolito456@aol.com
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.

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.
**M6975**

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<tr>
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<th>Section</th>
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<tr>
<td>12/31/2015</td>
<td>505.2</td>
<td>Jeff Sonne / FSEC</td>
<td>Yes</td>
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<tr>
<th>Chapter</th>
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<td>5</td>
<td>No</td>
<td>Pending Review</td>
<td>Pending Review</td>
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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.

### 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 409150 cfm (0.19 m³/s) (0.071 m³/s) shall be provided with makeup air at a rate approximately equal to the exhaust air rate. Such 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.
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:

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.

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.
## 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.

**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. 26 gauge) 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*. 
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<tr>
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<tr>
<td><strong>Summary of Modification</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td><strong>Rationale</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td><strong>Fiscal Impact Statement</strong></td>
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<tr>
<td><strong>Impact to local entity relative to enforcement of code</strong></td>
</tr>
<tr>
<td>Simplifies enforcement.</td>
</tr>
<tr>
<td><strong>Impact to building and property owners relative to cost of compliance with code</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td><strong>Impact to industry relative to the cost of compliance with code</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td><strong>Requirements</strong></td>
</tr>
<tr>
<td><strong>Has a reasonable and substantial connection with the health, safety, and welfare of the general public</strong></td>
</tr>
<tr>
<td>Modification follows Florida Fire Code requirements for life and safety.</td>
</tr>
<tr>
<td><strong>Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction</strong></td>
</tr>
<tr>
<td>Modification improves the code by eliminating conflicting requirements for Fire Alarm placement in air distribution systems.</td>
</tr>
<tr>
<td><strong>Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities</strong></td>
</tr>
<tr>
<td>There are no proprietary materials, products, methods required and follows Florida Fire Code requirements.</td>
</tr>
<tr>
<td><strong>Does not degrade the effectiveness of the code</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>

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
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 m³/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 m³/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 m³/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 m³/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.
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.


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
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<td>Pending Review</td>
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<tr>
<td>Commission Action</td>
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</tr>
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</table>

### 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

**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
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<th>Submitted</th>
<th>1/18/2016</th>
<th>Attachments</th>
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**Comment:**
Wording should be included that states the References NFPA 90A and 90B be the 2015 version.
Insert the following standards in alphabetical order within the list:

Chapter 15

Referenced Standards

NFPA 90A

NFPA 90B
**Summary of Modification**

Adds definition for LOCKING-TYPE TAMPER-RESISTANT CAP.

**Rationale**

See attached.

**Fiscal Impact Statement**

- **Impact to local entity relative to enforcement of code**
  
  Yes. Adding the definition will make enforcement of the requirement easier.

- **Impact to building and property owners relative to cost of compliance with code**
  
  None. Only adds definition.

- **Impact to industry relative to the cost of compliance with code**
  
  None. Only adds definition.

**Requirements**

- **Has a reasonable and substantial connection with the health, safety, and welfare of the general public**
  
  Yes. Helps to prevent “Sniffing” or “huffing” refrigerant gas.

- **Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction**
  
  Yes. Adds definition

- **Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities**
  
  No. Only adds definition.

- **Does not degrade the effectiveness of the code**
  
  No. Only adds definition.

**Is the proposed code modification part of a prior code version?** No
LOCKING-TYPE TAMPER-RESISTANT CAP. A cap that is designed to prevent its removal by means of hand-loosening or by means of commonly available tools. Such caps can be removed only by means of a unique key that is specifically designed for the locking cap.
RATIONAL:

Section M1411.8 of the 2015 IRC addresses the locking access of refrigerant port caps. New code sections in both the 2015 IMC and IRC require that access ports for refrigerants be contained in a secure location or, if located outside a locked, controlled area, be secured with a tamper-resistant locking cap. This code change was approved during the 2009, 2012 and 2015 I-Code cycles to help reduce unauthorized access to refrigerants, and to help AC system efficiency from the accidental mixing of refrigerant gases.

This proposal is intended to expand on intent and purpose of the new code section in the IMC and the IRC by defining the primary safeguard: the locking-type tamper resistant cap.

Refrigerant gas theft has become increasingly problematic in recent years. Some of this is due to the rising costs of these gases; however, stealing refrigerant for the act of huffing is increasing at an alarming rate. “Sniffing” or “huffing” refrigerant gas is extremely dangerous, causing brain damage or even death. Inhalants are the fourth most abused substance. According to the Inhalant Statistics and Reports "59% of children are aware of friends huffing at age 12." In the U.S., the 2006 National Survey on Drug Use and Health found that 1.1 million youths aged 12 to 17 had used inhalants in the past year. “Sniffing” and “huffing” can begin at age 10 or younger. 22% of inhalant abusers who died of Sudden Sniffing Death Syndrome had no history of previous inhalant abuse—they were first-time users.

Some port caps are designed to be removed with a set bit, Allen wrench, Schrader valve tool or screwdriver. The use of such tools to remove a cap could be considered an annoying delay by a determined thief because such port caps are not truly LOCKED. The majority of the victims of huffing are teens and pre-teens, many of whom could easily tamper with a port cap using such readily available tools.

This definition clarifies that the cap should be a truly tamper resistant lock to be effective, that is, can only be opened with a specially designed key. This clarification of the definition of a specially designed "lock and "key" will reduce theft and help to safe guard youngsters from serious injury or death resulting from the inhalation of dangerous refrigerants.
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.

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
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 N1402.4.1.2, 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.
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 ft² 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)”


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)]
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<td>1401.1</td>
<td>Joseph Belcher</td>
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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.

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.
### M7015

<table>
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<td>1/1/2016</td>
<td>1411.8</td>
<td>Cheryl Harris</td>
<td>No</td>
<td>No</td>
</tr>
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**TAC Recommendation**

Pending Review

**Commission Action**

Pending Review

### 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.

#### 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.
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.

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 + 8" inches above grade *outside of the building*.

5. The PVC ducts are solvent cemented
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<td>Chapter 15</td>
<td>Affects HVHZ No</td>
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### TAC Recommendation
Pending Review

### Commission Action
Pending Review

### Related Modifications

<table>
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<tr>
<td>Modify exhaust hood makeup air requirements.</td>
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<tr>
<th>Rationale</th>
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<tr>
<td>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.</td>
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<th>Fiscal Impact Statement</th>
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<tr>
<td>Impact to local entity relative to enforcement of code</td>
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<tr>
<td>Will require a method of assuring the mechanical contractor has followed the code.</td>
</tr>
<tr>
<td>Impact to building and property owners relative to cost of compliance with code</td>
</tr>
<tr>
<td>Minor differences than base code for most owners.</td>
</tr>
<tr>
<td>Impact to industry relative to the cost of compliance with code</td>
</tr>
<tr>
<td>For upscale homes may increase cost slightly for the purpose of reduced risk of health and safety issues and callbacks.</td>
</tr>
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</table>

### 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 400,150 cubic feet per minute (0.19 m³/s) (0.071 m³/s) shall be mechanically or naturally provided with makeup air at a rate approximately equal to the exhaust air rate. Such 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 if range hood exhaust systems capable of exhausting:

(a) less than 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.
**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.

**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.
**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:


**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.

**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
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 1/2 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.
Proposed Code Modifications

USER: Joe Bigelow, Department of Business & Professional Regulation, DBPR Personnel

Modification #  M7017
Name: Cheryl Harris
Address: 466 94th Ave No.
City: St Petersburg
State: FL
Zip Code: 33702
Email: charris@fracca.org
Primary Phone: (727) 576-3225
Alternate Phone:
Fax: (727) 578-9982

Modification Status: Verified

TAC: Mechanical
TAC Recommendation: Pending Review
Commission Action: Pending Review
Archived: No

Code Version: 2017
Code Change Cycle: 2017 Triennial Original Modification 07/01/2015 - 01/03/2016
Sub Code: Residential
Chapter & Topic: Chapter 15 - Exhaust Systems
Section: 1502.4.1
Related Modifications:

Affects High Velocity Hurricane Zone (HVHZ): No

Summary of Modification:
Corrects description of 0.0157 inches (0.3950 mm) thickness to Galvanized Metal Duct Gauge.

Text of Modification:

**M1502.4.1 Material and size.** Exhaust ducts shall have a smooth interior finish and be constructed of metal having a
minimum thickness of 0.0157 inches (0.3995 mm) (No. 28 gage). The duct shall be 4 inches (102 mm) nominal in diameter.

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<tr>
<td>01/19/2016</td>
<td>Mod_7017_TextOfModification.pdf</td>
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**Rationale**

The thickness listed is for 30 Gauge galvanized duct not 28. Referenced Gauge 28 is not needed and confusing.

**Fiscal Impact Statement**

Impact to local entity relative to enforcement of code (553.73(9)(b), F.S.)

Eliminates incorrect wording. No cost impact.

Impact to building and property owners relative to cost of compliance with code (553.73(9)(b), F.S.)

No cost impact.

Impact to industry relative to the cost of compliance with code (553.73(9)(b), F.S.)

No cost impact except to eliminate possible code violations for noncompliance.

Impact to small business relative to the cost of compliance with code (553.73(9)(b), F.S.)

No cost impact.

**Requirements**

Has a reasonable and substantial connection with the health, safety, and welfare of the general public (553.73(9)(a)2, F.S.)

Corrects numerical error. No other impact.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of
construction (553.73(9)(a)3,F.S.)

Corrects numerical error. No other impact.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities (553.73(9)(a)4,F.S.)

Corrects numerical error. No other impact.

Does not degrade the effectiveness of the code (553.73(9)(a)5,F.S.)

Corrects numerical error. No other impact.

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

No

1. The provisions contained in the proposed amendment are addressed in the applicable international code? (553.73(7)(g),F.S.)

No

2. 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. (553.73(7)(g),F.S.)

No

3. The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process. (553.73(7)(g),F.S.)

No

History

Date Submitted 01/01/2016
Date Verified 01/04/2016
Date TAC Recommendation Set 01/01/2016
Date Commission Action Set 01/01/2016
DBPR Staff Notes

Record of Modification

There are no records that match the search criteria.