Proposed Code Modifications

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WITH COMMENTS

TAC: Mechanical

Total Mods for **Mechanical** in **Approved as Submitted: 1**

Total Mods for report: 5

Sub Code: Energy Conservation

M68o6 1

Date Submitted	12/27/2015	**Section**	402.4	**Proponent**	Joseph Belcher
Chapter	4	**Affects HVHZ**	Yes	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

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

Related Modifications

Summary of Modification

Permit air leakage testing of low-rise R-2 as permitted for commercial.

Rationale

Current provisions for multi-family dwelling classified as low-rise residential require the testing of each unit separately. This amendment adds an exception to allow compliance to the air barrier requirements and testing as for commercial residential buildings allowing builders to test the entire building as a whole, as is permitted for commercial buildings.

Air tightness testing for single-family detached homes is very straightforward; however, it is much more difficult to accurately test attached dwelling units, including multi-family buildings. Currently the FBC-EC treats low-rise multi-family buildings of three stories or less like single-family homes and multi-family buildings of four stories or more like commercial buildings. Regardless of height, all multi-family buildings have the same air-tightness testing complications, such as: Does the entire building need to be tested at one time? What about multi-family buildings with open corridors? Does every dwelling need to be tested? Can the leakages be averaged between units? Is the leakage tested only to the “outside” or should it include leakage to adjacent units?

By approving this change, low-rise multi-family buildings and attached single-family dwellings will avoid these complications, but still held to the same level of performance as high-rise (R-2) residential as well as all commercial buildings.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact to local entity relative to code enforcement.

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

No impact to building and property owners relative to code enforcement.

Impact to industry relative to the cost of compliance with code

The impact to industry relative to the cost of code compliance is most likely a reduction in costs as the builder could schedule testing of the entire building at once or test the units individually.

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

No impact to small business.

Requirements

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

Yes because it offers an option for the testing of buildings containing multiple dwellings as a single building and retains the ability to test units individually. This provides an option to the builder that could result in decreased costs while ensuring compliance with the code.

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

The proposal strengthens and improves the code by providing a solution to a difficult problem.

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 increases the effectiveness of the code.

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

Alternate Language

1st Comment Period History

6806-A1

Proponent Mike Moore **Submitted** 2/22/2016 **Attachments** Yes

Rationale

The objective of EN6806 is to provide more options for air tightness testing of multiple attached dwelling units. If approved, however, EN6806 would inadvertently remove the requirement for mechanical ventilation of tight dwelling units, which is currently contingent on the results of a blower door test at or below 5 air changes per hour at 50 pascals. This comment would insure that if Florida approves EN6806, mechanical ventilation would still be required for all dwelling units in compliance with the air tightness requirements of Florida's IECC, regardless of the testing method that is used. Please refer to the rationale submitted for my proposed amendment to EN6573 for further information regarding combined ventilation/infiltration rates and health affects.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

As proposed, EN6806 may increase the local entity's burden by referencing a section of code that does not exist (i.e., C405.5.3.4 ??). Assuming this is corrected, increasing testing options can increase compliance, thereby reducing the local entity's costs of re-verification/inspection.

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

By increasing compliance options, costs to industry may be reduced. These cost savings may be passed on to the building and property owners.

Impact to industry relative to the cost of compliance with code

Increases compliance options and likely promotes cost competitiveness.

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

No impact to small business.

Requirements

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

The proposed changes to EN6806 are intended to safeguard public health, safety, and welfare by maintaining the requirement for mechanical ventilation currently in the model code.

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

The proposed changes to EN6806 maintain the IAQ benefits of the model code while increasing options for compliance in verifying building air tightness.

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

The proposed changes to EN6806 maintain current options for ventilation systems that can be used to provide minimum acceptable indoor air quality.

Does not degrade the effectiveness of the code

The proposed changes to EN6806 maintain the IAQ benefits of the model code while increasing options for compliance in verifying building air tightness.

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

2nd Comment Period

M6806-G2

Proponent Joseph Belcher **Submitted** 6/20/2016 **Attachments** No

Comment:

EN6806 FHBA requests the Energy TAC recommend approval of the modification as submitted.

RATIONALE: The reason given by the TAC as shown on the tracking chart for the Mod is that the provision is "not enforceable. ASHREA standards require tests for zones in AC units". The requested Mod simply applies provisions permitted for a four story or greater residential occupancy to three story or less multi-family occupancies. If the provision is in fact "unenforceable, how is Section C402.5 enforced for commercial buildings (which include R-2 more than three stories)? The statement that "ASHRAE standards require test for zones in AC units" as a reason to vote the request down is nonsensical. The Section of the base code referred to, Section 402.5, is a mandatory section on air leakage and makes no reference to ASHRAE standards. If the building was designed under ASHRAE standards, the provisions of ASHRAE would apply. If the building is designed using the FBC-EC, the provisions of the FBC-EC apply. It simply makes no sense to say a method suitable for a four story R-2 occupancy would not be acceptable for a three story R-2 occupancy, or a R-3 attached multi-family project such as townhouses.

Regarding the Public Comment by FSEC on the original proposal, there is a misunderstanding; the Section cited in the original proposal was correct. The intention of the change is to allow R-2 occupancies of less than four stories in height to comply with the provisions applicable to R-2 occupancies of four stories in height or greater.

1st Comment Period History

M6806-G1

Proponent Jeff Sonne / FSEC **Submitted** 2/25/2016 **Attachments** No

Comment:

[This comment assumes the proposer intended to reference IECC 2015 / FL base energy code section C402.5 instead of what was actually in the mod's text: "FBC-EC Section C405.5.3.4".] Testing an entire multifamily residential building as a whole would not be able to address between unit pollution. For this reason, we are against this mod.

Note ASHRAE Standard 62.2 addresses "compartmentalization" as follows:

8.4.1 Transfer Air. Measures shall be taken to minimize air movement across envelope components separating dwelling units, including sealing penetrations in the common walls, ceilings, and floors of each unit and by sealing vertical chases adjacent to the units. All doors between dwelling units and common hallways shall be gasketed or made substantially airtight.

8.4.1.1 Compliance. One method of demonstrating compliance with Section 8.4.1 shall be to verify a leakage rate below a maximum of 0.2 cfm per ft2 (100 L/s per 100 m2) of the dwelling unit envelope area (i.e., the sum of the area of walls between dwelling units, exterior walls, ceiling, and floor) at a test pressure of 50 Pa by a blower door test conducted in accordance with either ANSI/ASTM-E779, Standard Test Method for Determining Air Leakage Rate By Fan Pressurization,1 or ANSI/ASTM-E1827, Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door. The test shall be conducted with the dwelling unit as if it were exposed to outdoor air on all sides, top, and bottom by opening doors and windows of adjacent dwelling units.

Change the IECC as follows:

R402.4 Air Leakage (Mandatory). The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Section R402.4.1 through R402.4.4.

Exception: Dwelling units of R-2 occupancies and multiple attached single family dwellings shall be permitted to comply with FBC-EC Section C405.5.3.4.

R403.6 Mechanical ventilation (Mandatory). The building shall be provided with mechanical ventilation that meets the requirements of Section M1507 of the *International Residential Code* or Section 403 of the *International Mechanical Code*, as applicable, or with other approved means of mechanical ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

Change the IRC as follows:

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

Change the IMC as follows:

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. ~~Where the air infiltration rate in a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch water column (50 Pa) in accordance with Section R402.4.1.2 of the *International Energy Conservation Code*, the~~ dDwelling units 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.

R402.4 Air leakage (Mandatory). The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Section R402.4.1 through R402.4.4.

Exception: Dwelling units of R-2 Occupancies and multiple attached single family dwellings shall be permitted to comply with FBC-EC Section C405.5.3.4

TAC: Mechanical

Total Mods for **Mechanical** in **No Affirmative Recommendation with a Second: 3**

Total Mods for report: 4

Sub Code: Mechanical

M6384 2

Date Submitted	8/4/2015	**Section**	202	**Proponent**	Amanda Hickman
Chapter	2	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation No Affirmative Recommendation with a Second

Commission Action Pending Review

Comments

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

Related Modifications

6385

Summary of Modification

Adds definition for LOCKING-TYPE TAMPER-RESISTANT CAP.

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.

Impact to small business 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

2nd Comment Period

M6384-G1

Proponent Amanda Hickman **Submitted** 6/21/2016 **Attachments** Yes

Comment:

Based on contractor and inspector interaction in Florida there is a distinct level of uncertainty and ambiguity to what constitutes and qualifies as "locking" within this section of the code. The requirement has been in the International Mechanical Code since 2009 and there are still questions regarding what a locking cap is. For this reason, a definition was submitted to both the ICC and to Florida to clarify the term.

The ICC Technical Committee during the ICC hearing in Louisville, KY just this April unanimously approved the definition for the term "Locking Caps". In their reason for approving the definition, the Committee stated: "These devices will allow refrigerated gases to be locked in the system and will help prevent theft and inhalant abuses."

The ICC publishes commentary intended to clarify code language. Attached is the ICC commentary clarifying the term "Locking Cap". The definition being proposed is consistent with this commentary. We urge the TAC and the Commission to reconsider.

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.

cial and designer must be familiar with both documents. Therefore, while the exception to Section 1106.5.1 conflicts with ASHRAE 15, the provisions of this code shall apply pursuant to Section 102.8. Furthermore, many provisions in ASHRAE 15 are not contained in the code, including general system and component location restrictions, general installation requirements, material usage restrictions, system design pressure specifications, pressure vessel requirements, pressure relief protection, pressure vessel protection, relief valve discharge provisions, pressure limiting controls, system service provisions, factory testing requirements and general requirements for system signage and identification, refrigerant handling/storage and emergency procedures. IIAR 2 is similar in format and content to ASHRAE 15, but it is ammonia (R-717) specific.

1101.7 Maintenance. Mechanical refrigeration systems shall be maintained in proper operating condition, free from accumulations of oil, dirt, waste, excessive corrosion, other debris and leaks.

❖ Periodic maintenance is essential for the proper operation of mechanical refrigeration equipment. Typically, routine maintenance inspections occur when periodic testing is performed in accordance with Section 1109.1. However, maintenance should be performed any time damaged or weakened refrigeration systems are observed. Damaged refrigeration systems cannot be relied upon for protection since improperly maintained mechanical equipment will operate below peak efficiency, waste energy and eventually fail prematurely, adding unnecessary costs to the owner. The build up of oil, dirt and corrosion can adversely affect the heat exchange function of heat exchangers, and can contribute to motor failure and component overheating. The refrigeration systems must be kept clean in accordance with the manufacturer's recommendations, and any damaged or weakened component or device must be repaired or replaced and discarded. In essence, if the refrigerant stays contained in the refrigeration system, the hazards to occupants and the environment are greatly reduced; the hazards increase when the refrigerant becomes exposed outside of the system, often quickly and unexpectedly.

1101.8 Change in refrigerant type. The type of refrigerant in refrigeration systems having a refrigerant circuit containing more than 220 pounds (99.8 kg) of Group A1 or 30 pounds (13.6 kg) of any other group refrigerant shall not be changed without prior notification to the code official and compliance with the applicable code provisions for the new refrigerant type.

❖ The intent of this section is to keep the local fire code official or code official up to date on the status of large refrigeration systems and systems containing toxic and/or flammable refrigerants. Section 606 of the *International Fire Code*® (IFC®) contains several related requirements, including maintaining fire department access, posting emergency signs and labels, storage requirements and periodic system testing and maintenance of the test records (see commentary, Sections 1101.9 and 1106.6).

[F] 1101.9 Refrigerant discharge. Notification of refrigerant discharge shall be provided in accordance with the *International Fire Code*.

❖ Section 606 of the IFC requires notification of the fire department of any time there is a refrigerant discharge, either accidental or planned, from a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of refrigerant from any other group. Exceptions are stated for minor discharges associated with automatic pressure relief valves, service operations after system pump-down and systems operating below atmospheric pressure, which include an automatic purge system.

1101.10 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.

Exception: This section shall not apply to refrigerant circuit access ports on equipment installed in controlled areas such as on roofs with locked access hatches or doors.

❖ This provision intends to address a relatively new type and method of substance abuse where people intentionally inhale refrigerant gases for the intoxicating effect. In some cases, this inhalant abuse has resulted in the death of the individual. The typical condensing unit or heat pump unit is located outdoors and is equipped with access ports on the vapor and liquid refrigerant lines. These access ports are necessary for several purposes, such as to allow the connection of diagnostic gauges and to allow refrigerant to be added to or taken from the unit during servicing of the unit. Some of these access ports require backseated valves to be opened with a wrench to allow refrigerant to escape and many of these access ports are equipped with simple "Schraeder" valves that are similar to the valve cores used on car and truck tires. All access ports are provided with threaded caps to keep out debris and moisture and to also guard against valve leakage. Individuals intent on inhaling refrigerants have found that they can withdraw refrigerant from these units by using simple hand tools or their bare hands to remove the caps and open the valves.

The purpose of this section is to prevent this dangerous form of substance abuse by making it difficult if not impossible to gain access to the access ports. Special locking-type caps are available such that wrenches, pliers and fingers cannot be used to remove the caps without a special tool/key [see Commentary Figures 1101.10(1) through 1101.10(4)]. Methods other than special locking caps can be used such as installing the equipment in a chain link fence "cage" that is locked to prevent access to the equipment. Equipment installed on roofs that cannot be accessed except through a locked access hatch is

yet another way to prevent access. All newly installed equipment, including replacement equipment, must be provided with a method of protection as part of such installations. The exception recognizes that locking-type caps are not necessary where the refrigerant access ports are located in areas having controlled access, such as where the equipment is installed on roofs or in caged enclosures. If the equipment is made inaccessible by virtue of its location, the intent of the code is met because unauthorized access to the refrigerant ports is denied. See Commentary, Section 1102.3.

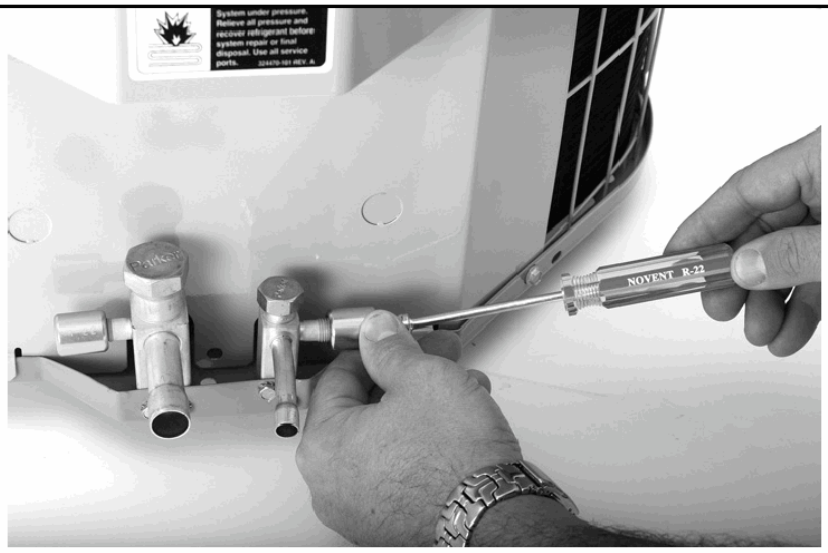

Figure 1101.10(1)
INSTALLATION OF LOCKING CAPS FOR REFRIGERANT ACCESS PORT
(Photo Courtesy of Novent LLC. & Airtec Products Corporation, Inc.)

Figure 1101.10(2)
REFRIGERANT LOCKING CAPS AND TOOLS
(Photo Courtesy of Novent LLC. & Airtec Products Corporation, Inc.)

Figure 1101.10(3)
REFRIGERANT LABELS FOR LOCKING CAPS
(Photo Courtesy of Novent LLC. & Airtec Products Corporation, Inc.)

Figure 1101.10(4)
SPECIAL REMOVAL TOOLS FOR REFRIGERANT LOCKING CAPS
(Photo Courtesy of Novent LLC. & Airtec Products Corporation, Inc.)

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.

Date Submitted	7/9/2015	**Section**	403.2	**Proponent**	Ippolito Michael
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation No Affirmative Recommendation with a Second

Commission Action Pending Review

Comments

General Comments Yes

Alternate Language Yes

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.

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

Reduction in construction, renovation and life cycle operating costs of Outside Air Systems and their respective Exhaust Systems.

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

Alternate Language

2nd Comment Period

6366-A6

Proponent Ippolito Michael **Submitted** 5/8/2016 **Attachments** Yes

Rationale

In FBCM 403.2 Exception (2) change the word "determine" to "demonstrate" in accordance with 403.2 Exception (1). M6366 complies with the intent of ASHRAE 62.1. M6366 is necessary for economic and environmental sustainability purposes. M6366 would allow for a reduction in the size of the outside air units and their respective exhaust systems and therefore a reduction in equipment cost and operation cost of the outside air systems and their respective exhaust systems. A reduction in equipment and operation cost reduces the financial burden on building owners and reduces the impact on environmental sustainability. M6366 allows for a uniform method of calculation by the registered design professional and verification by the Building Code Official having jurisdiction. M6366 allows for agreement between FBCM 403 and FBCB 453.15.5. Approval of M6366 and SP6364 is the right thing to do.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

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

It would reduce the equipment and operating cost of the required outside air systems and their respective exhaust systems.

Impact to industry relative to the cost of compliance with code

It would reduce the equipment and operating cost of the required outside air systems and their respective exhaust systems.

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

Reduction in construction, renovation and life cycle operating costs of Outside Air Systems and their respective Exhaust Systems.

Requirements

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

Outside (fresh) air make up is required to dilute the carbon dioxide created by the occupants.

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

It reduces the financial burden on building owners and reduces the impact on environmental sustainability.

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

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

Does not degrade the effectiveness of the code

It does not degrade the effectiveness of the Code.

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

2nd Comment Period

M6366-G2

Proponent Don Whitehead **Submitted** 5/27/2016 **Attachments** No

Comment:

Adding the People Outdoor Air Flow Rate to the Area Outdoor Air Flow Rate is already outlined in FBC, Mechanical, 403.3.1.1 Breathing zone outdoor airflow. and it is not necessary to be reiterated in this section.

Consideration of a neutral pressure condition from an Exhaust System is already outlined in FBC, Mechanical, 501.4 Pressure equalization. and it is not necessary to be reiterated in this section.

5th Edition (2014) FBC, Mechanical, 403.2 – Outdoor air required. should not be modified.

1st Comment Period History

M6366-G1

Proponent Don Whitehead **Submitted** 2/3/2016 **Attachments** No

Comment:

The registered design professional shall demonstrate, as oppose to determine, that the ventilation system will prevent unacceptable levels of contaminants in order to validate the approach used.

Adding the People Outdoor Air Flow Rate to the Area Outdoor Air Flow Rate is already outlined in FBC, Mechanical, 403.3.1.1 Breathing zone outdoor airflow.

Consideration of a neutral pressure condition from an Exhaust System shut down is already outlined in FBC, Mechanical, 501.4 Pressure equalization.

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* demonstrates 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.

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-Buiding-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 main 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 (and later Editions) 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 62-1999. In 2001 ASHRAE 62 became ASHRAE 62.1. The wording of FBC-B-453.15.5-2014 (FBC-B-423.15.5-2010) is not included in or supported by ASHRAE 62.1 Therefore, 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 also 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 Btuh/watt; 150 CFM per cooling Ton; 12,000-Btuh per Ton and $0.1 per Kwh:

   1,631,250 CFM/150 CFM per Ton = 10,875 Tons of cooling x 12,000 BTUH/ton = 130,500,000 Btuh
   130,500,000 Btuh x 1 watt/ 9.6 Btuh x 1 Kw/1000 Watts = 13,594 Kw x 2 Hrs per day = 27,188 Kwh per day
   27,188 Kwh per day x $0.1 per Kwh = $ 2,719 per day x 180 days per year = **$489,420 per year.**
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.

   Bhp = 5.2 x (3) x (1,631, 250) / (33000 (0.6)) = 1285 Bhp
   1285 Bhp x 0.75 Kw per Bhp = 964 Kw x 2 Hrs per day = 1,928 Kwh per day

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 Statues 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,

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M6385

4

Date Submitted	8/4/2015	**Section**	202	**Proponent**	Amanda Hickman
Chapter	2	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation No Affirmative Recommendation with a Second

Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

6384

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.

Impact to small business 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

2nd Comment Period

M6385-G1

Proponent Amanda Hickman **Submitted** 6/21/2016 **Attachments** Yes

Comment:

Based on contractor and inspector interaction in Florida there is a distinct level of uncertainty and ambiguity to what constitutes and qualifies as "locking" within this section of the code. The requirement has been in the International Mechanical Code since 2009 and there are still questions regarding what a locking cap is. For this reason, a definition was submitted to both the ICC and to Florida to clarify the term.

The ICC Technical Committee during the ICC hearing in Louisville, KY just this April unanimously approved the definition for the term "Locking Caps". In their reason for approving the definition, the Committee stated: "These devices will allow refrigerated gases to be locked in the system and will help prevent theft and inhalant abuses."

The ICC publishes commentary intended to clarify code language. Attached is the ICC commentary clarifying the term "Locking Cap". The definition being proposed is consistent with this commentary. We urge the TAC and the Commission to reconsider.

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.

cial and designer must be familiar with both documents. Therefore, while the exception to Section 1106.5.1 conflicts with ASHRAE 15, the provisions of this code shall apply pursuant to Section 102.8. Furthermore, many provisions in ASHRAE 15 are not contained in the code, including general system and component location restrictions, general installation requirements, material usage restrictions, system design pressure specifications, pressure vessel requirements, pressure relief protection, pressure vessel protection, relief valve discharge provisions, pressure limiting controls, system service provisions, factory testing requirements and general requirements for system signage and identification, refrigerant handling/storage and emergency procedures. IIAR 2 is similar in format and content to ASHRAE 15, but it is ammonia (R-717) specific.

1101.7 Maintenance. Mechanical refrigeration systems shall be maintained in proper operating condition, free from accumulations of oil, dirt, waste, excessive corrosion, other debris and leaks.

❖ Periodic maintenance is essential for the proper operation of mechanical refrigeration equipment. Typically, routine maintenance inspections occur when periodic testing is performed in accordance with Section 1109.1. However, maintenance should be performed any time damaged or weakened refrigeration systems are observed. Damaged refrigeration systems cannot be relied upon for protection since improperly maintained mechanical equipment will operate below peak efficiency, waste energy and eventually fail prematurely, adding unnecessary costs to the owner. The build up of oil, dirt and corrosion can adversely affect the heat exchange function of heat exchangers, and can contribute to motor failure and component overheating. The refrigeration systems must be kept clean in accordance with the manufacturer's recommendations, and any damaged or weakened component or device must be repaired or replaced and discarded. In essence, if the refrigerant stays contained in the refrigeration system, the hazards to occupants and the environment are greatly reduced; the hazards increase when the refrigerant becomes exposed outside of the system, often quickly and unexpectedly.

1101.8 Change in refrigerant type. The type of refrigerant in refrigeration systems having a refrigerant circuit containing more than 220 pounds (99.8 kg) of Group A1 or 30 pounds (13.6 kg) of any other group refrigerant shall not be changed without prior notification to the code official and compliance with the applicable code provisions for the new refrigerant type.

❖ The intent of this section is to keep the local fire code official or code official up to date on the status of large refrigeration systems and systems containing toxic and/or flammable refrigerants. Section 606 of the *International Fire Code*® (IFC®) contains several related requirements, including maintaining fire department access, posting emergency signs and labels, storage requirements and periodic system testing and maintenance of the test records (see commentary, Sections 1101.9 and 1106.6).

[F] 1101.9 Refrigerant discharge. Notification of refrigerant discharge shall be provided in accordance with the *International Fire Code*.

❖ Section 606 of the IFC requires notification of the fire department of any time there is a refrigerant discharge, either accidental or planned, from a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of refrigerant from any other group. Exceptions are stated for minor discharges associated with automatic pressure relief valves, service operations after system pump-down and systems operating below atmospheric pressure, which include an automatic purge system.

1101.10 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.

Exception: This section shall not apply to refrigerant circuit access ports on equipment installed in controlled areas such as on roofs with locked access hatches or doors.

❖ This provision intends to address a relatively new type and method of substance abuse where people intentionally inhale refrigerant gases for the intoxicating effect. In some cases, this inhalant abuse has resulted in the death of the individual. The typical condensing unit or heat pump unit is located outdoors and is equipped with access ports on the vapor and liquid refrigerant lines. These access ports are necessary for several purposes, such as to allow the connection of diagnostic gauges and to allow refrigerant to be added to or taken from the unit during servicing of the unit. Some of these access ports require backseated valves to be opened with a wrench to allow refrigerant to escape and many of these access ports are equipped with simple "Schraeder" valves that are similar to the valve cores used on car and truck tires. All access ports are provided with threaded caps to keep out debris and moisture and to also guard against valve leakage. Individuals intent on inhaling refrigerants have found that they can withdraw refrigerant from these units by using simple hand tools or their bare hands to remove the caps and open the valves.

The purpose of this section is to prevent this dangerous form of substance abuse by making it difficult if not impossible to gain access to the access ports. Special locking-type caps are available such that wrenches, pliers and fingers cannot be used to remove the caps without a special tool/key [see Commentary Figures 1101.10(1) through 1101.10(4)]. Methods other than special locking caps can be used such as installing the equipment in a chain link fence "cage" that is locked to prevent access to the equipment. Equipment installed on roofs that cannot be accessed except through a locked access hatch is

yet another way to prevent access. All newly installed equipment, including replacement equipment, must be provided with a method of protection as part of such installations. The exception recognizes that locking-type caps are not necessary where the refrigerant access ports are located in areas having controlled access, such as where the equipment is installed on roofs or in caged enclosures. If the equipment is made inaccessible by virtue of its location, the intent of the code is met because unauthorized access to the refrigerant ports is denied. See Commentary, Section 1102.3.

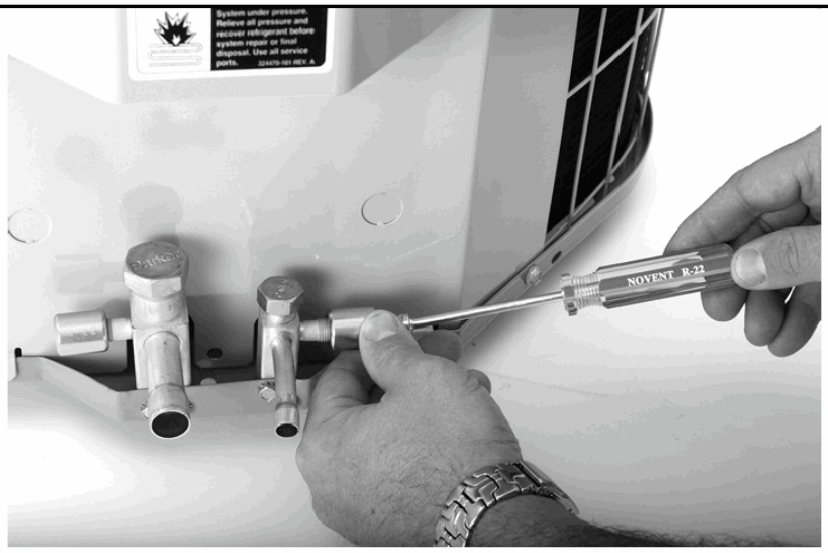

Figure 1101.10(1)
INSTALLATION OF LOCKING CAPS FOR REFRIGERANT ACCESS PORT
(Photo Courtesy of Novent LLC. & Airtec Products Corporation, Inc.)

Figure 1101.10(2)
REFRIGERANT LOCKING CAPS AND TOOLS
(Photo Courtesy of Novent LLC. & Airtec Products Corporation, Inc.)

Figure 1101.10(3)
REFRIGERANT LABELS FOR LOCKING CAPS
(Photo Courtesy of Novent LLC. & Airtec Products Corporation, Inc.)

Figure 1101.10(4)
SPECIAL REMOVAL TOOLS FOR REFRIGERANT LOCKING CAPS
(Photo Courtesy of Novent LLC. & Airtec Products Corporation, Inc.)

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.

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

Modification #	M7017
Name	Cheryl Harris
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Modification Status	Verified
More Information Requested View Request History	
TAC	Mechanical
TAC Recommendation	Approved as Modified
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 ~~(0.3950 mm) (No. 28 gage)~~. The duct shall be 4 inches (102 mm) nominal in

diameter.

Date	Attached File
01/19/2016	Mod_7017_TextOfModification.pdf

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 exihibits 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	04/13/2016
Date Commission Action Set	01/01/2016
DBPR Staff Notes	

Record of Modification

Mod #	Stage	Date Submitted	Submitted By	Code Change Cycle	Status
M7017-A1	Alternate Language	02/24/2016	Joseph Belcher	2017 Triennial Original Modification 07/01/2015 - 01/03/2016	VERIFY
M7017-R1	Revision	04/14/2016	Joe Bigelow	2017 Triennial Original Modification 07/01/2015 - 01/03/2016	VERIFY
M7017-G1	General Comment	06/20/2016	Gregory Hatfield	2017 Triennial Original Modification	VERIFY

				07/01/2015 - 01/03/2016	

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

Modification #	M7017-G1
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Code Change Cycle	2017 Triennial Original Modification 07/01/2015 - 01/03/2016
Code Version	2017
Sub Code	Residential
Chapter & Topic	Chapter 15 - Exhaust Systems
Section	1502.4.1
Status	Verified

General Comment

The petitioner noted that .0157" was confusing since it was 30ga tolerance and requested dropping 28ga from M1502.4.1. Please do not approve M7017 deletion of .0157" 28ga.

1997 was last code to reference Nominal thickness, it then switched to MINIMUM thickness from SMACNA Metal & Flexible Appendix A which lists 28ga as .0157". Table M1601.1.1(2) also references Minimum thickness .0157" as 28ga equivalent galvanized

Date	Attached File
06/20/2016	Mod_7017_G1_General_M7017 attachment references.pdf

Date Submitted	06/20/2016
Date Verified	06/20/2016

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SMACNA HVAC Duct Construction Standards Metal & Flexible 2005, 3rd Edition, Appendix A.1:

Gage	Thickness in Inches		
	Min.	Max.	Nom.
33	.0060	.0120	.0090
32	.0104	.0164	.0134
31	.0112	.0172	.0142
30	.0127	.0187	.0157
29	.0142	.020	.0172
28	.0157	.0217	.0187
27	.0172	.0232	.0202
26	.0187	.0247	.0217
25	.0217	.0287	.0247
24	.0236	.0316	.0276

TABLE M1601.1.1(2)
GAGES OF METAL DUCTS AND PLENUMS USED FOR HEATING OR C

DUCT SIZE	GALVANIZED	
	Minimum Thickness (inches)	Equivalent Galvanized Gage No.
Round ducts and enclosed rectangular ducts 14 inches or less	0.0157	28
	0.0187	26

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

* Required fields

Modification #	M7017-R1
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Code Change Cycle	2017 Triennial Original Modification 07/01/2015 - 01/03/2016
Code Version	2017
Sub Code	Residential
Chapter & Topic	Chapter 15 - Exhaust Systems
Section	1502.4.1

The base documents for the 2013 Code Update can be found here. ICC Website.

Text of Modification (Additions underlined; deletions ~~stricken~~)*

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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 ~~(0.3950 mm) (No. 28 gage)~~. The duct shall be 4 inches (102 mm) nominal in diameter.

Exception: Exhaust ducts may be 4 inches nominal in diameter Schedule 40 PVC when horizontally run beneath the slab.

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☐	06/21/2016	Mod_7017_R1_TextOfModification.pdf

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Date Submitted 04/14/2016

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

Proposed Code Modifications Menu > Modification Search > Modification List > Modification Detail > **Alternate Language Detail**

Jump to Bottom

Alternate Language #	M7017-A1
Name	Joseph Belcher
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Alternate Language Status: Verified

More Information Requested:

Code Change Cycle: 2017 Triennial Original Modification 07/01/2015 - 01/03/2016

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 ~~(0.3950 mm) (No. 28 gage)~~. The duct shall be 4 inches (102 mm) nominal in diameter.

Exception: Exhaust ducts may be 4 inches nominal in diameter Schedule 40 PVC when horizontally run beneath the slab.

Date	Attached File
02/29/2016	Mod_7017_A1_TextOfModification.pdf

Rationale

The PVC dryer exhaust duct run horizontally beneath the slab has been the standard practice in the northwest part of the state for many years for thousands of houses with no reported problems. The proposal recognizes a viable method of providing dryer exhaust without requiring penetration of the roof. In the unlikely event of a fire within the duct, the fire would be contained and prevented from entering the attic space or the building space. Duct cleaning is more easily accomplished with the system and the

Fiscal Impact Statement

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

None.

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

None.

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

None.

None.

Requirements

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

Improves public health, safety, and welfare by recognizing and providing a time tested and proven viable alternate to metal exhaust pipe penetrating the roof of structure.

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

Strengthens and improves the code by recognizing and providing a time tested and proven viable alternate to metal exhaust pipe penetrating the roof of structure.

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

Does not discriminate against materials, but provides for the use of an alternate material and method.

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

Improves the effectiveness of the code by recognizing and providing a time tested and proven viable alternate to metal exhaust pipe penetrating the roof of structure.

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

No

History

Date Submitted	02/24/2016
Date Verified	02/24/2016

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