# Mechanical

**Proposed Code Modifications**

# TAC: Mechanical

## Sub Code: Building

Total Mods for Mechanical: 46

# M3854



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| **Date Proposal Submitted** | 3/24/2010 | **Section** | 202 |
| **Chapter** | 2 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Steven Bassett | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

Mods 3844, 3840, 3853, 4190

**Summary of Modification**

revise definition

**Rationale**

It is the work of the Carbon Monoxide work group

**Fiscal Impact Statement**

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

Will make the code clearer and easier to enforce

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

Will reduce costs.

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

Will reduce costs.

**Requirements**

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

Will make the code more understandable to the necessary safety precautions will be complied with.

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

Makes the code more understandable.

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

Does not address materials, products, methods or systems of construction.

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

It improves the effectiveness of the code.

**ADDITION.** An extension or increase in floor area, number of stories or height of a building or structure.

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| **Date Proposal Submitted** | 3/24/2010 | **Section** | R315 |
| **Chapter** | 3 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | marilyn williams | **General Comments** | Yes |
| **Attachments** | Yes | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

The intent of the proposal is to align the Florida building code supplement with nationally recognized consensus standards for carbon monoxide detection.

**Rationale**

The intent of the proposal seeks to align sections 202 and 916 of the Florida building code supplement with nationally recognized consensus standards for carbon monoxide detection. See attachment for additional information.

**Fiscal Impact Statement**

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

The code change proposal seeks to remove ambiguity and add clarity to the code provisions for local code enforcement officials.

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

The code change proposal will not increase the cost of construction.

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

The code change proposal will not increase the cost of compliance to industry

**Requirements**

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

One of the most effective ways to protect the occupants from this odorless and tasteless product of combustion, known as the "Silent Killer" is through the installation of detectors complying with national consensus standards.

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

The code change proposal improves the code by adding clear, concise and enforceable language based on national consensus standards.

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

The code change proposal provides equitable requirements for all carbon monoxide detection and warning equipment.

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

The code change proposal does not degrade the effectiveness of the code instead it seeks to improve the usefulness of the code.

**General Comment**

M3844-G1

**Proponent** Jack Glenn **Submitted** 6/1/2010 **Attachments** No

**Comment**

This change may conflict with the provisions of HB-663 if signed by the Governor.

**Section R202, Definitions. Amend the following definition:**

**CARBON MONOXIDE ALARM.** A device for the purpose of detecting carbon monoxide, that produces a distinct audible alarm, and is listed ~~or~~ and labeled with the ~~appropriate standard, either~~ ANSI/UL 2034~~—96,~~ Standard for Single and Multiple Station CO Alarms, ~~or UL 2075—04, Gas and Vapor Detector Sensor, in accordance with its application.~~

**Section R202, Definitions. Add the following definition:**

**CARBON MONOXIDE DETECTOR.** A device for the purpose of detecting carbon monoxide and is listed and labeled with the ANSI/UL 2075, Gas and Vapor Detector Sensor.

**SECTION R315**

**CARBON MONOXIDE ALARMS**

**Revise Section R315 Add text to read as follows:**

**R315.1 Carbon monoxide protection.** Every building for which a permit for new construction is issued having a fossil-fuel-burning heater or appliance, a fireplace, or an attached garage shall have an operational carbon monoxide alarm installed within 10 feet of each room used for sleeping purposes. Carbon monoxide alarms shall be installed and maintained in accordance with NFPA 720 and manufacturer's instructions.

**R315.1.2 Household carbon monoxide detection systems.** Household carbon monoxide detection systems, that include carbon monoxide detectors and audible notification appliance, installed and maintained in accordance with this section for carbon monoxide alarms and NFPA 720 shall be permitted.

~~**R315.1.1**~~ **R315.2 Power Source.** In new construction, carbon monoxide alarms shall receive their primary power from the building wiring when such wiring is served from the local power utility. Such alarms shall have battery back up.

Carbon monoxide detectors shall receive their power from the approved control unit. The approved control unit shall receive its primary power from the building wiring when such wiring is served from a commercial source and the primary power source shall not include a disconnecting switch other than those required for overcurrent protection. The control panel shall be equipped with rechargeable batteries for secondary power backup.

Low-power radio frequency (wireless) detectors shall be permitted to be battery powered when the battery is electrically supervised and shall be capable of sending an alarm signal to the control unit after sending the initial battery depletion signal.

~~R315.1.2~~ **R315.3 Combination alarms.** Combination smoke/carbon monoxide alarms shall be listed ~~or~~ and labeled by a Nationally Recognized Testing Laboratory for both smoke detection and carbon monoxide detection.

~~R315.2~~ **R315.4 Where required in existing dwellings. Reserved**

~~R315.3~~ **R315.5 Alarm requirements. Reserved**

**Rationale:** The intent of the proposal seeks to align the provisions of sections 202 and 916 of the Florida building code supplement with nationally recognized consensus standards for carbon monoxide detection and warning equipment.

NEMA respectfully recommends a clear delineation between the terms. As currently written the definition of carbon monoxide alarms in section 202 of the Florida building code supplement does not correlate with the terminology used in ANSI/UL 2034, ANSI/UL 2075 and NFPA 720. The reason the three ANSI standards use different terms is because the performance and listing requirements are different. For example ANSI/UL 2075 does not preclude carbon monoxide detectors to incorporate an integral sounder but the standard does not mandate it. Also, power requirements in the Florida supplements do not reference the power requirements for wired and wireless carbon monoxide detectors.

In order for carbon monoxide detection and warning equipment to provide life safety protection they must be properly installed and maintained. NFPA 720, *Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment*, is the national consensus standard that establishes the performance installation and maintenance requirements for carbon monoxide detection devices. Therefore NEMA recommends adding text that requires carbon monoxide detection and warning equipment to follow the requirements of NFPA 720.

The Florida supplement is unclear if carbon monoxide detectors are allowed to be installed. In accordance with NFPA 720 the household warning functions shall be performed by carbon monoxide alarms or carbon monoxide detectors. The proposal adds clarity that carbon monoxide detection systems and carbon monoxide detectors are permissible in all commercial sleeping occupancies.

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| **Date Proposal Submitted** | 3/24/2010 | **Section** | 202 and 916 |
| **Chapter** | 9 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | marilyn williams | **General Comments** | Yes |
| **Attachments** | Yes | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

The intent of the proposal is to align the Florida building code supplement with nationally recognized consensus standards for carbon monoxide detection.

**Rationale**

Rationale: The intent of the proposal seeks to align sections 202 and 916 of the Florida building code supplement with nationally recognized consensus standards for carbon monoxide detection. See attachment for additional information.

**Fiscal Impact Statement**

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

The code change proposal seeks to remove ambiguity and add clarity to the code provisions for local code enforcement officials.

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

The code change proposal will not increase the cost of construction

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

The code change proposal will not increase the cost of compliance to industry

**Requirements**

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

It is well documented that carbon monoxide poisonings are a leading cause of injury or death.

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

The code change proposal improves the code by adding clear, concise and enforceable language based on national consensus standards.

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

The code change proposal provides equitable requirements for all carbon monoxide detection and warning equipment.

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

The code change proposal does not degrade the effectiveness of the code instead it seeks to improve the usefulness of the code.

**General Comment**

M3840-G1

**Proponent** Jack Glenn **Submitted** 6/1/2010 **Attachments** No

**Comment**

This change may conflict with the provisions of HB-663 if signed by the Governor.

**Chapter 2 Definitions.**

**Section 202 Amend the following definition:**

**CARBON MONOXIDE ALARM.** A device for the purpose of detecting carbon monoxide, that produces a distinct audible alarm, and ~~is listed or labeled with the appropriate standard, either ANSI/UL 2034—96, Standard for Single and Multiple Station CO Alarms, or UL 2075—04, Gas and Vapor Detector Sensor, in accordance with its application.~~ shall be listed by a nationally recognized testing laboratory (NRTL) that is U.S. Occupational Safety and Health Administration (OSHA) accredited to test and certify to American National Standards Institute (ANSI)/Underwriters Laboratories (UL) Standards ANSI/UL 2034, Standard for Single and Multiple Station CO Alarms

**Section 202. Add the following definition:**

**CARBON MONOXIDE DETECTOR.** A device for the purpose of detecting carbon monoxide and shall be listed by a nationally recognized testing laboratory (NRTL) that is U.S. Occupational Safety and Health Administration (OSHA) accredited to test and certify to American National Standards Institute (ANSI)/Underwriters Laboratories (UL) Standards ANSI/UL 2075, Gas and Vapor Detector Sensor

**Revise Section 916 Add text to read as follows:**

**916.1 Carbon monoxide protection.** Every building for which a permit for new construction is issued having a fossil-fuel-burning heater or appliance, a fireplace, or an attached garage shall have an operational carbon monoxide alarm installed within 10 feet of each room used for sleeping purposes. Carbon monoxide alarms shall be installed and maintained in accordance with NFPA 720 and manufacturer's instructions.

**Exception:** ~~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 where a fossil-fuel-burning heater, engine, or appliance is located.~~ Hospitals, inpatient hospice facilities or nursing home facilities shall have an approved operational carbon monoxide detector installed on the ceiling in the same room as a fossil-fuel burning heater, engine, or appliance. The carbon monoxide detector shall be connected to the carbon monoxide detection system or a ~~fire alarm~~ combination system of the hospital, inpatient hospice facility, or nursing home facility as ~~a supervisory~~ an alarm signal.

**916.1.1 Carbon monoxide detection systems.** Carbon monoxide detection systems, that include carbon monoxide detectors and audible notification appliance, installed and maintained in accordance with this section for carbon monoxide alarms and NFPA 720 shall be permitted.

~~916.1.1~~ **916.2 Power Source.** In new construction, carbon monoxide alarms shall receive their primary power from the building wiring when such wiring is served from the local power utility. Such alarms shall have battery back up.

Carbon monoxide detectors shall receive their power from the approved control unit. The approved control unit shall receive its primary power from the building wiring when such wiring is served from a commercial source and the primary power source shall not include a disconnecting switch other than those required for overcurrent protection. The control panel shall be equipped with rechargeable batteries for secondary power backup.

Low-power radio frequency (wireless) detectors shall be permitted to be battery powered when the battery is electrically supervised and shall be capable of sending an alarm signal to the control unit after sending the initial battery depletion signal.

~~916.1.2~~ **916.3 Combination alarms.** Combination smoke/carbon monoxide alarms shall be listed ~~or~~ and labeled by a Nationally Recognized Testing Laboratory for both smoke detection and carbon monoxide detection.

**Rationale:** The intent of the proposal seeks to align the provisions of sections 202 and 916 of the Florida building code supplement with nationally recognized consensus standards for carbon monoxide detection and warning equipment. NEMA respectfully recommends a clear delineation between the terms carbon monoxide alarm and carbon monoxide detector.

As currently written the definition of carbon monoxide alarms in section 202 of the Florida building code supplement does not correlate with the terminology used in ANSI/UL 2034, ANSI/UL 2075 and NFPA 720.

The reason the three ANSI standards use different terms is because the performance and listing requirements are different. For example ANSI/UL 2075 does not preclude carbon monoxide detectors from incorporating an integral sounder but the standard does not mandate it. Also, power requirements in the Florida supplements do not reference the power requirements for wired and wireless carbon monoxide detectors.

While NEMA fully endorses requiring CO detection devices to be certified/listed to the applicable American National Standards Institute (ANSI)/Underwriters Laboratories (UL) standards such certification/listing should be able to be done by any of the Nationally Recognized Testing Laboratories (NRTLs) approved by the U.S. Occupational Safety and Health Administration (OSHA) to test and certify to these national standards. This would include UL, but also allow manufacturers the option of having the products tested/certified and listed to the national consensus standards by one of the other NRTLs. OSHA's NRTL program can be viewed at:
http://www.osha.gov/dts/otpca/nrtl/index.html

In order for carbon monoxide detection and warning equipment to provide life safety protection they must be properly installed and maintained. NFPA 720, *Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment*, is the national consensus standard that establishes the performance installation and maintenance requirements for carbon monoxide detection devices. NEMA recommends adding text that requires carbon monoxide detection and warning equipment to follow the requirements of NFPA 720.

NFPA 720 permits a CO detection system to operate as a stand-alone system or it can be combined with either a fire alarm system or a security system. Specifically, section 5.5.2.1 permits the carbon monoxide system to be a stand-alone system while sections 5.5.2.1 and 5.5.4.1 permit CO detection systems to share components, equipment, circuitry and installation wiring with non-CO detection systems. The correct NFPA 720 term for a fire alarm system in which components are used with a non-fire signaling system is a combination system.

In accordance with sections 4.4.3.1.1 and 7.2.1.2.1 of NFPA 720 the actuation of a carbon monoxide detector or system shall be distinctly indicated as a carbon monoxide alarm signal. NEMA recommends changing the requirement for a carbon monoxide detector to be connected to a control unit from a supervisory signal to an alarm signal.

The Florida supplement is clear that carbon monoxide detectors are to be installed in the CO source room health care facilities but it is silent if carbon monoxide detectors are permitted to be installed in other commercial sleeping occupancies such as dormitories, hotels and apartment buildings. The proposal adds clarity that carbon monoxide detection systems using carbon monoxide detectors are permissible in all commercial sleeping occupancies.

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| **Date Proposal Submitted** | 3/24/2010 | **Section** | 916 |
| **Chapter** | 9 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Steven Bassett | **General Comments** | Yes |
| **Attachments** | No | **Alternate Language** | Yes |

**Related Modifications**

**Summary of Modification**

Changes to Carbon Monoxide Protection

**Rationale**

It is the work of the Carbon Monoxide work group to clairify the language.

**Fiscal Impact Statement**

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

Clairifies language to make it easier to enforce.

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

Will reduce cost to owners

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

Make it easier since it is more understandable

**Requirements**

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

It will improve the health, safety and welfare of the public.

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

It will strengthen the code because it will be more understandable

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

It opens the code to more products.

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

It improves the effectiveness of the code by making it easier to enforce

**Alternate Language**

M3853-A1

**Proponent** Mo Madani **Submitted** 5/19/2010 **Attachments** Yes

**Rationale**

Implement HB 663.

**Fiscal Impact Statement**

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

Implement HB 663.

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

Implement HB 663.

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

Implement HB 663.

**Requirements**

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

Implement HB 663.

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

Implement HB 663.

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

Implement HB 663.

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

Implement HB 663.

**General Comment**

M3853-G1

**Proponent** Jack Glenn **Submitted** 6/1/2010 **Attachments** No

**Comment**

This change may conflict with the provisions of HB-663 if signed by the Governor.

**916.1 Carbon monoxide protection.** Every separate building or an addition to an existing building ~~for which a permit for new construction is issued~~ having a fossil-fuel-burning heater or appliance, a fireplace or an attached garage, or other feature, fixture, or element that emits carbon monoxide as a product as a byproduct of combustion shall have an operational carbon monoxide alarm installed within 10 feet (3048 mm) of each room used for sleeping purposes in the new building or addition, or at such other location as required by the Florida Building Code. The requirements for this subsection may be satisfied with a battery-powered carbon monoxide alarm or a battery-powered carbon monoxide and smoke alarm. This subsection does not apply to existing buildings that are undergoing alterations or repairs unless the alteration is an addition as defined in Section 202 Defination.

Addition. An extension or increase in floor area, number of stories or height of a building or structure.

**916 Carbon monoxide protection**

**916.1 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, ~~or~~ an attached garage, or other feature, fixture, or element that emits carbon monoxide as a byproduct 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..

**916.1.1 Carbon monoxide alarm ~~Power Source.~~** ~~In new construction, alarms shall receive their primary power from the building wiring when such wiring is served from the local power utility. Such alarms shall have battery back up.~~ The requirements of Section 916.1 shall be satisfied by providing for one of the following alarm installation:

**(1) A hard-wired carbon monoxide alarm.**

**(2) A battery-powered carbon monoxide alarm.**

**(3) A hard-wired combination carbon monoxide and smoke alarm.**

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

**916.1.2 Combination alarms.** Combination smoke/carbon monoxide alarms shall be listed or 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 this Code.**

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| **Date Proposal Submitted** | 4/2/2010 | **Section** | New appendix |
| **Chapter** | 2711 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Doug Harvey | **General Comments** | Yes |
| **Attachments** | Yes | **Alternate Language** | No |

**Related Modifications**

Add code reference to chapter 35 including the edition date.

**Summary of Modification**

Add a new Appendix “XX” (Designation to be assigned)

**Rationale**

Please see support document for rationale.

**Fiscal Impact Statement**

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

This proposed change does not impact local enforcement, it merely provides an alternate path for design that adhere to the Florida Building Code

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

No fiscal impact to the building owner is anticipated

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

No fiscal impact to the industry is anticipated

**Requirements**

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

This proposed change protects the health, safety and welfare by allowing the code compliant use of “green” ideas and technologies

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

This proposed change improves the code for design consistency

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

This proposed code change does not discriminate

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

This proposed change does not degrade the effectiveness of the code.

**General Comment**

M4391-G1

**Proponent** Doug Harvey **Submitted** 6/1/2010 **Attachments** No

**Comment**

BOAF has suggested the International Green Construction Code (IGCC) be included as an adoptable appendix. While many ideas for “green” and green construction are present in the marketplace today, no other document has been through the process the IgCC has. This document has been compared to the base codes for Building, Mechanical, Plumbing, Fuel Gas and Energy. The code has been scrutinized so as to prevent conflicts between building code requirements and green/sustainable requirements. The IgCC has been evaluated and endorsed by the USGBC and ASHRAE as well through the national consensus process. Many areas are in the process of trying to adopt “green” standards for their communities. This will provide a method for jurisdictions looking to mandate greener and more sustainable requirements. In addition, this document was created in conjunction with ASHRAE, ICC and others, including public meetings, to ensure compatibility with many of the existing requirements in existence today and with a forward looking approach. While this is a relatively new document, inclusion as an adoptable appendix will offer an option that will help with code compliance, not code violation or putting different standards at odds with each other.

**General Comment**

M4391-G2

**Proponent** Jack Glenn **Submitted** 6/1/2010 **Attachments** No

**Comment**

The new appendix is based on a proposed standard that is not yet approved.

APPENDIX 'XX' (Designation to be assigned)

International Green Construction Code (IGCC)

The provisions in this appendix are not mandatory unless specifically referenced in the adopting ordinance

SECTION (XX) 101

GENERAL

(XX) 101.1 Scope. The provisions of this appendix are applicable to all occupancies covered by the International Green Construction Code (IGCC).

(XX) 101.2 Intent. The intent of this appendix is to provide direction for communities having a desire to preserve natural resources, especially water, and lessen the impact of construction on the built environment. Adoption of this standard is to safeguard the environment, public health, safety and general welfare through the establishment of requirements to reduce the negative potential impacts and increase the potential positive impacts of the built environment and building occupants, by means of minimum requirements to: conservation of natural resources, materials and energy; the employment of renewable energy technologies, indoor and outdoor air quality; and building operations and maintenance.

(XX) 101.3 Requirements. The design of buildings shall be in accordance with the International Green Construction Code (IGCC).

Add the Following to Chapter 35 – references:

ICC

International Code Council, Inc.

500 New Jersey Avenue, NW

6th Floor

Washington, DC 20001

Standard Referenced: IGCC

Title: **International Green Construction Code (IGCC)**

Reference in code section number: Appendix L

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| ***Date Submitted*** | April 2, 2010 |
| ***Mod Number*** | |
| *Code Version* | 2010 |
| *Code Change Cycle* | 2010 Triennial Original Modifications 03/01/2010/-/04/02/2010 |
| *Sub-code* | Building |
| *Chapter Topic* | Appendix, International Green Construction Code |
| *Section* | Appendix |
| *Related Modification* | Add code reference to chapter 35 including the edition date. |
| *Affects HVHZ* | No |
| *Summary of modification* | Add a new Appendix "XX" (Designation to be assigned) |
| *Text of Modification* | APPENDIX 'XX' (Designation to be assigned)<br><br>International Green Construction Code (IGCC)<br><br>The provisions in this appendix are not mandatory unless specifically referenced in the adopting ordinance<br><br>SECTION (XX) 101<br><br>GENERAL<br><br>(XX) 101.1 Scope. The provisions of this appendix are applicable to all occupancies covered by the International Green Construction Code (IGCC).<br><br>(XX) 101.2 Intent. The intent of this appendix is to provide direction for communities having a desire to preserve natural resources, especially water, and lessen the impact of construction on the built environment. Adoption of this standard is to safeguard the environment, public health, safety and general welfare through the establishment of requirements to reduce the negative potential impacts and increase the potential positive impacts of the built environment and building occupants, by means of minimum requirements to: conservation of natural resources, materials and energy; the employment of renewable energy technologies, indoor and outdoor air quality; and building operations and maintenance.<br><br>(XX) 101.3 Requirements. The design of buildings shall be in accordance with the International Green Construction Code (IGCC).<br><br>Add the Following to Chapter 35 – references:<br><br>ICC<br><br>International Code Council, Inc. |

| | |
|---|---|
| | 500 New Jersey Avenue, NW<br>6th Floor<br>Washington, DC 20001<br>Standard Referenced: IGCC<br>Title: International Green Construction Code (IGCC)<br>Reference in code section number: Appendix L |
| ***Rational*** | 1. The purpose of this proposed change is to add a new optional appendix to the FBC.<br>2. The proposed appendix will reference the International Green Construction Code (IGCC). This newly-developed, consensus-based standard may be used in conjunction with local code requirements specific to green buildings covered in the scope.<br>3. Green buildings are currently being designed and constructed nationwide using different programs guidelines, rating systems, and standards. The IGCC was developed under the direction of ICC, in conjunction with representatives from other nationally-recognized organizations with experience and expertise in this field, including ASHRAE members. In many cases, limited guidance is given as to the criteria to be used to determine if the building project meets the expectations. The IGCC provides a path using a publicly-reviewed resource for local jurisdictions to adopt and use in the administration of green residential building design. |
| ***Fiscal Impact statement*** | |
| *Impact to Local Enforcement* | This proposed change does not impact local enforcement, it merely provides an alternate path for design that adhere to the Florida Building Code |
| *Impact to Building owner* | No fiscal impact to the building owner is anticipated |
| *Impact to Industry* | No fiscal impact to the industry is anticipated |
| ***Requirements*** | |
| *Has connection to health safety and Welfare* | This proposed change protects the health, safety and welfare by allowing the code compliant use of "green" ideas and technologies |
| *Strengths or improves Code* | This proposed change improves the code for design consistency |
| *Does not discriminate* | This proposed change does not discriminate |
| *Does not degrade effectiveness of code* | This proposed change does not degrade the effectiveness of the code. |

# Sub Code: Mechanical

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| **Date Proposal Submitted** | 4/2/2010 | **Section** | All |
| **Chapter** | 1 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Doug Harvey | **General Comments** | Yes |
| **Attachments** | Yes | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Replace the Florida Building Code-Mechanical with the 2009 International Mechanical Code in its entirety.

**Rationale**

There are no Florida specific problems that are not covered by the regulations contained within the 2009 International Mechanical Code.

**Fiscal Impact Statement**

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

There is no impact to local enforcement other than gaining consistency and putting inspection and review personnel in line with the Code that certification is attained under and used throughout the nation

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

None

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

Allows for a code that is more up to date with the new standards, practices and materials. Improves consistency and compliance in design, construction and enforcement. Saves money and time by allowing for a single place to request code modifications.

**Requirements**

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

No change

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

Improves

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

This change does not discriminate

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

This change does not degrade the effectiveness of the code and should improve effectiveness as consistency will be increased

**General Comment**

M4383-G1

**Proponent** Doug Harvey **Submitted** 6/1/2010 **Attachments** No

**Comment**

We, the Building Officials Association of Florida (BOAF), believe this modification may require some additional explanation. The BOAF executive board has been consulted regarding this code proposal and they are in agreement that the proposal appears to go along the line of the vote taken by the Commission last fall to remove non-Florida specific items, return to the base documents and have a separate Florida supplement, if needed. The International Code is the base code for the Florida Codes. As such, a strike-through/underline version of the document has not been attached to this modification. Due to the length and file sizes needed, as well as the proposed document being familiar as the base code, this did not seem necessary. Since the base document is the root document for the Florida code, and the Commission voted to return to the base documents over the next two (2) code cycles, we ask the Commission to accept the proposal and allow it to move forward. This is based on the vote taken by the Commission during a public meeting in the Fall of 2009. BOAF supports taking the very specific items modifying the base code to meet Florida Statutes or rules into a smaller and easier to manage stand alone Florida supplement.

Replace the ~~Florida Building Code Mechanical~~ with the 2009 International Mechanical Code in its entirety.

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|---|---|
| ***Date Submitted*** | |
| ***Mod Number*** | |
| *Code Version* | 2010 |
| *Code Change Cycle* | 2010 Triennial Original Modifications 03/01/2010/-/04/02/2010 |
| *Sub-code* | Mechanical |
| *Chapter Topic* | Publication |
| *Section* | All |
| *Related Modification* | |
| *Affects HVHZ* | No |
| *Summary of modification* | Replace the Florida Building Code-Mechanical with the 2009 International Mechanical Code in its entirety. |
| *Text of Modification* | The 2009 International Mechanical Code text in its entirety. |
| ***Rational*** | There are no Florida specific problems that are not covered by the regulations contained within the 2009 International Mechanical Code. |
| ***Fiscal Impact statement*** | There is no fiscal impact by this change |
| *Impact to Local Enforcement* | There is no impact to local enforcement other than gaining consistency and putting inspection and review personnel in line with the Code that certification is attained under and used throughout the nation |
| *Impact to Building owner* | None |
| *Impact to Industry* | Allows for a code that is more up to date with the new standards, practices and materials. Improves consistency and compliance in design, construction and enforcement. Saves money and time by allowing for a single place to request code modifications. |
| ***Requirements*** | None |
| *Has connection to health safety and Welfare* | No change |
| *Strengths or improves Code* | Improves |
| *Does not discriminate* | This change does not discriminate |
| *Does not degrade effectiveness of code* | This change does not degrade the effectiveness of the code and should improve effectiveness as consistency will be increased |

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 202 |
| **Chapter** | 2 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | Yes |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

3750

**Summary of Modification**

Revise Air Conditioning definition

**Rationale**

The base code language provides the same level of protection.

**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**

None

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

None

**Requirements**

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

None

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

No change

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

Does not discriminate against anything

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

Does not degrade the code

**General Comment**

M3749-G1

**Proponent** Ann Stanton **Submitted** 5/11/2010 **Attachments** No

**Comment**

This mod should also be heard by the Energy TAC because the definition originally came from the energy code and needs to be returned to that code as it was inadvertently deleted.

~~**AIR CONDITIONING**. The process of treating air to control its temperature, humidity, cleanliness and distribution to meet requirements of the conditioned space.~~

**AIR CONDITIONING.** The treatment of air so as to control simultaneously the temperature, humidity, cleanness and distribution of the air to meet the requirements of a conditioned space.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 202 |
| **Chapter** | 2 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | Yes |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Definition of Air Distribution system retain the based code (IMC) language

**Rationale**

The base code language provides the same level of protection.

**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**

None

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

None

**Requirements**

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

None

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

No change

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

Does not discriminate against anything

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

Does not degrade the code

**General Comment**

M3750-G1

**Proponent** Ann Stanton **Submitted** 5/11/2010 **Attachments** No

**Comment**

This mod should also be heard by the Energy TAC because the definition originally came from the energy code and needs to be returned to that code as it was inadvertently deleted.

~~**AIR DISTRIBUTION SYSTEM**. Include all building elements (duct systems, air handling units, cavities of the building structure and mechanical closets) through which air is delivered to or from the conditioned spaces.~~

**AIR DISTRIBUTION SYSTEM.** Any system of ducts, plenums and air-handling equipment that circulates air within a space or spaces and includes systems made up of one or more air-handling units.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 202 |
| **Chapter** | 2 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | Yes |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Retain the based code (IMC) language

**Rationale**

The base code language provides the same level of protection.

**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**

None

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

None

**Requirements**

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

None

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

No change

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

Does not discriminate against anything

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

Does not degrade the code.

**General Comment**

M3756-G1

**Proponent** Ann Stanton **Submitted** 5/11/2010 **Attachments** No

**Comment**

This mod should also be heard by the Energy TAC because the definition originally came from the energy code and needs to be returned to that code as it was inadvertently deleted.

~~**AIR-HANDLING UNIT.** The fan unit of a furnace and the fan coil unit of a split system, packaged air conditioner or heat pump.~~

**AIR-HANDLING UNIT.** A blower or fan used for the purpose of distributing supply air to a room, space or area.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 202 |
| **Chapter** | 2 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Retain the based code (IMC) language

**Rationale**

The base code language provides the same level of protection and moves Florida in line with the nationally accepted definition.

**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**

None

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

None

**Requirements**

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

None

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

No change

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

Doe not discriminate against anything

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

Does not degrade the code.

~~**NONCOMBUSTIBLE BUILDING MATERIALS**. A material which meets either of the following requirements:~~

~~1. Materials which pass the test procedure set forth in ASTM E 136~~

~~2. Materials having a structural base of noncombustible materials as defined in 1, with a surfacing not more than 1/8 inch (3.17 mm) thick which has a flamespread rating not greater than 50 when tested in accordance with ASTM E 84.~~

~~The term noncombustible does not apply to the flamespread characteristics of interior finish or trim materials. A material shall not be classed as noncombustible which is subject to increase in combustibility or flamespread rating beyond the limits herein established through the effects of age, moisture or other atmospheric conditions.~~

-

**NONCOMBUSTIBLE MATERIALS.** Materials that, when tested in accordance with ASTM E 136, have at least three of four specimens tested meeting all of the following criteria:

1. The recorded temperature of the surface and interior thermocouples shall not at any time during the test rise more than 54°F (30°C) above the furnace temperature at the beginning of the test.
2. There shall not be flaming from the specimen after the first 30 seconds.
3. If the weight loss of the specimen during testing exceeds 50 percent, the recorded temperature of the surface and interior thermocouples shall not at any time during the test rise above the furnace air temperature at the beginning of the test, and there shall not be flaming of the specimen.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 202 |
| **Chapter** | 2 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Retain the base code (IMC) language.

**Rationale**

The base code language provides the same level of protection and moves Florida in line with the nationally accepted definition.

**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**

None

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

None

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

Does not degrade the code.

~~**WATER HEATER**. An indirect-fire fuel-burning or electrically heated appliance for heating water which does not exceed any of the following:~~

~~1. A heat input capacity of 200,000 Btuh (58.6 kW).~~

~~2. A water temperature of 200°F (93°C).~~

~~3. A nominal water capacity of 120 gal (454 L)~~

**WATER HEATER.** Any heating appliance or equipment that heats potable water and supplies such water to the potable hot water distribution system.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 4/2/2010 | **Section** | 301.13, 401.4, 501.2.1, 602.4, 603. |
| **Chapter** | 3 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Christopher Jones | **General Comments** | Yes |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

NOTE: similar modifications for chapters 3, 4, 5, 6 and 13 are all included under this single proposal.

**Summary of Modification**

Clarify the elevation above which mechanical systems, equipment and fixtures are required to be elevated is the elevation specified in 1612.4.

**Rationale**

The purpose of this code change is to provide consistency between the elevations of buildings and structures that are specified in Section 1612.4 and the elevations required for mechanical systems and equipment. Approved by ICC in Baltimore for 2012 IMC (S92).

**Fiscal Impact Statement**

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

No impact to Florida's communities that participate in the NFIP and administer floodplain management ordinances consistent with the NFIP regulations (44 CFR 60.3).

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

No impact. Owners must comply with local floodplain management ordinances adopted by Florida communities.

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

No impact. Compliance with local floodplain management ordinances adopted by Florida communities is not affected.

**Requirements**

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

Achieves protection of health, safety, and welfare of the general public, the same bases for adoption and enforcement of local floodplain management ordinances.

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

Clarifies code requirements for materials, products, methods, and systems.

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

Materials, products, methods, and systems that comply with local floodplain management ordinances are not affected by this proposed modification.

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

Improves effectiveness of the code by clarifying the specific intent of the provision.

**General Comment**

M4403-G1

**Proponent** Joy Duperault **Submitted** 5/27/2010 **Attachments** No

**Comment**

The FL Division of Emergency Management, Floodplain Management Office, recommends support for this proposal. It is appropriate that equipment serving a building be at or above the elevation of the lowest floor, otherwise equipment may be damaged even if the building is not affected. This is the way most buildings are built. In addition, if equipment is lower than the lowest floor, federal flood insurance discounts for elevating the floor above the BFE don't apply.

**[B] 301.13 Flood hazard**. For structures located in flood hazard areas, mechanical systems, equipment and appliances shall be located at or above the elevation required by Section 1612.4 of the Florida Building Code for utilities and attendant equipment ~~design flood elevation~~.

**Exception:** Mechanical systems, equipment and appliances are permitted to be located below the ~~design flood~~ elevation required by Section 1612.4 of the of the Florida Building Code for utilities and attendant equipment provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding up to such elevation ~~to the design flood elevation in compliance with the flood resistant construction requirements of the Florida Building Code~~.

**401.4 Intake opening location.** Air intake openings shall comply with all of the following:

4. Intake openings on structures in flood hazard areas shall be at or above the elevation required by Section 1612.4 of the Florida Building Code for utilities and attendant equipment ~~design flood elevation~~.

**501.2.1 Location of exhaust outlets.** The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612.4 of the Florida Building Code for utilities and attendant equipment ~~design flood elevation~~.

**[B] 602.4 Flood hazard.** For structures located in flood hazard areas, plenum spaces shall be located above the elevation required by Section 1612.4 of the Florida Building Code for utilities and attendant equipment ~~design flood elevation~~ or shall be designed and constructed to prevent water from entering or accumulating within the plenum spaces during floods up to such ~~the design flood~~ elevation. If the plenum spaces are located below the elevation required by Section 1612.4 of the Florida Building Code for utilities and attendant equipment ~~design flood elevation~~, they shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding up to such ~~to the design flood~~ elevation.

**[B] 603.13 Flood hazard areas.** For structures in flood hazard areas, ducts shall be located above the elevation required by Section 1612.4 of the Florida Building Code for utilities and attendant equipment ~~design flood elevation~~ or shall be designed and constructed to prevent water from entering or accumulating within the ducts during floods up to such ~~the design flood~~ elevation. If the ducts are located below the elevation required by Section 1612.4 of the Florida Building Code for utilities and attendant equipment ~~design flood elevation~~, the ducts shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding up to such ~~the design flood~~ elevation.

**1305.2.1 Flood hazard.** All fuel oil pipe, equipment and appliances located in flood hazard areas shall be located above the elevation required by Section 1612.4 of the Florida Building Code for utilities and attendant equipment ~~design flood elevation~~ or shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding up to such ~~the design flood~~ elevation.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 301.4.1 |
| **Chapter** | 3 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Delete section as unnecessary

**Rationale**

The code official has this authority under the provisions of Chapter 1.

**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**

None

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

None

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

Does not degrade the code.

~~**301.4.1 Modifications**. Whenever there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases, provided the code official shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the mechanical inspection department.~~

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 301.4.2 |
| **Chapter** | 3 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Delete section as unnecessary

**Rationale**

The code official has this authority under the provisions of Chapter 1.

**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**

None

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

none

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

Does not degrade the code.

~~**301.4.2 Alternative materials, methods, equipment and appliances.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material or method of construction shall be approved where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety~~

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 401.4.1 |
| **Chapter** | 4 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Retain base code (IMC) language

**Rationale**

Base code provides the same level of protection. Change will make the code consistent with nationally accepted practice.

**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**

None

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

None

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

Does not degrade the code.

~~**401.4.1 Intake openings.** Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks, except as otherwise specified in this code. Fresh air intakes shall not be located closer than 10 ft (3048 mm) from any chimney or vent outlet, or sanitary sewer vent outlet.~~

~~The exhaust from a bathroom or kitchen in a residential dwelling shall not be considered to be a hazardous or noxious contaminant.~~

**401.4 Intake opening location.** Air intake openings shall comply with all of the following:

1. Intake openings shall be located a minimum of 10 feet (3048 mm) from lot lines or buildings on the same lot. Where openings front on a street or public way, the distance shall be measured to the centerline of the street or public way.

2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.2.1.

3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening.

4. Intake openings on structures in flood hazard areas shall be at or above the design flood level.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 401.4.1 |
| **Chapter** | 4 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Delete section 401.4.1 and retain base code (IMC) criteria by using 401.4 and 401.5.

**Rationale**

Retain base code language.

**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**

None

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

None

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

Does not degrade the code.

~~**401.4.1 Intake openings.** Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks, except as otherwise specified in this code. Fresh air intakes shall not be located closer than 10 ft (3048 mm) from any chimney or vent outlet, or sanitary sewer vent outlet.~~

~~The exhaust from a bathroom or kitchen in a residential dwelling shall not be considered to be a hazardous or noxious contaminant.~~

**401.4 Intake opening location.** Air intake openings shall comply with all of the following:

1. Intake openings shall be located a minimum of 10 feet (3048 mm) from lot lines or buildings on the same lot. Where openings front on a street or public way, the distance shall be measured to the centerline of the street or public way.

2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.2.1.

3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening.

4. Intake openings on structures in flood hazard areas shall be at or above the design flood level.

**401.5 Intake opening protection.** Air intake openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles. Openings in louvers, grilles and screens shall be sized in accordance with Table 401.5, and shall be protected against local weather conditions. Outdoor air intake openings located in exterior walls shall meet the provisions for exterior wall opening protectives in accordance with the ~~International~~ Florida Building Code, Building.

**TABLE 401.5 OPENING SIZES IN LOUVERS, GRILLES AND SCREENS PROTECTING AIR INTAKE OPENINGS**

| OUTDOOR OPENING TYPE | MINIMUM AND MAXIMUM OPENING SIZES IN LOUVERS, GRILLES AND SCREENS MEASURED IN ANY DIRECTION |
|---|---|
| Intake openings in residential occupancies | Not < $^1/_4$ inch and not > $^1/_2$ Inch |
| Intake openings in other than residential occupancies | > $^1/_4$ inch and not > 1 inch |

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 4/1/2010 | **Section** | 401.5 |
| **Chapter** | 4 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Amanda Hickman | **General Comments** | No |
| **Attachments** | Yes | **Alternate Language** | No |

**Related Modifications**

Add AMCA 550 to Chapter 15 - Referenced Standards - Mod 4036

**Summary of Modification**

Adds new standard: AMCA 550 to section 401.5

**Rationale**

see attached

**Fiscal Impact Statement**

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

Approval of this modification will have no financial impact to local code enforcement authority.

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

Approval of this modification will have no financial impact to local code enforcement authority.

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

Industries that manufacture louvers will be affected by this modification because they will be required to test to the new standard for wind driven rain.

**Requirements**

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

Yes. It improves the durability and weather resistance of the building envelope during high-wind/rain events.

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

Yes. It facilitates consistency in product performance and capability by requiring testing to a standard that was specifically developed for louvers and specific to the geographic and climatic conditions of Florida.

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

No.

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

It improves the effectiveness and usefulness of the code because the code did not reference a standard that addressed protecting the ventilation openings against wind-driven rain.

**401.5 Intake opening protection.** Air intake openings that terminate outdoors shall be protected with corrosion resistant screens, louvers or grilles. Openings in louvers, grilles and screens shall be sized in accordance with Table 401.5, and shall be protected against local weather conditions. Louvers that protect air intake openings in structures located in hurricane-prone regions, as defined in the Florida Building Code, Building shall comply with AMCA 550. Outdoor air intake openings located in exterior walls shall meet the provisions for exterior wall opening protectives in accordance with the Florida Building Code, Building.

# AMCA Standard 550-08

## Test Method for High Velocity Wind Driven Rain Resistant Louvers


**AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.**

The International Authority on Air System Components

# AMCA Standard 550-08

## Test Method for High Velocity Wind Driven Rain Resistant Louvers

Air Movement and Control Association International, Inc.
30 W. University Drive
Arlington Heights, Illinois
60004

# AMCA Standards

**Authority**

AMCA Standard 550 was approved by the AMCA Membership on July 26, 2008.

**Copyright**



**Objections**

Air Movement and Control Association International, Inc. will consider and decide all written complaints regarding its standards, certification programs, or interpretations thereof. For information on procedures for submitting and handling complaints, write to:

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RG10 9TH

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**Related Publications**

| | |
|---|---|
| ANSI/AMCA Standard 500-L | *Laboratory Methods of Testing Louvers for Rating* |
| AMCA Publication 501 | *Application Manual for Louvers* |
| AMCA Publication 511 | *Certified Ratings Program - Product Rating Manual for Air Control Devices* |
| AMCA Publication 512 | *AMCA Listing Label Program* |
| ANSI/AMCA Standard 540 | *Test Method for Louvers Impacted by Wind Borne Debris* |

# Review Committee

| | |
|---|---|
| **Mike Watz** | **Greenheck Fan Corporation** |
| Mike Astourian | Ruskin Company |
| Dane Carey | United Enertech |
| Randal Geedey | The Airolite Company |
| Eric Gohring | Louvers and Dampers, Inc. |
| Loren Rasmusson | Industrial Louvers, Inc. |
| Bob Van Becelaere | Ruskin Company |
| Bill Vincent | Construction Specialties, Inc. |
| Tim Orris | AMCA International |

# Contents

# AMCA 550-08
# Test Method for High Velocity Wind Driven Rain Resistant Louvers

## 1. Purpose

This standard establishes uniform laboratory test methods and minimum performance ratings for water rejection capabilities of louvers intended to be used in high velocity wind conditions.

## 2. Scope

Tests conducted in accordance with the requirements of this standard are intended to demonstrate the acceptability of the louver for installation in facilities (essential and non-essential) that will remain in operation during a high velocity wind condition and where water infiltration must be kept to manageable amounts.

## 3. Units of Measurement

### 3.1 System of units

SI units (The International System of Units, Le Systéme International d'Unités) [1] are the primary units employed in this standard, with I-P units (Inch-Pound) given as the secondary reference. SI units are based on the fundamental values of the International Bureau of Weights and Measures [1], and I-P values are based on the values of the National Institute of Standards and Technology which are, in turn, based on the values of the International Bureau.

### 3.2 Basic units

The unit of length is the meter (m) or millimeter (mm); I-P units are the foot (ft.) or the inch (in.). The unit of mass is the kilogram (kg); the I-P unit is the poundmass (lbm). The unit of time is either the minute (min) or the second (s). The unit of temperature is either the degree Celsius (°C) or kelvin (K). I-P units are either the degree Fahrenheit (°F) or the degree Rankine (°R). The unit of force is the newton (N); the I-P unit is the pound (lb).

### 3.3 Airflow rate and velocity

#### 3.3.1 Airflow rate

The unit of volumetric airflow rate is the cubic meter per second ($m^3/s$); the I-P unit is the cubic foot per minute (cfm).

#### 3.3.2 Airflow velocity

The unit of airflow velocity is the meter per second (m/s); the I-P unit is the foot per minute (fpm).

### 3.4 Water flow rate

The unit of liquid volume is the liter (L); the I-P unit is the gallon (gal). The unit of liquid flow rate is the liter per second (L/s); the I-P unit is the gallon per minute (gpm).

### 3.5 Dimensionless groups

Various dimensionless quantities appear in the text. Any consistent system of units may be employed to evaluate these quantities, unless a numerical factor is included, in which case, units must be as specified.

### 3.6 Physical constants

The value of standard gravitational acceleration shall be taken as 9.80665 $m/s^2$ (32.174 $ft/s^2$) at mean sea level at 45° latitude [2]. The density of distilled water at saturation pressure shall be taken as 998.278 $kg/m^3$ (62.3205 $lbm/ft^3$) at 20 °C (68°F) [3]. The density of mercury at saturation pressure shall be taken at 13595.1 $kg/m^3$ (848.714 $lbm/ft^3$) at 0 °C (32°F) [3]. The specific weights in $kg/m^3$ ($lbm/ft^3$) of these fluids under standard gravity in a vacuum are numerically equal to their densities at corresponding temperatures.

## 4. Definitions

### 4.1 Louver

A louver is a device comprised of multiple blades, which, when mounted in an opening, permits the flow of air, but inhibits the entrance of other elements.

### 4.2 Essential facilities

Buildings and other structures designated as essential facilities, including, but not limited to, hospitals; other health care facilities having emergency treatment facilities; jails and detention facilities; fire, rescue and police stations, and emergency vehicle garages; designated emergency shelters; communication centers and other facilities required for emergency response; power generating stations; other public utility facilities required in an emergency; and buildings and other structures having critical national defense functions.

### 4.3 Non-essential facilities

All buildings and structures not defined as essential facilities in Section 4.2.

### 4.4 Performance variables

**4.4.1 Water infiltration**
The amount of water passing through a louver during the test.

**4.4.2 Rain fall simulation**
As calculated in Section 7.2.3 and Section 7.2.5.

**4.4.3 Wind stream velocity**
The movement rate of air generated during the test.

## 5. Test Specimen

One 1220 mm x 1220 mm (48 in. x 48 in.) louver shall be submitted for this high velocity wind driven rain test. The same louver, or an identical louver, shall be tested in accordance with the Wind Driven Rain Test detailed in ANSI/AMCA Standard 500-L, run at 22 m/s (50 mph) and 202.4 mm/hr (8 in./hr) of rainfall.

All devices tested shall be products as built, unpainted, clean, degreased, and without additional factory applied coating on the product's surfaces which would enhance water shedding capability. All devices tested shall be in the full open position without a screen across the air passages of the louver.

## 6. Apparatus

### 6.1 Test frame

**6.1.1**
The test frame shall be constructed of CMU blocks with a minimum size of 2.45 m x 2.45 m (8 ft x 8 ft) and a hole as shown in Figure 1 to allow the insertion of the louver.

A catch basin shall be constructed behind the louver, as shown in Figure 1, to catch the water that penetrates the louver.

**6.1.2**
The test frame shall be painted to prevent water from penetrating the test apparatus.

**6.1.3**
The test frame shall be rigidly supported during the test period.

### 6.2 Wind generator

**6.2.1**
The wind generator shall provide a constant wind profile over the entire face of the louver for the specified time period to a maximum wind stream velocity of 49 m/s (110 mph).

**6.2.2**
If the wind generator is unable to provide the required constant profile as determined by wind stream calibration (Section 7.1), air flow from the wind generator shall be directed and smoothed by suitably shaped baffles (see Figure 2).

### 6.3 Water supply

**6.3.1**
Water shall be supplied to the wind stream using a sprinkle pipe system mounted on a movable frame capable of simulating a uniform 223.5 mm/hr (8.8 in./hr) of rainfall over the test specimen. The simulated rainfall and flow meters shall be calibrated, and the water distribution shall be checked as noted in Section 7.2.

### 6.4 Instruments

Calibrations of instruments used in this test shall be maintained in accordance with the manufacturer's definitions.

## 7. Calibration

### 7.1 Wind stream calibration

**7.1.1**
The wind stream velocity shall be measured on a vertical plane grid having dimensions of 2.44 m wide x 1.22 m high (8 ft wide x 4 ft high) and grid dimensions of 610 mm x 610 mm (24 in. x 24 in.), located 610 mm (24 in.) in front of the test frame with the lower 2.44 m (8 ft) dimension in line with the bottom edge of the test frame opening (See Figure 3).

**7.1.2**
The measured wind stream velocity within each grid square shall be within ± 10% of the required axial velocity for each wind speed.

**7.1.3**
Upon completion of the wind stream calibration, the distance from the test frame to the outlet of the wind generator and any necessary baffle configurations shall be noted and maintained while conducting the test as described in Section 8.

### 7.2 Rainfall simulation and flow meter calibration

A maximum of six months prior to conducting the test, the flow meter(s) shall be calibrated using the method described in Section 7.2.1 through Section 7.2.6.

**7.2.1**
Prepare an apparatus to capture any water which would enter the wind stream during an actual test.

**7.2.2**
Commence water insertion for a period of one (1) minute

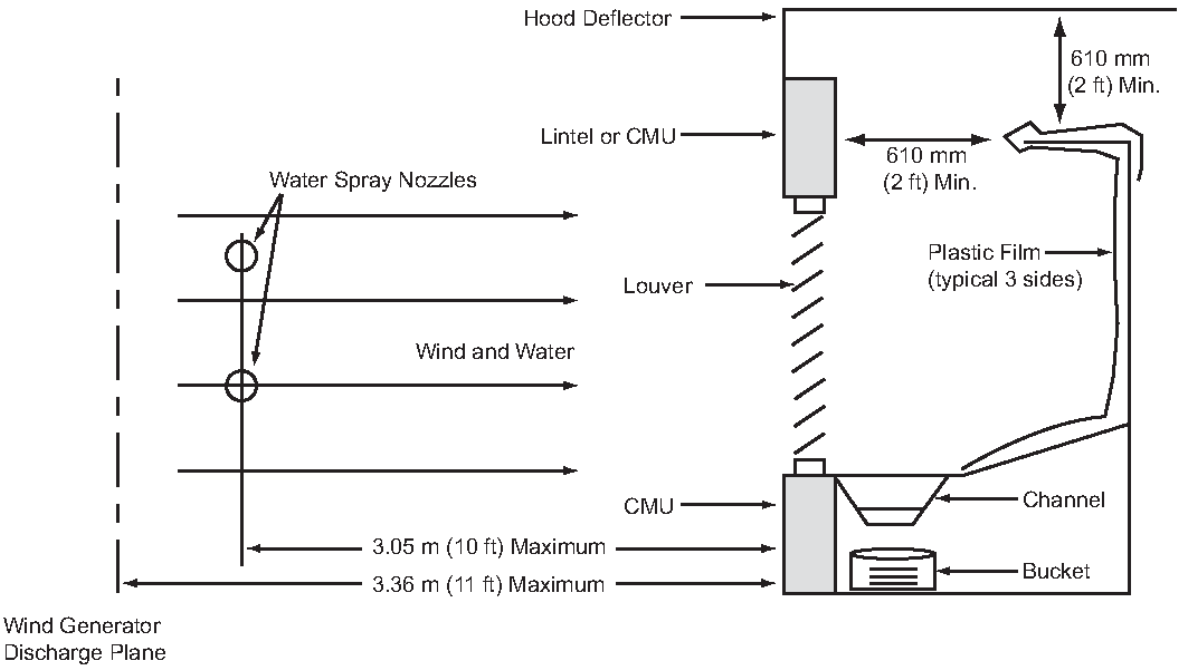


**Figure 1 - High Velocity Wind Driven Rain Test Setup**

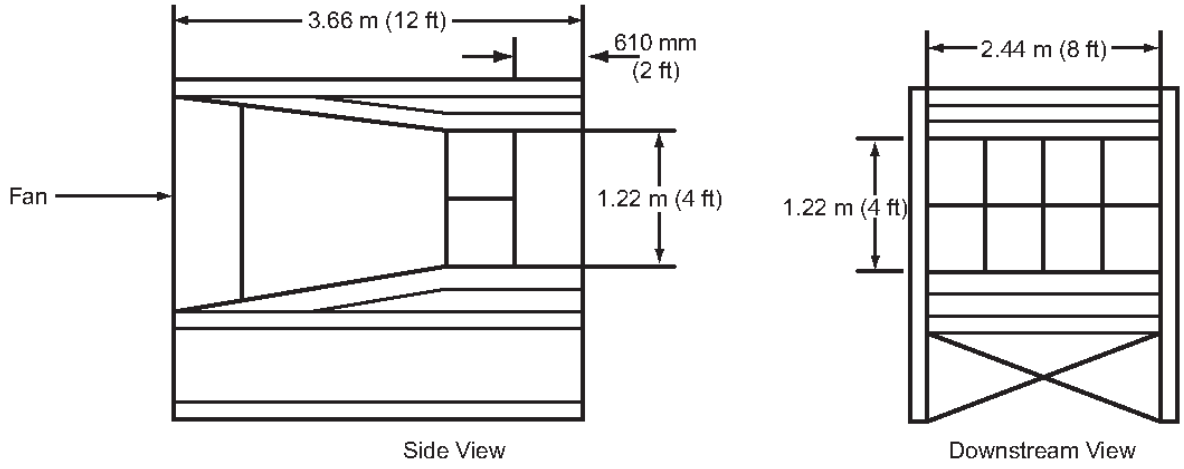


**Figure 2 - Wind Tunnel with Baffles**

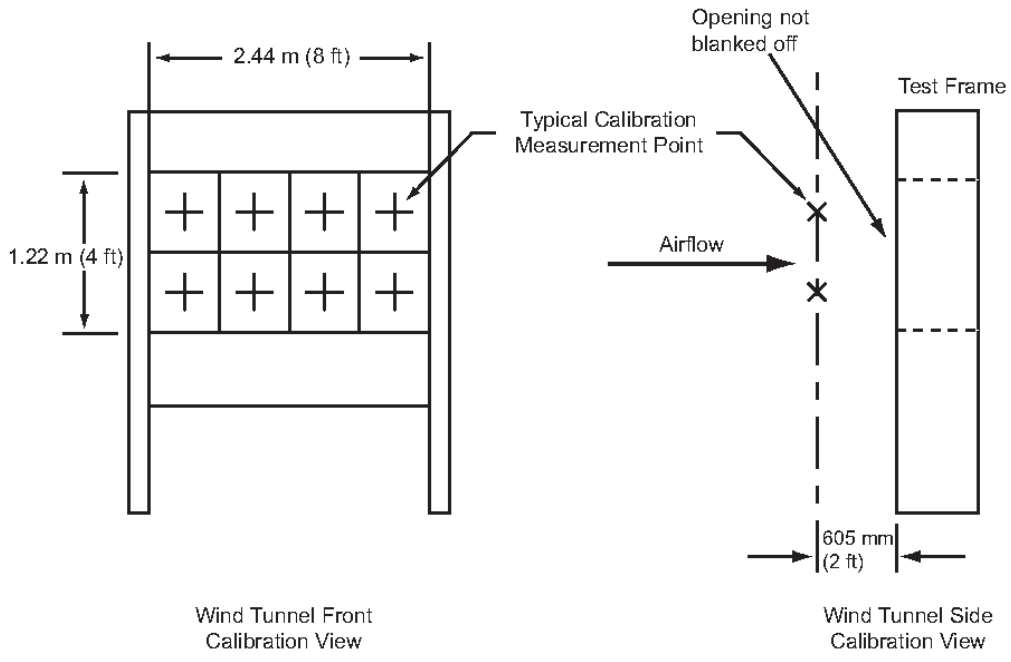


**Figure 3 - Wind Stream Calibration Setup**

and capture the water. Record the flow meter reading (gallons/min) during this process.

**7.2.3**
Convert the flow meter reading to rainfall simulation using the following formula:

$$\left[\frac{\left(\frac{\text{L}}{\text{min}}\right)\times\left(\frac{60\text{ min}}{1\text{ hour}}\right)\times\left(\frac{1{,}000{,}000\text{ mm}^3}{\text{L}}\right)}{4{,}459{,}346\text{ mm}^2}\right]=x\left(\frac{\text{mm}}{\text{hour}}\right)$$

Eqn 7.2.3 SI

$$\left[\frac{\left(\frac{\text{gallons}}{\text{min.}}\right)\times\left(\frac{60\text{ min.}}{1\text{ hour}}\right)\times\left(\frac{231\text{ in.}^3}{1\text{ gallon}}\right)}{6{,}912\text{ in.}^2}\right]=x\left(\frac{\text{in.}}{\text{hour}}\right)$$

Eqn 7.2.3 I-P

**Note**: For Equation 7.2.3 SI and Equation 7.2.3 I-P, 4,459,346 $mm^2$ and 6,912 $in.^2$ refer to the expected projection area of the water that hits the wall, respectively.

**7.2.4**
The quantity of rainfall simulation determined in Section 7.2.3 shall be within ± 5% of the desired rainfall simulation of 223.5 mm/hr (8.8 in./hr).

**7.2.5**
Measure the volume of water ($mm^3$ [$in.^3$]) captured and convert this to rainfall simulation (mm/hr [in./hr]) using the following formula:

$$\left[\frac{\left(\frac{\text{mm}^3}{4{,}459{,}346\text{ mm}^2}\right)}{1\text{ min}}\right]\times\left(\frac{60\text{ min}}{1\text{ hour}}\right)=y\left(\frac{\text{mm}}{\text{hour}}\right)$$

Eqn 7.2.5 SI

$$\left[\frac{\left(\frac{\text{in.}^3}{6{,}912\text{ in.}^2}\right)}{1\text{ min.}}\right]\times\left(\frac{60\text{ min.}}{1\text{ hour}}\right)=y\left(\frac{\text{in.}}{\text{hour}}\right)$$

Eqn 7.2.5 I-P

**Note**: For Equation 7.2.5 SI and Equation 7.2.5 I-P, 4,459,346 $mm^2$ and 6,912 $in.^2$ refer to the expected projection area of the water that hits the wall, respectively.

**7.2.6**
The rainfall simulation determined in Section 7.2.3 (*x*) shall be within ± 5% of the rainfall simulation determined in Section 7.2.5 (*y*).

### 7.3 Water distribution check

The water distribution check over the (1.22 m x 2.44 m [4 ft x 8 ft]) wall surface shall be checked and calibrated every six months using the method outlined herein. The water distribution system must be adjusted so that the water introduced into the wind stream strikes the wall area.

**7.3.1**
Prepare eight 610 mm (24 in.) squares of the absorptive material (i.e. roofing felt) and weigh each sample. From this data, determine the average weight of the samples. As an alternative, depending on the consistency of the weight of the absorptive material, each square used for calibration may be weighed individually.

**7.3.2**
Lay out the eight numbered squares of absorptive material (i.e. roofing felt) as shown in Figure 4. Put the hold-down frame over the squares of absorptive material.

**7.3.3**
Set the wind speed to 15.65 m/s (35 mph) and add water to the windstream at a constant rate, as indicated on the flow meter, until the absorptive material is well wetted, but not so that it is saturated, at which time, the wind and water flow shall be terminated.

**7.3.4**
Remove the hold-down frame from the wall and rapidly weigh the squares of wet absorptive material. Determine the weight of water absorbed by each square sample at the particular wind speed and flow meter setting.

**7.3.5**
No one particular square sample shall exhibit rain fall simulation, measured in weight, greater than or less than 25% of the average weight of all eight squares.

**7.3.6**
Repeat the steps in Sections 7.3.2, 7.3.3, 7.3.4, and 7.3.5 at a wind speed of 31.3 m/s (70 mph).

**7.3.7**
No one particular square sample shall exhibit rain fall simulation, measured in weight, greater than or less than 25% of the average weight of all eight squares.

## 8. Test Procedures

**8.1**
The louver to be tested shall be mounted and sealed as recommended by the manufacturer in the test frame to prevent any ingress of water other than through the louver blades.

**Table 1 - Wind Stream Velocity and Water Spray Intervals for Wind-Driven Rain Resistance Testing**

| Interval # | Wind Speed m/s (mph) | Time (min) | Water Spray |
|---|---|---|---|
| 1 | 15.65 (35) | 15 | On |
| 2 | 0 (0) | 5 | Off |
| 3 | 31.3 (70) | 15 | On |
| 4 | 0 (0) | 5 | Off |
| 5 | 40.2 (90) | 15 | On |
| 6 | 0 | 5 | Off |
| 7 | 49.2 (110) | 5 | On |
| 8 | 0 | 5 | Off |

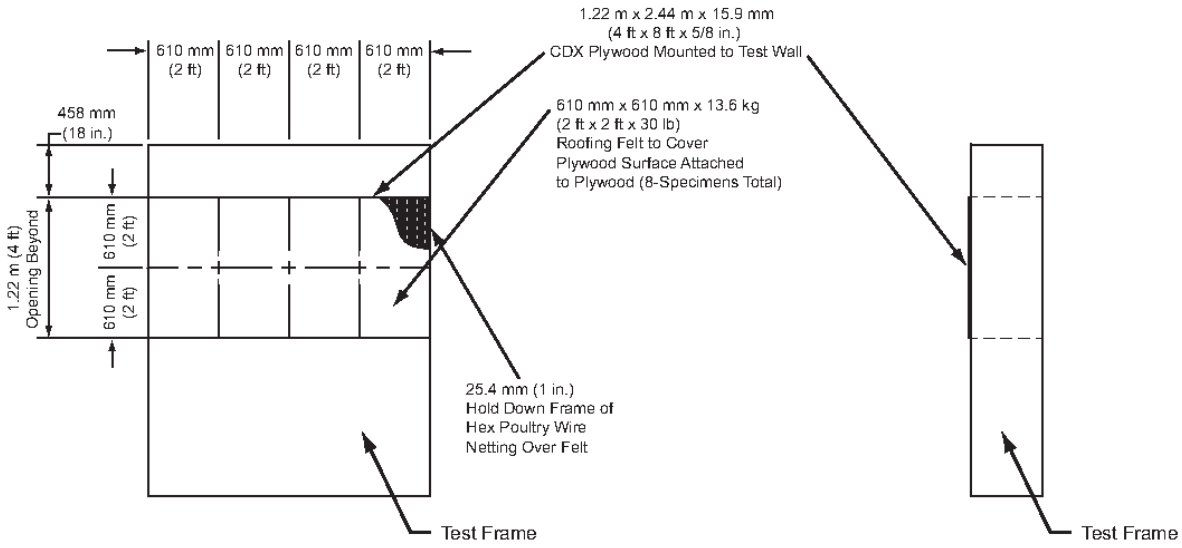


**Figure 4 - Core Area and Rainfall Coverage**

**8.2**
The wind stream velocity intervals shall be conducted as noted in Table 1.

**8.3**
Water shall be added to the wind stream upon commencement of the initial wind stream velocity in an even spray at a rate equal to 223.5 mm/hr (8.8 in./hr) of rainfall over the test specimen. The flow of water shall be measured with a calibrated flow meter during the test procedure to confirm water flow. Water flow shall be stopped and started in conjunction with the air flow intervals noted in Table 1.

**8.4**
The water penetrating the louver at each wind stream velocity shall be collected and measured.

## 9. Report and Results of Test

The test report shall be submitted in its entirety and shall include, at a minimum, the following:

1) The name, address, telephone number, and website address (optional) of the testing laboratory. Evidence of accreditation/certification to perform this test.

2) A unique identification number, with the identification number printed on each page.

3) Consecutive page numbers, with an indication of the total number of pages.

4) The date(s) when the test was performed and the date of the report.

5) The test standard number with the date of issue and an explanation detailing any derivation from the standard.

6) A signature, including titles, and date from both the Professional Engineer authorizing the test report and the lab technician.

7) A description of the louver, including:
   a) the model number
   b) any drawings and photographs of the louver
   c) a detailed report of the method of installation (including fasteners and caulk)

8) Test specimen construction documentation verifying the construction of the test sample.

9) Calibration data and calculations.

10) Detailed observations of any water infiltration and approximate times of water infiltration for each wind stream velocity tested. Observations should include the total volume of water which infiltrated the louver at each test speed.

11) The calculated percentage of water which infiltrated the louver based on the total amount of water sprayed at the test apparatus.

12) A determination of “pass” or “fail” based on whether or not the louver exhibits water infiltration in excess of 1% of the total water sprayed.

13) A video record of the test intervals (see Table 1), which must be made available upon request.

14) Photographs of the louver immediately prior to and subsequent to commencement and termination of the test.

## Annex A
## References (Informative)

[1] *The International System of Units (SI)*
Page, C. H. and Vigoureux, P.
National Bureau of Standards, NBS Special Publication 330, 1972.
(Now known as NIST.)

[2] ibid, p 19.

[3] *ASME Steam Tables*, p 283
American Society of Mechanical Engineers, 1967.

[4] *Checklist #0240 For The Approval of: Louvers (Includes Gable End Louvers)*
Miami-Dade County, Florida

[5] Florida Test Protocol TAS No. 100(A)-95
*Test Procedure for Wind and Wind Driven Rain Resistance and /or Increased Windspeed Resistance of Soffit Ventilation Strip and Continuous or Intermittent Ventilation System Installed at the Ridge Area*

[6] ANSI/AMCA Standard 500-L-07
*Laboratory Methods of Testing Louvers for Rating*

[7] ICC-ES AC85
*Acceptance Criteria for Test Reports*

[8] ICC-ES AC89
*Accreditation Criteria for Testing Laboratories*

## Annex B
## Reason for Two Louver Test Standards (Informative)

The requirement to test the louvers to two test criteria is based upon the need for the louver to perform at two conditions: during normal operation and during a hurricane.

A product could be designed for hurricane or high wind conditions but be unsuitable for normal day to day operation due to its high pressure drop and energy requirements.

**AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.**
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E-Mail : info@amca.org ▪ Web: www.amca.org

The Air Movement and control Association International, Inc. is a not-for-profit international association of the world's manufacturers of related air system equipment primarily, but limited to: fans, louvers, dampers, air curtains, airflow measurement stations, acoustic attenuators, and other air system components for the industrial, commercial and residential markets.

**Reason Statement for AMCA 550**

The ICC Mechanical Technical Committee unanimously approved this exact code change last November at the ICC hearings in Baltimore. In fact, not a single person stood up to speak in opposition to this change. Additionally, no public comments were proposed to this code change in the ICC process, meaning that this change will be on the consent agenda at the ICC Final Action Hearing in May and will be included in the 2012 International Mechanical Code.

AMCA Standard 550-08 *Test Method for High Velocity Wind Driven Rain Resistant Louvers* standardizes uniform laboratory test methods and minimum performance ratings for water rejection capabilities of louvers intended to be used in high velocity wind conditions.

The tests conducted in accordance with the requirements of this standard are intended to demonstrate the acceptability of the louver for installation in facilities (essential and nonessential) that will remain in operation during a high velocity wind condition and where water infiltration must be kept to manageable amounts.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 402.3.1 |
| **Chapter** | 4 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Delete section as it relates to natural ventilation

**Rationale**

Delete language as unnecessary as it does not relate to natural ventilation. It was removed from the IMC in 2003

**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**

None

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

none

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

Does not degrade the code.

~~**402.3.1 Bathrooms.** Rooms containing bathtubs, showers, spas and similar bathing fixtures shall be mechanically ventilated in accordance with Section 403.~~

~~**Exception:** Residential bathrooms with windows having no less than 3 sq.ft. of open space.~~

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 4/1/2010 | **Section** | 501.2.2 |
| **Chapter** | 5 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Amanda Hickman | **General Comments** | No |
| **Attachments** | Yes | **Alternate Language** | Yes |

**Related Modifications**

Add AMCA 550 to Referenced Standards and to section 401.5 Mods 4035 & 4036

**Summary of Modification**

Add AMCA 550 to section 501.2.2

**Rationale**

see attached

**Fiscal Impact Statement**

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

Approval of this modification will have no financial impact to local code enforcement authority.

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

Approval of this modification will have no financial impact to local code enforcement authority.

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

Industries that manufacture louvers will be affected by this modification because they will be required to test to the new standard for wind driven rain.

**Requirements**

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

Yes. It improves the durability and weather resistance of the building envelope during high-wind/rain events.

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

Yes. It facilitates consistency in product performance and capability by requiring testing to a standard that was specifically developed for louvers and specific to the geographic and climatic conditions of Florida.

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

No.

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

It improves the effectiveness and usefulness of the code because the code did not reference a standard that addressed protecting the ventilation openings against wind-driven rain.

**Alternate Language**

M4037-A1

**Proponent** Ann Stanton **Submitted** 5/25/2010 **Attachments** Yes

**Rationale**

There is no need to reference the term "hurricane prone region" or the International Building Code because it covers all of Florida.

**Fiscal Impact Statement**

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

Reference original impact statement.

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

Reference original impact statement.

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

Reference original impact statement.

**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**

Yes

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

No.

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

No.

**501.2.2 Exhaust opening protection.** Exhaust openings that terminate outdoors shall be protected with corrosion resistant screens, louvers or grilles. Openings in screens, louvers and grilles shall be sized not less than ¼ inch (6mm) and not larger than 1/2 inch (13 mm). Openings shall be protected against local weather conditions. Louvers that protect exhaust openings in structures located in hurricane-prone regions, as defined in the International Building Code, shall comply with AMCA Standard 550. Outdoor openings located in exterior walls shall meet the provisions for exterior wall opening protectives in accordance with the Florida Building Code, Building.

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# AMCA Standard 550-08

## Test Method for High Velocity Wind Driven Rain Resistant Louvers


**AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.**

The International Authority on Air System Components

# AMCA Standard 550-08

## Test Method for High Velocity Wind Driven Rain Resistant Louvers

Air Movement and Control Association International, Inc.
30 W. University Drive
Arlington Heights, Illinois
60004

# AMCA Standards

**Authority**

AMCA Standard 550 was approved by the AMCA Membership on July 26, 2008.

**Copyright**



**Objections**

Air Movement and Control Association International, Inc. will consider and decide all written complaints regarding its standards, certification programs, or interpretations thereof. For information on procedures for submitting and handling complaints, write to:

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Arlington Heights, IL 60004-1893 U.S.A.

AMCA International, Incorporated
c/o Federation of Environmental Trade Associations
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Reading, Berkshire, United Kingdom
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**Related Publications**

| | |
|---|---|
| ANSI/AMCA Standard 500-L | *Laboratory Methods of Testing Louvers for Rating* |
| AMCA Publication 501 | *Application Manual for Louvers* |
| AMCA Publication 511 | *Certified Ratings Program - Product Rating Manual for Air Control Devices* |
| AMCA Publication 512 | *AMCA Listing Label Program* |
| ANSI/AMCA Standard 540 | *Test Method for Louvers Impacted by Wind Borne Debris* |

# Review Committee

| | |
|---|---|
| **Mike Watz** | **Greenheck Fan Corporation** |
| Mike Astourian | Ruskin Company |
| Dane Carey | United Enertech |
| Randal Geedey | The Airolite Company |
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## 3. Units of Measurement

### 3.1 System of units

SI units (The International System of Units, Le Systéme International d'Unités) [1] are the primary units employed in this standard, with I-P units (Inch-Pound) given as the secondary reference. SI units are based on the fundamental values of the International Bureau of Weights and Measures [1], and I-P values are based on the values of the National Institute of Standards and Technology which are, in turn, based on the values of the International Bureau.

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### 3.3 Airflow rate and velocity

#### 3.3.1 Airflow rate

The unit of volumetric airflow rate is the cubic meter per second ($m^3/s$); the I-P unit is the cubic foot per minute (cfm).

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The unit of liquid volume is the liter (L); the I-P unit is the gallon (gal). The unit of liquid flow rate is the liter per second (L/s); the I-P unit is the gallon per minute (gpm).

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Various dimensionless quantities appear in the text. Any consistent system of units may be employed to evaluate these quantities, unless a numerical factor is included, in which case, units must be as specified.

### 3.6 Physical constants

The value of standard gravitational acceleration shall be taken as 9.80665 $m/s^2$ (32.174 $ft/s^2$) at mean sea level at 45° latitude [2]. The density of distilled water at saturation pressure shall be taken as 998.278 $kg/m^3$ (62.3205 $lbm/ft^3$) at 20 °C (68°F) [3]. The density of mercury at saturation pressure shall be taken at 13595.1 $kg/m^3$ (848.714 $lbm/ft^3$) at 0 °C (32°F) [3]. The specific weights in $kg/m^3$ ($lbm/ft^3$) of these fluids under standard gravity in a vacuum are numerically equal to their densities at corresponding temperatures.

## 4. Definitions

### 4.1 Louver

A louver is a device comprised of multiple blades, which, when mounted in an opening, permits the flow of air, but inhibits the entrance of other elements.

### 4.2 Essential facilities

Buildings and other structures designated as essential facilities, including, but not limited to, hospitals; other health care facilities having emergency treatment facilities; jails and detention facilities; fire, rescue and police stations, and emergency vehicle garages; designated emergency shelters; communication centers and other facilities required for emergency response; power generating stations; other public utility facilities required in an emergency; and buildings and other structures having critical national defense functions.

### 4.3 Non-essential facilities

All buildings and structures not defined as essential facilities in Section 4.2.

### 4.4 Performance variables

**4.4.1 Water infiltration**
The amount of water passing through a louver during the test.

**4.4.2 Rain fall simulation**
As calculated in Section 7.2.3 and Section 7.2.5.

**4.4.3 Wind stream velocity**
The movement rate of air generated during the test.

## 5. Test Specimen

One 1220 mm x 1220 mm (48 in. x 48 in.) louver shall be submitted for this high velocity wind driven rain test. The same louver, or an identical louver, shall be tested in accordance with the Wind Driven Rain Test detailed in ANSI/AMCA Standard 500-L, run at 22 m/s (50 mph) and 202.4 mm/hr (8 in./hr) of rainfall.

All devices tested shall be products as built, unpainted, clean, degreased, and without additional factory applied coating on the product's surfaces which would enhance water shedding capability. All devices tested shall be in the full open position without a screen across the air passages of the louver.

## 6. Apparatus

### 6.1 Test frame

**6.1.1**
The test frame shall be constructed of CMU blocks with a minimum size of 2.45 m x 2.45 m (8 ft x 8 ft) and a hole as shown in Figure 1 to allow the insertion of the louver.

A catch basin shall be constructed behind the louver, as shown in Figure 1, to catch the water that penetrates the louver.

**6.1.2**
The test frame shall be painted to prevent water from penetrating the test apparatus.

**6.1.3**
The test frame shall be rigidly supported during the test period.

### 6.2 Wind generator

**6.2.1**
The wind generator shall provide a constant wind profile over the entire face of the louver for the specified time period to a maximum wind stream velocity of 49 m/s (110 mph).

**6.2.2**
If the wind generator is unable to provide the required constant profile as determined by wind stream calibration (Section 7.1), air flow from the wind generator shall be directed and smoothed by suitably shaped baffles (see Figure 2).

### 6.3 Water supply

**6.3.1**
Water shall be supplied to the wind stream using a sprinkle pipe system mounted on a movable frame capable of simulating a uniform 223.5 mm/hr (8.8 in./hr) of rainfall over the test specimen. The simulated rainfall and flow meters shall be calibrated, and the water distribution shall be checked as noted in Section 7.2.

### 6.4 Instruments

Calibrations of instruments used in this test shall be maintained in accordance with the manufacturer's definitions.

## 7. Calibration

### 7.1 Wind stream calibration

**7.1.1**
The wind stream velocity shall be measured on a vertical plane grid having dimensions of 2.44 m wide x 1.22 m high (8 ft wide x 4 ft high) and grid dimensions of 610 mm x 610 mm (24 in. x 24 in.), located 610 mm (24 in.) in front of the test frame with the lower 2.44 m (8 ft) dimension in line with the bottom edge of the test frame opening (See Figure 3).

**7.1.2**
The measured wind stream velocity within each grid square shall be within ± 10% of the required axial velocity for each wind speed.

**7.1.3**
Upon completion of the wind stream calibration, the distance from the test frame to the outlet of the wind generator and any necessary baffle configurations shall be noted and maintained while conducting the test as described in Section 8.

### 7.2 Rainfall simulation and flow meter calibration

A maximum of six months prior to conducting the test, the flow meter(s) shall be calibrated using the method described in Section 7.2.1 through Section 7.2.6.

**7.2.1**
Prepare an apparatus to capture any water which would enter the wind stream during an actual test.

**7.2.2**
Commence water insertion for a period of one (1) minute

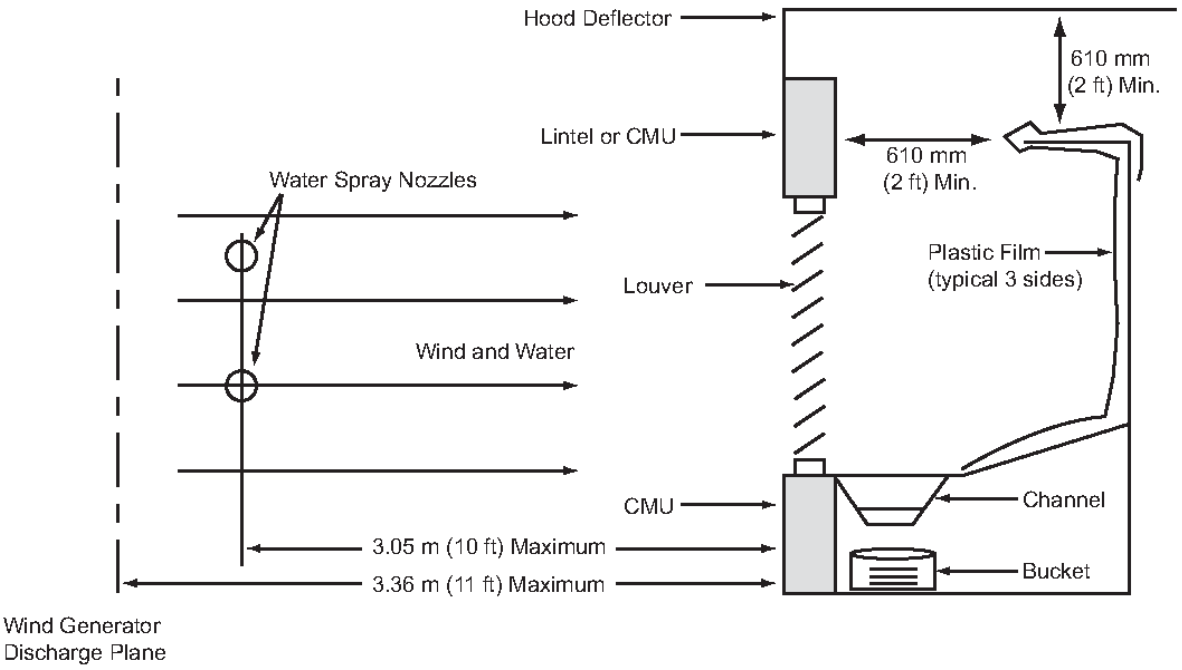


**Figure 1 - High Velocity Wind Driven Rain Test Setup**

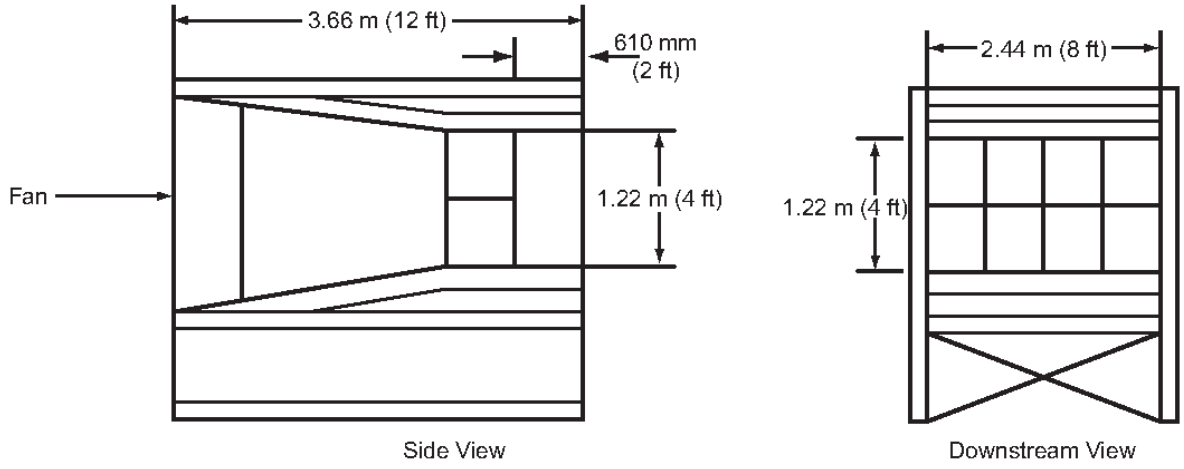


**Figure 2 - Wind Tunnel with Baffles**

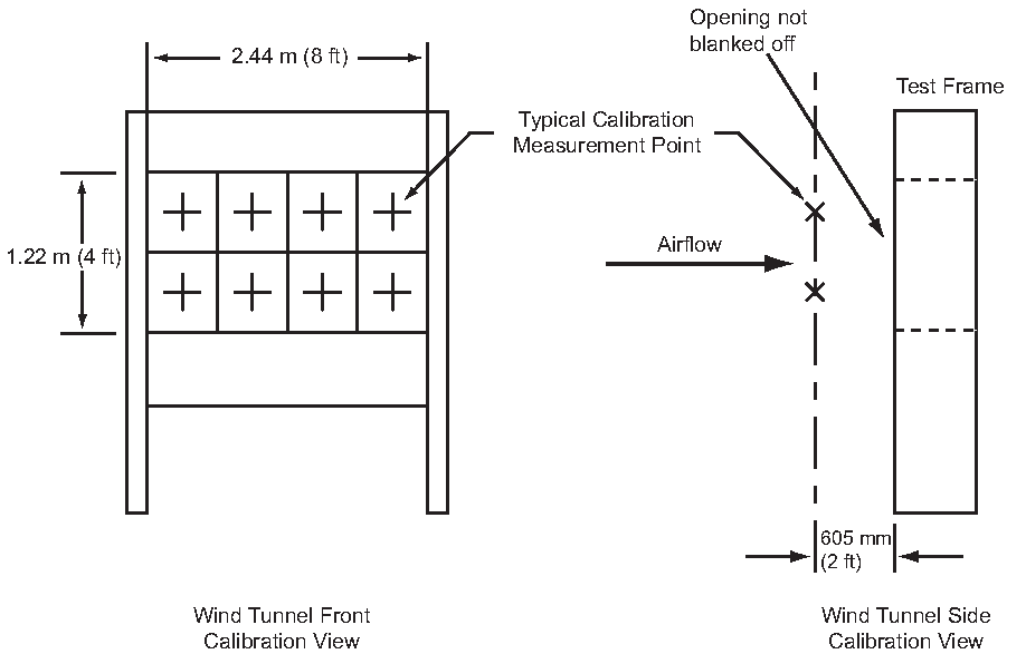


**Figure 3 - Wind Stream Calibration Setup**

and capture the water. Record the flow meter reading (gallons/min) during this process.

**7.2.3**
Convert the flow meter reading to rainfall simulation using the following formula:

$$\left[\frac{\left(\frac{\text{L}}{\text{min}}\right)\times\left(\frac{60\text{ min}}{1\text{ hour}}\right)\times\left(\frac{1{,}000{,}000\text{ mm}^3}{\text{L}}\right)}{4{,}459{,}346\text{ mm}^2}\right]=x\left(\frac{\text{mm}}{\text{hour}}\right)$$

Eqn 7.2.3 SI

$$\left[\frac{\left(\frac{\text{gallons}}{\text{min.}}\right)\times\left(\frac{60\text{ min.}}{1\text{ hour}}\right)\times\left(\frac{231\text{ in.}^3}{1\text{ gallon}}\right)}{6{,}912\text{ in.}^2}\right]=x\left(\frac{\text{in.}}{\text{hour}}\right)$$

Eqn 7.2.3 I-P

**Note**: For Equation 7.2.3 SI and Equation 7.2.3 I-P, 4,459,346 $mm^2$ and 6,912 $in.^2$ refer to the expected projection area of the water that hits the wall, respectively.

**7.2.4**
The quantity of rainfall simulation determined in Section 7.2.3 shall be within ± 5% of the desired rainfall simulation of 223.5 mm/hr (8.8 in./hr).

**7.2.5**
Measure the volume of water ($mm^3$ [$in.^3$]) captured and convert this to rainfall simulation (mm/hr [in./hr]) using the following formula:

$$\left[\frac{\left(\frac{\text{mm}^3}{4{,}459{,}346\text{ mm}^2}\right)}{1\text{ min}}\right]\times\left(\frac{60\text{ min}}{1\text{ hour}}\right)=y\left(\frac{\text{mm}}{\text{hour}}\right)$$

Eqn 7.2.5 SI

$$\left[\frac{\left(\frac{\text{in.}^3}{6{,}912\text{ in.}^2}\right)}{1\text{ min.}}\right]\times\left(\frac{60\text{ min.}}{1\text{ hour}}\right)=y\left(\frac{\text{in.}}{\text{hour}}\right)$$

Eqn 7.2.5 I-P

**Note**: For Equation 7.2.5 SI and Equation 7.2.5 I-P, 4,459,346 $mm^2$ and 6,912 $in.^2$ refer to the expected projection area of the water that hits the wall, respectively.

**7.2.6**
The rainfall simulation determined in Section 7.2.3 ($x$) shall be within ± 5% of the rainfall simulation determined in Section 7.2.5 ($y$).

### 7.3 Water distribution check

The water distribution check over the (1.22 m x 2.44 m [4 ft x 8 ft]) wall surface shall be checked and calibrated every six months using the method outlined herein. The water distribution system must be adjusted so that the water introduced into the wind stream strikes the wall area.

**7.3.1**
Prepare eight 610 mm (24 in.) squares of the absorptive material (i.e. roofing felt) and weigh each sample. From this data, determine the average weight of the samples. As an alternative, depending on the consistency of the weight of the absorptive material, each square used for calibration may be weighed individually.

**7.3.2**
Lay out the eight numbered squares of absorptive material (i.e. roofing felt) as shown in Figure 4. Put the hold-down frame over the squares of absorptive material.

**7.3.3**
Set the wind speed to 15.65 m/s (35 mph) and add water to the windstream at a constant rate, as indicated on the flow meter, until the absorptive material is well wetted, but not so that it is saturated, at which time, the wind and water flow shall be terminated.

**7.3.4**
Remove the hold-down frame from the wall and rapidly weigh the squares of wet absorptive material. Determine the weight of water absorbed by each square sample at the particular wind speed and flow meter setting.

**7.3.5**
No one particular square sample shall exhibit rain fall simulation, measured in weight, greater than or less than 25% of the average weight of all eight squares.

**7.3.6**
Repeat the steps in Sections 7.3.2, 7.3.3, 7.3.4, and 7.3.5 at a wind speed of 31.3 m/s (70 mph).

**7.3.7**
No one particular square sample shall exhibit rain fall simulation, measured in weight, greater than or less than 25% of the average weight of all eight squares.

## 8. Test Procedures

**8.1**
The louver to be tested shall be mounted and sealed as recommended by the manufacturer in the test frame to prevent any ingress of water other than through the louver blades.

**Table 1 - Wind Stream Velocity and Water Spray Intervals for Wind-Driven Rain Resistance Testing**

| Interval # | Wind Speed m/s (mph) | Time (min) | Water Spray |
|---|---|---|---|
| 1 | 15.65 (35) | 15 | On |
| 2 | 0 (0) | 5 | Off |
| 3 | 31.3 (70) | 15 | On |
| 4 | 0 (0) | 5 | Off |
| 5 | 40.2 (90) | 15 | On |
| 6 | 0 | 5 | Off |
| 7 | 49.2 (110) | 5 | On |
| 8 | 0 | 5 | Off |

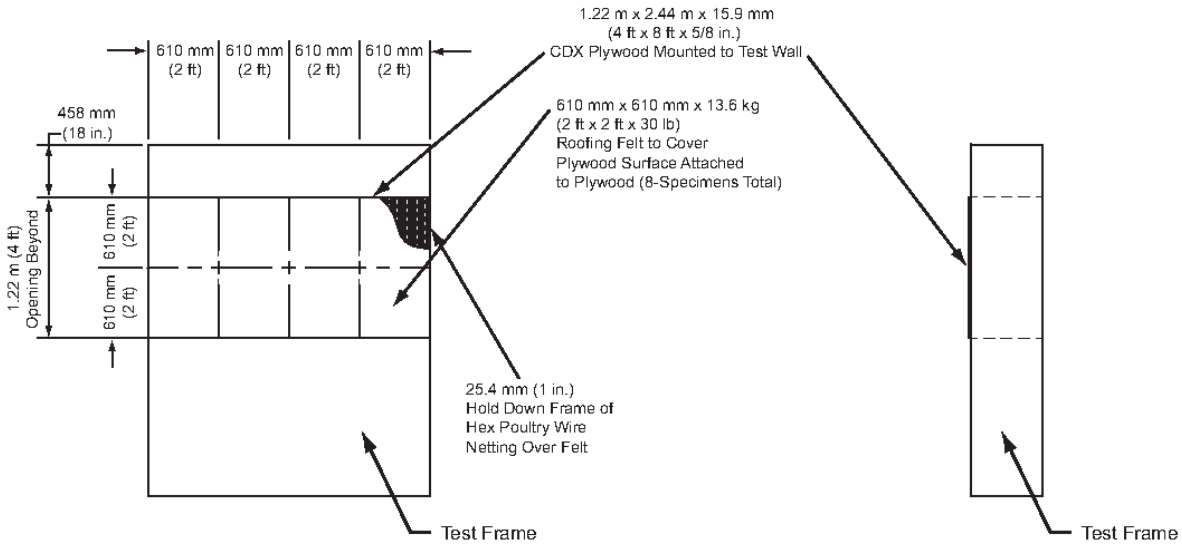


**Figure 4 - Core Area and Rainfall Coverage**

**8.2**
The wind stream velocity intervals shall be conducted as noted in Table 1.

**8.3**
Water shall be added to the wind stream upon commencement of the initial wind stream velocity in an even spray at a rate equal to 223.5 mm/hr (8.8 in./hr) of rainfall over the test specimen. The flow of water shall be measured with a calibrated flow meter during the test procedure to confirm water flow. Water flow shall be stopped and started in conjunction with the air flow intervals noted in Table 1.

**8.4**
The water penetrating the louver at each wind stream velocity shall be collected and measured.

## 9. Report and Results of Test

The test report shall be submitted in its entirety and shall include, at a minimum, the following:

1) The name, address, telephone number, and website address (optional) of the testing laboratory. Evidence of accreditation/certification to perform this test.

2) A unique identification number, with the identification number printed on each page.

3) Consecutive page numbers, with an indication of the total number of pages.

4) The date(s) when the test was performed and the date of the report.

5) The test standard number with the date of issue and an explanation detailing any derivation from the standard.

6) A signature, including titles, and date from both the Professional Engineer authorizing the test report and the lab technician.

7) A description of the louver, including:
   a) the model number
   b) any drawings and photographs of the louver
   c) a detailed report of the method of installation (including fasteners and caulk)

8) Test specimen construction documentation verifying the construction of the test sample.

9) Calibration data and calculations.

10) Detailed observations of any water infiltration and approximate times of water infiltration for each wind stream velocity tested. Observations should include the total volume of water which infiltrated the louver at each test speed.

11) The calculated percentage of water which infiltrated the louver based on the total amount of water sprayed at the test apparatus.

12) A determination of “pass” or “fail” based on whether or not the louver exhibits water infiltration in excess of 1% of the total water sprayed.

13) A video record of the test intervals (see Table 1), which must be made available upon request.

14) Photographs of the louver immediately prior to and subsequent to commencement and termination of the test.

## Annex A
## References (Informative)


[1] *The International System of Units (SI)*
Page, C. H. and Vigoureux, P.
National Bureau of Standards, NBS Special Publication 330, 1972.
(Now known as NIST.)

[2] ibid, p 19.

[3] *ASME Steam Tables*, p 283
American Society of Mechanical Engineers, 1967.

[4] *Checklist #0240 For The Approval of: Louvers (Includes Gable End Louvers)*
Miami-Dade County, Florida

[5] Florida Test Protocol TAS No. 100(A)-95
*Test Procedure for Wind and Wind Driven Rain Resistance and /or Increased Windspeed Resistance of Soffit Ventilation Strip and Continuous or Intermittent Ventilation System Installed at the Ridge Area*

[6] ANSI/AMCA Standard 500-L-07
*Laboratory Methods of Testing Louvers for Rating*

[7] ICC-ES AC85
*Acceptance Criteria for Test Reports*

[8] ICC-ES AC89
*Accreditation Criteria for Testing Laboratories*

## Annex B
## Reason for Two Louver Test Standards (Informative)

The requirement to test the louvers to two test criteria is based upon the need for the louver to perform at two conditions: during normal operation and during a hurricane.

A product could be designed for hurricane or high wind conditions but be unsuitable for normal day to day operation due to its high pressure drop and energy requirements.

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The Air Movement and control Association International, Inc. is a not-for-profit international association of the world's manufacturers of related air system equipment primarily, but limited to: fans, louvers, dampers, air curtains, airflow measurement stations, acoustic attenuators, and other air system components for the industrial, commercial and residential markets.

**Reason Statement for AMCA 550**

The ICC Mechanical Technical Committee unanimously approved this exact code change last November at the ICC hearings in Baltimore. In fact, not a single person stood up to speak in opposition to this change. Additionally, no public comments were proposed to this code change in the ICC process, meaning that this change will be on the consent agenda at the ICC Final Action Hearing in May and will be included in the 2012 International Mechanical Code.

AMCA Standard 550-08 *Test Method for High Velocity Wind Driven Rain Resistant Louvers* standardizes uniform laboratory test methods and minimum performance ratings for water rejection capabilities of louvers intended to be used in high velocity wind conditions.

The tests conducted in accordance with the requirements of this standard are intended to demonstrate the acceptability of the louver for installation in facilities (essential and nonessential) that will remain in operation during a high velocity wind condition and where water infiltration must be kept to manageable amounts.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/19/2010 | **Section** | 603 |
| **Chapter** | 6 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Ann Stanton | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

3654

**Summary of Modification**

Revise section 603 to summarize Florida-specifics into a table and return to International code formatting.

**Rationale**

It has been problemmatic for years that Florida-specifics overlap I-code criteria, specifically when code requirements are lost because of oversight due to formatting. Further, the table format shows all duct sealing and mechanical attachment criteria at once, making code requirements clearer.

FYI: Text in red is brought into the code from new requirements to the '09 I-Codes.

**Fiscal Impact Statement**

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

Provides clarity of code criteria. Makes the code more consistent with the I-code which help with training and commentary purposes.

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

None.

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

None.

**Requirements**

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

Yes. Provides for clarity and consistency of code enforcement.

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

Improves the code by making it more clear and consistent.

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

No. The proposal would line the Florida code up with the I-code.

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

No degradation is anticipated.

## SECTION 603

## DUCT CONSTRUCTION AND INSTALLATION

**603.1 General.** An air distribution system shall be designed and installed to supply the required distribution of air. The installation of an air distribution system shall not affect the fire protection requirements specified in the building code. Ducts shall be constructed, braced, reinforced and installed to provide structural strength and durability. All transverse joints, longitudinal seams and fitting connections shall be securely fastened and sealed in accordance with the applicable standards of this section.

All enclosures which form the primary air containment passageways for air distribution systems shall be considered ducts or plenum chambers and shall be constructed and sealed in accordance with the applicable criteria of this section.

**Revise FL-specific 603.1.1 to include IMC '09 603.4.1 change as shown:**

**603.1.1 Mechanical fastening.** All joints between sections of air ducts and plenums, between intermediate and terminal fittings and other components of air distribution systems, and between subsections of these components shall be mechanically fastened to secure the sections independently of the closure system(s).

**Sections 603.1.2 – 603.1.6 No change to FL-specific.**

**Revise FL-specific Section 603.1.7 to add IRC '09 M1601.4.1 criteria as shown (for code consistency):**

**603.1.7 Approved closure systems.** Closure system materials, including adhesives when used, shall have a flame spread rating not over 25 without evidence of continued progressive combustion and a smoke-developed rating not over 50 when tested in accordance with the ASTM E 84. The following closure systems and materials are approved for air distribution construction and sealing for the applications and pressure classes prescribed in Sections 603.2 through 603.10:

1 – 5 No change.

6. Foams. Spray polyurethane foam shall be permitted to be applied without additional joint seals. **[comes from M1601.4.1 (for code consistency)]**

**Add FL-specific Section 603.1.8 (moved from 603.8), Cavities of the Building Structure, to 603.1, General, as shown:**

**603.1.8 Cavities of the Building Structure**. Cavities in framed spaces, such as dropped soffits and walls, shall not be used to deliver air from or return air to the conditioning system unless they contain an air duct insert insulated according to Section 503.2.7.1 of the Florida Building Code, Energy Conservation, and constructed and sealed in accordance with the requirements of Table 603 appropriate for the duct materials used.

**Exception:** Return air plenums.

**Section 603.2 Revise to include FL-specific as shown:**

**603.2 Duct sizing.** Ducts installed within a single dwelling unit shall be sized in accordance with ACCA Manual D or other approved methods. Ducts installed within all other buildings shall be sized in accordance with the ASHRAE Handbook of Fundamentals or other equivalent computation procedure based on the following:

1. Calculation of the supply air for each room shall be based on the greater of the heating load or sensible cooling load for that room.

2. Duct size shall be determined by the supply air requirements of each room, the available static pressure and the total equivalent length of the various duct runs.

3. Friction loss data shall correspond to the type of material used in duct construction.

**Section FL 603.3 Delete FL-specific as shown; move criteria to Table 603. Reinstate Section 603.3 of the IMC as shown.**

~~**603.3 Metallic ducts, rigid and flexible.** All ducts shall be constructed of iron, steel, aluminum or other approved material. Ducts shall be constructed as specified in the SMACNA HVAC Duct Construction Standards - Metal and Flexible.~~

~~**Exception:** Ducts installed within single dwelling units shall have a minimum thickness as specified in Table 603.3.~~

~~All transverse joints, longitudinal seams and duct wall penetration of ducts and joints with other air distribution systems components shall be mechanically attached and sealed using approved closure systems for that pressure class specified in Section 603.3.1 or 603.3.2.~~

~~**603.3.1 Pressure less than 1 inch water gage, approved closure systems.** The following closure systems are approved for rigid metal duct designed to be operated at pressures less than 1 inch water gauge when they conform to the approved closure and mechanical attachment requirements of Section 603.1:~~

~~1. Continuous welds.~~

~~2. Snaplock seams, and grooved, standing, double corner, single corner and Pittsburgh lock seams and all other rolled mechanical seams.~~

~~3. Mastic, mastic plus embedded fabric, or mastic ribbons.~~

~~4. Gaskets.~~

~~5. Pressure-sensitive tape.~~

~~6. Aerosol sealant.~~

~~**603.3.2 Pressure 1 inch water gage or greater, approved closure systems.** The following closure systems are approved for rigid metal duct designed to be operated at pressures 1 inch water gage or greater and flexible duct when they conform to the approved closure and mechanical attachment requirements of Section 603.1:~~

~~1. Continuous welds.~~

~~2. Mastic, mastic plus embedded fabric, or mastic ribbons.~~

~~3. Gaskets.~~

~~**603.3.3 High pressure duct systems.** High pressure duct systems designed to operate at pressures greater than 3 inches water gage (4 inches water gage pressure class), shall be tested in accordance with the SMACNA HVAC Air Duct Leakage Test Manual. The tested duct leakage class, at a test pressure equal to the design duct pressure class rating, shall be equal to or less than Leakage Class 6. Leakage testing may be limited to representative sections of the duct system but in no case shall such tested sections include less than 25 percent of the total installed duct area for the designated pressure class.~~

**603.3 Duct classification.** Ducts shall be classified based on the maximum operating pressure of the duct at pressures of positive or negative 0.5, 1.0, 2.0, 3.0, 4.0, 6.0 or 10.0 inches (1 inch w.c. = 248.7 Pa) of water column. The pressure classification of ducts shall equal or exceed the design pressure of the air distribution in which the ducts are utilized.

**Section 603.4. Reinstate IMC section 603.4 as per IMC '09 and add reference to Florida-specific criteria in Table 603 as shown.**

**603.4 Metallic ducts.** All metallic ducts shall be constructed as specified in the SMACNA HVAC Duct Construction Standards—Metal and Flexible and shall be mechanically attached and sealed using approved closure systems for the pressure class as specified in Table 603.

**Exception:** Ducts installed within single dwelling units shall have a minimum thickness as specified in Table 603.4.

**Section FL 603.3.4. Return section number to IMC 603.4.1, reserve section and add criteria to Table 603 and Section 603.1.1.**

**603.4.1 ~~603.3.4~~ ~~Mechanical~~ Minimum fasteners.** Reserved. ~~Round metallic ducts shall be mechanically fastened by means of at least three sheet metal screws or rivets spaced equally around the joint.~~

~~**Exception:** Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion so as to prevent a hinge effect.~~

**Section 603.5. Renumber FL 603.4 to 603.5 as in the IMC and add reference to Florida-specific criteria in Table 603 as shown:**

**603.5 4 Nonmetallic ducts.** Nonmetallic ducts shall be constructed with Class 0 or Class 1 duct material in accordance with UL 181 and shall meet appropriate criteria in Table 603 for the type of duct installed. Fibrous duct construction shall conform to the SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards. The maximum air temperature within nonmetallic ducts shall not exceed 250°F (121°C).

**Section 603.4.1 Renumber FL 603.4.1 to 603.5.1 as in the IMC and add reference to FL-specific criteria in Table 603 as shown:**

**603.54.1 Gypsum ducts.** Gypsum boards that form air shafts (ducts) shall be limited to return air systems where the air temperatures do not exceed 125°F (52°C) and the gypsum board surface temperature is maintained above the airstream dew-point temperature and shall meet applicable criteria of Table 603. Gypsum return air ducts shall not be incorporated in air-handling systems utilizing evaporative coolers.

**Add FL-specific section referencing plenums, mechanical closets, and enclosed support platforms to Table 603 as shown:**

**603.5.2 Building cavities designed for air transport.** Cavities designed to deliver air from or return air to the conditioning system such as plenums, mechanical closets, enclosed support platforms, cases, air shafts, etc. shall be lined with an air barrier and sealed in accordance with applicable criteria in Table 603, and shall be insulated in accordance with Section 503.2.7.1 of the Florida Building Code, Energy Conservation.

**Section 603.4.2. Delete FL-specific language as shown. Add criteria to Table 603.**

~~**603.4.2 Fibrous glass duct, rigid**. All joints, seams and duct wall penetrations including, but not limited to, the joints between sections of duct and the joints between duct and other distribution system components shall be mechanically attached and sealed using approved closure systems as specified in Section 603.1.~~

~~**603.4.2.1 Approved closure systems.** The following closure systems are approved for rigid fibrous glass ducts when they conform to the approved closure and mechanical attachment requirements of Section 603.1:~~

~~1. Heat-activated tapes.~~

~~2. Pressure-sensitive tapes.~~

~~3. Mastics or mastic-plus-embedded fabric systems.~~

~~**603.4.2.2 Mechanical fastening.** Attachments of ductwork to air-handling equipment shall be by mechanical fasteners. Where access is limited, two fasteners on one side shall be acceptable when installed in accordance with Section 603.1.6.~~

**Section 603.5. Renumber to 603.6 as in IMC '09 and add reference to FL-specific table as shown:**

**603.6 ~~5~~ Flexible air ducts and flexible air connectors.** Flexible air ducts, both metallic and nonmetallic, shall comply with Sections 603.6.1, 603.6.1.1, 603.6.3 and 603.6.4. Flexible air connectors, both metallic and nonmetallic, shall comply with Sections 603.6.2 through 603.6.4.

**603.6 ~~5~~.1 Flexible air ducts.** Flexible air ducts, both metallic and nonmetallic, shall be tested in accordance with UL 181. Such ducts shall be listed and labeled as Class 0 or Class 1 flexible air ducts and shall be installed in accordance with Table 603 and Section 304.1.

**603.6~~5~~.1.1 Duct length.** [No change]

**603.6~~5~~.2 Flexible air connectors.** Flexible air connectors, both metallic and nonmetallic, shall be tested in accordance with UL 181. Such connectors shall be listed and labeled as Class 0 or Class 1 flexible air connectors and shall be installed in accordance with Table 603 and Section 304.1.

**603.6~~5~~.2.1 Connector length**. [No change to text]

**603.6~~5~~.2.2 Connector penetration limitations.** [No change to text]

**603.6~~5~~.3 Air temperature.** [No change to text]

**603.6~~5~~.4 Flexible air duct and air connector clearance.** [No change to text]

**603. 6~~5~~.5 Penetrations prohibited.** Flexible air ducts and flexible air connectors shall not pass through any fire-resistance-rated assembly. Flexible air connectors shall not pass through any wall, floor or ceiling.

**Section 603.4.3. Renumber as 603.7 as in IMC '09.**

**603.7 ~~4.3 7~~ Rigid duct penetrations.** 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 and ducts penetrating the walls or ceilings separating a dwelling from a private garage shall be continuous and constructed of a minimum 26 gage [0.0187 inch (0.4712 mm)] galvanized sheet metal, 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 Florida ~~International~~ Building Code, Building.

**603.5.6 Delete FL-specific sections 603.5.6, 603.5.6.1 – 603.5.6.5 as shown. Add criteria to Table 603.**

~~**603.5.6 Flexible air duct systems, nonmetal.** Flexible nonmetal ducts shall be joined to all other air distribution system components by either terminal or intermediate fittings. All duct collar fittings shall have a minimum 5/ 8 inch (.63 mm) integral flange for sealing to other components and a minimum 3 inch (76 mm) shaft for insertion into the inner duct core.~~

~~Flexible ducts having porous inner cores shall not be used.~~

~~**Exception:** Ducts having a nonporous liner between the porous inner core and the outer jacket. Fastening and sealing requirements shall be applied to such intermediate liners.~~

~~All joints of flexible ducts to fittings and fittings to other air distribution system components shall be mechanically attached and sealed as specified in Sections 603.5.6.1 through 603.5.6.6.~~

~~Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked "181B-C." [from 603.9]~~

~~**603.5.6.1 Duct core to duct fitting, mechanical attachment.** The reinforced core shall be mechanically attached to the duct fitting by a drawband installed directly over the wire-reinforced core and the duct fitting. The duct fitting shall extend a minimum of 2 inches (51 mm) into each section of duct core. When the flexible duct is larger than 12 inches (305 mm) in diameter or the design pressure exceeds 1 inch water gage, the drawband shall be secured by a raised bead or indented groove on the fitting.~~

~~**603.5.6.2 Duct core to duct fitting, approved closure systems.** The reinforced lining shall be sealed to the duct fitting using one of the following sealing materials which conforms to the approved closure and mechanical attachment requirements of Section 603.1:~~

~~1. Gasketing.~~

~~2. Mastic, mastic plus embedded fabric, or mastic ribbons.~~

~~3. Pressure-sensitive tape.~~

~~4. Aerosol sealants, provided that their use is consistent with UL 181.~~

~~**603.5.6.3 Duct outer jacket to duct collar fitting.** The outer jacket of a flexible duct section shall be secured at the juncture of the air distribution system component and intermediate or terminal fitting in such a way as to prevent excess condensation. The outer jacket of a flexible duct section shall not be interposed between the flange of the duct fitting and the flexible duct, rigid fibrous glass duct board, or sheet metal to which it is mated.~~

~~**603.5.6.4 Duct collar fitting to rigid duct, mechanical attachment.** The duct collar fitting shall be mechanically attached to the rigid duct board or sheet metal by appropriate mechanical fasteners; either screws, spin-in flanges, or dovetail flanges.~~

**603.5.6.5 Duct collar fitting to rigid duct, approved closure systems.** The duct collar fitting's integral flange shall be sealed to the rigid duct board or sheet metal using one of the following closure systems/materials which conforms to the approved closure and mechanical attachment standards of Section 603.1:

1. Gasketing.

2. Mastic or mastic plus embedded fabric.

3. Mastic ribbons when used to attach a duct collar to sheet metal.

4. Pressure sensitive tape.

5. Aerosol sealants, provided that their use is consistent with UL 181.

-

**603.6 Delete FL-specific sections 603.6, 603.6.1 – 603.6.2 as shown. Add criteria to Table 603.**

**603.6 Terminal and intermediate fittings.** All seams and joints in terminal and intermediate fittings, between fitting subsections and between fittings and other air distribution system components or building components shall be mechanically attached and sealed as specified in Section 603.6.1 or Section 603.6.2.

**603.6.1 Fittings and joints between dissimilar duct types, approved closure systems.**

Approved closure systems shall be as designated by air distribution system component material type in Section 603.1

**Exception:** When the components of a joint are fibrous glass duct board and metal duct, including collar fittings and metal equipment housings, the closure systems approved for fibrous glass duct shall be used.

**603.6.2 Terminal fittings and air ducts to building envelope components, approved closure systems.** Terminal fittings and air ducts which penetrate the building envelope shall be mechanically attached to the structure and sealed to the envelope component penetrated and shall use one of the following closure systems/materials which conform to the approved closure and mechanical application requirements of Section 603.1:

1. Mastics or mastic plus embedded fabrics.

2. Gaskets used in terminal fitting/grille assemblies which compress the gasket material between the fitting and the wall, ceiling or floor sheathing.

**Section 603.7. Delete FL-specific sections 603.7, 603.7.1 as shown. Add criteria to Table 603.**

**603.7 Air Handling Units.** All air handling units shall be mechanically attached to other air distribution system components. Air handling units located outside the conditioned space shall be sealed using approved closure systems conforming to the approved closure and mechanical application requirements of 603.3.

~~**603.7.1 Approved Closure Systems**. Systems conforming to the product and application standards of §M603.1 may be used when sealing air handling units.~~

**Section 603.8. Delete FL-specific sections 603.8 as shown. Add criteria to Section 603.1.8 and to Table 603.**

~~**603.8 Cavities of the building structure.** Cavities in framed spaces, such as dropped soffits and walls, shall not be used to deliver air from or return air to the conditioning system unless they contain an air duct insert which is insulated in accordance with Table 13-410.AB.2.2 or Table 13-610.AB.2.1 of Chapter 13 of the Florida Building Code, Energy Conservation Building and constructed and sealed in accordance with the requirements of Section 603.1 appropriate for the duct materials used.~~

~~**Exception:** Return air plenums.~~

~~Cavities designed for air transport such as mechanical closets, chases, air shafts, etc. shall be lined with an air barrier and sealed in accordance with Section 603.9 and shall be insulated in accordance with Table 13-410.1.AB.2.2 or Table 13-610.1.AB.2.1 of Chapter 13 of the Florida Building Code, Energy Conservation Building.~~

~~Building cavities which will be used as return air plenums shall be lined with a continuous air barrier made of durable non-porous materials. All penetrations of the air barrier shall be sealed with a suitable long-life mastic material.~~

~~**Exception:** Surfaces between the plenum and conditioned spaces from which the return/mixed air is drawn.~~

~~Building cavities beneath a roof deck that will be used as return air plenums shall have an insulated roof with the insulation having an R-value of at least R-19.~~

**Section 603.8. Reinstate 603.8 IMC, Underground ducts. Move from FL-specific 603.18.**

**603.~~18~~ Underground ducts.** Ducts shall be approved for underground installation. Metallic ducts not having an approved protective coating shall be completely encased in a minimum of 2 inches (51 mm) of concrete.

**603.~~18~~.1 Slope.** Ducts shall have a minimum slope of 1/8 inch per foot (10.4 mm/m) to allow drainage to a point provided with access.

**603.~~18~~.2 Sealing.** Ducts shall be sealed and secured prior to pouring the concrete encasement.

**603.~~18~~.3 Plastic ducts and fittings.** Plastic ducts shall be constructed of PVC having a minimum pipe stiffness of 8 psi (55 kPa) at 5-percent deflection when tested in accordance with ASTM D 2412. Plastic duct fittings shall be constructed of either PVC or high-density polyethylene. Plastic duct and fittings shall be utilized in underground installations only. The maximum design temperature for systems utilizing plastic duct and fittings shall be 150EF (66EC).

**Section 603.9. Delete FL-specific sections 603.9, 603.9.1- 603.9.2 as shown. Add criteria to Table 603.**

~~**603.9 Mechanical closets.** The interior surfaces of mechanical closets shall be sheathed with a continuous air barrier as specified in Section 603.9.1 and shall be sealed with approved closure systems as specified in Section 603.9.2. All joints shall be sealed between air barrier segments and between the air barriers of walls and those of the ceiling, floor and door framing. All penetrations of the air barrier including, but not limited to, those by air ducts, plenums, pipes, service lines, refrigerant lines, electrical wiring, and condensate drain lines shall be sealed to the air barrier and approved closure systems.~~

~~**Exception:** Air passageways into the closet from conditioned space that are specifically designed for return air flow.~~

~~Through-wall, through-floor and through-ceiling air passageways into the closet shall be framed and sealed to form an airtight passageway using approved air duct materials and approved closure systems.~~

~~Duct penetrations through any part of the ceiling, walls or floor of a mechanical closet shall have sufficient space between surrounding ceiling, walls or floor and any duct or plenum penetration to allow for sealing of the penetration and inspection of the seal.~~

~~Clothes washers, clothes dryers, combustion water heaters and atmospheric combustion furnaces shall not be located in mechanical closets used as return air plenums.~~

~~**603.9.1 Approved air barriers.** The following air barriers are approved for use in mechanical closets:~~

~~1. One half inch thick (12.7 mm) or greater gypsum wallboard, taped and sealed.~~

~~2. Other panelized materials having inward facing surfaces with an air porosity no greater than that of a duct product meeting Section 22 of UL 181 which are sealed on all interior surfaces to create a continuous air barrier.~~

~~**603.9.2 Approved closure systems.** The following closure systems are approved for use in mechanical closets:~~

~~1. Gypsum wallboard joint compound over taped joints between gypsum wallboard panels.~~

~~2. Sealants complying with the product and application standards of Section 603.4.2.1 for fibrous glass duct board;~~

~~A suitable long-life caulk or mastic compliant with the locally adopted mechanical code for all applications~~

**Section 603.9. Reinstate IMC section 603.9 as shown. Do not use IMC 603.9 language; add FL-specific criteria to Table 603 as shown elsewhere. Add reference to Table 603.**

**603.9 Joints, seams and connections.** All air distribution system joints, seams and connections shall be constructed, sealed and attached as described in Table 603 by duct type.

**Section 603.10. Delete FL-specific sections 603.10 as shown. Add criteria to Table 603.**

~~**603.10 Enclosed support platforms.** Enclosed support platforms located between the return air inlet(s) from conditioned space and the inlet of the air handling unit or furnace, shall contain a duct section constructed entirely of rigid metal, rigid fibrous glass duct board, or flexible duct which is constructed and sealed according to the respective requirements of Section 603.1 and insulated according to the requirements of Section 13-410.AB.2.2 and 13-610.AB.2.1 of Chapter 13 of the Florida Building Code, Energy Conservation Building.~~

~~? The duct section shall be designed and constructed so that no portion of the building structure, including adjoining walls, floors and ceilings, shall be in contact with the return air stream or function as a component of this duct section.~~

~~? The duct section shall not be penetrated by a refrigerant line chase, refrigerant line, wiring, pipe or any object other than a component of the air distribution system.~~

~~? Through-wall, through-floor and through-ceiling penetrations into the duct section shall contain a branch duct which is fabricated of rigid fibrous glass duct board or rigid metal and which extends to and is sealed to both the duct section and the grille side wall surface. The branch duct shall be fabricated and attached to the duct insert in accordance with Section 603.3 or Section 603.4.2, respective to the duct type used.~~

**Section 603.10. Reinstate 603.10 IMC, Supports, and add from IRC M1601.4.3 and FL-specific 603.5.6.6 as shown:**

**603.10 Supports.** Ducts shall be supported with approved hangers at intervals not exceeding 10 feet (3048 mm) in accordance with requirements of Sections 603.10.1 – 603.10.3, or by other approved duct support systems designed in accordance with the Florida Building Code, Building ~~International Building Code~~. ~~Flexible and other factory-made ducts shall be supported in accordance with the manufacturer's installation instructions.~~

**603.10.1 Metal ducts.** Metal ducts shall be supported by ½-inch (13 mm) wide 1-gage metal straps or 12-gage galvanized wire at intervals not exceeding 10 feet (3048 mm) or other approved means.

**603.10.2 Rigid nonmetal ducts.** Rigid nonmetallic ducts shall be supported in accordance with the manufacturer's installation instructions.

**603.10.3 Flexible ducts.** Flexible ducts shall be configured and supported so as to prevent the use of excess duct material, prevent duct dislocation or damage, and prevent constriction of the duct below the rated duct diameter in accordance with the following requirements:

1. Ducts shall be installed fully extended. The total extended length of duct material shall not exceed 5 percent of the minimum required length for that run.

2. Bends shall maintain a center line radius of not less than one duct diameter.

3. Terminal devices shall be supported independently of the flexible duct.

4. Horizontal duct shall be supported at intervals not greater than 5 feet (1524 mm). Duct sag between supports shall not exceed ½ inch (12.7 mm) per foot of length. Supports shall be provided within 1½ feet (38 mm) of intermediate fittings and between intermediate fittings and bends. Ceiling joists and rigid duct or equipment may be considered to be supports.

5. Vertical duct shall be stabilized with support straps at intervals not greater than 6 feet (1829 mm).

6. Hangers, saddles and other supports shall meet the duct manufacturer's recommendations and shall be of sufficient width to prevent restriction of the internal duct diameter. In no case shall the material supporting flexible duct that is in direct contact with it be less than 1½ inches (38 mm) wide.

**603.11 Furnace connection. Change to read as shown.**

**603.11 Furnace connection. Reserved.**

**Sections 603.12 and 603.13.** [No change]

**603.14 Location. Change to read as shown.**

**603.14 Location.** Ducts shall not be installed in or within 6 inches (152 mm) of the earth, except where such ducts comply with Section 603.7.

**Sections 603.15 through 603.17.** [No change]

**Section 603.18. Move FL-specific, Underground ducts, back to IMC 603.8 (same language).**

**TABLE 603**

**DUCT SYSTEM CONSTRUCTION AND SEALING**

| DUCT TYPE/ CONNECTION | SEALING REQUIREMENTS | MECHANICAL ATTACHMENT | TEST STANDARD |
|---|---|---|---|
| **Metal duct, rigid and flexible**<br><br>Pressures less than 1-inch water gauge | Closure systems as described in Section 603.1.7:<br><br>1. Continuous welds. | Mechanical attachments approved:<br><br>1. Continuous welds.<br><br>2. Snaplock seams, and grooved, | |

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| | 2. Snaplock seams, and grooved, standing, double-corner, single-corner and Pittsburgh-lock seams and all other rolled mechanical seams.<br><br>3. Mastic, mastic-plus-embedded fabric, or mastic ribbons. `<br><br>4. Gaskets.<br><br>5. Pressure-sensitive tape.<br><br>6. Aerosol sealant | standing, double-corner, single-corner and Pittsburgh-lock seams and all other rolled mechanical seams.<br><br>Crimp joints for round metal ducts shall have a contact lap of at least 11/2inches (38 mm).<br><br>Round metal ducts shall be mechanically fastened by means of at least three sheet-metal screws or rivets equally spaced around the joint. [1] | SMACNA HVAC Air Duct Leakage Test Manual |
| Pressures 1-inch water gauge or greater<br><br>High pressure duct systems designed to operate at pressures greater than 3-inch water gauge (4-inch water gauge pressure class) | Closure systems as described in Section 603.1.7:<br><br>1. Continuous welds.<br><br>2. Mastic or mastic-plus-embedded fabric systems.<br><br>3. Gaskets.<br><br>The tested duct leakage class, at a test pressure equal to the design duct pressure class rating, shall be equal to or less than Leakage Class 6. Leakage testing may be limited to representative sections of the duct system but in no case shall such tested sections include less than 25 percent of the total installed duct area for the designated pressure class. | Mechanical attachments approved:<br><br>1. Continuous welds<br><br>Round metal ducts shall be mechanically fastened by means of at least three sheet-metal screws or rivets equally spaced around the joint. [1] | |
| **Plastic duct** | See Section 603.8.3. | Joints between plastic ducts and plastic fittings shall be made in accordance with the manufacturer's installation instructions. | **ASTM D 2412** |
| **Fibrous glass duct, rigid.** | All joints, seams and duct wall penetrations between sections of duct and between duct and other distribution system components | Mechanically fastened per standard to secure the sections independent of the closure system(s). | NAIMA Fibrous Glass Duct Construction |

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| | shall be sealed with<br><br>closure systems as described in Section 603.1.7:<br><br>1. Heat-activated tapes.<br><br>2. Pressure-sensitive tapes.<br><br>3. Mastics or mastic-plus-embedded fabric systems. | Attachments of ductwork to air-handling equipment shall be by mechanical fasteners in accordance with Section 603.1.1. Where access is limited, two fasteners on one side shall be acceptable. | Standards.<br><br>UL 181<br><br>UL 181A |
| **Flexible duct systems, nonmetal.**<br><br>**Duct core to duct fitting** | All duct collar fittings shall have a minimum 5/8 inch (16 mm) integral flange for sealing to other components and a minimum 3-inch (76 mm) shaft for insertion into the inner duct core.<br><br>Flexible ducts having porous inner cores shall not be used.<br><br>**Exception:** Ducts having a nonporous liner between the porous inner core and the outer jacket. Fastening and sealing requirements shall be applied to such intermediate liners.<br><br>The reinforced lining shall be sealed to the duct fitting using one of the following sealing materials which conforms to the approved closure and mechanical attachment requirements of Section 603.1.7:<br><br>1. Gasketing.<br><br>2. Mastic, mastic-plus-embedded fabric, or mastic ribbons.<br><br>3. Pressure-sensitive tape.<br><br>4. Aerosol sealants, provided that their use is consistent with UL 181. | Flexible nonmetal ducts shall be joined to all other air distribution system components by either terminal or intermediate fittings. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C.<br><br>The reinforced core shall be mechanically attached to the duct fitting by a drawband installed directly over the wire-reinforced core and the duct fitting. The duct fitting shall extend a minimum of 2 inches (51 mm) into each section of duct core. When the flexible duct is larger than 12 inches (303 mm) in diameter or the design pressure exceeds 1-inch water gauge, the drawband shall be secured by a raised bead or indented groove on the fitting. | UL 181<br><br>UL 181B<br><br>ADC FDPIS |

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| **Duct outer jacket to duct collar fitting**<br><br>**Duct collar fitting to rigid duct** | The outer jacket of a flexible duct section shall be secured at the juncture of the air distribution system component and intermediate or terminal fitting in such a way as to prevent excess condensation. The outer jacket of a flexible duct section shall not be interposed between the flange of the duct fitting and the flexible duct, rigid fibrous glass duct board, or sheet metal to which it is mated.<br><br>The duct collar fitting's integral flange shall be sealed to the rigid duct board or sheet metal using one of the following closure systems/materials which conforms to the approved closure and mechanical attachment standards of Section 603.1.7:<br><br>1. Gasketing.<br><br>2. Mastic or mastic-plus-embedded fabric systems.<br><br>3. Mastic ribbons when used to attach a duct collar to sheet metal.<br><br>4. Pressure-sensitive tape.<br><br>5. Aerosol sealants, provided that their use is consistent with UL 181. | The duct collar fitting shall be mechanically attached to the rigid duct board or sheet metal by appropriate mechanical fasteners, either screws, spin-in flanges, or dovetail flanges. | |
| **Terminal and intermediate fittings.**<br><br>**Fittings and joints between dissimilar duct types** | Approved closure systems shall be as designated by air distribution system component material type in Section 603.1.7.<br><br>**Exception:** When the | | |

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| **Terminal fittings and air ducts to building envelope components** | components of a joint are fibrous glass duct board and metal duct, including collar fittings and metal equipment housings, the closure systems approved for fibrous glass duct shall be used.<br><br>Terminal fittings and air ducts which penetrate the building envelope shall be mechanically attached to the structure and sealed to the envelope component penetrated and shall use one of the following closure systems/materials which conform to the approved closure and mechanical application requirements of Section 603.1.7:<br><br>1. Mastics or mastic-plus-embedded fabrics.<br><br>2. Gaskets used in terminal fitting/grille assemblies which compress the gasket material between the fitting and the wall, ceiling or floor sheathing. | | |
| **Air-handling units.** | Air-handling units located outside the conditioned space shall be sealed using approved closure systems described in Section 603.1.7 for metallic ducts. | All air-handling units shall be mechanically attached to other air distribution system components. | |
| **Return plenums.** | Building cavities which will be used as return air plenums shall meet Section 603.1.8 and shall be lined with a continuous air barrier made of durable nonporous materials. All penetrations to the air barrier shall be sealed with a suitable long-life mastic material.<br><br>**Exception:** Surfaces between the plenum and conditioned spaces from which the return/mixed air is drawn.<br><br>Roof decks above building cavities used as a return air | | |

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| | plenum shall be insulated to at least R-19. | | |
| **Mechanical closets.** | All joints between the air barriers of walls, ceiling, floor and door framing and all penetrations of the air barrier shall be sealed to the air barrier with approved closure systems. Through-wall, through-floor and through-ceiling air passageways into the closet shall be framed and sealed to form an air-tight passageway.<br><br>**Exception:** Air passageways into the closet from conditioned space that are specifically designed for return air flow.<br><br>The following air barriers are approved for use in mechanical closets:<br><br>1. One-half-inch-thick (12.7 mm) or greater gypsum wallboard, taped and sealed.<br><br>2. Other panelized materials having inward facing surfaces with an air porosity no greater than that of a duct product meeting Section 22 of UL 181 which are sealed on all interior surfaces to create a continuous air barrier. | The following closure systems are approved for use in mechanical closets:<br><br>1. Gypsum wallboard joint compound over taped joints between gypsum wallboard panels.<br><br>2. Sealants complying with the product and application standards of ths table for fibrous glass ductboard.<br><br>3. A suitable long-life caulk or mastic compliant with the locally adopted mechanical code for all applications. | |
| **Enclosed support platforms in unconditioned spaces.** | Enclosed support platforms located between the return air inlet(s) from conditioned space and the inlet of the air-handling unit or furnace, shall contain a duct section constructed entirely of rigid metal, rigid fibrous glass duct board, or flexible duct which is constructed and sealed according to the applicable requirements of this table and insulated according to the requirements of Section 503.2.7.1 of the Florida Building Code, Energy Conservation.<br><br>1. No portion of the building | | |

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| | structure, including adjoining walls, floors and ceilings, shall be in contact with the return air stream or function as a component of this duct section.<br><br>2. The duct section shall not be penetrated by a refrigerant line, chase, refrigerant line, wiring, pipe or any object other than a component of the air distribution system.<br><br>3. Through-wall, through-floor and through ceiling penetrations into the duct system shall contain a branch duct fabricated of rigid fibrous glass duct board or rigid metal and shall extend to and be sealed by both the duct section and the grille side wall surface. | The branch duct shall be fabricated and attached to the duct insert in accordance with requirements for the duct type used. | |

[1] Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.

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| **Date Proposal Submitted** | 3/23/2010 | **Section** | 603.11 |
| **Chapter** | 6 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Retain base code (IMC) language to provide direction for furnace connections.

**Rationale**

Provisions for furnace connections are needed in the code.

**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**

none

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

none

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

Does not degrade the code.

~~**603.11 Furnace connection. Reserved.**~~

**603.11 Furnace connections.** Ducts connecting to a furnace shall have a clearance to combustibles in accordance with the furnace manufacturer's installation instructions.

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| **Date Proposal Submitted** | 3/23/2010 | **Section** | 603.14 |
| **Chapter** | 6 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Retain base code (IMC) language. Reference to 603.7 is incorrect.

**Rationale**

Correct reference to appropriate code section.

**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**

none

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

None

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

Does not degrade anything.

~~**603.14 Location.** Ducts shall not be installed in or within 6 inches (152 mm) of the earth, except where such ducts comply with Section 603.7.~~

**603.14 Location.** Ducts shall not be installed in or within 4 inches (102 mm) of the earth, except where such ducts comply with Section 603.8.

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| **Date Proposal Submitted** | 3/25/2010 | **Section** | 603.4.3 |
| **Chapter** | 6 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Robert Cochell | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Make Code consistant with residential duct code criteria

**Rationale**

Make Code consistant with residential duct code criteria

**Fiscal Impact Statement**

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

None - make code same residential and commercial

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

One standard

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

One standard

**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**

yes

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

no

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

no

**603.4.3 ~~7~~ Rigid duct penetrations.** 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 and ducts penetrating the walls or ceilings separating a dwelling from a private garage shall be continuous and constructed of a minimum 26 gage [0.0187 inch (0.4712 mm)] galvanized sheet metal, 1 inch (25 mm) minimum rigid nonmetallic Class 0 or Class 1 duct board, or other approved material 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 Florida ~~International~~ Building Code, Building.

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| **Date Proposal Submitted** | 3/23/2010 | **Section** | 606.2 |
| **Chapter** | 6 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Retain base code language.

**Rationale**

Base code provides same or better level of protection

**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**

None

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

none

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

does not degrade the code.

~~**606.2 Where required.** Smoke detectors shall be installed where indicated in Sections 606.2.1 through 606.2.3 and NFPA 90A.~~

~~**606.2.1 Supply air systems. Change to read as shown.**~~

~~**606.2.1 Supply air systems.** Smoke detectors shall be installed in supply air systems with a design capacity greater than 2,000 cfm (0.9 m3/s), in the supply air duct.~~

~~**Exception:** Smoke detectors are not required in the supply air system where the space served by the air distribution system is protected by a system of area smoke detectors in accordance with the Florida Fire Prevention Code. The area smoke detector system shall comply with Section 606.4.~~

~~**606.2.2 Common supply, return air and supply air systems. Change to read as shown.**~~

~~**606.2.2 Common supply, return air and supply air systems**. Where multiple air-handling systems share common supply or return air ducts or plenums with a combined design capacity greater than 2,000 cfm (0.9 $m^3$/s), the return air **and** supply air system shall be provided with smoke detectors in accordance with Section 606.2.1.~~

~~**606.2.3 Return and supply risers. Change to read as shown.**~~

~~**606.2.3 Return and supply risers**. Where return air and supply air risers serve two or more stories and are part of a return air and supply air system having a design capacity greater than 15,000 cfm (7.1 m^3/s), smoke detectors shall be installed at each story. Such smoke detectors shall be located upstream of the connection between the return air riser and any air ducts or plenums and between the air supply source and the first branch or take-off to the areas served.~~

**606.2 Where required.** Smoke detectors shall be installed where indicated in Sections 606.2.1 through 606.2.3.
**Exception:** Smoke detectors shall not be required where air distribution systems are incapable of spreading smoke beyond the enclosing walls, floors and ceilings of the room or space in which the smoke is generated.

**606.2.1 Return air systems.** Smoke detectors shall be installed in return air systems with a design capacity greater than 2,000 cfm (0.9 $m^3$/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 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~~ Florida Fire Prevention Code. The area smoke detection system shall comply with Section 606.4.

**606.2.2 Common supply and return air systems.** Where multiple air-handling systems share common supply or return air ducts or plenums with a combined design capacity greater than 2,000 cfm (0.9 $m^3$/s), the return air system shall be provided with smoke detectors in accordance with Section 606.2.1.
**Exception:** Individual smoke detectors shall not be required for each fan-powered terminal unit, provided that such units do not have an individual design capacity greater than 2,000 cfm (0.9 $m^3$/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.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 606.4 |
| **Chapter** | 6 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Retain base code (IMC) language

**Rationale**

Base code provides more clarity and the same or better level of protection

**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**

None

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

None

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

Does not degrade the code.

**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.

-

**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.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 918.6 |
| **Chapter** | 9 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Retain base code (IMC) language. Section 918 is Titled “Forced-Air Warm-Air Furnaces not “Mechanical Systems”

**Rationale**

Base code provides the correct reference to equipment type.

**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**

None

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

None

**Requirements**

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

None

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

Strengthen the codemaking correcting refence to equipment type.

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

Does not descriminate against anything.

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

Does not degrade the code.

~~**918.6 Prohibited sources.** Outside or return air for a forced-air mechanical system shall not be taken from the following locations:~~

~~[Locations: No change]~~

**918.6 Prohibited sources.** Outdoor or return air for a forced-air heating system shall not be taken from the following locations:

[Locations: No change]

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 4/2/2010 | **Section** | 1001.1 |
| **Chapter** | 10 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | george taylor | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | Yes |

**Related Modifications**

**Summary of Modification**

helps mechanical and boiler inspectors identify potentially unsafe boiler rooms,due to high levels of carbon monoxide.limit carbon monoxide in boiler rooms to a maximum of 50 ppm, as per OSHA guidelines.

**Rationale**

to promote life safety in boiler rooms due to carbon monoxide leaks

**Fiscal Impact Statement**

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

promotes life safety in boiler rooms.

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

potential boiler shut down due to high and dangerous levels of carbon monoxide.

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

no impact to industry.

**Requirements**

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

promotes life safety in boiler rooms.

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

improves the code.

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

does not discriminate to any of the above.

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

does not degrade the code.

**Alternate Language**

M4396-A2

**Proponent** george taylor **Submitted** 4/27/2010 **Attachments** Yes

**Rationale**

Original rational remains good.

**Fiscal Impact Statement**

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

see original proposal.

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

see original proposal.

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

see original proposal.

**Requirements**

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

see original proposal.

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

see original proposal.

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

see original proposal.

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

see original proposal.

**SECTION 1001 GENERAL**

**1001.1 Scope.** This chapter shall govern the installation, alteration and repair of boilers, water heaters and pressure vessels.

**Exceptions:**

1. Pressure vessels used for unheated water supply.
2. Portable unfired pressure vessels and Interstate Commerce Commission containers.
3. Containers for bulk oxygen and medical gas.
4. Unfired pressure vessels having a volume of 5 cubic feet (0.14 $m^3$) or less operating at pressures not exceeding 250 pounds per square inch (psi) (1724 kPa) and located within occupancies of Groups B, F, H, M, R, S and U.
5. Pressure vessels used in refrigeration systems that are regulated by Chapter 11 of this code.
6. Pressure tanks used in conjunction with coaxial cables, telephone cables, power cables and other similar humidity control systems.
7. Any boiler or pressure vessel subject to inspection by federal or state inspectors.

8. limit carbon monoxide in boiler rooms to a maximum of 50 ppm.

**1004.2 Installation.** In addition to the requirements of this code, the installation of boilers shall conform to the manufacturer's instructions. Operating instructions of a permanent type shall be attached to the boiler. Boilers shall have all controls set, adjusted and tested by the installer. The manufacturer's rating data and the nameplate shall be attached to the boiler.

Proposed 4396 appears to be in the wrong section. Have proposed a better alternative below that would achieve the same goal.

**1004.2.1 Carbon monoxide testing.** Boilers shall be tested to a maximum level of 50 PPM of carbon monoxide as per OSHA guidelines.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 1003.1 |
| **Chapter** | 10 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Retain base code (IMC) language.

**Rationale**

Base code provides the same level of protection.

**Fiscal Impact Statement**

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

Nnone

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

None

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

None

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

Does not degrade the code.

~~**1003.1 General**. All pressure vessels shall bear the label of an approved agency and shall be installed in accordance with the manufacturer's installation instructions. Pressure vessels shall be designed and stamped per ASME Boiler and Pressure Vessel Code Section VIII Division 1, Division 2 or Division 3~~

**1003.1 General.** All pressure vessels shall be in accordance with the ASME Boiler and Pressure Vessel Code, shall bear the label of an approved agency and shall be installed in accordance with the manufacturer's installation instructions.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/18/2010 | **Section** | 1006.6 |
| **Chapter** | 10 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Ben Bentley | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

3603, 3647, 3648

**Summary of Modification**

Add exception to this section of code for a solar system that can have multiple PRV's. Discharging a 1/2" relief valve device in the solar loop into thie T&P tank discharge should be acceptable.

**Rationale**

Maximum discharge flow through all the discharge piping can not be more than the maximum discharge of the largest relief device discharge size. Section M2301.2.8 requirment is the only reason a pressure relief device must be installed in the collector loop. If this relief device opens only a cup of water is discharged. Therefore, discharging a 1/2" relief device in the solar loop into the T&P tank discharge meets all discharge requirments.

**Fiscal Impact Statement**

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

None, easily recognized.

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

None

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

None

**Requirements**

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

Meets all requirments like the discharge from a T&P valve.

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

Provides equivalent products at a lower cost to the consumer.

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

No

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

No

**1006.6 Safety and relief valve discharge.** Safety and relief valve discharge pipes shall be of rigid pipe that is approved for the temperature of the system. The discharge pipe shall be the same diameter as the safety or relief valve outlet. Safety and relief valves shall not discharge so as to be a hazard, a potential cause of damage or otherwise a nuisance. High-pressure-steam safety valves shall be vented to the outside of the structure. Where a low-pressure safety valve or a relief valve discharges to the drainage system, the installation shall conform to the Florida Building Code, Plumbing.

Exception: direct solar water heating system relief valve(s) may discharge directly on the roof.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/23/2010 | **Section** | 1107.2.1 |
| **Chapter** | 11 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

retain base code (IMC) language.

**Rationale**

Base code provides the same level of protection.

**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**

None

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

None

**Requirements**

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

None

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

No change

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

Does not discriminate against anything.

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

Does not degrade the code.

~~**1107.2.1 Piping in concrete floors.** Piping installed in or beneath concrete floors shall be encased in pipe duct. Where piping passes through concrete or masonry walls, ceilings, floors or beams, such piping shall be provided with sleeves or thimbles which shall be at least 3/8 inch (9.5 mm) larger than the outside diameter of the piping plus the insulation. All voids between piping and casing shall be adequately enclosed with an approved material.~~

**1107.2.1 Piping in concrete floors.** Refrigerant piping installed in concrete floors shall be encased in pipe ducts. The piping shall be isolated and supported to prevent damaging vibration, stress and corrosion.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/18/2010 | **Section** | 1402.2 |
| **Chapter** | 14 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Ben Bentley | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Water heaters and/or solar storage tank-water heater combinations are considered to be solar equipment. An execption should be made for the solar water heater since no one expects it to be raised 6 feet off the finished floor.

**Rationale**

It is not reasonable to expect a water heater to be raised 6 feet above the finished floor.

**Fiscal Impact Statement**

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

I see no impact to the local building department as it would be business as usual.

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

Nothing that they don't already have with a standard water heater.

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

Allows industry to go about business as usual without being conserned about elevating tanks that can weigh over 800 pounds.

**Requirements**

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

The impact is no different than a standard water heater.

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

Helps the code to sound reasonable without trying to impose restrictions on solar only tanks.

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

No, it does not discriminate and allows solar water heaters to be installed like standard water heaters.

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

No, improves it by making it sound reasonable.

**1402.2 Protection of equipment.** Solar equipment exposed to vehicular traffic shall be installed not less than 6 feet (1829 mm) above the finished floor.

**Exception:** This section shall not apply to the water heater or where other equipment is protected from motor vehicle impact. ~~where the equipment is protected from motor vehicle impact~~.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/31/2010 | **Section** | 1402.4.1 |
| **Chapter** | 14 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Pate Lisa | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Solar collectors mounted above the roof.

**Rationale**

Installation of rack system to be consistent with Florida Building Code, Building Chapter 15 requirements.

**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**

No connection.

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

Strengthens and improves code.

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

Does not discriminate.

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

Does not degrade.

1402.4.1 Collectors mounted above the roof.

When mounted on or above the roof covering, the collector array and supporting construction shall be constructed of noncombustible materials or fire-retardant-treated wood conforming to the Florida Building Code, Building to the extent required for the type of roof construction of the building to which the collectors are accessory. Sealing of or adhering of such system must be in accordance with the Florida Building Code, Building Chapter 15 requirements.

NO CHANGE TO REMAINING TEXT

# M3391

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 1/7/2010 | **Section** | 1402.5.1 |
| **Chapter** | 14 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Ben Bentley | **General Comments** | No |
| **Attachments** | Yes | **Alternate Language** | No |

**Related Modifications**

3389

**Summary of Modification**

FSEC clearly shows a PRV only for the solar loop in manuals and approved systems. FSEC is correct. Code needs to show T&P for tank and PRV for solar loop.

**Rationale**

FSEC (The Florida Solar Energy Center) clearly states that a PRV (pressure relief valve) not a P&T (pressure and temperature relief valve) can be installed to protect the component parts in an isolated solar loop. See attachment for further details.

**Fiscal Impact Statement**

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

I see no impact to the local building departments. Local building departments are requiring P&T valves because they believe that the P&T is a stricter code requirement.

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

Negative impact - none. Positive impact - the property owner will not be required to pay for service calls, labor and materials that would have otherwise been necessary if a P&T, rather that a PRV, had been installed due to premature valve failure.

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

No impact to the solar industry since they have been installing PRV's on the solar loop for the past 20 years.

**Requirements**

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

No trucks traveling to do service calls - saftey. No 140 degree water spilling off roof when it should be going back into the tank. No dripping of water off roof due to temperature portion of valve. No roof stains, no replacement parts.

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

Product is more than equivalent in all ways, provides a more service free system.

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

No, a PRV instead of a P&T .

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

No, it improves the efficiency and durablility of the solar system.

**1402.5 Equipment.** The solar energy system shall be equipped in accordance with the requirements of Sections 1402.5.1 through 1402.5.4.

**1402.5.1 Pressure and temperature.** Solar energy system components containing pressurized fluids shall be protected against pressures and temperatures exceeding design limitations with a pressure and/or temperature relief valve. Each section of the system in which excessive pressures are capable of developing shall have a relief device located so that a section cannot be valved off or otherwise isolated from a relief device. Relief valves shall comply with the requirements of Section 1006.4 and discharge in accordance with Section 1006.6.

Solar Codes
M2301.2.3 (P&T Relief)
1402.5.1
Direct Pumped Systems Fig. #1, Fig. #2
Indirect Pumped Systems Fig. #3, Fig. #4
FSEC Manuals

-M2301.2.3 Pressure and Temperature Relief
System components containing fluids shall be protected with pressure and temperature-relief valves. Relief devices shall be installed in sections of the system so that a section of a system cannot be valved off or isolated from a relief device.
Comments: Sentence #1 – Very poor wording (system components could be a pump or an air vent). The second sentence makes no sense and is probably an oversight or misprint. The statement found on pages 3-18 (FSEC Solar Manual) makes more sense "By code, a pressure relief valve is required in any portion of the system that can be isolated that contains a pressure producing fixture." So, I would suggest M2301.2.3 – 1) Pressure and Temperature Relief – Pressure Relief Protection
1. Pressure and temperature relief – A pressure and temperature relief device must/shall be installed on the solar storage tank/water heater combination because over temperature or over pressurization could pose a safety concern.
2. Pressure relief protection – pressure relief protection is required in any portion of the system that can be isolated that contains a pressure producing fixture (solar collector). Pressure relief protection within the solar loop for direct potable water systems can be installed on the roof, near the collectors, discharge port pointed down directly to roof, no more than 1'-0" off roof without discharge connection since relief will only discharge a cup of water since water loop is isolated. Indirect relief discharge shall be discharged ……. or into a suitable container.
Comments: 1) Pressure relief valves
2) FSEC's "Solar Thermal Manual" manuals state the proper usages of relief only verses P&T valves. See 2-23 & 24 and 3-18 (copies attached).
3) Note that the collector valves, installed properly, are rated above the temp setting of a P&V valve.
4) 13-612.1.ABC.3.4 Solar Water Heating Systems
Suggestion: Change the wording or make building officials aware of sentence, Collectors in installed solar water heating systems (add the word, generally) should meet the following criteria:
1.-
2.-
There are viable exceptions-
Good topic for CE.
5) 1402.5.1 a.) Pressure and temperature – my first note is that .1, .2, .3 and .4 are referring to indirect systems, but it never says such.

b.) temp/pressure, temp & pressure wording needs
to be straightened out. This section comes closer
to stating what M2301.2.3 should express.
Chapter 23: Solar Systems (2004 FBC, Residential, Commentary)
1) M2301.2.3 – P&T relief – suggest total wording revision and total wording revision on commentary – comment – pipes do not burst due to temp – plastic pipes melt, flat plates do not normally heat to 200 degrees on a freezing winter day. The entire explanation is worded poorly. Ex: A working solar flat plate system will generally cease to produce energy at about 170 degrees in the summer even with extended non usage (vacation). On a freezing winter day, 130 degree tank temperature from the sun is considered good.
Chapter 23: Direct Pumped Systems
Figure 1 – picture of direct system
Suggestion – Since that picture came from FSEC, the drawing, not the yellow wording, is correct. Notice that the tank P/T and the collector PRV. Note – pictures in Figure 2-6 on the following pages show exactly the same thing.
Alternative materials and methods application – how do we proceed? When one looks at the above information, there should be a strong and convincing argument that a roof PRV is superior in safety and durability. Why? Safety – valve opening will occur 20 times less. All other properly installed components are designed to take temperatures in excess of the P&T. PRV is most stringent in cost. FSEC's manuals always show and verbalize PRV's only within the collector loop. Temperature never pops the valve when the system is isolated, it is always pressure. CE video (7 hours) indicates this. The relaxed gel in the probe causes premature openings and coupled with spring tension weakening the roof valve, if P&T, will open at below 150 degrees, causing daily spillage on roof. PRV is the only way to go.

FLORIDA SOLAR ENERGY CENTER®

*Creating Energy Independence*

## Resources - Solar Thermal Manual

This is the manual to be used in the State of Florida's Solar Contractor Test

**Design and Installation & Repair and Maintenance**

The intent of this manual is to equip the reader with the knowledge and skills needed to design, install, operate and maintain the most common types of solar water heating systems.

The manual presents an overview of solar thermal applications, provides basic information on the principles of solar energy, reviews solar thermal technologies, and provides detailed instruction on the safe, efficient installation of solar water heating and pool heating systems. The manual is divided into six sections, with each separated into individual modules.

The manual is broken down into various sections. For ease of downloading, these sections are provided below in PDF format. Go to Adobe© Acrobat© Reader™ to obtain a free version of the Reader™ that will enable you to open PDF files. These are large files, so be patient during the download.

Section 1: Solar Concepts provides an introduction, table of contents, and a basic understanding of solar thermal concepts.

Section 2: Solar Water Heating Systems focuses on what are commonly called solar domestic hot water systems, which heat water.

Section 3: System Installation covers the steps involved in installing a solar water heating system.

Section 4: Troubleshooting presents structured methods to follow in diagnosing and correcting solar water heating system problems.

Section 5: Solar Swimming Pool Heating Systems is devoted to solar systems that provide heat for swimming pools.

The Appendix includes the following

- Crome Dome Collector Siting Aid
- FSEC Simplified Sizing Procedures for Solar Domestic Hot Water Systems
- Electric Water Heater Circuitry
- Volt-Ohmmeter (VOM) or Multimeter Operation
- Solar System Flow Rates
- Tools for Service and Repair

Sec #2

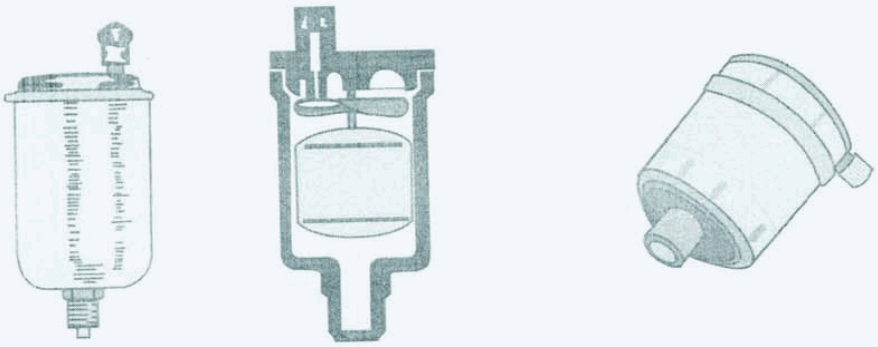


Figure 25 Air vent

## TEMPERATURE-PRESSURE RELIEF VALVE

A temperature-pressure relief valve is also called a pressure-temperature relief valve or P&T valve or T&P valve. These names are used interchangeably in the industry. This valve (Figure 26) protects system components from excessive pressures and temperatures. A pressure-temperature relief valve is always plumbed to the solar storage (as well as auxiliary) tank. In thermosiphon and ICS systems, where the solar tanks are located on a roof, these tanks may also be equipped with a temperature-pressure relief valve since they are in some jurisdictions considered storage vessels. These valves are usually set by the manufacturer at 150 psi and 210° F. Since temperature pressure relief valves open at temperatures below typical collector loop operating conditions, they are not commonly installed in collector loops. (See pressure relief valves below.) Temperature-pressure relief valves located inside a building must drain to the outside. If uncertain, follow local code requirements.

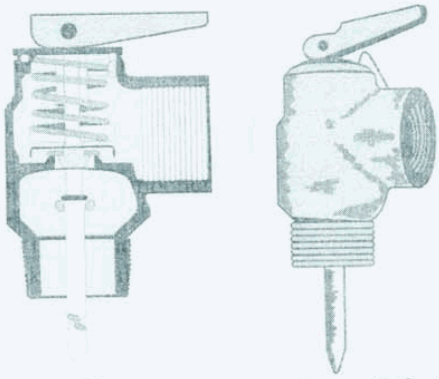


Figure 26 Pressure-temperature relief valve

Sec #2



## PRESSURE RELIEF VALVE

A pressure relief valve (Figure 27) protects components from excessive pressures that may build up in system plumbing. In any system where the collector loop can be isolated from the storage tank, a pressure relief valve must be installed on the collector loop. The pressure rating of the valve (typically 125 psi) must be lower than the pressure rating of all other system components, which it is installed to protect.

The pressure relief valve is usually installed at the collector. Because it opens only with high pressure, it operates less frequently than does a temperature-pressure relief valve. For this reason, it offers a higher degree of reliability and is the valve of choice for protecting the solar collector. Indirect systems typically use pressure-relief valves with even lower psi settings. Pressure relief valves located inside a building should be piped to discharge to a safe location.

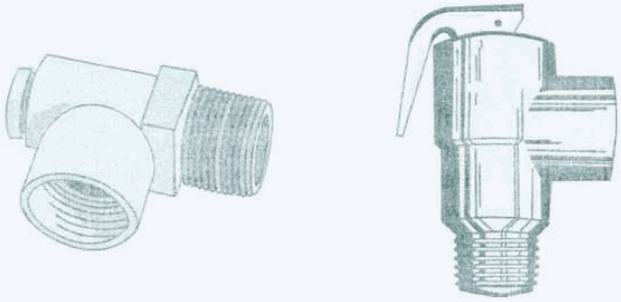


Figure 27 Pressure relief valve

## PRESSURE GAUGE

A pressure gauge (Figure 28) is used in indirect systems to monitor pressure within the fluid loop. In both direct and indirect systems, such gauges can readily indicate if a leak has occurred in the system plumbing.


Figure 28 Pressure gauge

If multiple collector arrays are used, an air vent should be installed on each array. The system must be piped to prevent air traps and allow for gravity draining (Figure 24).

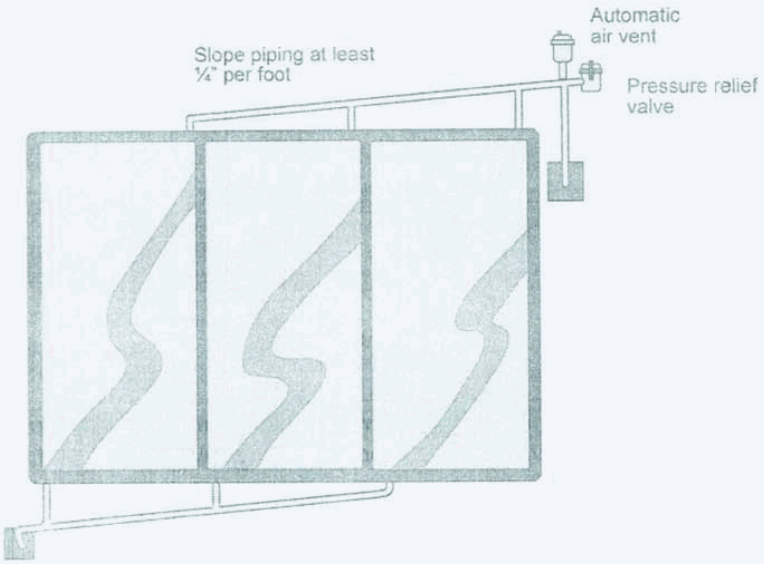


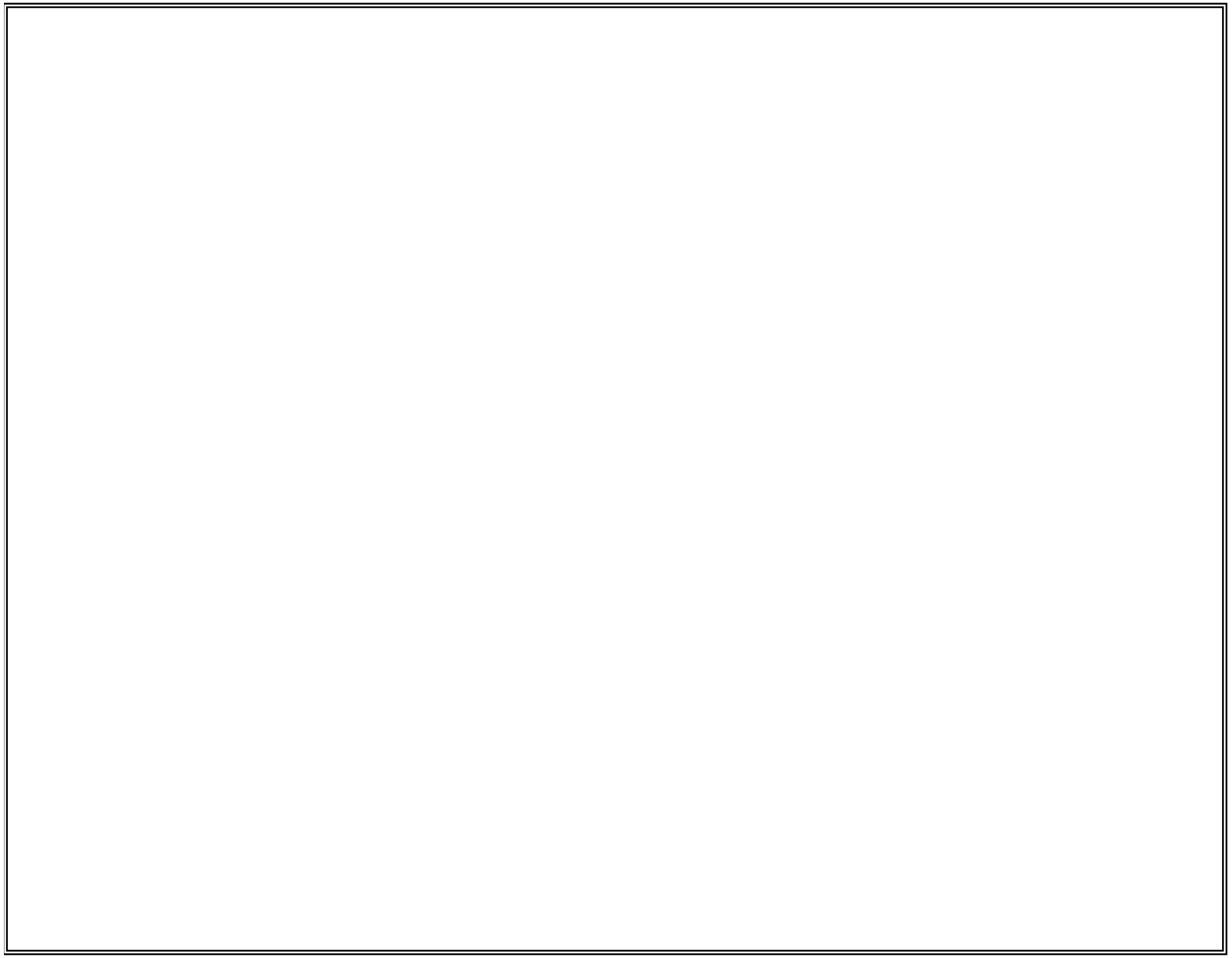

**Figure 24 Piped and vented collector array**

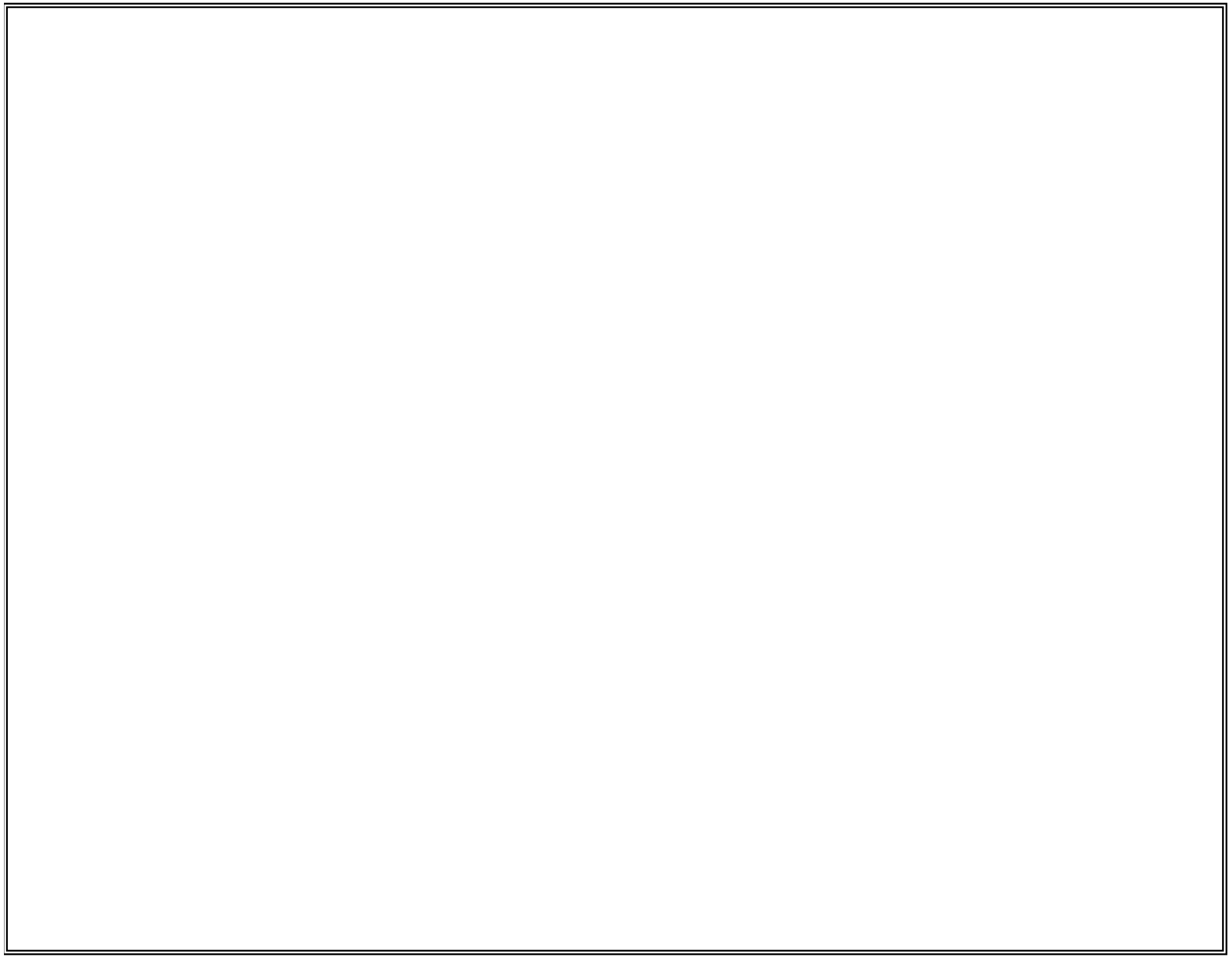
By code, a pressure relief valve is required in any portion of the system that can be isolated that contains a pressure producing fixture. For example, a circulating pump might have isolation valves so it can be removed for maintenance, but it is not considered a pressure producing fixture from the standpoint of the risk of bursting the system, so you don't need a pressure relief valve on this part of the system. However, the collector, or tanks with heater elements (connected or not), and even tankless water heaters are pressure producing fixtures, so if any can be isolated, there must be a pressure relief valve somewhere in that portion of the isolated loop that contain them. Most solar water heaters have the pressure relief valve for the collector loop installed at the collector. Special care should be taken to ensure the hot overflow from this valve does not come into contact with people or pets; some codes specify how this should be accomplished. The discharge pipe must be large enough to safely handle the overflow volume from indirect antifreeze systems, which usually operate at low pressure. Special low-pressure relief valves are often used on these systems.

## Piping Collector Arrays

Cover all roof piping with insulation. Protect the insulation from degradation through exposure to ultra violet (UV) light by completely covering it with UV-resistant paint, or metallic or vinyl tape. Painted insulation will need to be repainted periodically, as the paint will deteriorate over time.

FSEC (The Florida Solar Energy Center) clearly states that a PRV (pressure relief valve) not a P&T (pressure and temperature relief valve) can be installed to protect the component parts in an isolated solar loop. See highlighted sections below on pages 3-18 (FSEC Solar Manual) makes more sense "By code, a pressure relief valve is required in any portion of the system that can be isolated that contains a pressure producing fixture." Local building departments are demanding that a P&T valve be installed. This requirement forces local contractors to install a device not recommended nor APPROVED by FSEC or the manufacturer of the system. See attached FSEC system approval sheet with isometric drawing indicating a pressure relief valve "ONLY" installed in the solar loop, (see component legend, item number 10, PRV, highlighted in yellow). The proposed code change above will allow the contractor to install per FSEC and manufacturers recommendations. FSEC is correct in that a PRV only should be installed in the loop. Installing a PRV meets all safety and durability requirements of the code and eliminates servicing the system which would be required if a P&T, not a PRV is installed in the solar loop.





# FLORIDA SOLAR ENERGY CENTER

1679 Clearlake Road, Cocoa, FL 32922-5703 (321) 638-1000

## Approved Solar Energy System

FSEC S1175 Sep-94

Revised Mar-10

| DISTRIBUTOR | SYSTEM |
|---|---|
| Solar Hydronics Corp.<br>1423 Gunn Highway<br>Odessa, FL 33556 | 0-80-40 |

The system listed below was evaluated by the Florida Solar Energy Center (FSEC) in accordance with the Florida Standards Program for Solar Domestic Water and Pool Heating Systems (FSEC-GP-80-7) and was found to meet the minimum standards established by FSEC.

## Description

/ - designates various model suffixes

| Collector | Model | | Units | Total Rating |
|---|---|---|---|---|
| | 1. Amer. Energy Tech. | AE-40 | 1 | 34,400 Btu |
| | 2. Amer. Energy Tech. | MSC-40 | 1 | 33,900 Btu |
| | 3. Solar Hydronics Corp. | SHC-40 | 1 | 34,400 Btu |
| | 4. Amer. Energy Tech. | AE-21 | 2 | 35,200 Btu |
| | 5. Amer. Energy Tech. | MSC-21 | 2 | 34,800 Btu |
| | 6. Solar Hydronics Corp. | SHC-21 | 2 | 35,200 Btu |

| Tank | Model | | Capacity |
|---|---|---|---|
| ☑ Direct | 1. American | SE-62/112-80H-045S | 80 gal. |
| ☐ Int. Heat Exch. | | | |

| Pump | Model | | Power Draw | Rated Power |
|---|---|---|---|---|
| | 1.Taco | 003-BC4 | 51.75 WATTS | 1/40 H.P. |
| | 2. Solar Hydronics Corp. | 003-BC4 | 51.75 WATTS | 1/40 H.P. |
| | 3. Solar Hydronics Corp. | 003-VTBC4 Pump/cntrl | 51.75 WATTS | 1/40 H.P. |

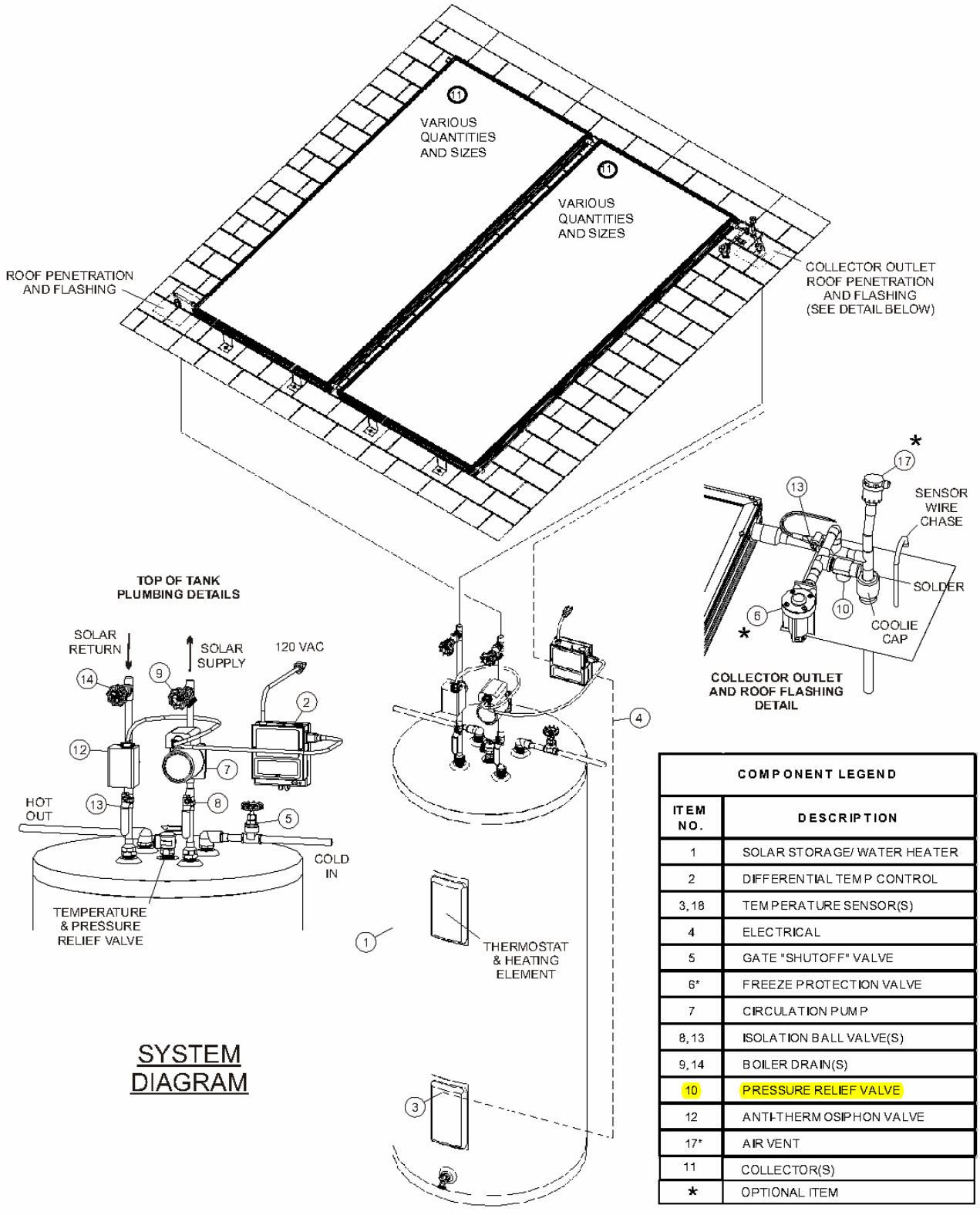
| Controller | Model | |
|---|---|---|
| ☑ Differential Temperature | 1.Independent Energy | CM-30/C-30/GL-30LC0 |
| ☐ Absolute Temperature | 2. Solar Hyrdronics Corp. | SHC-30-LC0 |
| ☐ Thermosiphon | 3. Stecca | TRO-301-1-B-00 |
| ☐ Other _____ | 4. IMC | SOLR-2ELC-10 |
| | 5. Resol | DeltaSol BS/1 |

Freeze Protection by: manual drain, freeze protection valve, and/or automatic recirculation.

| Other | |
|---|---|
| Major Components in addition to above. | 1. Eaton FP-45 Freeze Protection Valve* (optional) |
| | 2. Motorized Check Valve: Honeywell |

If further information is required you may contact the Florida Solar Energy Center at the above address.

# SOLAR WATER HEATING SYSTEM (AC)




## SYSTEM DIAGRAM

| COMPONENT LEGEND | |
|---|---|
| ITEM NO. | DESCRIPTION |
| 1 | SOLAR STORAGE/ WATER HEATER |
| 2 | DIFFERENTIAL TEMP CONTROL |
| 3, 18 | TEMPERATURE SENSOR(S) |
| 4 | ELECTRICAL |
| 5 | GATE "SHUTOFF" VALVE |
| 6* | FREEZE PROTECTION VALVE |
| 7 | CIRCULATION PUMP |
| 8, 13 | ISOLATION BALL VALVE(S) |
| 9, 14 | BOILER DRAIN(S) |
| 10 | PRESSURE RELIEF VALVE |
| 12 | ANTI-THERMOSIPHON VALVE |
| 17* | AIR VENT |
| 11 | COLLECTOR(S) |
| * | OPTIONAL ITEM |

*Collector Mounting*

If multiple collector arrays are used, an air vent should be installed on each array. The system must be piped to prevent air traps and allow for gravity draining (Figure 24).

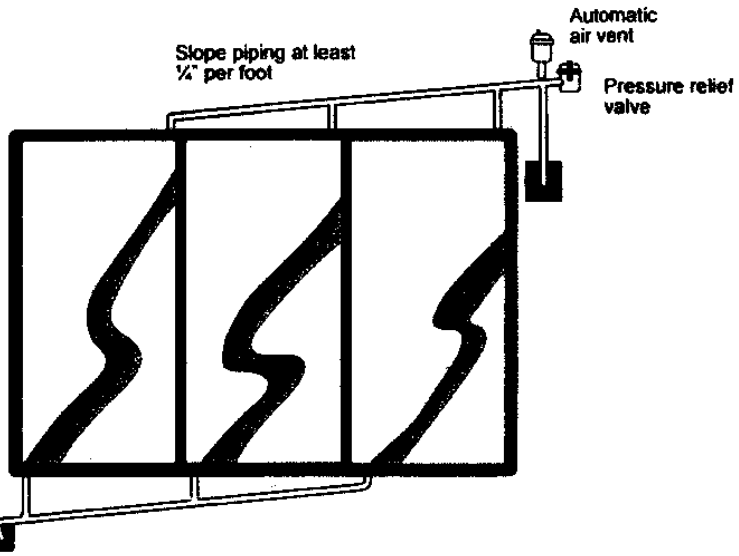



**Figure 24 Piped and vented collector array**

By code, a pressure relief valve is required in any portion of the system that can be isolated that contains a pressure producing fixture. For example, a circulating pump might have isolation valves so it can be removed for maintenance, but it is not considered a pressure producing fixture from the standpoint of the risk of bursting the system, so you don't need a pressure relief valve on this part of the system. However, the collector, or tanks with heater elements (connected or not), and even tankless water heaters are pressure producing fixtures, so if any can be isolated, there must be a pressure relief valve somewhere in that portion of the isolated loop that contain them. Most solar water heaters have the pressure relief valve for the collector loop installed at the collector. Special care should be taken to ensure the hot overflow from this valve does not come into contact with people or pets; some codes specify how this should be accomplished. The discharge pipe must be large enough to safely handle the overflow volume from indirect antifreeze systems, which usually operate at low pressure. Special low-pressure relief valves are often used on these systems.

**Piping Collector Arrays**

Cover all roof piping with insulation. Protect the insulation from degradation through exposure to ultra violet (UV) light by completely covering it with UV-resistant paint, or metallic or vinyl tape. Painted insulation will need to be repainted periodically, as the paint will deteriorate over time.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/18/2010 | **Section** | 1402.5.4 |
| **Chapter** | 14 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Ben Bentley | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

For clarity to distinguish between potable and non potable liquid single phase solar energy systems.

**Rationale**

Where no mistake will be made, by interpertation, to put a direct potable water solar water heating system in the same category as a liquid single phase (non potable indirect) solar energy system.

**Fiscal Impact Statement**

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

None, it only clarifies and reduces confussion as to type of system.

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

None, just for clarification of people who are trying to interpret the code.

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

None, just clarity.

**Requirements**

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

The is none, clarity purposes only.

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

Strenghtens and improves the code by seperating the requirments for direct verses indirect solar systems.

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

None

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

No, it strengthens the understanding of the code by seperation of different types of solar thermal systems.

1402.5.4 Expansion tanks. Non potable liquid single-phase solar energy systems shall be equipped with expansion tanks sized in accordance with Section 1009.

# M3819

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/31/2010 | **Section** | 1402.6 |
| **Chapter** | 14 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Pate Lisa | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

Roof and wall penetrations.

**Rationale**

Make Florida Building Code, Building and Residential consistent and to tie them together.

**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**

No connection.

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

Strengthens and improves code.

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

Does not discriminate.

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

Does not degrade.

M1402.6 Penetrations.

Roof and wall penetrations shall be sealed to prevent entry of water, rodents and insects. Roof penetrations must be in accordance with Florida Building Code, Residential Chapter 23.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 4/1/2010 | **Section** | Referenced Standards |
| **Chapter** | 15 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Amanda Hickman | **General Comments** | No |
| **Attachments** | Yes | **Alternate Language** | No |

**Related Modifications**

Add AMCA Standard 550 to Sections 401.5 & 501.2.2 - Mods 4035 & 4037

**Summary of Modification**

Add AMCA 550 to Referenced Standards

**Rationale**

see attached

**Fiscal Impact Statement**

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

Approval of this modification will have no financial impact to local code enforcement authority.

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

Approval of this modification will have no financial impact to local code enforcement authority.

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

Industries that manufacture louvers will be affected by this modification because they will be required to test to the new standard for wind driven rain.

**Requirements**

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

Yes. It improves the durability and weather resistance of the building envelope during high-wind/rain events.

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

Yes. It facilitates consistency in product performance and capability by requiring testing to a standard that was specifically developed for louvers and specific to the geographic and climatic conditions of Florida.

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

No.

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

It improves the effectiveness and usefulness of the code because the code did not reference a standard that addressed protecting the ventilation openings against wind-driven rain.

# AMCA 550-08 Test Method for High Velocity Wind Driven Rain Resistant Louvers

# AMCA Standard 550-08

## Test Method for High Velocity Wind Driven Rain Resistant Louvers


**AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.**

The International Authority on Air System Components

# AMCA Standard 550-08

## Test Method for High Velocity Wind Driven Rain Resistant Louvers

Air Movement and Control Association International, Inc.
30 W. University Drive
Arlington Heights, Illinois
60004

# AMCA Standards

**Authority**

AMCA Standard 550 was approved by the AMCA Membership on July 26, 2008.

**Copyright**



**Objections**

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Arlington Heights, IL 60004-1893 U.S.A.

AMCA International, Incorporated
c/o Federation of Environmental Trade Associations
2 Waltham Court, Milley Lane, Hare Hatch
Reading, Berkshire, United Kingdom
RG10 9TH

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**Related Publications**

| | |
|---|---|
| ANSI/AMCA Standard 500-L | *Laboratory Methods of Testing Louvers for Rating* |
| AMCA Publication 501 | *Application Manual for Louvers* |
| AMCA Publication 511 | *Certified Ratings Program - Product Rating Manual for Air Control Devices* |
| AMCA Publication 512 | *AMCA Listing Label Program* |
| ANSI/AMCA Standard 540 | *Test Method for Louvers Impacted by Wind Borne Debris* |

# Review Committee

| | |
|---|---|
| **Mike Watz** | **Greenheck Fan Corporation** |
| Mike Astourian | Ruskin Company |
| Dane Carey | United Enertech |
| Randal Geedey | The Airolite Company |
| Eric Gohring | Louvers and Dampers, Inc. |
| Loren Rasmusson | Industrial Louvers, Inc. |
| Bob Van Becelaere | Ruskin Company |
| Bill Vincent | Construction Specialties, Inc. |
| Tim Orris | AMCA International |

# Contents

# AMCA 550-08
# Test Method for High Velocity Wind Driven Rain Resistant Louvers

## 1. Purpose

This standard establishes uniform laboratory test methods and minimum performance ratings for water rejection capabilities of louvers intended to be used in high velocity wind conditions.

## 2. Scope

Tests conducted in accordance with the requirements of this standard are intended to demonstrate the acceptability of the louver for installation in facilities (essential and non-essential) that will remain in operation during a high velocity wind condition and where water infiltration must be kept to manageable amounts.

## 3. Units of Measurement

### 3.1 System of units

SI units (The International System of Units, Le Systéme International d'Unités) [1] are the primary units employed in this standard, with I-P units (Inch-Pound) given as the secondary reference. SI units are based on the fundamental values of the International Bureau of Weights and Measures [1], and I-P values are based on the values of the National Institute of Standards and Technology which are, in turn, based on the values of the International Bureau.

### 3.2 Basic units

The unit of length is the meter (m) or millimeter (mm); I-P units are the foot (ft.) or the inch (in.). The unit of mass is the kilogram (kg); the I-P unit is the poundmass (lbm). The unit of time is either the minute (min) or the second (s). The unit of temperature is either the degree Celsius (°C) or kelvin (K). I-P units are either the degree Fahrenheit (°F) or the degree Rankine (°R). The unit of force is the newton (N); the I-P unit is the pound (lb).

### 3.3 Airflow rate and velocity

#### 3.3.1 Airflow rate

The unit of volumetric airflow rate is the cubic meter per second ($m^3/s$); the I-P unit is the cubic foot per minute (cfm).

#### 3.3.2 Airflow velocity

The unit of airflow velocity is the meter per second (m/s); the I-P unit is the foot per minute (fpm).

### 3.4 Water flow rate

The unit of liquid volume is the liter (L); the I-P unit is the gallon (gal). The unit of liquid flow rate is the liter per second (L/s); the I-P unit is the gallon per minute (gpm).

### 3.5 Dimensionless groups

Various dimensionless quantities appear in the text. Any consistent system of units may be employed to evaluate these quantities, unless a numerical factor is included, in which case, units must be as specified.

### 3.6 Physical constants

The value of standard gravitational acceleration shall be taken as 9.80665 $m/s^2$ (32.174 $ft/s^2$) at mean sea level at 45° latitude [2]. The density of distilled water at saturation pressure shall be taken as 998.278 $kg/m^3$ (62.3205 $lbm/ft^3$) at 20 °C (68°F) [3]. The density of mercury at saturation pressure shall be taken at 13595.1 $kg/m^3$ (848.714 $lbm/ft^3$) at 0 °C (32°F) [3]. The specific weights in $kg/m^3$ ($lbm/ft^3$) of these fluids under standard gravity in a vacuum are numerically equal to their densities at corresponding temperatures.

## 4. Definitions

### 4.1 Louver

A louver is a device comprised of multiple blades, which, when mounted in an opening, permits the flow of air, but inhibits the entrance of other elements.

### 4.2 Essential facilities

Buildings and other structures designated as essential facilities, including, but not limited to, hospitals; other health care facilities having emergency treatment facilities; jails and detention facilities; fire, rescue and police stations, and emergency vehicle garages; designated emergency shelters; communication centers and other facilities required for emergency response; power generating stations; other public utility facilities required in an emergency; and buildings and other structures having critical national defense functions.

### 4.3 Non-essential facilities

All buildings and structures not defined as essential facilities in Section 4.2.

### 4.4 Performance variables

**4.4.1 Water infiltration**
The amount of water passing through a louver during the test.

**4.4.2 Rain fall simulation**
As calculated in Section 7.2.3 and Section 7.2.5.

**4.4.3 Wind stream velocity**
The movement rate of air generated during the test.

## 5. Test Specimen

One 1220 mm x 1220 mm (48 in. x 48 in.) louver shall be submitted for this high velocity wind driven rain test. The same louver, or an identical louver, shall be tested in accordance with the Wind Driven Rain Test detailed in ANSI/AMCA Standard 500-L, run at 22 m/s (50 mph) and 202.4 mm/hr (8 in./hr) of rainfall.

All devices tested shall be products as built, unpainted, clean, degreased, and without additional factory applied coating on the product's surfaces which would enhance water shedding capability. All devices tested shall be in the full open position without a screen across the air passages of the louver.

## 6. Apparatus

### 6.1 Test frame

**6.1.1**
The test frame shall be constructed of CMU blocks with a minimum size of 2.45 m x 2.45 m (8 ft x 8 ft) and a hole as shown in Figure 1 to allow the insertion of the louver.

A catch basin shall be constructed behind the louver, as shown in Figure 1, to catch the water that penetrates the louver.

**6.1.2**
The test frame shall be painted to prevent water from penetrating the test apparatus.

**6.1.3**
The test frame shall be rigidly supported during the test period.

### 6.2 Wind generator

**6.2.1**
The wind generator shall provide a constant wind profile over the entire face of the louver for the specified time period to a maximum wind stream velocity of 49 m/s (110 mph).

**6.2.2**
If the wind generator is unable to provide the required constant profile as determined by wind stream calibration (Section 7.1), air flow from the wind generator shall be directed and smoothed by suitably shaped baffles (see Figure 2).

### 6.3 Water supply

**6.3.1**
Water shall be supplied to the wind stream using a sprinkle pipe system mounted on a movable frame capable of simulating a uniform 223.5 mm/hr (8.8 in./hr) of rainfall over the test specimen. The simulated rainfall and flow meters shall be calibrated, and the water distribution shall be checked as noted in Section 7.2.

### 6.4 Instruments

Calibrations of instruments used in this test shall be maintained in accordance with the manufacturer's definitions.

## 7. Calibration

### 7.1 Wind stream calibration

**7.1.1**
The wind stream velocity shall be measured on a vertical plane grid having dimensions of 2.44 m wide x 1.22 m high (8 ft wide x 4 ft high) and grid dimensions of 610 mm x 610 mm (24 in. x 24 in.), located 610 mm (24 in.) in front of the test frame with the lower 2.44 m (8 ft) dimension in line with the bottom edge of the test frame opening (See Figure 3).

**7.1.2**
The measured wind stream velocity within each grid square shall be within ± 10% of the required axial velocity for each wind speed.

**7.1.3**
Upon completion of the wind stream calibration, the distance from the test frame to the outlet of the wind generator and any necessary baffle configurations shall be noted and maintained while conducting the test as described in Section 8.

### 7.2 Rainfall simulation and flow meter calibration

A maximum of six months prior to conducting the test, the flow meter(s) shall be calibrated using the method described in Section 7.2.1 through Section 7.2.6.

**7.2.1**
Prepare an apparatus to capture any water which would enter the wind stream during an actual test.

**7.2.2**
Commence water insertion for a period of one (1) minute

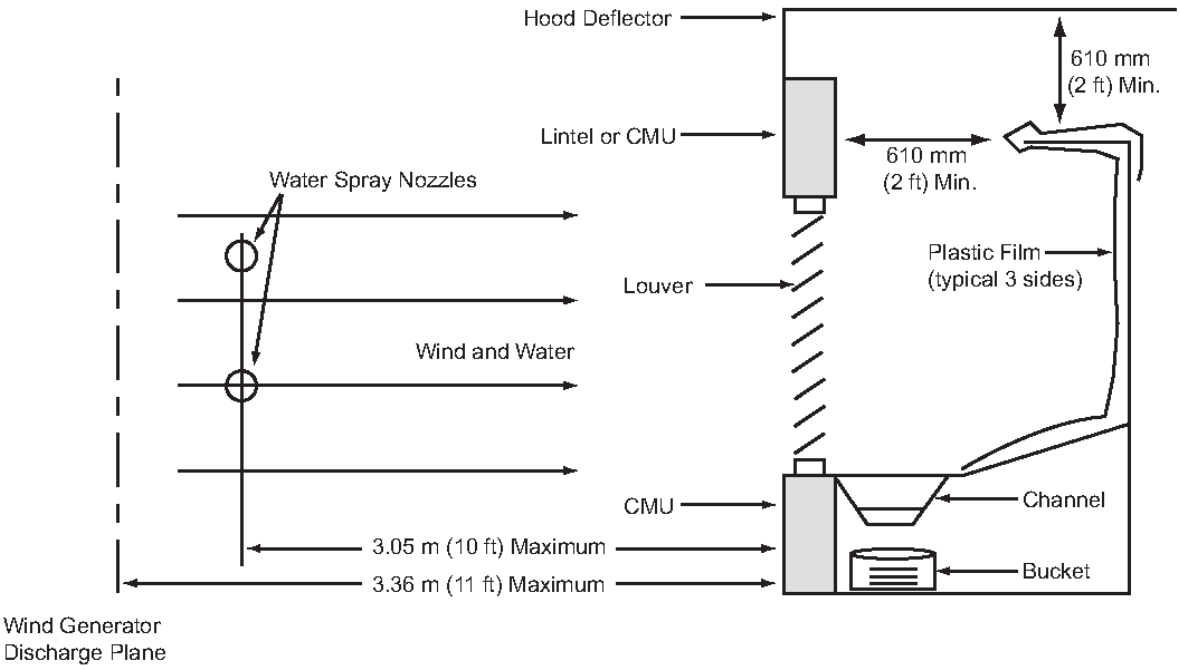


**Figure 1 - High Velocity Wind Driven Rain Test Setup**

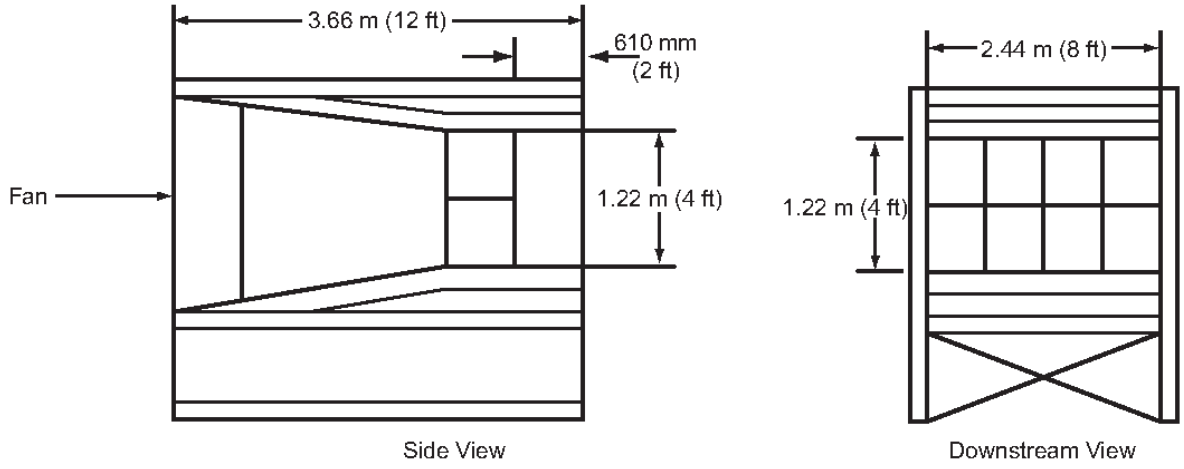


**Figure 2 - Wind Tunnel with Baffles**

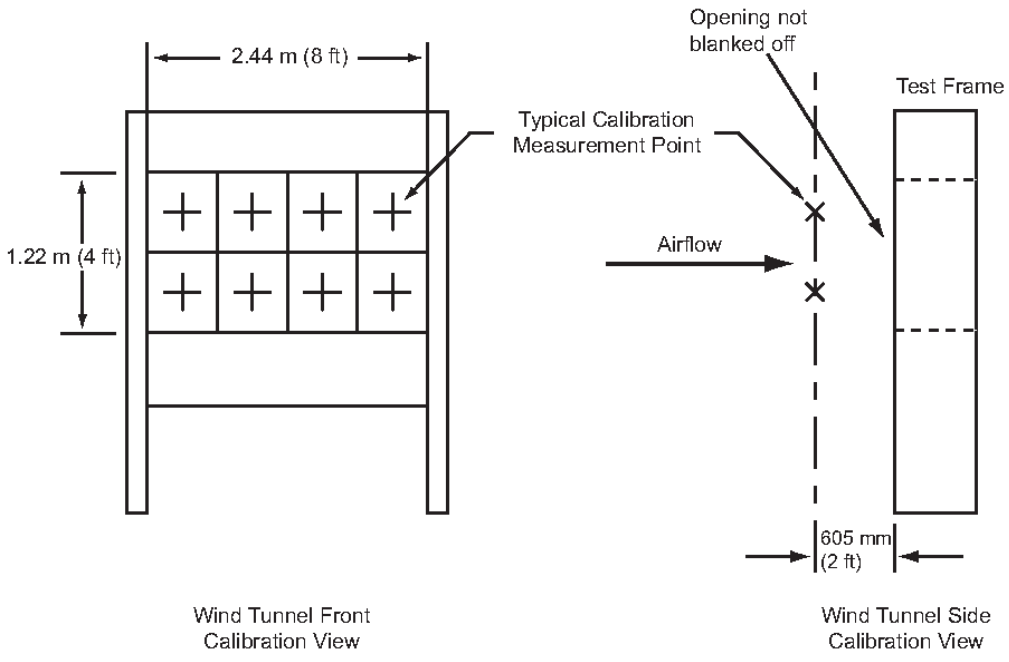


**Figure 3 - Wind Stream Calibration Setup**

and capture the water. Record the flow meter reading (gallons/min) during this process.

**7.2.3**
Convert the flow meter reading to rainfall simulation using the following formula:

$$\left[\frac{\left(\frac{\text{L}}{\text{min}}\right)\times\left(\frac{60\text{ min}}{1\text{ hour}}\right)\times\left(\frac{1{,}000{,}000\text{ mm}^3}{\text{L}}\right)}{4{,}459{,}346\text{ mm}^2}\right]=x\left(\frac{\text{mm}}{\text{hour}}\right)$$

Eqn 7.2.3 SI

$$\left[\frac{\left(\frac{\text{gallons}}{\text{min.}}\right)\times\left(\frac{60\text{ min.}}{1\text{ hour}}\right)\times\left(\frac{231\text{ in.}^3}{1\text{ gallon}}\right)}{6{,}912\text{ in.}^2}\right]=x\left(\frac{\text{in.}}{\text{hour}}\right)$$

Eqn 7.2.3 I-P

**Note**: For Equation 7.2.3 SI and Equation 7.2.3 I-P, 4,459,346 $mm^2$ and 6,912 $in.^2$ refer to the expected projection area of the water that hits the wall, respectively.

**7.2.4**
The quantity of rainfall simulation determined in Section 7.2.3 shall be within ± 5% of the desired rainfall simulation of 223.5 mm/hr (8.8 in./hr).

**7.2.5**
Measure the volume of water ($mm^3$ [$in.^3$]) captured and convert this to rainfall simulation (mm/hr [in./hr]) using the following formula:

$$\left[\frac{\left(\frac{\text{mm}^3}{4{,}459{,}346\text{ mm}^2}\right)}{1\text{ min}}\right]\times\left(\frac{60\text{ min}}{1\text{ hour}}\right)=y\left(\frac{\text{mm}}{\text{hour}}\right)$$

Eqn 7.2.5 SI

$$\left[\frac{\left(\frac{\text{in.}^3}{6{,}912\text{ in.}^2}\right)}{1\text{ min.}}\right]\times\left(\frac{60\text{ min.}}{1\text{ hour}}\right)=y\left(\frac{\text{in.}}{\text{hour}}\right)$$

Eqn 7.2.5 I-P

**Note**: For Equation 7.2.5 SI and Equation 7.2.5 I-P, 4,459,346 $mm^2$ and 6,912 $in.^2$ refer to the expected projection area of the water that hits the wall, respectively.

**7.2.6**
The rainfall simulation determined in Section 7.2.3 ($x$) shall be within ± 5% of the rainfall simulation determined in Section 7.2.5 ($y$).

### 7.3 Water distribution check

The water distribution check over the (1.22 m x 2.44 m [4 ft x 8 ft]) wall surface shall be checked and calibrated every six months using the method outlined herein. The water distribution system must be adjusted so that the water introduced into the wind stream strikes the wall area.

**7.3.1**
Prepare eight 610 mm (24 in.) squares of the absorptive material (i.e. roofing felt) and weigh each sample. From this data, determine the average weight of the samples. As an alternative, depending on the consistency of the weight of the absorptive material, each square used for calibration may be weighed individually.

**7.3.2**
Lay out the eight numbered squares of absorptive material (i.e. roofing felt) as shown in Figure 4. Put the hold-down frame over the squares of absorptive material.

**7.3.3**
Set the wind speed to 15.65 m/s (35 mph) and add water to the windstream at a constant rate, as indicated on the flow meter, until the absorptive material is well wetted, but not so that it is saturated, at which time, the wind and water flow shall be terminated.

**7.3.4**
Remove the hold-down frame from the wall and rapidly weigh the squares of wet absorptive material. Determine the weight of water absorbed by each square sample at the particular wind speed and flow meter setting.

**7.3.5**
No one particular square sample shall exhibit rain fall simulation, measured in weight, greater than or less than 25% of the average weight of all eight squares.

**7.3.6**
Repeat the steps in Sections 7.3.2, 7.3.3, 7.3.4, and 7.3.5 at a wind speed of 31.3 m/s (70 mph).

**7.3.7**
No one particular square sample shall exhibit rain fall simulation, measured in weight, greater than or less than 25% of the average weight of all eight squares.

## 8. Test Procedures

**8.1**
The louver to be tested shall be mounted and sealed as recommended by the manufacturer in the test frame to prevent any ingress of water other than through the louver blades.

**Table 1 - Wind Stream Velocity and Water Spray Intervals for Wind-Driven Rain Resistance Testing**

| Interval # | Wind Speed m/s (mph) | Time (min) | Water Spray |
|---|---|---|---|
| 1 | 15.65 (35) | 15 | On |
| 2 | 0 (0) | 5 | Off |
| 3 | 31.3 (70) | 15 | On |
| 4 | 0 (0) | 5 | Off |
| 5 | 40.2 (90) | 15 | On |
| 6 | 0 | 5 | Off |
| 7 | 49.2 (110) | 5 | On |
| 8 | 0 | 5 | Off |

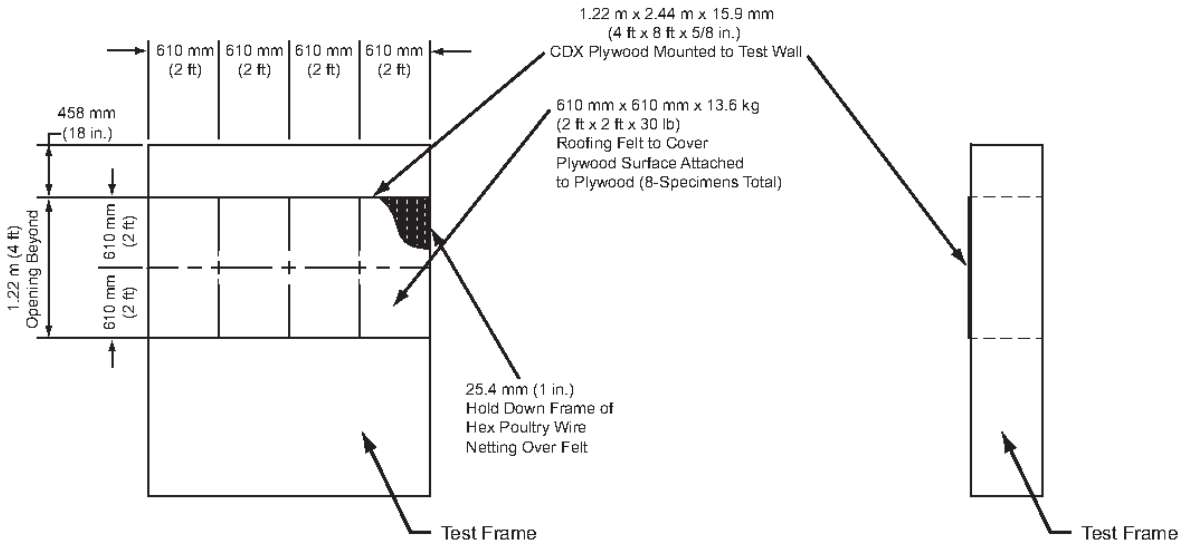


**Figure 4 - Core Area and Rainfall Coverage**

**8.2**
The wind stream velocity intervals shall be conducted as noted in Table 1.

**8.3**
Water shall be added to the wind stream upon commencement of the initial wind stream velocity in an even spray at a rate equal to 223.5 mm/hr (8.8 in./hr) of rainfall over the test specimen. The flow of water shall be measured with a calibrated flow meter during the test procedure to confirm water flow. Water flow shall be stopped and started in conjunction with the air flow intervals noted in Table 1.

**8.4**
The water penetrating the louver at each wind stream velocity shall be collected and measured.

## 9. Report and Results of Test

The test report shall be submitted in its entirety and shall include, at a minimum, the following:

1) The name, address, telephone number, and website address (optional) of the testing laboratory. Evidence of accreditation/certification to perform this test.

2) A unique identification number, with the identification number printed on each page.

3) Consecutive page numbers, with an indication of the total number of pages.

4) The date(s) when the test was performed and the date of the report.

5) The test standard number with the date of issue and an explanation detailing any derivation from the standard.

6) A signature, including titles, and date from both the Professional Engineer authorizing the test report and the lab technician.

7) A description of the louver, including:
   a) the model number
   b) any drawings and photographs of the louver
   c) a detailed report of the method of installation (including fasteners and caulk)

8) Test specimen construction documentation verifying the construction of the test sample.

9) Calibration data and calculations.

10) Detailed observations of any water infiltration and approximate times of water infiltration for each wind stream velocity tested. Observations should include the total volume of water which infiltrated the louver at each test speed.

11) The calculated percentage of water which infiltrated the louver based on the total amount of water sprayed at the test apparatus.

12) A determination of “pass” or “fail” based on whether or not the louver exhibits water infiltration in excess of 1% of the total water sprayed.

13) A video record of the test intervals (see Table 1), which must be made available upon request.

14) Photographs of the louver immediately prior to and subsequent to commencement and termination of the test.

## Annex A
## References (Informative)

[1] *The International System of Units (SI)*
Page, C. H. and Vigoureux, P.
National Bureau of Standards, NBS Special Publication 330, 1972.
(Now known as NIST.)

[2] ibid, p 19.

[3] *ASME Steam Tables*, p 283
American Society of Mechanical Engineers, 1967.

[4] *Checklist #0240 For The Approval of: Louvers (Includes Gable End Louvers)*
Miami-Dade County, Florida

[5] Florida Test Protocol TAS No. 100(A)-95
*Test Procedure for Wind and Wind Driven Rain Resistance and /or Increased Windspeed Resistance of Soffit Ventilation Strip and Continuous or Intermittent Ventilation System Installed at the Ridge Area*

[6] ANSI/AMCA Standard 500-L-07
*Laboratory Methods of Testing Louvers for Rating*

[7] ICC-ES AC85
*Acceptance Criteria for Test Reports*

[8] ICC-ES AC89
*Accreditation Criteria for Testing Laboratories*

## Annex B
## Reason for Two Louver Test Standards (Informative)

The requirement to test the louvers to two test criteria is based upon the need for the louver to perform at two conditions: during normal operation and during a hurricane.

A product could be designed for hurricane or high wind conditions but be unsuitable for normal day to day operation due to its high pressure drop and energy requirements.

**AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.**
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Arlington Heights, IL 60004-1893 U.S.A.
Tel: (847) 394-0150 ▪ Fax: (847) 253-0088
E-Mail : info@amca.org ▪ Web: www.amca.org

The Air Movement and control Association International, Inc. is a not-for-profit international association of the world's manufacturers of related air system equipment primarily, but limited to: fans, louvers, dampers, air curtains, airflow measurement stations, acoustic attenuators, and other air system components for the industrial, commercial and residential markets.

**Reason Statement for AMCA 550**

The ICC Mechanical Technical Committee unanimously approved this exact code change last November at the ICC hearings in Baltimore. In fact, not a single person stood up to speak in opposition to this change. Additionally, no public comments were proposed to this code change in the ICC process, meaning that this change will be on the consent agenda at the ICC Final Action Hearing in May and will be included in the 2012 International Mechanical Code.

AMCA Standard 550-08 *Test Method for High Velocity Wind Driven Rain Resistant Louvers* standardizes uniform laboratory test methods and minimum performance ratings for water rejection capabilities of louvers intended to be used in high velocity wind conditions.

The tests conducted in accordance with the requirements of this standard are intended to demonstrate the acceptability of the louver for installation in facilities (essential and nonessential) that will remain in operation during a high velocity wind condition and where water infiltration must be kept to manageable amounts.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/24/2010 | **Section** | SMACNA |
| **Chapter** | 15 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Ann Stanton | **General Comments** | Yes |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

3654

**Summary of Modification**

Update referenced standard.

**Rationale**

Update to current version of published standard.

**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**

None.

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

Purchase current industry standard.

**Requirements**

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

Yes. Replace updated standard.

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

Yes.

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

No.

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

No.

**General Comment**

M3842-G1

**Proponent** Ann Stanton **Submitted** 4/30/2010 **Attachments** No

**Comment**

The "Reference in code section number" should be changed to "Table 603".

**SMACNA**

Sheet Metal & Air Conditioning Contractors National Assoc., Inc.

4201 Lafayette Center Drive

Chantilly, VA 20151-1209

| Standard Referenced Reference in code | | |
|---|---|---|
| Number | Title | |
| section number | | |
| SMACNA/ANSI—85 | HVAC Air Duct Leakage Test Manual | |
| 603.3.3 | | |

REPG 2003

# Sub Code: Residential

# M4190

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/31/2010 | **Section** | 315.1 |
| **Chapter** | 3 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | J Glenn-BASF | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | Yes |

**Related Modifications**

**Summary of Modification**

Retain base code (IRC) language

**Rationale**

Utilizes base code language as it provides better direction

**Fiscal Impact Statement**

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

No impact on local enforcement

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

None

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

None

**Requirements**

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

No change

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

Brings Florida in-line with nationally accepted practice

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

Does not discriminate against anything.

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

Does not degrade the code.

**Alternate Language**

## M4190-A1

**Proponent** Mo Madani **Submitted** 5/19/2010 **Attachments** Yes

**Rationale**

Implement HB 663.

**Fiscal Impact Statement**

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

Implement HB 663.

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

Implement HB 663.

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

Implement HB 663.

**Requirements**

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

Implement HB 663.

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

Implement HB 663.

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

Implement HB 663.

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

Implement HB 663.

**R315.1Carbon monoxide ~~protection~~ alarms.** ~~Every building for which a permit for new construction is issued having a fossil-fuel-burning heater or appliance, a fireplace, or an attached garage shall have an operational carbon monoxide alarm installed within 10 feet of each room used for sleeping purposes.~~ For new construction, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in dwelling units within which fuel-fired appliances are installed and in dwelling units that have attached garages.

Chapter 2,

Revise the definition for the term "Addition" as follows:

Addition. An extension or increase in floor area, number of stories or height of a building or structure.

**Revise Section R315.1 Add text to read as follows:**

**R315.1Carbon monoxide protection.** Every separate building or an addition to an exiting building for which a permit for new construction is issued and having a fossil-fuel-burning heater or appliance, a fireplace, ~~or~~ an attached garage, or other feature, fixture, or element that emits carbon monoxide as byproduct of combustion shall have an operational carbon monoxide alarm installed within 10 feet of each room used for sleeping purposes.

Exception: **This section shall not apply to existing buildings that are undergoing alterations or repair unless the alteration is an addition as defined in this Code.**

**R315.1.1 Carbon monoxide alarm ~~Power Source~~.** ~~In new construction, alarms shall receive their primary power from the building wiring when such wiring is served from the local power utility. Such alarms shall have battery back up.~~ The requirements of Section R315.1 shall be satisfied by providing for one of the following alarm installation:

**(1) A hard-wired carbon monoxide alarm.**

**(2) A battery-powered carbon monoxide alarm.**

**(3) A hard-wired combination carbon monoxide and smoke alarm.**

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

**R315.1.2 Combination alarms.** Combination smoke/carbon monoxide alarms shall be listed or labeled by a Nationally Recognized Testing Laboratory.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 4/2/2010 | **Section** | 12-21 |
| **Chapter** | 12 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Doug Harvey | **General Comments** | Yes |
| **Attachments** | Yes | **Alternate Language** | No |

**Related Modifications**

Replace the Florida Building Code, Residential Section 25-32 Mechanical with Section 25-32 Mechanical of the 2009 International Residential Code in its entirety.

**Summary of Modification**

Replace the Florida Building Code, Residential Section 12-21 Mechanical with Section 12-21 Mechanical of the 2009 International Residential Code in its entirety.

**Rationale**

There are no Florida specific problems that are not covered by the regulations contained within the International Residential Code Section 12-21 Mechanical.

**Fiscal Impact Statement**

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

There is no impact to local enforcement other than gaining consistency and putting inspection and review personnel in line with the Code that certification is attained under and used throughout the nation

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

None

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

Allows for a code that is more up to date with the new standards, practices and materials. Improves consistency and compliance in design, construction and enforcement. Saves money and time by allowing for a single place to request code modifications.

**Requirements**

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

No change

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

Improves

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

This proposed code change does not discriminate

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

This change does not degrade the effectiveness of the code and should improve effectiveness as consistency will be increased.

**General Comment**

M4390-G1

**Proponent** Doug Harvey **Submitted** 6/1/2010 **Attachments** No

**Comment**

We, the Building Officials Association of Florida (BOAF), believe this modification may require some additional explanation. The BOAF executive board has been consulted regarding this code proposal and they are in agreement that the proposal appears to go along the line of the vote taken by the Commission last fall to remove non-Florida specific items, return to the base documents and have a separate Florida supplement, if needed. The International Code is the base code for the Florida Codes. As such, a strike-through/underline version of the document has not been attached to this modification. Due to the length and file sizes needed, as well as the proposed document being familiar as the base code, this did not seem necessary. Since the base document is the root document for the Florida code, and the Commission voted to return to the base documents over the next two (2) code cycles, we ask the Commission to accept the proposal and allow it to move forward. This is based on the vote taken by the Commission during a public meeting in the Fall of 2009. BOAF supports taking the very specific items modifying the base code to meet Florida Statutes or rules into a smaller and easier to manage stand alone Florida supplement.

Replace ~~Florida Building Code – Residential Chapter 12-21~~ with 2009 International Residential Code Chapter 12-21 Mechanical text in its entirety.

| | |
|---|---|
| ***Date Submitted*** | |
| ***Mod Number*** | |
| *Code Version* | 2010 |
| *Code Change Cycle* | 2010 Triennial Original Modifications 03/01/2010-04/02/2010 |
| *Sub-code* | Florida Building Code, Residential |
| *Chapter Topic* | Publication |
| *Section* | 12-21 Mechanical |
| *Related Modification* | |
| *Affects HVHZ* | No |
| *Summary of modification* | Replace the Florida Building Code, Residential Section 12-21 Mechanical with Section 12-21 Mechanical of the 2009 International Residential Code in its entirety. |
| *Text of Modification* | Replace ~~Florida Building Code – Residential Chapter 12-21~~ with 2009 International Residential Code Chapter 12-21 Mechanical text in its entirety. |
| ***Rational*** | There are no Florida specific problems that are not covered by the regulations contained within the International Residential Code Section 12-21 Mechanical. |
| ***Fiscal Impact statement*** | There is no fiscal impact by this change |
| *Impact to Local Enforcement* | There is no impact to local enforcement other than gaining consistency and putting inspection and review personnel in line with the Code that certification is attained under and used throughout the nation |
| *Impact to Building owner* | None |
| *Impact to Industry* | Allows for a code that is more up to date with the new standards, practices and materials. Improves consistency and compliance in design, construction and enforcement. Saves money and time by allowing for a single place to request code modifications. |
| ***Requirements*** | None |
| *Has connection to health safety and Welfare* | None |
| *Strengths or improves Code* | Improves |
| *Does not discriminate* | This change does not discriminate |
| *Does not degrade effectiveness of code* | This change does not degrade the effectiveness of the code and should improve effectiveness as consistency will be increased. |

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 4/2/2010 | **Section** | 1307.2.1 |
| **Chapter** | 13 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Robert Cochell | **General Comments** | Yes |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

M301.12 (Mod 3859)

**Summary of Modification**

Add prescriptive for ground mounted units

**Rationale**

Prescriptive method is needed not to be engineered with each installtion. This method was employed for at least two code cycles without a known failure; it is easy to install and inspect.

**Fiscal Impact Statement**

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

Easier to inspect

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

lowers cost, an engineer not necessary for each installation

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

lowers expense without compromise of the security of the equipment

**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**

yes, provides proven method of tie down

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

Does not discriminate

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

Enhances code

**General Comment**

M3869-G1

**Proponent** Robert Cochell **Submitted** 5/10/2010 **Attachments** No

**Comment**

Needs to also be included in Mechanical 301.12 for code concurrence. Essential code say the same thing in both places

This may be accomplished by design or by application of Section M1307.2.1.2.

**M1307.2.1.1 Ground-mounted units.** Ground-mounted units for R3 residential applications may be anchored with #14 screws with gasketed washers according to the following.

1. For units with sides less than 12 inches (305 mm), one screw shall be used at each side of the unit

2. For units between 12 and 24 inches (305 and 610 mm), two screws shall be used per side.

3. For units between 24 and 36 inches (305 and 914 mm), three screws shall be used per side.

4. For units greater than 36 inches (914 mm) or 5 tons, anchorage shall be designed in accordance with Section 301.12.

**Notes:**

1. Corrosion protection. Buildings located within 3,000 feet (914 400 mm) of the ocean should utilize nonferrous metal, stainless steel or steel with minimum G-90 hot-dip galvanized coating for equipment stands and anchors and stainless steel screws.

2. Strapping. Job-site strengthening of fan cowlings and vent hoods is recommended. Two or four stainless steel cables are recommended, depending on design wind conditions. Alternatively, additional, heavy straps can be screwed to the cowling and curb.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/31/2010 | **Section** | M1308.1 |
| **Chapter** | 13 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | T Stafford | **General Comments** | No |
| **Attachments** | Yes | **Alternate Language** | No |

**Related Modifications**

See modifications to Sections R301.3, R301.5, R404,R502, R503, R505, R602, R603, R604, R605, R611, R702, R802, R803, R804, M2101.6, P2603.2 in the FBC Residential.

**Summary of Modification**

This modification is a correlation with the modification that deletes the prescriptive construction requirements in the code that do not apply to the design of buildings in Florida.

**Rationale**

This modification is a correlation with the modification that deletes the prescriptive construction techniques in the FBCR that do not apply in Florida due to wind speed limitations. See attached supporting documentation.

**Fiscal Impact Statement**

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

This modification will improve local entities in their efforts to enforce the code by removing requirements that are not applicable in Florida due to wind speed limitations.

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

This modification will have a negligible impact to building and property owners relative to cost of compliance with the code.

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

This modification will have a negligible impact to the industry relative to cost of compliance with the code.

**Requirements**

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

This modification removes provisions that do not apply to the construction of buildings in Florida thereby reducing confusion associated with understanding the code requirements and ensuring that the appropriate provisions of the code are being used and applied.

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

This modification strengthens the code by deleting requirements that are only applicable for lower design wind speed areas that are not applicable to the construction of buildings in Florida.

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

The proposed changes are performance based and therefore do not discriminate against any other material, product, method, or system of construction.

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

This modification improves the effectiveness of the code by deleting requirements that are not applicable to the construction of buildings in Florida, which ensures that the code is more focuse on the methods appropriate for the applicable design wind speeds.

**25.**

**M1308.1 Drilling and notching.** Wood-framed structural members shall be drilled, notched or altered in accordance with the provisions of Sections R502.1.5 ~~R502.2.7~~, R602.1.4 ~~R602.2.7, R602.2.7.1~~ and R802.1.8 ~~R802.2.6~~. Holes, cutting, and notching in cold-formed, steel-framed members shall be in accordance with AISI 230~~, load-bearing members shall only be permitted in accordance with Sections R505.2, R603.2 and R804.2. In accordance with the provisions of Sections R505.3.5, R603.3.4 and R804.3.5, cutting and notching of flanges and lips of cold-formed, steel-framed, load-bearing members shall not be permitted~~.Structural insulated panels (SIPs) shall be drilled and notched or altered in accordance with the provisions of Section R613.7 ~~R612.9~~.

Reason: This proposal is essentially a clean-up and clarification of the prescriptive requirements in the code. Many of the requirements in the base code (2009 IRC) are only applicable where the basic wind speed is less than 100 mph. According to the Figure R301.2(4), areas where the wind speed is less than 100 mph is very limited in Florida. Section R301.2.1.1 requires buildings to be designed by some other standard where the wind speed equals or exceeds 100 mph. Even though Figure R301.2(4) does show some areas with a wind speed less than 100 mph, we are not aware of any jurisdiction in Florida that has established a wind speed of less than 100 mph. In fact, the county maps that were required to be drawn all indicate a design wind speed of at least 100 mph. Therefore, the less than 100 mph provisions that are shown stricken through in this proposal do not apply anywhere in Florida. By removing these provisions will improve understanding of the code and will prevent someone from inadvertently using prescriptive provisions that will not satisfy the required design wind loads.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/3/2010 | **Section** | M1501.1 |
| **Chapter** | 15 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Timothy de Carion | **General Comments** | Yes |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

**Summary of Modification**

I have added "Roof Terminations shall not be obstructed by roofing material to impead airflow" because it is a common practice of using the short "roof jacks" on barrel tile roofs and the outlet of the jack is blocked by tiles.

**Rationale**

Short roof jacks are being installed on barrell tile roof and blocking air flow. Some installations have only 1/4" clearance and rain is coming back into roof jacks by the water bouncing into jack.

**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**

less water damage and increased efficency of the exhaust

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

none

**Requirements**

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

yes

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

yes, less leaks and more flow

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

Most products cannot control the type of application that a product will be used. I have never seen any product instructions say "only use on shingle roofs and not barrel tiles". A contractor must use the product with the right application.

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

no

**General Comment**

M3482-G1

**Proponent** Jack Glenn **Submitted** 5/31/2010 **Attachments** No

**Comment**

There is a significant cost involued in this requirement and the proponent has not provided a justification for such increased expense.

Language is not needed the code as written is clear.

## SECTION M1501 GENERAL

**M1501.1 Outdoor discharge.** The air removed by every mechanical exhaust system shall be discharged to the outdoors. Roof Terminations shall not be obstructed by roofing material to impead airflow . A minimum of 4" from the outlet to the roof surface shall be maintained Air shall not be exhausted into an attic, soffit, ridge vent or crawl space.

**Exception:** Whole-house ventilation-type attic fans that discharge into the attic space of dwelling units having private attics shall be permitted

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/19/2010 | **Section** | 1601 |
| **Chapter** | 16 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Ann Stanton | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

3653

**Summary of Modification**

Move Florida-specific duct sealing and attachment criteria to a table and return to I-code section formatting.

**Rationale**

This mod would return section M1601 to I-code formatting for code consistency with the national standard by compiling most Florida-specific sealing and attachment criteria in a table. It would also lessen the potential for code criteria to be inadvertently omitted. It further adds new I-code sealing and attachment criteria to Florida-specific criteria in the table.

**Fiscal Impact Statement**

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

Makes the code more clear. Improves consistency with the national code for purposes of training and commentary.

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

None.

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

None.

**Requirements**

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

Yes. The mod provides for code clarity and thus better enforcement of safety-related code requirements relating to duct construction.

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

Yes. It improves the clarify of the code.

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

No.

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

No.

## SECTION M1601

## DUCT CONSTRUCTION

**M1601.1 Duct design.** Duct systems serving heating, cooling and ventilation equipment shall be fabricated in accordance with the provisions of this section and ACCA Manual D or other approved methods based on the following:

1. Calculation of the supply air for each room shall be based on the greater of the heating load or sensible cooling load for that room.

2. Duct size shall be determined by the supply air requirements of each room, the available static pressure and the total equivalent length of the various duct runs.

3. Friction loss data shall correspond to the type of material used in duct construction.

**Change Section M1601.1.1 to include Florida-specific criteria from Sections M1601.5 through M1601.11 [to be deleted] as shown:**

**M1601.1.1 Above-ground duct systems.** Above-ground duct systems shall conform to the following:

1. Equipment connected to duct systems shall be designed to limit discharge air temperature to a maximum of 250°F (121°C) and shall meet the applicable requirements of Section M1601.4 and Table M1601.4.
2. Factory-made air ducts shall be constructed of Class 0 or Class 1 materials as designated in Table M1601.1.1(1) and shall meet the applicable requirements of Section M1601.4 and Table M1601.4.
3. Fibrous duct construction shall conform to the SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards and shall meet the applicable requirements of Section M1601.4 and Table M1601.4.
4. Metallic ducts shall meet the applicable requirements of Section M1601.4 and Table M1601.4. Minimum thickness of metal duct material shall be as listed in Table M1601.1.1(2). Galvanized steel shall conform to ASTM A 653.
5. Use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C), that ~~and~~ exposed surfaces are not subject to condensation, and that applicable criteria of Section M1601.4 and Table M1601.4 are met.
6. [No change to IRC section]
7. [No change to IRC section]
8. Cavities designed to deliver air from or return air to the conditioning system such as plenums, mechanical closets, enclosed support platforms, cases, air shafts, etc. shall be lined with an air barrier and sealed in accordance with the applicable requirements of Section M1601.4 and Table M1601.4 and shall be insulated in accordance with Section 403.2.1 of the Florida Building Code, Energy Conservation.

**Change Section M1601.3 as shown:**

**M1601.3 Duct insulation materials.** See Section 403.2.1 of the Florida Building Code, Energy Conservation, for duct insulation R-value requirements. Duct insulation materials shall conform to the following requirements: [No change to 1. – 3.]

**Change Section M1601.4 as shown:**

**M1601.4 Duct i~~I~~nstallation.** An air distribution system shall be designed and installed to supply the required distribution of air. The installation of an air distribution system shall not affect the fire protection requirements specified in the building code. Ducts shall be constructed, braced, reinforced and installed to provide structural strength and durability. All transverse joints, longitudinal seams and fitting connections shall be securely fastened and sealed in accordance with the applicable standards of this section.

All enclosures which form the primary air containment passageways for air distribution systems shall be considered ducts or plenum chambers and shall be constructed and sealed in accordance with the applicable criteria of Table M1601.4 and this section. Duct installation shall comply with Sections M1601.4.1 through M1601.4.13 ~~7~~.

See Section 403.2.2.1of the Florida Building Code, Energy Conservation, for duct testing requirements. ~~Duct installation shall comply with Sections M1601.4.1 through M1601.4.7.~~

**M1601.4.1 Duct installation, general. ~~Joints and seams.~~** [Delete IRC section in its entirety]

**M1601.4.1.1Mechanical fastening.** All joints between sections of air ducts and plenums, between intermediate and terminal fittings and other components of air distribution systems, and between subsections of these components shall be mechanically fastened to secure the sections independently of the closure system(s).

**M1601.4.1.2 Sealing.** Air distribution system components shall be sealed with approved closure systems in accordance with specific criteria in Table M1601.4.

**M1601.4.1.3 Space provided.** Sufficient space shall be provided adjacent to all mechanical components located in or forming a part of the air distribution system to assure adequate access for: (1) construction and sealing in accordance with the requirements of Section M1601.4; (2) inspection; and (3) cleaning and maintenance. A minimum of 4 inches (102 mm) is considered sufficient space around air-handling units.

**Exception:** Retrofit or replacement units not part of a renovation.

**M1601.4.1.4 Product application.** Closure products shall be applied to the air barriers of air distribution system components being joined in order to form a continuous barrier or they may be applied in accordance with the manufacturer's instructions or appropriate industry installation standard where more restrictive.

**M1601.4.1.5 Surface preparation.** The surfaces upon which closure products are to be applied shall be clean and dry in accordance with the manufacturer's installation instructions.

**M1601.4.1.6 Approved mechanical attachments.** Approved mechanical attachments for air distribution system components include screws, rivets, welds, interlocking joints crimped and rolled, staples, twist in (screw attachment), and compression systems created by bend tabs or screw tabs and flanges or by clinching straps. Mechanical attachments shall be selected from Table M1601.4 to be appropriate to the duct system type.

**M1601.4.1.7 Approved closure systems.** The following closure systems and materials are approved for air distribution construction and sealing for the applications and pressure classes shown in Table M1601.4.

1. Metal closures.

a. Welds applied continuously along metal seams or joints through which air could leak.

b. Snaplock seams, and grooved, standing, double-corner, single-corner and Pittsburgh-lock seams, as defined by SMACNA, as well as all other rolled mechanical seams. All seams shall be rolled or crimped.

2. Gasketing, which achieves a 25/50 flame spread/smoke-density-development rating under ASTM E 84 or UL 723, provided that it is used only between mated surfaces which are mechanically fastened with sufficient force to compress the gasket and to fill all voids and cracks through which air leakage would otherwise occur.

3. Mastic closures. Mastics shall be placed over the entire joint between mated surfaces. Mastics shall not be diluted. Approved mastics include the following:

a. Mastic or mastic-plus-embedded fabric systems applied to fibrous glass ductboard that are listed and labeled in accordance with UL 181A, Part III.

b. Mastic or mastic-plus-embedded fabric systems applied to nonmetal flexible duct that are listed and labeled in accordance with UL 181B, Part II.

c. Mastic ribbons, which achieve a 25/50 flame spread/smoke density development rating under ASTM E 84 or UL 723, provided that they may be used only in flange-joints and lap-joints, such that the mastic resides between two parallel surfaces of the air barrier and that those surfaces are mechanically fastened.

4. Tapes. Tapes shall be applied such that they extend not less than 1 inch onto each of the mated surfaces and shall totally cover the joint. When used on rectangular ducts, tapes shall be used only on joints between parallel rigid surfaces and on right angle joints. Approved tapes include the following:

a. Pressure-sensitive tapes.

1) Pressure-sensitive tapes applied to fibrous glass ductboard that are listed and labeled in accordance with UL 181A, Part I.

2) Pressure-sensitive tapes applied to nonmetal flexible duct that are listed and labeled in accordance with UL 181B, Part I.

b. Heat-activated tapes applied to fibrous glass ductboard that are listed and labeled in accordance with UL 181A, Part II.

5. Aerosol sealant. Such sealants shall be installed by manufacturer-certified installers following manufacturer instructions and shall achieve 25/50 flame spread/smoke-density-development ratings under ASTM E 84 or UL 723.

6. Spray polyurethane foam shall be permitted to be applied without additional joint seals.

**M1601.4.1.8 ~~2~~ Cavities of the building structure.** Cavities in framed spaces, such as dropped soffits and walls, shall not be used to deliver air from or return air to the conditioning system unless they contain an air duct insert which is insulated in accordance with Section 403.2.1 of the Florida Building Code, Energy Conservation, and constructed and sealed in accordance with the requirements Table M1601.4 appropriate for the duct materials used.

**Exception**: Return air plenums.

**M1601.4.2 Plastic duct joints.** Reserved. [Move criteria to Table M1601.4]

**Table M1601.4. Add FL-specific table of duct construction criteria in the FBC-Residential to return the current expanded, revised version of the FBC-R to its original IRC form.**

**TABLE M1601.4**

**DUCT SYSTEM CONSTRUCTION AND SEALING**

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| DUCT TYPE/CONNECTION | SEALING REQUIREMENTS | MECHANICAL ATTACHMENT | TEST STANDARD |
|---|---|---|---|
| **Metal duct, rigid and flexible**<br><br>**Pressures less than 1-inch water gauge** | Closure systems as described in Section M1601.4.1.7:<br><br>1. Continuous welds.<br><br>2. Snaplock seams, and grooved, standing, double-corner, single-corner and Pittsburgh-lock seams and all other rolled mechanical seams.<br><br>3. Mastic, mastic-plus-embedded fabric, or mastic ribbons. `<br><br>4. Gaskets.<br><br>5. Pressure-sensitive tape. | Mechanical attachments approved:<br><br>1. Continuous welds.<br><br>2. Snaplock seams, and grooved, standing, double-corner, single-corner and Pittsburgh-lock seams and all other rolled mechanical seams.<br><br>Crimp joints for round metal ducts shall have a contact lap of at least 11/2inches (38 mm).<br><br>Round metal ducts shall be mechanically fastened by means of at least three sheet-metal screws or rivets equally spaced | SMACNA HVAC Air Duct Leakage Test Manual<br><br>1 |

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| **Pressures 1-inch water gauge or greater** | 6. Aerosol sealant<br><br>Closure systems as described in Section M1601.4.1.7:<br><br>1. Continuous welds.<br><br>2. Mastic or mastic-plus-embedded fabric systems.<br><br>3. Gaskets. | around the joint. [1]<br><br>Mechanical attachments approved:<br><br>1. Continuous welds<br><br>Round metal ducts shall be mechanically fastened by means of at least three sheet-metal screws or rivets equally spaced around the joint.[1] | |
| **High pressure duct systems designed to operate at pressures greater than 3-inch water gauge (4-inch water gauge pressure class)** | The tested duct leakage class, at a test pressure equal to the design duct pressure class rating, shall be equal to or less than Leakage Class 6. Leakage testing may be limited to representative sections of the duct system but in no case shall such tested sections include less than 25 percent of the total installed duct area for the designated pressure class. | | |
| **Plastic duct** | See Section M1601.1.2. | Joints between plastic ducts and plastic fittings shall be made in accordance with the manufacturer's installation instructions. | **ASTM D 2412** |
| **Fibrous glass duct, rigid.** | All joints, seams and duct wall penetrations between sections of duct and between duct and other distribution system components shall be sealed with<br><br>closure systems as described in Section M1601.4.1.7:<br><br>1. Heat-activated tapes.<br><br>2. Pressure-sensitive tapes.<br><br>3. Mastics or mastic-plus-embedded fabric systems. | Mechanically fastened per standard to secure the sections independent of the closure system(s).<br><br>Attachments of ductwork to air-handling equipment shall be by mechanical fasteners in accordance with Section M1601.4.1.1. Where access is limited, two fasteners on one side shall be acceptable. | NAIMA Fibrous Glass Duct Construction Standards.<br><br>UL 181<br><br>UL 181A |
| **Flexible duct systems, nonmetal.** | All duct collar fittings shall have a minimum 5/8 inch (16 mm) integral flange for sealing to other components and a | Flexible nonmetal ducts shall be joined to all other air distribution system components by either terminal or intermediate fittings. | UL 181<br><br>UL 181B |

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| | minimum 3-inch (76 mm) shaft for insertion into the inner duct core.<br><br>Flexible ducts having porous inner cores shall not be used.<br><br>**Exception:** Ducts having a nonporous liner between the porous inner core and the outer jacket. Fastening and sealing requirements shall be applied to such intermediate liners. | Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C. | ADC FDPIS |
| **Duct core to duct fitting** | The reinforced lining shall be sealed to the duct fitting using one of the following sealing materials which conforms to the approved closure and mechanical attachment requirements of Section M1601.4.1.7:<br><br>1. Gasketing.<br><br>2. Mastic, mastic-plus-embedded fabric, or mastic ribbons.<br><br>3. Pressure-sensitive tape.<br><br>4. Aerosol sealants, provided that their use is consistent with UL 181. | The reinforced core shall be mechanically attached to the duct fitting by a drawband installed directly over the wire-reinforced core and the duct fitting. The duct fitting shall extend a minimum of 2 inches (51 mm) into each section of duct core. When the flexible duct is larger than 12 inches (303 mm) in diameter or the design pressure exceeds 1-inch water gauge, the drawband shall be secured by a raised bead or indented groove on the fitting. | |
| **Duct outer jacket to** | The outer jacket of a flexible duct section shall be secured at the juncture of the air distribution system component and intermediate or terminal fitting in such a way as to prevent excess condensation. The outer jacket of a flexible duct section shall not be interposed between the flange of the duct fitting and the flexible duct, rigid fibrous glass duct | | |

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| **duct collar fitting**<br><br>**Duct collar fitting to rigid duct** | board, or sheet metal to which it is mated.<br><br>The duct collar fitting's integral flange shall be sealed to the rigid duct board or sheet metal using one of the following closure systems/materials which conforms to the approved closure and mechanical attachment standards of Section M1601.4.1.7:<br><br>1. Gasketing.<br><br>2. Mastic or mastic-plus-embedded fabric systems.<br><br>3. Mastic ribbons when used to attach a duct collar to sheet metal.<br><br>4. Pressure-sensitive tape.<br><br>5. Aerosol sealants, provided that their use is consistent with UL 181. | The duct collar fitting shall be mechanically attached to the rigid duct board or sheet metal by appropriate mechanical fasteners, either screws, spin-in flanges, or dovetail flanges. | |
| **Terminal and intermediate fittings.**<br><br>**Fittings and joints between dissimilar duct types**<br><br>**Terminal fittings and** | Approved closure systems shall be as designated by air distribution system component material type in Section M1601.4.1.7.<br><br>**Exception:** When the components of a joint are fibrous glass duct board and metal duct, including collar fittings and metal equipment housings, the closure systems approved for fibrous glass duct shall be used.<br><br>Terminal fittings and air ducts which penetrate the building envelope shall be mechanically | | |

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| **air ducts to building envelope components** | attached to the structure and sealed to the envelope component penetrated and shall use one of the following closure systems/materials which conform to the approved closure and mechanical application requirements of Section M1601.4.1.7:<br><br>1. Mastics or mastic-plus-embedded fabrics.<br><br>2. Gaskets used in terminal fitting/grille assemblies which compress the gasket material between the fitting and the wall, ceiling or floor sheathing. | | |
| **Air-handling units.** | Air-handling units located outside the conditioned space shall be sealed using approved closure systems described in Section M1601.4.1.7 for metallic ducts. | All air-handling units shall be mechanically attached to other air distribution system components. | |
| **Return plenums.** | Building cavities which will be used as return air plenums shall meet Section M1601.4.1.8 and shall be lined with a continuous air barrier made of durable nonporous materials. All penetrations to the air barrier shall be sealed with a suitable long-life mastic material.<br><br>**Exception:** Surfaces between the plenum and conditioned spaces from which the return/mixed air is drawn.<br><br>Roof decks above building cavities used as a return air plenum shall be insulated to at least R-19. | | |
| **Mechanical closets.** | All joints between the air barriers of walls, ceiling, floor and door framing and all penetrations of the air barrier shall be sealed to the air barrier with approved closure systems. Through-wall, through-floor and through-ceiling air passageways into the closet shall be framed and sealed to form an air-tight | The following closure systems are approved for use in mechanical closets:<br><br>1. Gypsum wallboard joint compound over taped joints between gypsum wallboard panels.<br><br>2. Sealants complying with the | |

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| | passageway.<br><br>**Exception:** Air passageways into the closet from conditioned space that are specifically designed for return air flow.<br><br>The following air barriers are approved for use in mechanical closets:<br><br>1. One-half-inch-thick (12.7 mm) or greater gypsum wallboard, taped and sealed.<br><br>2. Other panelized materials having inward facing surfaces with an air porosity no greater than that of a duct product meeting Section 22 of UL 181 which are sealed on all interior surfaces to create a continuous air barrier. | product and application standards of ths table for fibrous glass ductboard.<br><br>3. A suitable long-life caulk or mastic compliant with the locally adopted mechanical code for all applications. | |
| **Enclosed support platforms in unconditioned spaces.** | Enclosed support platforms located between the return air inlet(s) from conditioned space and the inlet of the air-handling unit or furnace, shall contain a duct section constructed entirely of rigid metal, rigid fibrous glass duct board, or flexible duct which is constructed and sealed according to the applicable requirements of this table and insulated according to the requirements of Section 403.2.1 of the Florida Building Code, Energy Conservation.<br><br>1. No portion of the building structure, including adjoining walls, floors and ceilings, shall be in contact with the return air stream or function as a component of this duct section.<br><br>2. The duct section shall not be penetrated by a refrigerant line, chase, refrigerant line, wiring, pipe or any object other than a component of the air distribution system. | | |

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| | 3. Through-wall, through-floor and through ceiling penetrations into the duct system shall contain a branch duct fabricated of rigid fibrous glass duct board or rigid metal and shall extend to and be sealed by both the duct section and the grille side wall surface. | The branch duct shall be fabricated and attached to the duct insert in accordance with requirements for the duct type used. | |

1 Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.

**Section M1601.4.3, Support. Revise section to include FL-specific support criteria.**

**M1601.4.3 Support.**

**M1601.4.3.1 Metal ducts.** Metal ducts shall be supported by ½-inch (13 mm) wide 1-gage metal straps or 12-gage galvanized wire at intervals not exceeding 10 feet (3048 mm) or other approved means.

**M1601.4.3.2 Rigid nonmetal ducts.** Rigid n~~N~~onmetallic ducts shall be supported in accordance with the manufacturer's installation instructions.

**M1601.4.3.3 Flexible ducts.** Flexible ducts shall be configured and supported so as to prevent the use of excess duct material, prevent duct dislocation or damage, and prevent constriction of the duct below the rated duct diameter in accordance with the following requirements:

1. Ducts shall be installed fully extended. The total extended length of duct material shall not exceed 5 percent of the minimum required length for that run.

2. Bends shall maintain a center line radius of not less than one duct diameter.

3. Terminal devices shall be supported independently of the flexible duct.

4. Horizontal duct shall be supported at intervals not greater than 5 feet (1524 mm). Duct sag between supports shall not exceed ½ inch (12.7 mm) per foot of length. Supports shall be provided within 1½ feet (38 mm) of intermediate fittings and between intermediate fittings and bends. Ceiling joists and rigid duct or equipment may be considered to be supports.

5. Vertical duct shall be stabilized with support straps at intervals not greater than 6 feet (1829 mm).

6. Hangers, saddles and other supports shall meet the duct manufacturer's recommendations and shall be of sufficient width to prevent restriction of the internal duct diameter. In no case shall the material supporting flexible duct that is in direct contact with it be less than 1½ inches (38 mm) wide.

**M1601.4.4 Fireblocking.** [No change to IRC]

**M1601.4.5 Duct insulation <u>installation</u>.** Duct insulation shall be installed in accordance with the following requirements: [1. – 3. No change.]

**M1601.4.6** – **M1601.4.13** [No change to text approved by Mechanical TAC]

**M1601.5 Under-floor plenums.** [Return to IRC text]

**M1601.6 Independent garage HVAC systems.** [Return to IRC text.]

**Sections FL M1601.5 – M1601.11. Delete FL-specific duct installation criteria and move them to Table M1601.4.**

~~**M1601.5 Metallic ducts, rigid and flexible.** All ducts shall be constructed of iron, steel, aluminum or other approved material. Ducts shall be constructed as specified in the SMACNA HVAC Duct Construction Standards – Metal and Flexible.~~

~~**Exception:** Ducts installed within single dwelling units shall have a minimum thickness as specified in Table M1601.5.~~

~~All transverse joints, longitudinal seams and duct wall penetration of ducts and joints with other air distribution systems components shall be mechanically attached and sealed using approved closure systems for that pressure class specified in Section M1601.5.1 or M1601.5.2.~~

~~**M1601.5.1 Pressure less than 1-inch water gage, approved closure systems.** The following closure systems are approved for rigid metal duct designed to be operated at pressures less than 1 inch water gage when they conform to the approved closure and mechanical attachment requirements of Section M1601.3:~~

~~1. Continuous welds.~~

2. Snaplock seams and grooved, standing, double corner, single corner and Pittsburgh lock seams and all other rolled mechanical seams.

3. Mastic, mastic plus embedded fabric, or mastic ribbons.

4. Gaskets.

5. Pressure sensitive tape.

6. Aerosol sealant.

**M1601.5.2 Pressure 1 inch water gage or greater, approved closure systems.** The following closure systems are approved for rigid metal duct designed to be operated at pressures 1 inch water gage or greater and flexible duct when they conform to the approved closure and mechanical attachment requirements of Section M1601.3:

1.Continuous welds.

2.Mastic, mastic plus embedded fabric or mastic ribbons.

3.Gaskets.

**M1601.5.3 High pressure duct systems.** High pressure duct systems designed to operate at pressures greater than 3 inches water gauge (4 inches water gauge pressure class), shall be tested in accordance with the SMACNA HVAC Air Duct Leakage Test Manual. The tested duct leakage class, at a test pressure equal to the design duct pressure class rating, shall be equal to or less than Leakage Class 6. Leakage testing may be limited to representative sections of the duct system but in no case shall such tested sections include less than 25 percent of the total installed duct area for the designated pressure class.

**M1601.6 Nonmetallic ducts.** Nonmetallic ducts shall be constructed with Class 0 or Class 1 duct material in accordance with UL 181. Fibrous duct construction shall conform to the SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards. The maximum air temperature with nonmetallic ducts shall not exceed 250°F (121°C).

**M1601.6.1 Gypsum.** Gypsum boards that form air shafts (ducts) shall be limited to return air systems where the air temperatures do not exceed 125°F (52°C) and the gypsum board surface temperature is maintained above the airstream dew point temperature. Gypsum return air ducts shall not be incorporated in air handling systems utilizing evaporative coolers.

**M1601.6.2 Fibrous glass duct, rigid.** All joints, seams and duct wall penetrations including, but not limited to, the joints between sections of duct and the joints between duct and other distribution system components shall be mechanically attached and sealed using approved closure systems as specified in Section M1601.3.

**M1601.6.2.1 Approved closure systems.** The following closure systems are approved for rigid fibrous glass ducts when they conform to the approved closure and mechanical attachment requirements of Section M1601.3:

1. Heat activated tapes.

2. Pressure sensitive tapes.

3. Mastics or mastic plus embedded fabric systems.

**M1601.6.2.2 Mechanical fastening.** Attachments of ductwork to air handling equipment shall be by mechanical fasteners. Where access is limited, two fasteners on one side shall be acceptable when installed in accordance with Section M1601.3.6.

**M1601.6.3 Flexible air duct systems, nonmetal.** Flexible nonmetal ducts shall be joined to all other air distribution system components by either terminal or intermediate fittings. All duct collar fittings shall have a minimum 5/8 inch (16 mm) integral flange for sealing to other components and a minimum 3 inch (76 mm) shaft for insertion into the inner duct core.

Flexible ducts having porous inner cores shall not be used.

**Exception:** Ducts having a nonporous liner between the porous inner core and the outer jacket. Fastening and sealing requirements shall be applied to such intermediate liners.

All joints of flexible ducts to fittings and fittings to other air distribution system components shall be mechanically attached and sealed as specified in Sections M1601.6.3.1 through M1601.6.3.6. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C.

**M1601.6.3.1 Duct core to duct fitting, mechanical attachment.** The reinforced core shall be mechanically attached to the duct fitting by a drawband installed directly over the wire reinforced core and the duct fitting. The duct fitting shall extend a minimum of 2 inches (51 mm) into each section of duct core. When the flexible duct is larger than 12 inches (305 mm) in diameter or the design pressure exceeds 1 inch water gauge, the drawband shall be secured by a raised bead or indented groove on the fitting.

**M1601.6.3.2 Duct core to duct fitting, approved closure systems.** The reinforced lining shall be sealed to the duct fitting using one of the following sealing materials which conforms to the approved closure and mechanical attachment requirements of Section M1601.3:

1. Gasketing.

2. Mastic, mastic plus embedded fabric or mastic ribbons.

3. Pressure sensitive tape.

4. Aerosol sealants, provided that their use is consistent with UL 181.

**M1601.6.3.3 Duct outer jacket to duct collar fitting**. The outer jacket of a flexible duct section shall be secured at the juncture of the air distribution system component and intermediate or terminal fitting in such a way as to prevent excess condensation. The outer jacket of a flexible duct section shall not be interposed between the flange of the duct fitting and the flexible duct, rigid fibrous glass duct board, or sheet metal to which it is mated.

**M1601.6.3.4 Duct collar fitting to rigid duct, mechanical attachment.** The duct collar fitting shall be mechanically attached to the rigid duct board or sheet metal by appropriate mechanical fasteners, either screws, spin-in flanges, or dovetail flanges.

**M1601.6.3.5 Duct collar fitting to rigid duct, approved closure systems.** The duct collar fitting's integral flange shall be sealed to the rigid duct board or sheet metal using one of the following closure systems/materials which conforms to the approved closure and mechanical attachment standards of Section M1601.3:

1.Gasketing.

2.Mastic or mastic-plus-embedded fabric.

3.Mastic ribbons when used to attach a duct collar to sheet metal.

4.Pressure-sensitive tape.

5.Aerosol sealants, provided that their use is consistent with UL 181.

**M1601.6.3.6 Flexible duct installation and support.** Flexible ducts shall be configured and supported so as to prevent the use of excess duct material, prevent duct dislocation or damage, and prevent constriction of the duct below the rated duct diameter in accordance with the following requirements:

1. Ducts shall be installed fully extended. The total extended length of duct material shall not exceed 5 percent of the minimum required length for that run.

2. Bends shall maintain a center line radius of not less than one duct diameter.

3. Terminal devices shall be supported independently of the flexible duct.

4. Horizontal duct shall be supported at intervals not greater than 5 feet (1524 mm). Duct sag between supports shall not exceed 1/2 inch (12.7 mm) per foot of length. Supports shall be provided within 1½ feet (457 mm) of intermediate fittings and between intermediate fittings and bends. Ceiling joists and rigid duct or equipment may be considered to be supports.

5. Vertical duct shall be stabilized with support straps at intervals not greater than 6 feet (1829 mm).

6. Hangers, saddles and other supports shall meet the duct manufacturer's recommendations and shall be of sufficient width to prevent restriction of the internal duct diameter. In no case shall the material supporting flexible duct that is in direct contact with it be less than 1½ inches (38 mm) wide.

**M1601.6.4 4.2 Plastic duct joints.** Joints between plastic ducts and plastic fittings shall be made in accordance with the manufacturer's installation instructions.

**M1601.7 Terminal and intermediate fittings.** All seams and joints in terminal and intermediate fittings, between fitting subsections and between fittings and other air distribution system components or building components shall be mechanically attached and sealed as specified in Section M1601.7.1 or Section M1601.7.2.

**M1601.7.1 Fittings and joints between dissimilar duct types, approved closure systems.** Approved closure systems shall be as designated by air distribution system component material type in Section M1601.3.

**Exception:** When the components of a joint are fibrous glass duct board and metal duct, including collar fittings and metal equipment housings, the closure systems approved for fibrous glass duct shall be used.

**M1601.7.2 Terminal fittings and air ducts to building envelope components, approved closure systems.** Terminal fittings and air ducts which penetrate the building envelope shall be mechanically attached to the structure and sealed to the envelope component penetrated and shall use one of the following closure systems/materials which conform to the approved closure and mechanical application requirements of Section M1601.3:

1. Mastics or mastic plus embedded fabrics.

2. Gaskets used in terminal fitting/grille assemblies which compress the gasket material between the fitting and the wall, ceiling or floor sheathing.

**M1601.8 Air-handling units.** All air handling units shall be mechanically attached to other air distribution system components. Air handling units located outside the conditioned space shall be sealed using approved closure systems conforming to the approved closure and M1601.5.1 and the mechanical application requirements of Section M1601.3. See Section M1305.1.3.

**M1601.8.1 Approved closure systems.** Systems conforming to the product and application standards of Section M1601.3 may be used when sealing air handling units.

**M1601.9 Cavities of the building structure.** Cavities in framed spaces, such as dropped soffits and walls, shall not be used to deliver air from or return air to the conditioning system unless they contain an air duct insert which is insulated in accordance with Table N1110.AB.2.1 and constructed and sealed in accordance with the requirements of Section M1601.3 appropriate for the duct materials used.

**Exception:** Return air plenums.

Cavities designed for air transport such as mechanical closets, chases, air shafts, etc., shall be lined with an air barrier and sealed in accordance with Section M1601.10 and shall be insulated in accordance with Table N1110.AB.2.1

Building cavities which will be used as return air plenums shall be lined with a continuous air barrier made of durable nonporous materials. All penetrations to the air barrier shall be sealed with a suitable long-life mastic material.

**Exception**: Surfaces between the plenum and conditioned spaces from which the return/mixed air is drawn.

Building cavities beneath a roof deck that will be used as return air plenums shall have an insulated roof with the insulation having an R-value of at least R-19.

**M1601.10 Mechanical closets.** The interior surfaces of mechanical closets shall be sheathed with a continuous air barrier as specified in Section M1601.10.1 and shall be sealed with approved closure systems as specified in Section M1601.10.2. All joints shall be sealed between air barrier segments and between the air barriers of walls and those of the ceiling, floor and door framing. All penetrations of the air barrier including, but not limited to, those by air ducts, plenums, pipes, service lines, refrigerant lines, electrical wiring, and condensate drain lines shall be sealed to the air barrier and approved closure systems.

**Exception:** Air passageways into the closet from conditioned space that are specifically designed for return air flow.

Through-wall, through-floor and through-ceiling air passageways into the closet shall be framed and sealed to form an airtight passageway using approved air duct materials and approved closure systems.

Duct penetrations through any part of the ceiling, walls or floor of a mechanical closet shall have sufficient space between surrounding ceiling, walls or floor and any duct or plenum penetration to allow for sealing of the penetration and inspection of the seal.

Clothes washers, clothes dryers, combustion water heaters and atmospheric combustion furnaces shall not be located in mechanical closets used as return air plenums.

**M1601.10.1 Approved air barriers.** The following air barriers are approved for use in mechanical closets:

1. One-half inch (12.7 mm) thick or greater gypsum wallboard, taped and sealed.

2. Other panelized materials having inward facing surfaces with an air porosity no greater than that of a duct product meeting Section 22 of UL 181 which are sealed on all interior surfaces to create a continuous air barrier.

**M1601.10.2 Approved closure systems.** The following closure systems are approved for use in mechanical closets:

1. Gypsum wallboard joint compound over taped joints between gypsum wallboard panels.

2. Sealants complying with the product and application standards of Sec. M1601.6.3.1 for fibrous glass ductboard;

3. A suitable long-life caulk or mastic compliant with the locally adopted mechanical code for all applications.

**M1601.11 Enclosed support platforms.** Enclosed support platforms located between the return air inlet(s) from conditioned space and the inlet of the air handling unit or furnace, shall contain a duct section constructed entirely of rigid metal, rigid fibrous glass duct board, or flexible duct which is constructed and sealed according to the respective requirements of Section M1601.3 and insulated according to the requirements of Section N1110

The duct section shall be designed and constructed so that no portion of the building structure, including adjoining walls, floors and ceilings, shall be in contact with the return air stream or function as a component of this duct section.

The duct section shall not be penetrated by a refrigerant line chase, refrigerant line, wiring, pipe or any object other than a component of the air distribution system.

Through-wall, through-floor and through-ceiling penetrations into the duct section shall contain a branch duct which is fabricated of rigid fibrous glass duct board or rigid metal and which extends to and is sealed to both the duct section and the grille side-wall surface. The branch duct shall be fabricated and attached to the duct insert in accordance with Section M1601.5 or Section M1601.6.2, respective to the duct type used.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/31/2010 | **Section** | M2101.6 |
| **Chapter** | 21 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | T Stafford | **General Comments** | No |
| **Attachments** | Yes | **Alternate Language** | No |

**Related Modifications**

4210

See modifications to Sections R301.3, R301.5, R404,R502, R503, R505, R602, R603, R604, R605, R611, R702, R802, R803, R804, M1308.1, P2603.2 in the FBC Residential.

**Summary of Modification**

This modification is a correlation with the modification that deletes the prescriptive construction requirements in the code that do not apply to the design of buildings in Florida.

**Rationale**

This modification is a correlation with the modification that deletes the prescriptive construction techniques in the FBCR that do not apply in Florida due to wind speed limitations. See attached supporting documentation.

**Fiscal Impact Statement**

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

This modification will improve local entities in their efforts to enforce the code by removing requirements that are not applicable in Florida due to wind speed limitations.

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

This modification will have a negligible impact to building and property owners relative to cost of compliance with the code.

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

This modification will have a negligible impact to the industry relative to cost of compliance with the code.

**Requirements**

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

This modification removes provisions that do not apply to the construction of buildings in Florida thereby reducing confusion associated with understanding the code requirements and ensuring that the appropriate provisions of the code are being used and applied.

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

This modification strengthens the code by deleting requirements that are only applicable for lower design wind speed areas that are not applicable to the construction of buildings in Florida.

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

The proposed changes are performance based and therefore do not discriminate against any other material, product, method, or system of construction.

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

This modification improves the effectiveness of the code by deleting requirements that are not applicable to the construction of buildings in Florida, which ensures that the code is more focuse on the methods appropriate for the applicable design wind speeds.

**26.**

**M2101.6 Drilling and notching**. Wood-framed structural members shall be drilled, notched or altered in accordance with the provisions of Sections R502.1.5 ~~R502.2.6~~, R602.1.4 ~~R602.2.7, R602.2.7.1~~ and R802.1.8 ~~R802.2.4~~. Holes, cutting, and notching in cold-formed, steel-framed members shall be in accordance with AISI 230~~, load-bearing members shall only be permitted in accordance with Sections R506.2, R603.2 and R804.2. In accordance with the provisions of Sections R505.3.5, R603.3.4 and R804.3.5, cutting and notching of flanges and lips of cold-formed, steel-framed, load-bearing members shall not be permitted.~~ Structural insulated panels (SIPs) shall be drilled and notched or altered in accordance with the provisions of Section R613.7 ~~R614~~.

Reason: This proposal is essentially a clean-up and clarification of the prescriptive requirements in the code. Many of the requirements in the base code (2009 IRC) are only applicable where the basic wind speed is less than 100 mph. According to the Figure R301.2(4), areas where the wind speed is less than 100 mph is very limited in Florida. Section R301.2.1.1 requires buildings to be designed by some other standard where the wind speed equals or exceeds 100 mph. Even though Figure R301.2(4) does show some areas with a wind speed less than 100 mph, we are not aware of any jurisdiction in Florida that has established a wind speed of less than 100 mph. In fact, the county maps that were required to be drawn all indicate a design wind speed of at least 100 mph. Therefore, the less than 100 mph provisions that are shown stricken through in this proposal do not apply anywhere in Florida. By removing these provisions will improve understanding of the code and will prevent someone from inadvertently using prescriptive provisions that will not satisfy the required design wind loads.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/18/2010 | **Section** | 2301.2.9 |
| **Chapter** | 23 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Ben Bentley | **General Comments** | No |
| **Attachments** | No | **Alternate Language** | No |

**Related Modifications**

3389

**Summary of Modification**

If mod 3389 is accepted then the last sentence of this code 2301.2.9 needs to be changed.

**Rationale**

The rationale is to keep different sections of the code refering to the same item identical.

**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**

None

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

None

**Requirements**

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

None other than proposed by mod 3389.

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

Yes, it makes the different sections of the code say exactly the same thing.

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

No.

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

No.

M2301.2.9 Maximum temperature limitation. Systems shall be equipped with means to limit the maximum water temperature of the system fluid entering or exchanging heat with any pressurized vessel inside the dwelling to 180°F (82°C). This protection is in addition to the required temperature- and/or pressure-relief valves required by Section M2301.2.3.

| | | | |
|---|---|---|---|
| **Date Proposal Submitted** | 3/18/2010 | **Section** | M2301.2.3 |
| **Chapter** | 23 | **TAC Recommendation** | Pending Review |
| **Affects HVHZ** | No | **Commission Action** | Pending Review |
| **Proponent** | Ben Bentley | **General Comments** | No |
| **Attachments** | Yes | **Alternate Language** | No |

**Related Modifications**

3391

**Summary of Modification**

Solar P&T valve vs PRV only valve- local bldg depts are interpreting M2301.2.3 to mean a t&p valve only. FSEC clearly shows a PRV only for the solar loop. FSEC is correct. Code needs to show t&p for tank and PRV for solar loop.

**Rationale**

FSEC clearly states that a PRV (pressure relief valve) not a P&T can be installed to protect the component parts in an isolated solar loop. See attachment for furtuer details FSEC system approval #S1175 clearly shows a PRV, not T&P, is installed in the solar loop. See attachment for furtuer details

**Fiscal Impact Statement**

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

I see no impact to the local building departments. Local building departments are requiring P&T valves because they believe that the P&T is a strickter code requirement.

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

Negative impact-none. Positive impact-the property owner will not be required to pay for service calls, labor or materials that would have otherwise been necessary if a T&P, rather than a PRV had been installed. T&P valve installation causes premature failure.

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

No impact to the solar industry since they have been installing PRV's on the solar loop for the past 20 years.

**Requirements**

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

No trucks traveling to do service calls - saftey. No 140 degree water spilling off roof when it should be going back into the tank. No dripping of water off roof due to temperature portion of valve. No roof stains, no replacement parts.

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

Product is more than equivalent in all ways, provides a more service free system.

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

NO, a PRV instead of a P&T.

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

No, it improves the efficiency and durablility of the system.

**SECTION M2301 SOLAR ENERGY SYSTEMS**

**M2301.2.3 Pressure and temperature relief.** Solar energy system ~~System~~ components containing fluids shall be protected against pressures and temperatures exceeding design limitations with a pressure and/or temperature relief valve.~~with pressure- and temperature-relief valves~~. Each section of the system in which excessive pressures are capable of developing shall have a relief device located so that a section cannot be valved off or otherwise isolated from a relief device.~~Relief devices shall be installed in sections of the system so that a section cannot be valved off or isolated from a relief device.~~

Solar Codes
M2301.2.3 (P&T Relief)
1402.5.1
Direct Pumped Systems Fig. #1, Fig. #2
Indirect Pumped Systems Fig. #3, Fig. #4
FSEC Manuals

-M2301.2.3 Pressure and Temperature Relief
System components containing fluids shall be protected with pressure and temperature-relief valves. Relief devices shall be installed in sections of the system so that a section of a system cannot be valved off or isolated from a relief device.
Comments: Sentence #1 – Very poor wording (system components could be a pump or an air vent). The second sentence makes no sense and is probably an oversight or misprint. The statement found on pages 3-18 (FSEC Solar Manual) makes more sense "By code, a pressure relief valve is required in any portion of the system that can be isolated that contains a pressure producing fixture." So, I would suggest M2301.2.3 – 1) Pressure and Temperature Relief – Pressure Relief Protection
1. Pressure and temperature relief – A pressure and temperature relief device must/shall be installed on the solar storage tank/water heater combination because over temperature or over pressurization could pose a safety concern.
2. Pressure relief protection – pressure relief protection is required in any portion of the system that can be isolated that contains a pressure producing fixture (solar collector). Pressure relief protection within the solar loop for direct potable water systems can be installed on the roof, near the collectors, discharge port pointed down directly to roof, no more than 1'-0" off roof without discharge connection since relief will only discharge a cup of water since water loop is isolated. Indirect relief discharge shall be discharged ……. or into a suitable container.
Comments: 1) Pressure relief valves
2) FSEC's "Solar Thermal Manual" manuals state the proper usages of relief only verses P&T valves. See 2-23 & 24 and 3-18 (copies attached).
3) Note that the collector valves, installed properly, are rated above the temp setting of a P&V valve.
4) 13-612.1.ABC.3.4 Solar Water Heating Systems
Suggestion: Change the wording or make building officials aware of sentence, Collectors in installed solar water heating systems (add the word, generally) should meet the following criteria:
1.-
2.-
There are viable exceptions-
Good topic for CE.
5) 1402.5.1 a.) Pressure and temperature – my first note is that .1, .2, .3 and .4 are referring to indirect systems, but it never says such.

b.) temp/pressure, temp & pressure wording needs
to be straightened out. This section comes closer
to stating what M2301.2.3 should express.
Chapter 23: Solar Systems (2004 FBC, Residential, Commentary)
1) M2301.2.3 – P&T relief – suggest total wording revision and total wording revision on commentary – comment – pipes do not burst due to temp – plastic pipes melt, flat plates do not normally heat to 200 degrees on a freezing winter day. The entire explanation is worded poorly. Ex: A working solar flat plate system will generally cease to produce energy at about 170 degrees in the summer even with extended non usage (vacation). On a freezing winter day, 130 degree tank temperature from the sun is considered good.
Chapter 23: Direct Pumped Systems
Figure 1 – picture of direct system
Suggestion – Since that picture came from FSEC, the drawing, not the yellow wording, is correct. Notice that the tank P/T and the collector PRV. Note – pictures in Figure 2-6 on the following pages show exactly the same thing.
Alternative materials and methods application – how do we proceed? When one looks at the above information, there should be a strong and convincing argument that a roof PRV is superior in safety and durability. Why? Safety – valve opening will occur 20 times less. All other properly installed components are designed to take temperatures in excess of the P&T. PRV is most stringent in cost. FSEC's manuals always show and verbalize PRV's only within the collector loop. Temperature never pops the valve when the system is isolated, it is always pressure. CE video (7 hours) indicates this. The relaxed gel in the probe causes premature openings and coupled with spring tension weakening the roof valve, if P&T, will open at below 150 degrees, causing daily spillage on roof. PRV is the only way to go.

FLORIDA SOLAR ENERGY CENTER®

*Creating Energy Independence*

# Resources - Solar Thermal Manual

This is the manual to be used in the State of Florida's Solar Contractor Test

**Design and Installation & Repair and Maintenance**

The intent of this manual is to equip the reader with the knowledge and skills needed to design, install, operate and maintain the most common types of solar water heating systems.

The manual presents an overview of solar thermal applications, provides basic information on the principles of solar energy, reviews solar thermal technologies, and provides detailed instruction on the safe, efficient installation of solar water heating and pool heating systems. The manual is divided into six sections, with each separated into individual modules.

The manual is broken down into various sections. For ease of downloading, these sections are provided below in PDF format. Go to Adobe© Acrobat© Reader™ to obtain a free version of the Reader™ that will enable you to open PDF files. These are large files, so be patient during the download.

Section 1: Solar Concepts provides an introduction, table of contents, and a basic understanding of solar thermal concepts.

Section 2: Solar Water Heating Systems focuses on what are commonly called solar domestic hot water systems, which heat water.

Section 3: System Installation covers the steps involved in installing a solar water heating system.

Section 4: Troubleshooting presents structured methods to follow in diagnosing and correcting solar water heating system problems.

Section 5: Solar Swimming Pool Heating Systems is devoted to solar systems that provide heat for swimming pools.

The Appendix includes the following

- Crome Dome Collector Siting Aid
- FSEC Simplified Sizing Procedures for Solar Domestic Hot Water Systems
- Electric Water Heater Circuitry
- Volt-Ohmmeter (VOM) or Multimeter Operation
- Solar System Flow Rates
- Tools for Service and Repair

Sec #2

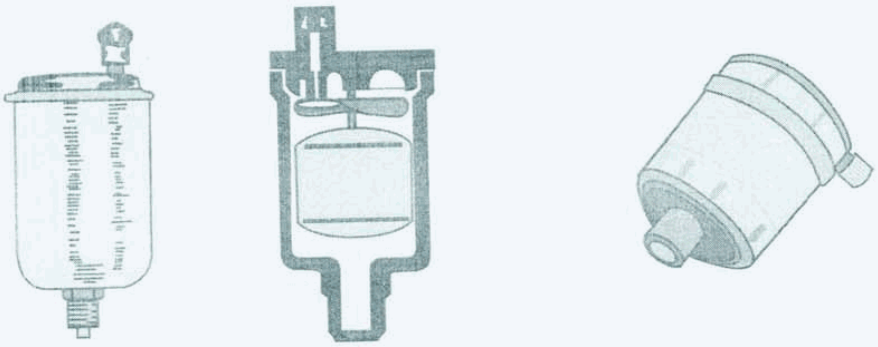

Figure 25 Air vent

## TEMPERATURE-PRESSURE RELIEF VALVE

A temperature-pressure relief valve is also called a pressure-temperature relief valve or P&T valve or T&P valve. These names are used interchangeably in the industry. This valve (Figure 26) protects system components from excessive pressures and temperatures. A pressure-temperature relief valve is always plumbed to the solar storage (as well as auxiliary) tank. In thermosiphon and ICS systems, where the solar tanks are located on a roof, these tanks may also be equipped with a temperature-pressure relief valve since they are in some jurisdictions considered storage vessels. These valves are usually set by the manufacturer at 150 psi and 210° F. Since temperature pressure relief valves open at temperatures below typical collector loop operating conditions, they are not commonly installed in collector loops. (See pressure relief valves below.) Temperature-pressure relief valves located inside a building must drain to the outside. If uncertain, follow local code requirements.

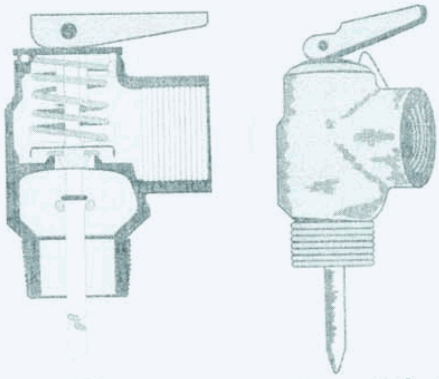

Figure 26 Pressure-temperature relief valve

Sec #2



## PRESSURE RELIEF VALVE

A pressure relief valve (Figure 27) protects components from excessive pressures that may build up in system plumbing. In any system where the collector loop can be isolated from the storage tank, a pressure relief valve must be installed on the collector loop. The pressure rating of the valve (typically 125 psi) must be lower than the pressure rating of all other system components, which it is installed to protect.

The pressure relief valve is usually installed at the collector. Because it opens only with high pressure, it operates less frequently than does a temperature-pressure relief valve. For this reason, it offers a higher degree of reliability and is the valve of choice for protecting the solar collector. Indirect systems typically use pressure-relief valves with even lower psi settings. Pressure relief valves located inside a building should be piped to discharge to a safe location.

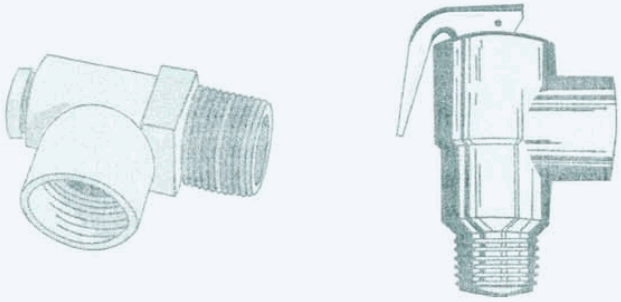

Figure 27 Pressure relief valve

## PRESSURE GAUGE

A pressure gauge (Figure 28) is used in indirect systems to monitor pressure within the fluid loop. In both direct and indirect systems, such gauges can readily indicate if a leak has occurred in the system plumbing.


Figure 28 Pressure gauge

If multiple collector arrays are used, an air vent should be installed on each array. The system must be piped to prevent air traps and allow for gravity draining (Figure 24).

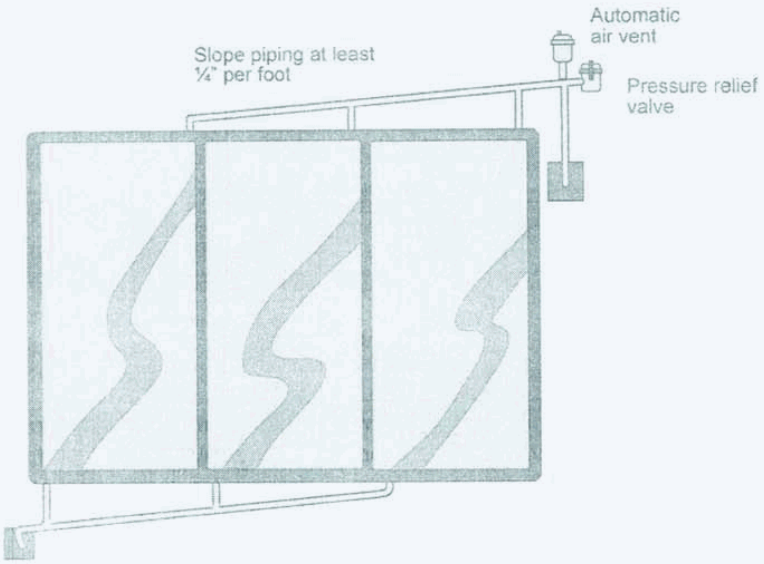


**Figure 24 Piped and vented collector array**

By code, a pressure relief valve is required in any portion of the system that can be isolated that contains a pressure producing fixture. For example, a circulating pump might have isolation valves so it can be removed for maintenance, but it is not considered a pressure producing fixture from the standpoint of the risk of bursting the system, so you don't need a pressure relief valve on this part of the system. However, the collector, or tanks with heater elements (connected or not), and even tankless water heaters are pressure producing fixtures, so if any can be isolated, there must be a pressure relief valve somewhere in that portion of the isolated loop that contain them. Most solar water heaters have the pressure relief valve for the collector loop installed at the collector. Special care should be taken to ensure the hot overflow from this valve does not come into contact with people or pets; some codes specify how this should be accomplished. The discharge pipe must be large enough to safely handle the overflow volume from indirect antifreeze systems, which usually operate at low pressure. Special low-pressure relief valves are often used on these systems.

## Piping Collector Arrays

Cover all roof piping with insulation. Protect the insulation from degradation through exposure to ultra violet (UV) light by completely covering it with UV-resistant paint, or metallic or vinyl tape. Painted insulation will need to be repainted periodically, as the paint will deteriorate over time.

Building and property owners will see no increase or decrease in the total cost of the solar system due to it's insignificant cost, initially. However, the property owner will not be required to pay for service calls, labor and materials that would have otherwise been necessary if a P&T, rather that a PRV, had been installed.

FSEC (The Florida Solar Energy Center) clearly states that a PRV (pressure relief valve) not a P&T (pressure and temperature relief valve) can be installed to protect the component parts in an isolated solar loop. See highlighted sections below on pages 3-18 (FSEC Solar Manual) makes more sense "By code, a pressure relief valve is required in any portion of the system that can be isolated that contains a pressure producing fixture." Local building departments are demanding that a P&T valve be installed. This requirement forces local contractors to install a device not recommended by FSEC nor the manufacturer of the system. The proposed code change above will allow the contractor to install per FSEC and manufacturers recommendations. FSEC is correct in that a PRV only should be installed in the loop. Installing a PRV meets all safety and durability requirements of the code and eliminates servicing the system which would be required if a P&T, not a PRV is installed in the solar loop.

*Collector Mounting*

If multiple collector arrays are used, an air vent should be installed on each array. The system must be piped to prevent air traps and allow for gravity draining (Figure 24).

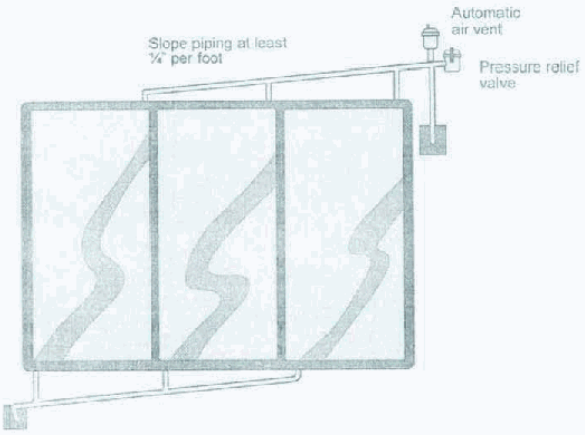


**Figure 24 Piped and vented collector array**

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