

WINDOW WALL WORKGROUP REPORT TO THE FLORIDA BUILDING COMMISSION



August 11, 2009

Melbourne, Florida

Facilitation, Meeting and Process Design By



CONSENSUS SOLUTIONS

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FLORIDA BUILDING COMMISSION

WINDOW WALL WORKGROUP REPORT

Overview and Project Scope

Raul L. Rodriguez, AIA, Chair of the Florida Building Commission, at the request of industry convened a Window Workgroup, charged with representing their stakeholder group's interests, and working with other interest groups to develop a consensus package of recommendations for submittal to the Florida Building Commission. The original scope and purpose of the Workgroup was to provide recommendations on how to provide building officials with needed information for conducting field inspections to ensure windows comply with the relevant wind pressure Code requirements. In addition, the workgroup was charged with considering issues related to window installation and water intrusion. The Workgroup developed consensus on a package of recommendations primarily related to the components and format for a supplemental label, to function as an inspection label, at the May 2006 meeting, and subsequent to the May meeting, window industry stakeholders requested an additional meeting and opportunity to reconsider the package of recommendations. The Chair agreed to reconvene the Workgroup and charged them with reviewing and deciding on the consensus recommendations, which were finalized in November of 2006 and delivered to the Commission in December of 2006, and implemented through the 2007 Code Update Cycle. In April of 2007, the Workgroup's scope was expanded to evaluate and develop consensus recommendations for a template for installation instructions submitted for product approval submittals. The Workgroup completed and delivered their consensus recommendations to the Commission in April of 2007.

At the April 2009 Commission meeting, Chairman Rodriguez announced that the Window Workgroup was renamed to the Window/Wall Workgroup, with the expanded scope of evaluating and developing recommendations regarding the window-wall interface (installation and water intrusion). The Workgroup is evaluating possible code amendments for the 2010 Florida Building Code.

Window/Wall Workgroup Members

Robert Amoruso, Chuck Anderson, Joe Belcher, Bob Boyer, Rusty Carrol, Jaime Gascon, Dale Griener, Jim Gulde, Jon Hill, John Jervis, C.W. Macomber, Dave Olmstead, Craig Parrino, Roger Sanders, Jim Schock, Steve Strawn, Jim Stropoli, Jim Westphal, Dick Wilhelm, and Dwight Wilkes.

REPORT OF THE AUGUST 11, 2009 MEETING

Opening and Meeting Attendance

The meeting started at 1:00 PM, and the following Workgroup members were present: Robert Amoruso, Chuck Anderson, Joe Belcher, Bob Boyer, Rusty Carrol, Herminio Gonzalez for Jaime Gascon, Dale Griener, Jim Gulde, John Jervis, Jeffrey Stone for C.W. Macomber, Craig Parrino, Jim Schock, Steve Strawn, Jim Stropoli, Jim Westphal, and Dwight Wilkes.

Members Absent

Jon Hill, Dave Olmstead, Roger Sanders, and Dick Wilhelm.

DCA Staff Present

Rick Dixon, Mo Madani, and Jim Richmond.

Meeting Facilitation

The meeting was facilitated by Jeff Blair from the FCRC Consensus Center at Florida State University. Information at: <http://consensus.fsu.edu/>



Project Webpage

Information on the project, including agenda packets, meeting reports, and related documents may be found in downloadable formats at the project webpage below:

<http://consensus.fsu.edu/FBC/wwg.html>

Agenda Review and Approval

The Workgroup voted unanimously, 16 - 0 in favor, to approve the agenda as presented including the following objectives:

- ✓ To Approve Regular Procedural Topics (Agenda and Summary Report)
- ✓ To Identify/Evaluate Code Amendment Options Regarding Windows and the Window/Wall Interface
- ✓ To Receive Update On Research and Identify Future Research Needs
- ✓ To Discuss Window/Wall Initiatives
- ✓ To Consider Public Comment
- ✓ To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

June 15, 2009 Facilitator's Summary Report Review and Approval

Jeff Blair, Commission Facilitator, asked if any members had corrections or additions to the June 15, 2009 Report, and none were offered.

The Workgroup voted unanimously, 16 - 0 in favor, to approve the June 15, 2009 Facilitator's Summary Report as presented.

Overview of Current Relevant Code Requirements

Mo Madani, Technical Unit Manager DCA Codes and Standards, provided members with an overview of current Florida Building Code requirements regarding the window/wall interface and answered members questions. The presentation is included as "Attachment 3" of this Report.
(Attachment 3—Current Code Requirements)

Identification and Evaluation of Code Amendment Options Regarding Windows and the Window/Wall Interface to be Addressed in the 2010 Florida Building Code

Members were asked to identify and evaluate options regarding Code amendments for the 2010 Code Update process regarding reducing water infiltration from the window wall interface. Options were evaluated using a four-point ranking scale where 4 = acceptable, 3 = minor reservations, 2 = major reservations, and 1 = unacceptable. Options ranked with a 75% or greater number of 4's and 3's in proportion to 2's and 1's shall be considered consensus draft recommendations. Following are options that achieved a consensus level of support as proposed code amendments:

- 1. Reorganize the code sections to split curtain wall from garage door requirements.*
- 2. Add requirement to Chapter One, plan review requirements, detail through wall penetrations for fenestrations for both commercial and residential plans.*
- 3. Include a standard detail for each type of installation and place in the code commentary.*
- 4. 106.3.5 Minimum plan review criteria for buildings. The examination of the documents by the building official shall include the following minimum criteria and documents: a floor plan; site plan; foundation plan; floor/ roof framing plan or truss layout; all fenestration penetrations; flashing; and rough opening dimensions and all exterior elevations.*

The complete results of the ranking exercise and a summary of comments is included as "Attachment 4" of this Report.
(Attachment 4—Options Ranking Exercise Results)

UF Window/Wall Research Update

Cory Salzano, ME, M2E Consulting Engineers, (for Forrest Masters, Assistant Professor of Civil and Coastal Engineering), provided members with a PowerPoint Presentation update on UF research projects being conducted by the UF Hurricane Test Lab regarding water infiltration and the window/wall interface and answered member's questions. Cory noted that 3 projects were evaluated: 1. water penetration resistance of residential window installation options for hurricane-prone areas; 2. comparison of wind-driven rain test methods for residential fenestration; 3. water penetration resistance of field and factory muller units. The complete presentation may be viewed at the project webpage as follows:
<http://consensus.fsu.edu/FBC/wwg.html>

General Public Comment

Members of the public were invited to provide the Workgroup with comments.

There were no general public comments provided. Members of the public were provided opportunities spoke on each of the substantive discussion issues before the Workgroup.

Review of Workgroup Delivery and Meeting Schedule

The Workgroup's delivery and meeting schedule is as follows:

Workgroup appointed	4/8/09
Workgroup meetings	6/8/09
	8/09-10/09
Recommendations to Commission	12/09
Proposals for 2010 FBC submitted for adoption	3/10

(See 2010 FBC development schedule: 2010 Code Effective date is 12/31/2011)

Next Steps

The Workgroup will focus on other key initiatives as follows:

market incentive initiatives, installer training and certification initiatives, beyond code window performance initiatives, and research initiatives.

Adjourn

The Workgroup voted unanimously, 16 - 0 in favor, to adjourn at 5:00 PM.

ATTACHMENT 1

MEETING EVALUATION

Average rank using a 0 to 10 scale, where 0 means totally disagree and 10 means totally agree.

1. Please assess the overall meeting.

- 9.54 The background information was very useful.
- 9.54 The agenda packet was very useful.
- 9.77 The objectives for the meeting were stated at the outset.
- 9.23 Overall, the objectives of the meeting were fully achieved.

2. Do you agree that each of the following meeting objectives was achieved?

- 9.31 Evaluation of Code Amendment Options Regarding Windows and the Window/Wall Interface.
- 9.58 Update On Research and Identify Future Research Needs.
- 9.40 Discussion of Window/Wall Initiatives.
- 9.50 Identification of Next Steps.

3. Please tell us how well the Facilitator helped the participants engage in the meeting.

- 9.62 The members followed the direction of the Facilitator.
- 9.54 The Facilitator made sure the concerns of all members were heard.
- 9.69 The Facilitator helped us arrange our time well.
- 9.54 Participant input was documented accurately.

4. Please tell us your level of satisfaction with the meeting?

- 9.54 Overall, I am very satisfied with the meeting.
- 9.69 I was very satisfied with the services provided by the Facilitator.
- 9.33 I am satisfied with the outcome of the meeting.

5. Please tell us how well the next steps were communicated?

- 9.42 I know what the next steps following this meeting will be.
- 9.33 I know who is responsible for the next steps.

6. What did you like best about the meeting?

- How the facilitator ran the meeting and kept everyone focused on the issues.
- Facilitator and other participants are excellent.
- Variety of participants skill and experience.
- I thought the meeting was very productive.
- It was scheduled during the FBC meeting.
- Good discussion on important issues.

7. How could the meeting have been improved?

- Provide cookies and sodas at break time.
- Time.
- Smaller room with a dry erase board.
- Coffee.
- Too much on agenda. Caused a sense of rushing, could not complete agenda and many workgroup members had to leave before end of meeting.

8. Do you have any other comments that you would like to add?

- Jeff makes all the difference in running a great meeting. Keep it up!
- Well run, productive meeting.

ATTACHMENT 2
MEETING ATTENDANCE—PUBLIC

Public Meeting Attendance
Name
Jack Glenn
Jeffery Stone
Tom Kopec
Peter Thornton
Dennis Chappell
Jim Heise
Mavry Pinto
Frank O'Neil
Patricia Robinson
James Krahn
Michael LaFevre

ATTACHMENT 3
CURRENT WINDOW WALL CODE REQUIREMENTS

2007 Florida Building Code, Building

106.3.5 **Minimum plan review criteria for buildings.** The examination of the documents by the building official shall include the following minimum criteria and documents: a floor plan; site plan; foundation plan; floor/roof framing plan or truss layout; and all exterior elevations:

Commercial Buildings:

- 8. Structural requirements shall include:
 - Soil conditions/analysis
 - Termite protection
 - Design loads
 - Wind requirements
 - Building envelope
 - Structural calculations (if required)
 - Foundation

Wall systems

- Floor systems
- Roof systems
- Threshold inspection plan
- Stair systems

SECTION 109
INSPECTIONS

Residential (one- and two-family)

- 6. **Structural requirements shall include:**

Wall section from foundation through roof, including assembly and materials connector tables wind requirements structural calculations (if required)

1714.5.2.1 Testing and labeling. Exterior windows and glass doors shall be tested by an approved independent testing laboratory, and shall be labeled with an approved label identifying the manufacturer, performance characteristics and approved product certification agency, testing laboratory, evaluation entity or Miami-Dade Product Approval to indicate compliance with the requirements of one of the following specifications:

ANSI/AAMA/NWDA 101/I.S. 2 or 101/I.S. 2/NAFS or AAMA/WDMA/CSA 101/I.S. 2/A440 or TAS 202 (HVHZ shall comply with TAS 202 utilizing ASTM E 1300-98 or ASTM E 1300-02 or Section 2404).

1714.5.4 Anchorage methods. The methods cited in this section apply only to anchorage of window and door assemblies to the main wind force resisting system.

1714.5.4.1 Anchoring requirements. **Window and door assemblies shall be anchored in accordance with the published manufacturer's recommendations to achieve the design pressure** specified. Substitute anchoring systems used for substrates not specified by the fenestration manufacturer shall provide equal or greater anchoring performance as demonstrated by accepted engineering practice.

1714.5.4.2 Masonry, concrete or other structural substrate. Where the wood shim or buck thickness is less than 1 1/2 inches (38 mm), window and door assemblies shall be anchored through the main frame or by jamb clip or subframe system, in accordance with the manufacturer's published installation instructions. Anchors shall be securely fastened directly into the masonry, concrete or other structural substrate material. Unless otherwise tested, bucks shall extend beyond the interior face of the window or door frame such that full support of the frame is provided. Shims shall be made from materials capable of sustaining applicable loads, located and applied in a thickness capable of sustaining applicable loads. Anchors shall be provided to transfer load from the window or door frame to the rough opening substrate.

Where the wood buck thickness is 1 1/4 inches (38 mm) or greater, the buck shall be securely fastened to transfer load to the masonry, concrete or other structural substrate and the buck shall extend beyond the interior face of the window or door frame. Window and door assemblies shall be anchored through the main frame or by jamb clip or subframe system or through the flange to the secured wood buck in accordance with the manufacturer's published installation instructions. Unless otherwise tested, bucks shall extend beyond the interior face of the window or door frame such that full support of the frame is provided. Shims shall be made from materials capable of sustaining applicable loads, located and applied in a thickness capable of sustaining applicable loads. Anchors shall be provided to transfer load from the window or door frame assembly to the secured wood buck.

1714.5.4.3 Wood or other approved framing materials. Where the framing material is wood or other approved framing material, window and glass door assemblies shall be anchored through the main frame or by jamb clip or subframe system or through the flange in accordance with the manufacturer's published installation instructions. Shims shall be made from materials capable of sustaining applicable loads, located and applied in a thickness capable of sustaining applicable loads. Anchors shall be provided to transfer load from the window or door frame to the rough opening substrate.

1714.5.5 Mullions occurring between individual window and glass door assemblies.

1714.5.5.1 Mullions. Mullions or mullioned fenestration assemblies shall be tested by an approved testing laboratory in accordance with either AAMA 450, ASTM E 330, or TAS 202 (HVHZ shall comply with TAS 202), or shall be engineered in accordance with AAMA 450 using accepted engineering practice. Mullions tested as stand-alone units or qualified by engineering shall use performance criteria cited in Sections 1714.5.5.2, 1714.5.5.3 and 1714.5.5.4. Mullions qualified by an actual test of an entire assembly shall comply with Section 1714.5.5.4, except that mullions in assemblies requiring a deflection limitation, as defined in AAMA/WDMA/CSA 101/I.S.2/A440, shall meet Sections 1714.5.5.2 and 1714.5.5.3. Products not included within the scope of Section 1714.5.5.1 shall comply with Sections 1714.5.5.3 and 1714.5.5.4.

1714.5.5.2 Load transfer. Mullions shall be designed to transfer the design pressure loads applied by the window and door assemblies to the rough opening substrate.

1714.5.5.3 Deflection. Mullions shall be capable of resisting the design pressure loads applied by the window and door assemblies to be supported without deflecting more than $L/175$, where L is the span of the mullion in inches.

1714.5.5.4 Structural safety factor. Mullions that are tested by an approved testing laboratory shall be capable of resisting a load of 1.5 times the design pressure loads applied by the window and door assemblies to be supported. The 1.5 times the design pressure load shall be sustained for 10 seconds, and the permanent deformation shall not exceed 0.2 percent of the mullion span for assemblies requiring deflection limitations, as defined in AAMA/WDMA/CSA 101/I.S.2/A440 and 0.4 percent of the mullion span for all other assemblies after the 1.5 times design pressure load is removed. Mullions that are qualified by engineering shall be capable of resisting the design pressure loads applied by the window and door assemblies to be supported without exceeding the allowable stress of the mullion elements.

1714.7 Installation instruction for exterior windows and doors. Windows and doors shall be installed in accordance with the manufacturer's installation instruction.

2007 Florida Building Code, Residential

SECTION R613

EXTERIOR WINDOWS AND DOOR ASSEMBLIES

R613.3.1 Testing and labeling. Exterior windows and glass doors shall be tested by an approved independent testing laboratory, and shall be labeled with an approved permanent label identifying the manufacturer, the products model/series number, performance characteristics and approved product certification agency, testing laboratory, evaluation entity or Miami-Dade Product Approval to indicate compliance with the requirements of one of the following specifications:

ANSI/AAMA/NWDA101/I.S.2 or 101/I.S.2/NAFS or AAMA/WDMA/CSA 101/I.S.2/A440 or TAS 202 (HVHZ shall comply with TAS 202 utilizing ASTM E 1300-98 or ASTM E 1300-02).

R613.6 Anchorage methods.

R613.6.1 Anchoring requirements. Window and door assembly anchoring systems shall be tested to achieve the design pressure specified. Substitute anchoring systems shall provide equal or greater anchoring performance as demonstrated by accepted engineering practice. When provided, the manufacturer's published installation instructions for as tested or substitute anchoring systems can be used. In no case shall the anchorage exceed the spacing for the tested rated performance.

R613.6.1.1 Masonry, concrete or other structural substrate. Where the wood shim or buck thickness is less than 1 1/2 inches (38 mm), window and door assemblies shall be anchored through the main frame or by jamb clip or subframe system, in accordance with the manufacturers published installation instructions. Anchors shall be securely fastened directly into the masonry, concrete or other structural substrate material. Unless otherwise tested, bucks shall extend beyond the interior face of the window or door frame such that full support of the frame is provided. Shims shall be

made from materials capable of sustaining applicable loads, located and applied in a thickness capable of sustaining applicable loads. Anchors shall be provided to transfer load from the window or door frame to the rough opening substrate.

Where the wood buck thickness is 1 1/2 inches (38 mm) or greater, the buck shall be securely fastened to transfer load to the masonry, concrete or other structural substrate and the buck shall extend beyond the interior face of the window or door frame. Window and door assemblies shall be anchored through the main frame or by jamb clip or subframe system or through the flange to the secured wood buck in accordance with the manufacturers published installation instructions. Unless otherwise tested, bucks shall extend beyond the interior face of the window or door frame such that full support of the frame is provided. Shims shall be made from materials capable of sustaining applicable loads, located and applied in a thickness capable of sustaining applicable loads. Anchors shall be provided to transfer load from the window or door frame assembly to the secured wood buck.

R613.6.1.2 Wood or other approved framing material. Where the framing material is wood or other approved framing material, window and glass door assemblies shall be anchored through the main frame or by jamb clip or subframe system or through the flange in accordance with the manufacturer's published installation instructions. Shims shall be made from materials capable of sustaining applicable loads, located and applied in a thickness capable of sustaining applicable loads. Anchors shall be provided to transfer load from the window or door frame to the rough opening substrate.

R613.7 Mullions occurring between individual window and glass door assemblies.

R613.7.1 Mullions. Mullions, other than mullions which are an integral part of a window or glass door assembly tested and labeled in accordance with Section R613.3.1, shall be tested by an approved testing laboratory in accordance with AAMA 450 or be engineered in accordance with accepted engineering practice.

R613.7.1.1 Engineered mullions. Mullions qualified by accepted engineering practice shall comply with the performance criteria in Sections R613.7.2, R613.7.3, and R613.7.4.

R613.7.1.2 Mullions tested as stand alone units. Mullions tested as stand alone units in accordance with AAMA 450 shall comply with the performance criteria in Sections R613.7.2, R613.7.3, and R613.7.4.

R613.7.1.3 Mullions tested in an assembly. Mullions qualified by a test of an entire assembly in accordance with AAMA 450 shall comply with Sections R613.7.2 and R613.7.4.

R613.7.2 Load transfer. Mullions shall be designed to transfer the design pressure loads applied by the window and door assemblies to the rough opening substrate.

R613.7.5 Installation instruction for exterior windows and doors. Windows and doors shall be installed in accordance with ASTM E 2112 or in accordance with the manufacturer's installation instruction.

R613.8 Flashing, sealants and weatherstripping. Flashing and sealants for exterior windows and doors shall comply with Section R703.8.

R703.8 Flashing. Approved corrosion-resistant flashing shall be applied shingle-fashion in such a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. The flashing shall extend to the surface of the exterior wall finish. Approved corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

R613.8.1 All exterior fenestration products shall be sealed at the juncture with the building wall with a sealant complying with AAMA 800 and ASTM C 920 Class 25 Grade NS or greater for proper joint expansion and contraction, ASTM C 1281, AAMA 812, or other approved standard as appropriate for the type of sealant.

SECTION R616

PRESCRIPTIVE REQUIREMENTS FOR WINDOW INSTALLATION IN WOOD FRAME CONSTRUCTION

R616.1 General.

R616.1.1 The provisions of this section shall cover the installation of windows in buildings utilizing a membrane/drainage system of not more than three stories in height.

R616.1.2 The provisions of this section apply to windows which employ a mounting flange or fin that is attached and sealed to the window perimeter frame and is designed as an installation fastening appendage.

R616.1.3 The provisions of this section cover the installation process for the described windows and do not include fabrication techniques that would be required to joint individual windows to each other, either horizontally or vertically. It does not cover any other factory or field fabrication which joins or combines multiple windows. The instructions for mulling windows together and any accessories required must be supplied by the window manufacturer.

R616.1.4 The provisions of this section provide minimum requirements for window installation, based on current best practices. Actual conditions in buildings may vary. In cases where variations occur, the installer shall consult with the window manufacturer or registered design professional. If

the provisions of this section conflicts with the manufacturer's instruction, the manufacturer's instruction shall take precedence.

R616.2 Water resistance.

R616.2.1 Water-resistive barriers (WRB). The installation of the WRB shall be installed prior to the window installation. The application of the WRB involves covering the vertical surfaces of the wall, lapped, fastened, taped, and sealed per the WRB manufacturer's instructions. Penetrations through the WRB for the installation of windows shall be made pursuant to this standard by the window installer. Apply the WRB in water shedding fashion, starting at the base of the wall and working towards the top. Install the WRB to the face of the building framing or sheathing.

R616.2.2 Sealants. All gunable sealants shall comply with AAMA 808.5 (per AAMA 800) and ASTM C 920 Class 25 Grade NS or greater for proper joint expansion and contraction. If preformed tapes are used they shall meet ASTM C 1281 specification. Prior to using the sealants, the applicator shall seek input from sealant manufacturer for proper joint design, material compatibility, and sealant selection. Aerosol foam sealants shall perform to the AAMA 812 standard.

R616.2.3 Cladding application stucco and other cladding shall not be installed prior to window installation.

R616.2.4 Pre-installation.

R616.2.4.1 Pre-installation inspection. Prior to the installation of the window, an inspection of the WRB shall be made by the window installer to ensure that it has been installed in accordance with the WRB manufacturer's instructions. Any tears, penetrations, or defects within 12 inches past the rough opening area shall be sealed per the WRB manufacturer's instructions before the installation starts. Refer to ASTM C 755.

R616.3 Window installation procedures.

R616.3.1 Installation procedures.

R616.3.1.1 In the event that the WRB has not been modified the installer shall complete the following steps. Carefully cut the WRB in a modified "I" pattern per ASTM E 2112. A full "I" cut is also acceptable. Fold the bottom and side flaps over and behind the interior side of the framing. Attach the WRB into position on the inside of the rough opening, and trim any excess as required.

R616.3.1.2 At the head of the opening, starting at the top corner of the window (rough) opening, measure from the corner horizontal and then vertical a dimension equal to the roll width of the flashing to be applied, and make a mark. At a 45 degree angle, carefully cut the WRB on a diagonal. Repeat this step on the opposite corner. Gently raise the bottom edge of the flap created in the WRB up and temporarily tape the top corners and center to the exterior face of the WRB above. This is done in order to allow for installation of the window and head flashing later.

R616.3.2 Apply horizontal sill flashing material. If a rigid or semirigid sill pan system is used, apply sill flashing level with the top edge of the rough opening sill.

R616.3.2.1 Self-adhering flashing (SAF) is able to serve as both horizontal sill flashing and the sill pan with sufficient width. The SAF must cover the sill to at least the depth of the window plus 2 inches onto the face of the WRB drainage plane. Cut the sill flashing long enough to extend an equal distance beyond the rough opening width. Cut a length equal to the rough opening width plus two times the roll width of the jamb flashing. When mechanical flashing is used the minimum roll width shall be 9 inches, while SAF shall be a minimum of 4 inches.

R616.3.3 Install a rigid or semirigid sill pan system. The pan shall direct water to the exterior or to the membrane drainage plane for subsequent drainage to the exterior of the building. When the sill pan is made of metal and includes end dams, seal the sill pan into position, integrating the end dams with the WRB and the down turned leg of the sill pan with the flashing. SAF may also be used to seal the end dam to the WRB at the jamb condition.

R616.3.4 Inspect and clean the back side (interior surface) of the exterior window mounting flange. Look for any missing seals at the corner joinery. If corner seals are missing or need to be touched up, contact the window manufacturer for the recommended type of sealant to apply and then reapply as necessary.

R616.3.5 Apply a continuous 3/8-inch nominal diameter bead of sealant to the back surface (interior face) of the mounting flange of the window at the head and both jambs. Apply sealant in line with any prepunched holes or slots in the mounting flange. Connect that bead of sealant across any joinery on the window frame at all four corners. At an option, the sealant shall be permitted to be applied to the wall surface as opposed to the back of the mounting flange.

R616.3.6 Apply a discontinuous bead of sealant on the interior surface of the mounting flange at the sill. The bead of sealant is to have a minimum of two-inch voids near the ends, which will allow any liquid water that has entered the window opening to exit easily.

R616.3.6.1 As an alternate to the discontinuous bead of sealant, a weep screed or wicking mechanism may be applied at the jamb ends of the sill to allow liquid water to escape.

R616.3.6.2 Additionally, if a rigid or semirigid sill pan is used, apply a bead of sealant to the outboard side of the upturned leg of the pan where it will integrate with the interior side of the window and form an air/water seal.

R616.3.7 Immediately set the window into the opening. Hold the window temporarily into position and apply shims as required to ensure the window is set plumb, level, square and true. Fasten the window perimeter securely into position in accordance with the manufacturer's instructions. Install shims in such a manner that they will not interfere with the application of the air seal which will be applied on the interior side in the steps that follow.

R616.3.8 Flashing shall be applied over the mounting flange of the window at both jambs. Either SAF or mechanical flashing shall be permitted to be used in the following steps. When SAF is used, the additional bead of sealant over the mounting flange (see Section R616.3.8.2) shall be omitted.

R616.3.8.1 Cut the flashing to a measurement equal to twice the roll width of the flashing being used, plus the height of the rough opening, minus 1 inch.

R616.3.8.2 When mechanical flashing is used, apply a continuous 3/8-inch nominal diameter bead of sealant over the wall and the exterior face of the mounting flange, starting 8 1/2 inches above the rough opening continuing down the jambs to the bottom of the sill mounting flange. Apply in line with any pre-punched holes/slots in the mounting flange and cover any fastener heads.

R616.3.8.3 Position the top end of the flashing 1/2-inch below where the top edge of the head flashing will cover the jamb flashing later. Do not interfere with the WRB flap at the head. Tuck the top of the jamb flashing under the flap of the water-resistive barrier at the head.

R616.3.9 Apply a piece of flashing across the head of the rough opening. Either SAF or mechanical flashing may be used. Where SAF is used, the sealant over the mounting flange (see Section R616.3.9.3) shall be omitted.

R616.3.9.1 Cut a piece of head flashing that is the width of the rough opening plus two times the roll width of the flashing plus 2 inches.

R616.3.9.2 Apply primer to any exposed OSB as required by the flashing manufacturer.

R616.3.9.3 When using mechanically applied flashing, apply a continuous 3/8-inch nominal diameter bead of sealant along the mounting flange at the head. Apply the sealant in line with any prepunched holes or slots in the mounting flange and cover any fastener heads.

R616.3.9.4 Adhere the flashing across the head of the window on top of the mounting flange and beyond the rough opening on each side extending it 1 inch over the outside edge of the flashing at the jambs. Fasten the mechanically applied flashing as needed.

R616.3.10 Remove the previously applied tape which holds the flap of the WRB at the head. Allow the flap to lay flat over the head flashing. Apply a new piece of sheathing tape over the entire diagonal cut made in the WRB. The tape should be compressed against the WRB and the head flashing, which extends over the jamb.

R616.3.11 On the interior, the installer shall apply a backer rod and an interior perimeter bead of sealant or other window manufacturer approved material between the window and the rough opening on all sides to form an air seal. If a rigid or semirigid sill pan was used, recheck the seal between the sill of the window and the upturned leg of the sill pan and reseal as needed.

R616.3.11.1 In cases where shims cause interference with the application of the backer rod or sealant, trim excess shim material to allow for a continuous air/water seal. In all cases, make sure the entire perimeter joint has been sealed, creating an air/water-tight condition.

R616.4 Post installation procedure drainage holes shall be inspected for blockage and freed of any obstructions to allow drainage.

ATTACHMENT 4
OPTIONS RANKING EXERCISE RESULTS

The Window/Wall Workgroup is charged with evaluating and developing recommendations regarding the window-wall interface (installation and water intrusion).

1. 2010 Code Amendment Proposals

Format

Reorganize the sections to split curtain wall from garage door requirements.

	<i>4=acceptable</i>	<i>3= minor reservations</i>	<i>2=major reservations</i>	<i>1= not acceptable</i>
<i>Initial Ranking</i> <i>8/11/09</i>	14	1	0	0
<i>Revised</i>	15	0	0	0

Comments and Reservations (August 11, 2009):

JB: What is issue? Answer: curtain wall is currently placed in garage door section

DW: Should go further. Separate, but add section for just flashing of door and windows.

Create separate section of code for all flashing of windows and doors requirements

	<i>4=acceptable</i>	<i>3= minor reservations</i>	<i>2=major reservations</i>	<i>1= not acceptable</i>
<i>Initial Ranking</i> <i>8/11/09</i>	4	10	1	0
<i>Revised</i>	0	2	5	4

Comments and Reservations (August 11, 2009):

DW: code has several sections which is confusing, so one location would help clarify.

SS: flashing is a finishing detail and shouldn't be in Chapter 6, move to appropriate chapter.

DW: take out of structural and put in wall.

CP: want to see language before voting in favor of this concept.

JS: prefer to keep the ICC format.

CA: might be redundant to copy language from reference documents in the code, reference to the standard approach may be easier for future.

DG: changed vote on second vote because we need to maintain ICC codes format.

Installation Instructions/Standards

Consider adopting the FMA/AAMA prescriptive installation documents by reference.

	<i>4=acceptable</i>	<i>3= minor reservations</i>	<i>2=major reservations</i>	<i>1= not acceptable</i>
<i>Initial Ranking 8/11/09</i>	2	6	3	4

Comments and Reservations (August 11, 2009):

MM: are these available yet?

CA: 100 is available, 200 ballot is still out on this now for modifications to original expected to be complete by December 2009.

JB: masonry industry has opposed some issues in standards, not available yet, will oppose requirement of putting something between stucco and block.

CP: 100 is for frame and 200 is for masonry walls, my negative vote is for masonry requirement.

JB: his comments and vote were relative to masonry also.

Members agreed to split out 100 and 200 and discuss/rank separately.

Consider adopting the FMA/AAMA 100 (wood frame) prescriptive installation documents by reference.

	<i>4=acceptable</i>	<i>3= minor reservations</i>	<i>2=major reservations</i>	<i>1= not acceptable</i>
<i>Initial Ranking 8/11/09</i>	2	8	5	0

Comments and Reservations (August 11, 2009):

JS: need to identify edition of the standard if added to code.

Jim Krahn: 100 and 200 are AMMA and FMA, there is a FMA/WDMA 250, will be 300 series for door installation. 250 is for mounting flange windows in CMUs.

CP: can't support this because haven't reviewed latest version of document.

DG: need to have more precise recommendations and need to review the document first.

JJ: Code already has 616 sequence and adding 100 would be redundant, would need to remove if use as reference standard.

Consider adopting the FMA/AAMA 200 (masonry frame) prescriptive installation documents by reference.

	<i>4=acceptable</i>	<i>3= minor reservations</i>	<i>2=major reservations</i>	<i>1= not acceptable</i>
<i>Initial Ranking 8/11/09</i>	0	8	2	5

Comments and Reservations (August 11, 2009):

JJ: document depends on unsustainable precision of wall openings (in field).

JB: believes you can get masonry opening within tolerances given, put dimension requirements and inspection in code last time and will pursue plan review next time

JJ: code and FMA document have different field tolerance requirements.

Review new AMMA standards for window installation for reference into the code.

Members agreed standards have to be complete before considering.

Consider including Jacksonville installation in the code.

	<i>4=acceptable</i>	<i>3= minor reservations</i>	<i>2=major reservations</i>	<i>1= not acceptable</i>
<i>Initial Ranking 8/11/09</i>	0	8	5	3

Comments and Reservations (August 11, 2009):

Members agreed this could be re-evaluated once the documents is sent and reviewed.

JS: specification is for wood frame with stucco, Jacksonville window industry is proposing to run stucco to flange, grooving and finishing.

DW: First Coast BOAF original flashing detail was based on 2112.

Jeff S: don't know much about it.

DW: this is not needed.

CA: word description of the stucco stop and gap.

Would adoption of inspection checklist for window installation be a helpful addition to the code.

	<i>4=acceptable</i>	<i>3= minor reservations</i>	<i>2=major reservations</i>	<i>1= not acceptable</i>
<i>Initial Ranking 8/11/09</i>	1	0	5	9

Comments and Reservations (August 11, 2009):

DG: concern with checklist in code.

Require installation sealant details for product approval to cover masonry, Stucco and wood installations.

	<i>4=acceptable</i>	<i>3= minor reservations</i>	<i>2=major reservations</i>	<i>1= not acceptable</i>
<i>Initial Ranking 8/11/09</i>	0	4	2	9

Comments and Reservations (August 11, 2009):

JS: some manufacturers installation specifications are not adequate but code defers to them.

SS: manufacturers requirements should generally apply, but they don't work for all instances.

Manufactures must state on their product approval compatible wall systems with proper installation drawings.

Members agreed this option is outside scope of Workgroup.

Standards referenced in the codes must be readily available.

Members agreed this is already required.

Evaluation agencies instructed not approve installation details not allowed by the Code

Comments and Reservations (August 11, 2009):

JS: problem is some think installation specifications apply to flashing also.

Members agreed to send to PA for review, outside scope of the Workgroup.

Consider developing a default fastener schedule

Comments and Reservations (August 11, 2009):

CA: these do not preempt manufacturers specifications but could provide a default schedule.

SS: too many different window configurations and substrates to be practical.

DG: since schedule would be based on worst case, the table would rarely be used.

CP: good concept, but when came up previously decided one size fits all not good.

DW: too complex.

Ken: another problem is cantilever effect on fasteners.

CA: *Withdrew proposal.*

Consider requiring 2-by bucks in masonry openings

	<i>4=acceptable</i>	<i>3= minor reservations</i>	<i>2=major reservations</i>	<i>1= not acceptable</i>
<i>Initial Ranking</i> <i>8/11/09</i>	0	1	8	5

Comments and Reservations (August 11, 2009):

CA: 2x buck would give you same substrate to attach window to as it was tested in.

JB: I disagree.

CP: 1x bucks have been used due to other problems created by using 2x bucks.

Prescriptive Requirements

Require a stucco stop to keep stucco off window frame.

Members agreed to consider at the next meeting.

Send Chuck’s information to members.

Installation details should provide the correct detail regarding not having stucco in contact with window frame.

Members agreed to consider at the next meeting.

Installation requirements should include ensuring there are good options to trim and service the system later.

Comments and Reservations (August 11, 2009):

Members agreed this was not an option to rank.

CA: need to be able to replace sealant.

CP: need to have installation that can be later serviced.

JS: trim is covering sealant causing problem.

CP: concern is any new and different install technique be evaluated for ability for later removal and repair

Add head flashing requirement for through wall flashing.

Comments and Reservations (August 11, 2009):

Members agreed this was not an option to rank.

Is this specific to frame?

Not comfortable with what is being asked here.

Add requirement to Chapter one, plan review requirements, detail through wall penetrations for fenestrations for both commercial and residential plans.

	<i>4=acceptable</i>	<i>3= minor reservations</i>	<i>2=major reservations</i>	<i>1= not acceptable</i>
<i>Initial Ranking 8/11/09</i>	4	10	0	0

Comments and Reservations (August 11, 2009):

JS: nothing yet in code that deals with penetration and flashing so need something code officials can inspect.

JB: is limiting to fenestration products ok?

Add language for window maintenance in the chap 16 voluntary part of Existing Building Code.

This option was withdrawn.

Comments and Reservations (August 11, 2009):

DG: Maybe language in Existing Bldg Code to address this. Maybe it is an education process for public

JB: urge caution; 2004 storms showed the newer buildings had problems more than multi-painted older buildings; Chapter 16 added to FBC, Existing for voluntary only.

CP: classify as significant problem; not building code though; furthering education should be Commission initiative; good thing to do.

JS: doesn't hurt to have instructive language in code under "repairs". Should be in non-mandatory part of the code.

JB: should be in Chapter 16 instead of Repairs.

JR: problems with putting in code.

DW: ASTM E 2112 speaks to requirement for installing window in way it can be maintained

DG: this is more of an education process than code, withdraw as an option.

Put snippet in code that owner must get manufacturers documents on maintenance.

DG: there is no way to enforce that owner gets such information.

JS: move this suggestion under installer certification perhaps, instead as a code option.

SS: manufacturer's websites have information on maintenance already.

Discuss the use of three sided sill pans under sills.

	<i>4=acceptable</i>	<i>3= minor reservations</i>	<i>2=major reservations</i>	<i>1= not acceptable</i>
<i>Initial Ranking 8/11/09</i>	0	0	0	14

Comments and Reservations (August 11, 2009):

CA: there is no reason to put this in the code.

JB: agree with CA, no reason to put in code.

Include a standard detail for each type of installation, should be placed in the code commentary.

	4=acceptable	3= minor reservations	2=major reservations	1= not acceptable
Initial Ranking 8/11/09	7	6	0	0

Comments and Reservations (August 11, 2009):

JS: someone needs to have responsibility for the design/installation specifications. The problem is residential.

JS: a picture is worth thousand words. Add picture to go with the requirements currently in code.

RC: where do you stop if you start this?

JB: good idea for a commentary, perhaps window industry could develop one. Building departments would want an A or E detail for anything not in drawings included in the code.

MM: building department would not allow anything but what is in the drawings.

DW: a few details on windows would not overload code, e.g. look at details for rebar installation that are in current code.

RC: would consider putting comment in commentary type format.

DG: belongs in commentary. Agrees with JB.

JS: propose adding installation details and they should be placed in code commentary.

106.3.5 Minimum plan review criteria for buildings. The examination of the documents by the building official shall include the following minimum criteria and documents: a floor plan; site plan; foundation plan; floor/roof framing plan or truss layout; all fenestration penetrations; flashing; and rough opening dimensions and all exterior elevations.

	4=acceptable	3= minor reservations	2=major reservations	1= not acceptable
Initial Ranking 8/11/09	8	4	1	0

Comments and Reservations (August 11, 2009):

RC: still have to have design drawings so should be no problem requiring this in code; would add rough opening size to requirement too.

DW: should add through wall penetrations also.

CA: possibly use “flashing” and “sealing” .

Inclusion of verbiage to require job-specific installation instructions to accompany each window and door, and make access to instructions easier and more assured.

Section R613.1, be amended to read: “Windows shall be installed and flashed in accordance with the manufacturer’s written job-specific installation instructions. Written job-specific installation instructions shall be provided by the manufacturer for each window”.

	4=acceptable	3= minor reservations	2=major reservations	1= not acceptable
Initial Ranking 8/11/09	1	1	3	9

Comments and Reservations (August 11, 2009):

SS: this can’t be done.

JJ: architects are doing this now. Prescriptive in code won’t work. Need alternative.

CA: manufacturer's stocking makes this difficult. Architects or engineers of record should be responsible.

JB: I agree with CA.

Inclusion of Structural, Free-Foam PVC as an acceptable buck material for CMU construction.

Section R613.6.1.1 states, in part: “Masonry, concrete or other structural substrate. Where the wood shim or buck thickness is less than 1-1/2 inches (38mm), window and door assemblies shall be anchored through the main frame or by jamb clip or sub-frame system, in accordance with the manufacturers published installation instructions.” Tends to limit interpretation that the buck system needs to be wood. Either removing the wood reference or adding “Structural Free Foam PVC”.

Comments and Reservations (August 11, 2009):

This option was withdrawn.

JJ: reason is for ability to make a curved buck. Suggest removing word “wood”.

JB: would this allow for other than curved use?

CP: is intent to allow only for bucks for less than 1.5 inch?

JJ: no, should be allowed for sealing any buck opening.

CP: what about through fastening, will it cause fastener problems?

JJ: maybe should limit to some maximum spacing.

MM: this is a product and should not be in the code.

JB: the concept is good, but need to know more.

RC: would support "or other approved materials".

DG: I agree with the concept, but object to removing “wood” from the code. Should say "or other approved material".

Do the same in other parallel sections.

Acceptance of visco-elastic foam tape as equivalent to materials and methods currently used for weatherproofing window wall joints. (aka impregnated acrylic foam tape).

Comments and Reservations (August 11, 2009):

This option was withdrawn.

JJ: recommend use of this in retrofits. Concern is it doesn't meet definition of flashing which may prevent its use.

CA: struggle with expandable foams.

JJ: this is not an injectable foam. It has been well tested in Europe

MM: is this used as a sealant or flashing

JJ: in Europe it replaces flashing and sealing.

Maybe this should be included in testing done here.

JJ: there are only European standards.

JB: discussion on how to get PA.

MM: maybe submit for evaluation to acceptance criteria of ICC or evaluation entity.

JJ: if manufacturer included this in its installation specifications would that be acceptable to code?

DG: the code has covered this and it is up to Building Official to apply the alternative method approval approach.

Visco elastic foam weather sealing “tapes” need to be made acceptable for use in CMU (and other) installations governed by the Florida Building Code and cannot be held contrary to in-place definitions for Flashing, Insulation and Vapor Retardant, etc. while it’s maybe contrary to their definitions, it performs these functions in field application.

Options:

1. Grandfather-in the applicable European standards and tests cited as equivalencies.
2. Field Test as part of the on-going testing performed at UF to demonstrate performance.
3. Create code language to be inserted in appropriate Code Sections to create de facto or implied code approval.

How can aging problems be addressed? Previous discussion indicated some of the issue is improper design and part is ineffective maintenance.

Members agreed there was no reason/need to rank this.

TESTING AND EVALUATION

Develop an acceptable level of leakage for window/wall assembly tests.

Members agreed this is a research issue.